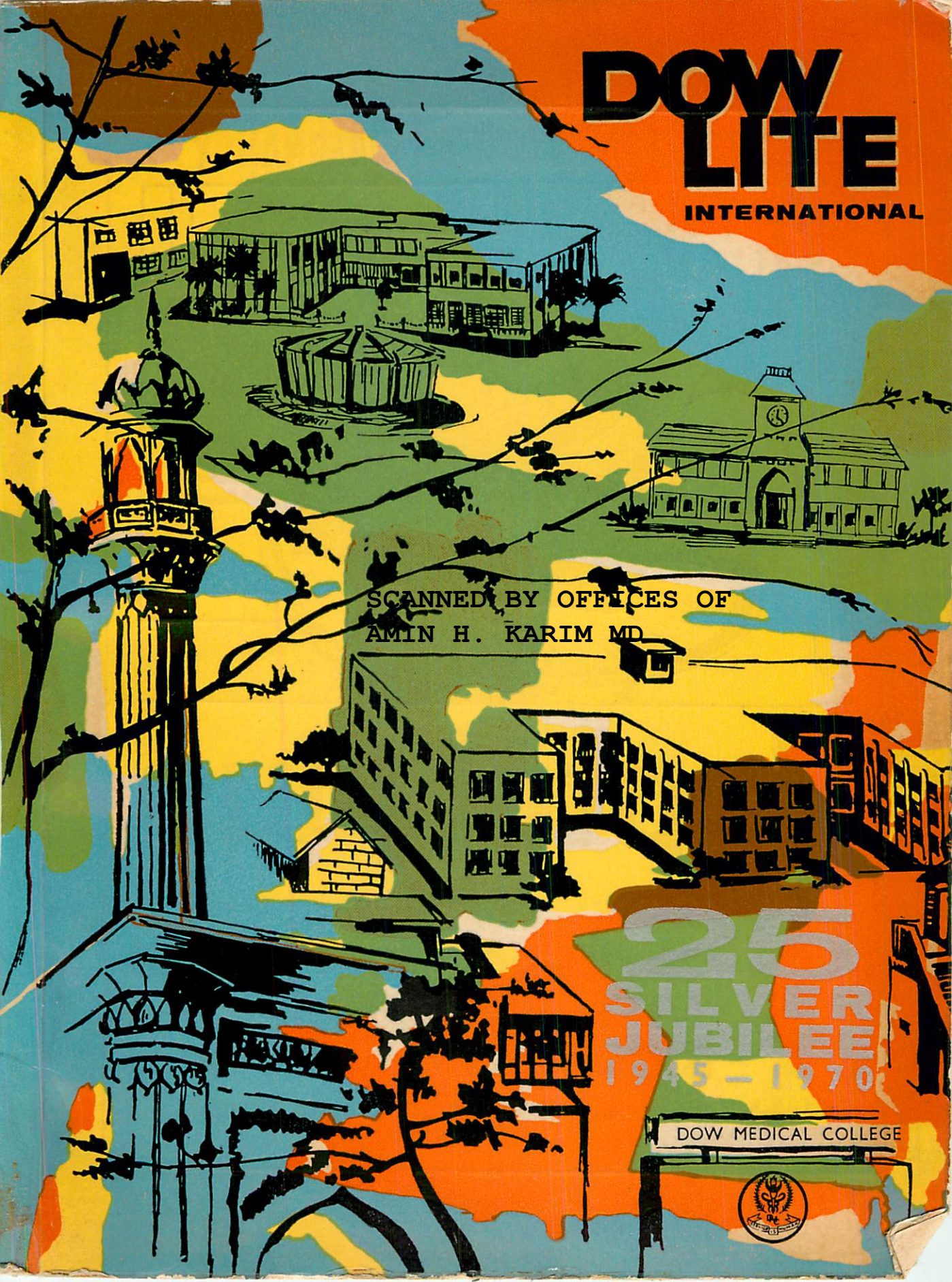
DOW
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INTERNATIONAL
SCANNED BY OFFICES OF
AMIN H. KARIM MD
25
SILVER
JUBILEE
1945 — 1970
DOW MEDICAL COLLEGE


بسم الله الرحمن الرحيم
عثمان طارق

On the auspicious occasion of our Alma-Mater's Silver Jubilee (1945-46 - 1970-71), the Chairman and the Editor of Dowlite take the pleasure of presenting the Jubille Edition of DOWLITE INTERNATIONAL to the readers.

Every thing has been done to make this issue worthy of the occasion.

It is hoped that the Magazine comes upto the expectations of all.

Editor & Magazine Secretary
Dow Medical College Students' Union

PATRON

Prof. ABDUL WAHID

MS (Anat), MS. (Surg), FICS.

Chairman Magazine Section

Prof. FAZAL ELAHI

F.R.C.S.;. F.I.C.S.;F.A.C.S.

Chairman Writers' Forum

Surg. M. R. SHIRAZI

(M.R.C.S.; L.R.C.P.;)
M.B.,B.S. (Lon); F.R.C.S. (Ebin)

CHAIRMAN, PHOTOGRAPHY ARTS & CRAFTS SOCIETY

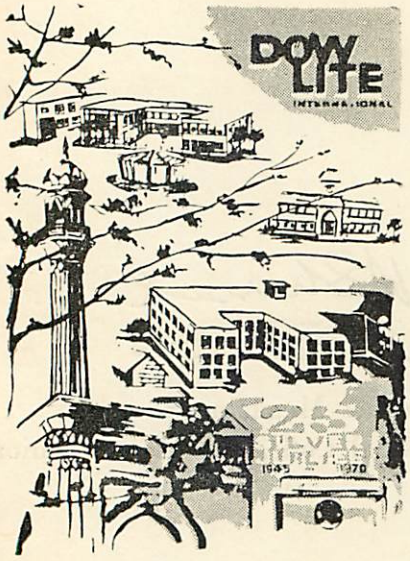
Dr. NUSRAT ALI SHAIKH

(M.B.,B.S. F.R.C.P.)

Editor & Magazine Secretary

HASHEM SHARIAT

Final Year M.B.,B.S.

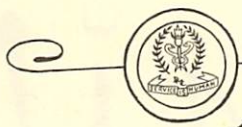


TITLE COVER

Top, left the Hospital with its Auditorium in front. In the right foreground the old College Building while in front of it, is the new College, built in 1945. On the left side is the College Mosque.

The individual Articles Published in this Dowlite, in no way, necessary represent the views of the members of the Editorial Board and the Editor.

DOWLITE



International

1945 1970

Silver Jubilee

Dow Medical College

Karachi


بسم الله الرحمن الرحيم
ومن يؤت الحكمة فقد أوتي خيرا كثيرا
البقرة ٢٦٩

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granted wisdom hath
been given abundent
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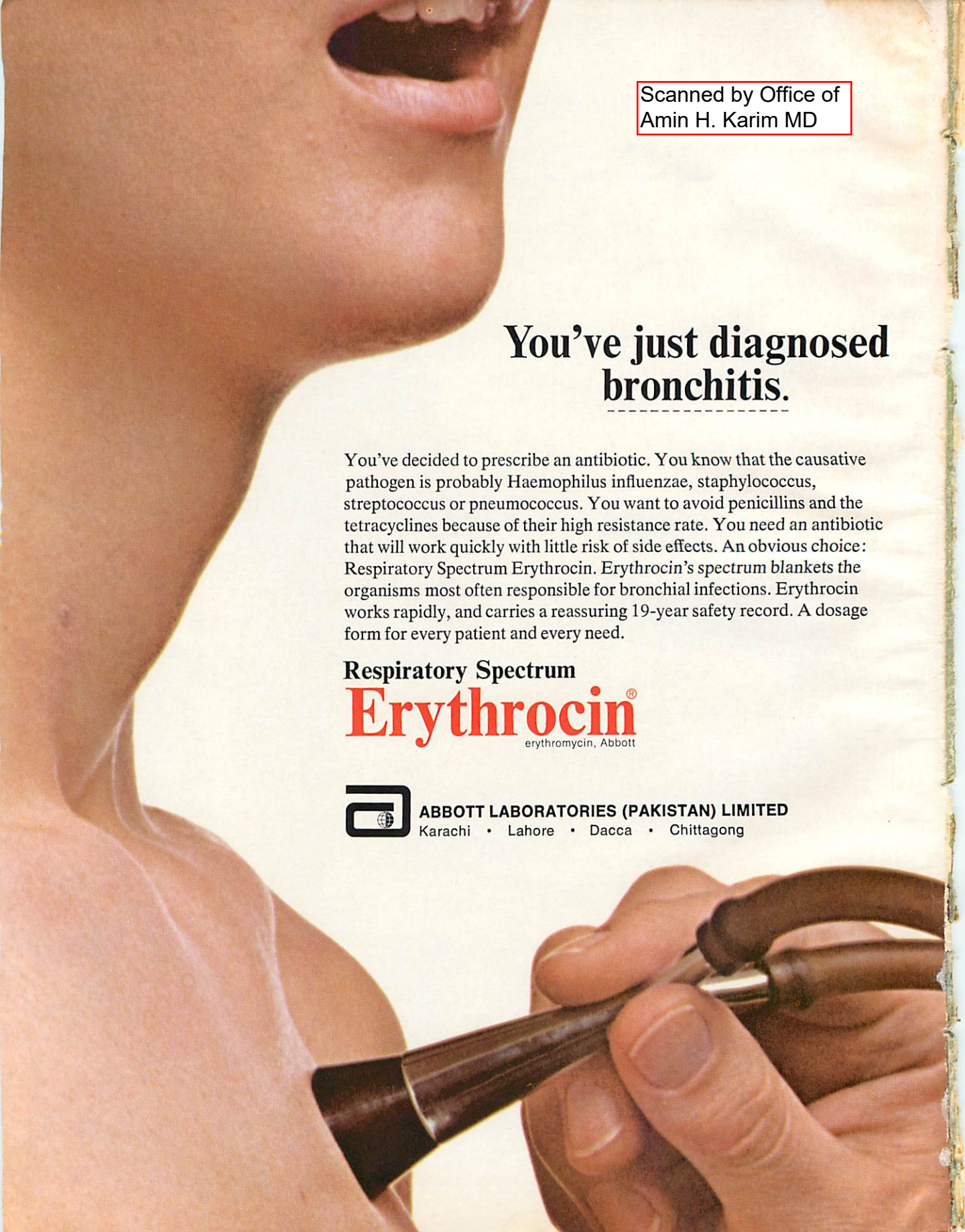

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QUAID-E-AZAM MOHAMMAD ALI JINNAH

National Consolidation

"Islam has taught us this, and I think you will agree with me that whatever else you may be and whatever you are, you are a Muslim. You belong to a Nation now; you have now carved out a territory, vast territory, it is all yours; it does not belong to a Punjabi or a Sindhi, or a Pathan, or a Bengali; it is yours. You have got your Central Government where several units are represented. Therefore, if you want to built yourself into a Nation, for God's sake give up this provincialism. Provincialism has been one of the curses, and so is sectionalism— Shia, Sunni, etc.'

Quaid-i-Azam Mohammed Ali Jinnah.

Governor of Sind

Lt. Gen. RAKHMAN GUL
S. Pk., SQA., Sk., MC.

MESSAGE

I AM glad to learn that the Dow Medical College, Karachi, is celebrating its Silver Jubilee Year in December, 1970.

The Institute, indeed, has rendered commendable services in the field of medical education, despite the fact that it was the solitary college, on the eve of the partition of the Himalayan sub-continent, that provided doctors for the sourthern part of the western wing of the infant state of Pakistan.

The medical profession is one of the noblest pursuits which win profound respect and admiration as it opens new venues of service to humanity and its humane approach towards the ailing people is certainly praiseworthy.

There is a great dearth of medical men in rural area. I hope, the young doctors, after completing their education, will spread out themselves in our villages and will serve, with missionary zeal, their brethren in distress, irrespective of territorial and financial considerations.

I congratulate the promoters of the Annual Magazine, "Dowlite International", on this auspicious occasion and wish them all the successes in their venture.

I trust that the Silver Jubilee Annual may prove to be a compendium of medical know-how for the students of medicines and surgery.

Lt. GEN. RAKHMAN GUL,

S. Pk., SQA., SK., MC.

MESSAGE

I AM glad that you have remembered me on this auspicious occasion of the celebration of 25th Anniversary of Dow Medical College, Karachi. I feel delighted to be associated with it, because, as you may be aware, being Health Minister in those days, I have been closely connected with the affairs and development of this institution when it was transferred from the Government of Sind in July, 1951. Soon after it was taken over by the Central Government, a grant of over Rs. 43 lakhs was sanctioned for its development out of two year priority social uplift programme initiated by the first Prime Minister of Pakistan, the Late Shahid-e-Millat Liaquat Ali Khan. The College started only with 44 seats in 1945-46 and they were increased to 130 from its 1951-52 session. Soon thereafter the condensed M.B.B.S. Course classes were also started in this institution. I, therefore, feel proud when I learn of the continued progress of the College.

Your College is one of the Medical College that Pakistan inherited and has played a vital role in providing the much needed medical cover to the people. It has also been a pioneer in promoting education in Pharmacy by starting Diploma in Pharmacy Classes in 1954. I hope that Dow Medical College, located in a place which has the distinction of being the birth place of the Founder of Pakistan and situated in the biggest city of Pakistan, will set traditions for medical profession and become a foremost Institution worthy of the largest Muslim country and a progressing nation.

I wish you all success in your celebrations and will always look forward eagerly to the onward march of your College.

30-1-71

(A. M. MALIK)
Minister.

Message

I understand that the Dow Medical College Students' Union (Magazine Section) in publishing the silver jubilee number of their annual magazine DOWLITE to commemorate the silver jubilee of the College. The editor has made a special effort to present material regarding the history of the college which has rendered valuable service in medical education. Many students belonging to this city, this province, Pakistan and several friendly countries are amongst its alumni. It is befitting that the students of the college should record their appreciation of their alma mater through a special edition of DOWLITE. I am convinced that this effort will be instrumental in enlightening the members of the college and others with the history of the college and the contribution that it has made to the cause of medical education.

I. H. Qureshi

(I. H. QURESHI)
(S. Pk., Ph. D. (Cantab)
Vice-Chancellor.
University of Karachi.

OUR PATRON

Professor Abdul Wahid

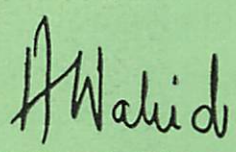
MS. (Anat), MS (Surg.) FICS
Patron, Students' Union & Administrator.
Dow Medical College, Karachi.

MESSAGE

THE comparison of ourselves with the students of other nations is an important adjunct to the available educational facilities for us locally. One of the methods to know about fellowmen of this little world is to write and read about each other. It is most befitting at this time to sart this medium of communication which shall serve to acquaint the students of the friendly countries in the first instance and others as well about our trends, standards and calibre. Such a literature is going to stimulate a sense of reciprocity and we are bound to receive foreign literature in return. This will enable us to teach as well as learn in a very broad manner.

It is, no doubt, a very difficult task that we are undertaking and we hope to gain and maintain a respectable status for our scholarship. There are many traditional things that should not be hidden from the outside world even if for nothing more than to get healthy criticisms and advice for improvements. At the same time there may be some facts which might have been due to very extra-ordinary circumstances, which may not be significant for reporting as they might create a feeling among the readers that they are customary in the country.

Mr. Hashem Shariat, our Magazine Secretary, deserves our appreciation and congratulations for having brought out this Magazine. I wish him all success.



PROF.A. WAHID

MS. (Anat), MS (Surg), FICS

Patron, Students' Union and, Administrator,
Dow Medical College, Karachi.

Our Chairman

Professor : FAZAL ELAHI

F.R.C.S.; F.I.C.S.; F.A.C.S.

FOREWORD

THE Publication of the Silver Jubilee Number of DOWLITE is a matter of great pride and pleasure for everybody concerned with Dow Medical College, Karachi. In the short period of 25 years this fledgling has grown to the size of a giant. In 1945 there were total number of 44 students and now 1970-71 there are 1101 students.

In 1945, 44 students were admitted to First Year-In 1970-71, 224 students were admitted to First Year.

In 1950 first Batch of Dow students passed among whom there were 9 males and 3 females thus that was a batch of 12 graduates I am proud of having tought that batch which has produced many outstanding doctors.

Till 1970 Dow Medical College has produced 1760 male doctors and 527 female doctors thus a total number of 2287 doctors.

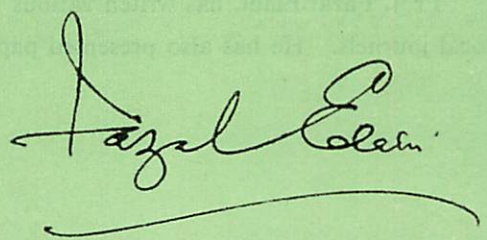
Looking back on my 23 long years of association with Dow Medical College as a teacher, I get a sense of satisfaction and joy when I visualise the growing ranks of young medicos filing through the portals of this College; growing not only in number but also in their brilliant achievements. The students of this College have been second to none in the fields of academic learning and dedication to duty, as well as in sports, cultural, literary and other extracurricular activities. Many of them are now shining like bright stars in the four corners of the globe.

The Journal of Dow Medical College has also grown in stature with the institution. It has been solely due to the selfless services of bands of dedicated and brilliant young men and women medicos, who, in the face of great difficulties and ordeals, kept the Journal going and progressing. The torch has been carried with pride and distinction. It is my prayerful conviction that, *Inshallah*, this relay will never deviate or decline.

I shall take this opportunity to humbly suggest that arrangements should be made to preserve permanently the various outstanding achievements of students and staff of this college, a record of memorable events and the dreams and aspirations of the Alma Mater in the shape of a museum or library to cherish the memories and to act as a beacon for the posterity. We must preserve "The footprints in the sand of time" for the future historian.

I wish to congratulate all those who have contributed articles of such high standard to the Journal. Lastly I wish to congratulate the Magazine Secretary, Mr. Hashem Shariat and his associates, through whose efforts this excellent publication is presented. He admirably overcame the burdles of time, money, space and sometimes inevitable set backs even at the cost of his personal comfort and studies. We salute such dedication.

With thanks giving for the past and best hopes for the future:



PROFESSOR FAZAL ELAHI
F.R.C.S.; F.I.C.S.; F.A.C.S

PROFESSOR FAZAL ELAHI

M.B., B.S.; D.T.M. & H. (Eng.); F.R.C.S. (Edin); F.I.C.S; F.A.C.S.,
Professor of Surgery Unit II
Dow Medical College, Civil Hospital Karachi

Professor Fazal Elahi was born on 5th of January 1925 in distric Lucknow, India, from where he did his primary and secondary education, and then graduated his M.B.,B.S. from King George's Medical College, Lucknow in 1947. He was awarded Gold and Silver medals, for having honours in Anatomy, Pharmacalog and Pathology. Was awarded Prize of best Muslim student. Having a brilliant medical career, he was University Scholarship holder in all the academic years. He was member of his college tennis club.

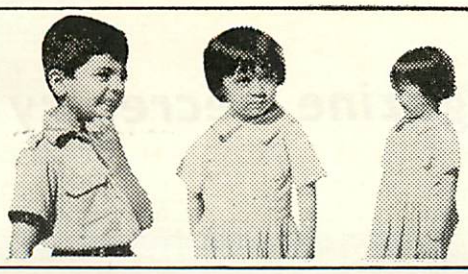
On partition, he migrated to Pakistan and joined Dow Medical College as demostrator in Pathalogy from 1948-50.

Prof. Fazal Elahi left for U.K. in 1950 for his postgraduation. He was of the first batch of British Council Scholar, from Pakistan. in 1950. He obtained his D.T.M. &H from London School of Hygiene and Tropical Medicine in 1951 and his fellowship F.R.C.S. from Edinburgh in 1953. Later in 1960 was honoured with F.I.C.S. and F.A.C.S.

On return to Pakistan from abroad in 1953, was appointed as assistant Professor of Surgery in Civil Hospital Karachi and its sister institution Jinnah Central Hospital Karachi and then in 1965 he was honoured with Professorship of Surgery.

The Surgical Unit III of Civil Hospital Karachi was organised and made in its present form and location by professor Fazal Elahi, and thus had the pleasure of being the first Professor incharge of this Surgical Unit.

Prof. Fazal Elahi, has writen various papers which have been printed in foreign and local journels. He has also presented paper in several seminars and Symposiums.



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†Roger, C.J. (1970) Med. Proc. S.A. (Sept) 301 and 303	gastro-enteritis with resp. infections	30	6 months to 6 years 5 days treatment	87% 13% improved	Prompt relief. No superinfection, well tolerated
	tonsillitis	482		95%	
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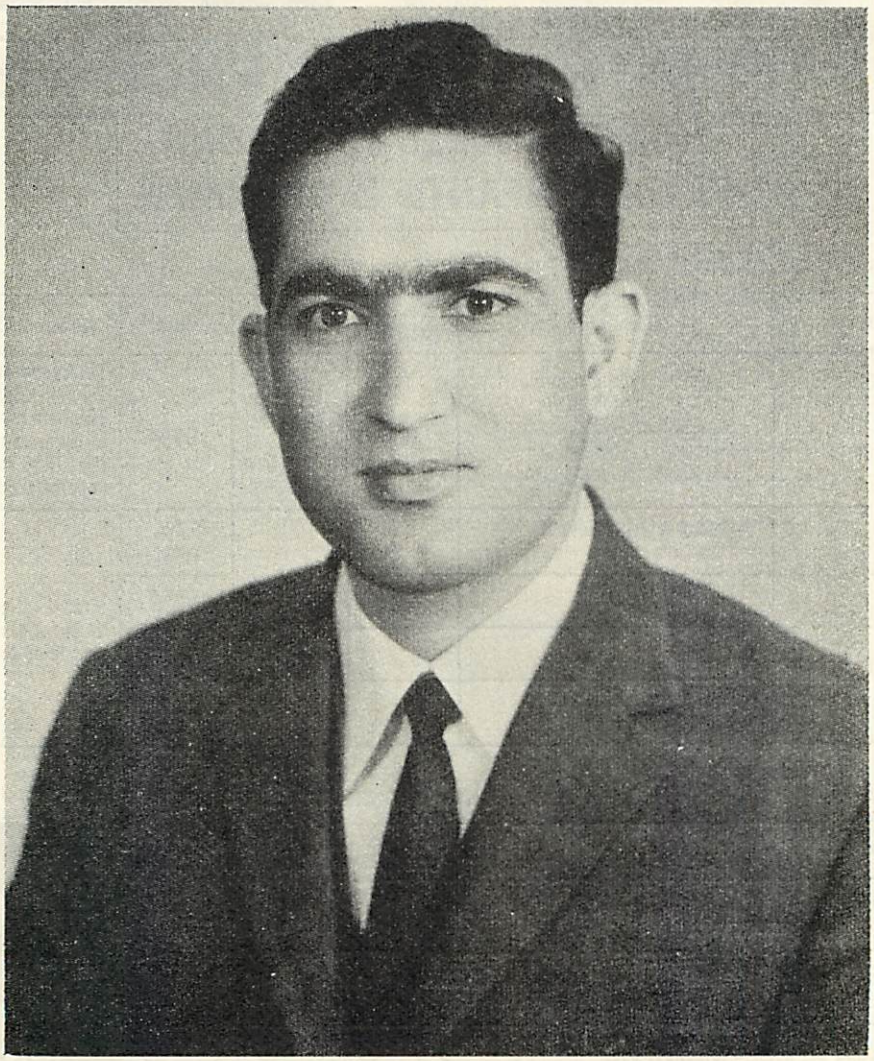
Editor & Magazine Secretary



HASHEM SHARIAT

President

Arts & Crafts Society, Photographic Society and Writer's Forum

Voice of Medicos :

IT is a set convention to say a few words in the form of an Editorial, expressing one's views and as such, an Editorial has come to be regarded, unfortunately as a mere tool for criticizing, everything and asking for unattainable objectives, in vague generalization. Likewise, it is generally set aside, since it is not expected to have any practical base and foundation of its own.

My purpose, therefore, through these columns is to break this myth and say something positive, tangible and attainable—covering the various aspects of the activities of a medico.

There is an unending stream of problems that faces us, and no one can be expected to overcome them overnight. Nevertheless, efforts towards this end are the essence of a progressive outlook which we all must possess. However, efforts in this context must be directed on a priority basis, where we, as students must give priority to what affects us, try to solve our own acedemic problems, set ourselves a standard of learning, of which not only we are proud of but whichreflects to us and ot the world that we are students first engaged in pursuit of the noble cause of Medical Education, for which we entered this institution and not succumb to the temptation which are not of a permanent nature.

General Development and Extension of College and Hospital :

Having studied in the college environments amidst its traditionally old structures, it is gratifying to note that the expansion phase of the college under our able Administrator, Professor A. Wahid, is fast nearing completions It is requested that the new blocks to be built will have requisite arrangements for the students, with provision of proper boys and girls common rooms, Union office, Secreteries rooms, meeting room, guest rooms etc.

Likewise, we suggest and urge that the hospital would be extended to amalgamate within itself the adjoining offsprings namely; Sind Government Hospital, Epidemic Hospital, Civil Defence Training School and T. B. Training Centre, enabling us to have among other fascilities a separate O.P.D. block systematically demarcated.

Furthermore it is desirable to shift the, Epidemic Hospital from its present over crowded area to a suitable spot on the out-skirt of the city, for giving the needed relief to the residents of the area and a better atmosphere for patients suffering from contagious diseases.

Teacher, Student Relationship and Politics :

It is rather unfortunate that I have to include this aspect of our college life into my discussion here, but it is a bitter fact which we all must acknowledge. A teacher, is a custodian and a guardian to the student and it need not be stressed that no matter what stage a student reaches in his professional career, he can never and should never be oblivious of the debt he owes to him for his teaching. Any friction or any unpleasantness in their relationship must be viewed by all as such, and I feel that whenever possible, direct confrontation between an aggrieved student and a teacher or vice versa must be smoothened out through proper arbitrary channels in the spirit of forgive and forget.

The "DECLARATION OF GENEVA" attopted by the World Medical Association at Geneva in* 1948, *which is an amendment to the "HIPPOCRATIC OATH" administered to Medicos all over the world, lays great stress on Student/ Teacher relationship and service to suffering humanity at large.*

Likewise, acedamic problems pertaining to teaching, examinations and general demand, must be dealt with in the same manner in order to avoid confusion and indiscipline.

College Party Politics :

The spirit of opposition that we find in our college party politics must be checked, so as to avoid any harmful or negative tendencies. The blessing of constructive criticism must be not be transformed into an evil of destructive politics and this stands true for all.

A healthy opposition is a must for any improvement and development in the college, and for that matter any where, but opposition and criticism just for the fun of it or just to degrade and malign the other is not only shameful but an act done in a bad taste. An elected union, irrespective of its individual component and their affiliation must work in a harmonious manner and it must be treated as an entity representing the college and all the students. Its failure or its success should be shared by all and it should not be made a victim of strife due to petty personal considerations of a few students here and there.

Academic Time-Table :

Maximum utilisation of the time as per time-table would not only go a long way in creating the proper congenial atmosphere in the college, but will also help us in making most of what ever time we have at our disposal. Minor adjustments in clinical teaching times such as the present three hours stretch, of which we generally utilise half the time only, could well be divided with requisite breaks of lecture hours and in this way more concentrated efforts on the part of the students could be ellicited.

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*See Page XXIX

The Attendance Myth :

The present system of laying undue emphasis on the attendance as an indication of student's regularity is prepasterous, especially when we all know how we manage to get it. I feel that either these restrictions should be scrapped through and through, or they should be adhered to strictly. For by the present moderate pathway we are causing more harm than good.

Specialists and the under Graduate Students :

Specialities are coming up very fast and rapidly and within the last two years almost all the recognised specialities for the under graduates teaching have been started and fully and highly qualified teachers have already been recruited to these departments.

It is gratifying to note that the specialities in our field of Medical Profession, instead of being mere names on the board of hospital departments, have now started taking shape and are actually becoming live departments. But they are yet far from even adolescence and adulthood. They are almost todlers, even the oldest one to have taken shape in our hospital is far from being adequately staffed and equiped, less so are the other specialities which have been born in recent times. It need not be stressed what place specialities have in the present days Scientific World.

Further more we are gratefull to the administration under whose guidance the hospital building for housing these departments have been completed and it is hoped that they will have their due share of the responsibility of patient's care and teaching of these specialities subjects to the under graduate students so that they are not left behind in this advancing world in these specialities fields.

Clinical Meetings :

A series of regular clinical meetings could be initiated to provide a healthy background for the teachers/students discussion, on various clinical cases and this will not only help us to get a better understanding of the subject but will also break the ice and the apparent allofness that exists between the teacher and the student. More over it will give a phrtographic impression on the student's mind, once he attends such a wide ranging discussion as these clinical meetings will involve.

Guardianship :

Intermingled with the above, is the bright possibility of further improvement in the teachers/students relationship. By a guardianship scheme, by which a reasonable number of students specifically belonging to that catagory which needs guardians regarding matters like accomodations, books, medical treatment, matters concerning studies and other necessary items could be under the academic guardianship of a professor. These students which will have a mutual responsibility and respect towards their guardian—professor in particular & other teachers in general and in this way at least a start towards better, healthier and intimate atmosphere

between teachers/students could be achieved. Moreover, it would bring the teachers close and akin to the student and the present gulf that we find on their part to associate themselves with healthy student activities, be it a mere attendance in college functions would be removed.

College Record :

A word or two above the rather unfortunate state of affairs that prevails regarding the maintanance of college old records. It need not be mentioned that every institution has a history and a back-ground of its own, and the reflection that they give of the institution to others is immense and significant. Hence, to keep our records in tact and to maintain the present records in every sphere of student activities through an archives section would be a trouble worth taking, and I hope that the authorities concerned would take some positive steps in this context. To elaborate, suffice it to say that records like lists of students, union with their group photograph, all publications, published through union, the college Annual Magazine, list of ex-principals and professors with their biodatas and photographs etc., are the things which must be available easily for any reference that might crop up any time.

Shortage of Staff :

As is usual in all developing countries, Pakistan is also short of Technical Personal, a glaring example of this shortage is our college. We have only about 78 *teaching staff members for a total number of about* 1100 *students, whereas the college statistic, as published about* 6 *months ago show that there should have been at least* 120 *teaching staff members. The worst part of it is that the student enrolment is increasing and contrary to it the experienced staff especially in the basic departments is dwindling. In order to maintain the standard of education etc., this trend should be arrested by providing insentives to the staff.*

Authorities :

Some mention about the various administrative set ups that are responsible for the running of the college will show that at present they are being controlled by three often conflicting authorities, namely the Pakistan Medical Council, The Health Secretariat and the University of Karachi. Due to this not only is there a great confusion in the solution of the various administrative and academic problems of the college but also there is an unnecessary over-lapping and an intermingling of policies and their interpretations. It need not be mentioned the more the supervisors, the more the hindrance and consequently, limitations increase and work suffers. If an arrangement is made such that the college is under one authority for its proper administrative and academic working, I am sure, we shall find quite a few of our problems solved automatically.

Rural Health Service :

It is an uncontrovertable fact that the rural Health Services need a great improvement and evident patronage from all sections of the medical profession. It is the doctor's responsibility, no doubt to help improve the services, but it is natural that no amount of compulsory status can help until proper impetus is given to them—impetus in the form of proper facilities for his living and his practising,

and also some scope for his further advance and progress. The doctor going there must have a free hand to manage his affairs and he must be provided with proper facilities to do its work properly. Likewise, if he is given a stimulus that he can own the full fledged dispensary where t he works, after a certain given limit of time, he will definitely feel attracted towards it.

Difficulties Facing Foreign (Under Graduate) Medical Students :

Beside other minor problems that faces our foreign students here is the major difficulties of their language. Students find it very difficult to cope up with the lectures in the class. In order to solve their this problem it would be worth starting a short course of about three months or so, for their progress in the language and thus prepare them for the University level.

Likewise the allofness that is usually seen with the foreign students could well be removed if occassions like get-together, outings or educational tours and so on are arranged on Semi Government expences. This would not only bring the foreign students close to the local students but also in turn improve their language.

Increase of Seats :

The fast increasing number of students trying for admission to the Medical College, and in contrary to their luck of facilities, was soon felt by the President of the Union, who took the matter very urgently and after a very hard work and over coming several hurdles, he managed to increase the seat this year, in the Dow Medical College.

Boys seats was increased from 50 *to* 94, *while that in the girls was increased from* 25 *to* 34.

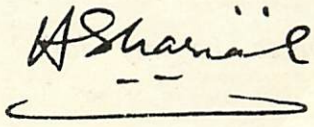
Another Medical College :

At this stage it would be most appropriate to express our hearty welcome to the news about the upcoming Aga Khan's Medical college and hospital in Karachi. To have a sister institution as such would be an invaluable boon to all Karachites in general and the medical students and profession is particular in all the spheres of their activities.

Conclusion :

All said and done, I request my teachers, colleagues, friends and fellow students to give thoughts to the suggestions made in this editorial for bettering the lot of medicos in our province in particular and the country in general.

Finally suggestions and healthy criticism is welcomed from all, so that improvements could be made in the future issues of this magazines, by those who take over its management in future.



Hippocratic Oath.

"I Swear _____

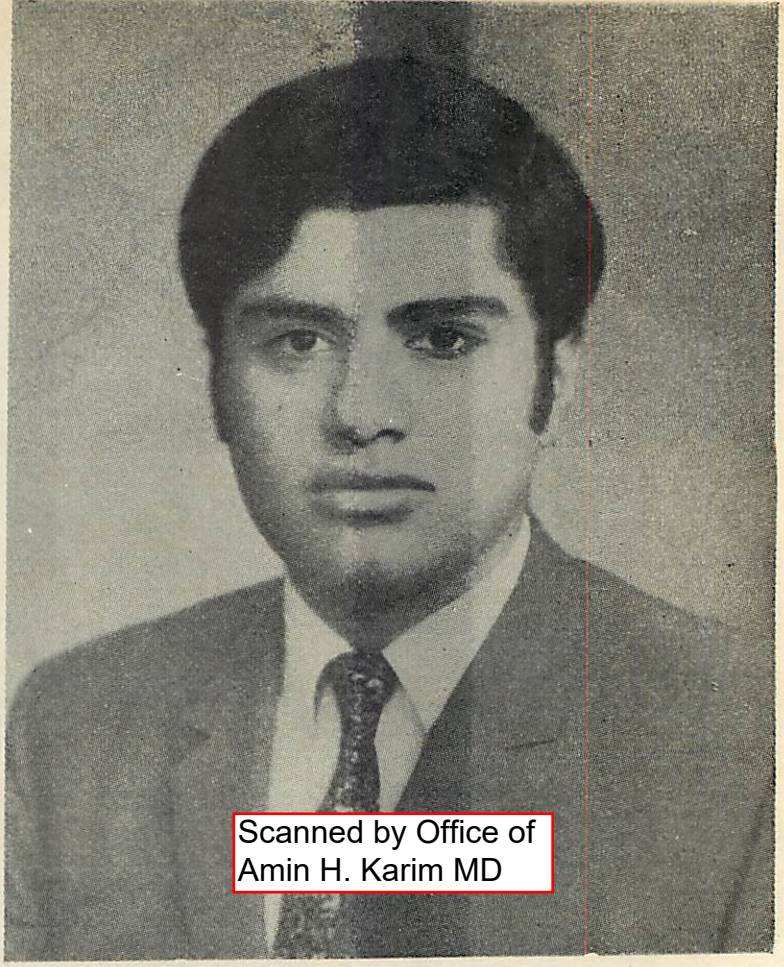
"To consider dear to me as my parents him who taught me this art; to live in common with him and if necessary to share my good with him; to look upon his children as my own brothers, to teach them this art if they so desire without fee or written promise; to impart to my sons and the sons of the master who taught me and the disciples who have enrolled themselves and have agreed to the rules of the profession, but to these alone, the precepts and the instruction. I will prescribe regimen for the good of my patients according to my ability and my judgment and never do harm to anyone. To please no one will I prescribe a deadly drug, nor give advice which may cause his death. Nor will I give a woman a pessary to procure abortion. But I will preserve the purity of my life and my art. I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners (specialists in this art). In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional doing and all seduction, and especially from the pleasure of love with women or with men, be they free or slaves. All that may come to my knowledge in the exercise of my profession or outside my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and will never reveal. If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all men and in all time; but if I swerve from it or violate it, may the reverse be my lot".

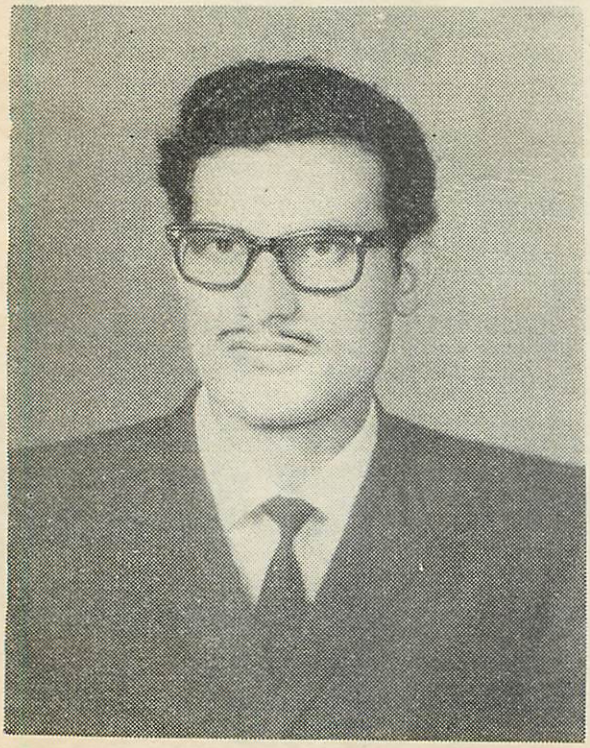
Declaration of Geneva

"I solemnly pledge myself to consecrate my life to the service of humanity. I will give to my teachers the respect and gratitude which is their due: I will practice my profession with conscience and dignity; the health of my patient will be my first consideration; Iwill respect the secrets which are confided in me; I will maintain by all means in my power the honour and noble traditions of the medical profession; my collegues will be my brothers; I will not permit considerations of religion, nationality, race, party politics of social standing to intervene between my duty and my patient: I will maintain the utmost respect for human lite from the time of conception: even under threat. I will not use my medical knowledge contrary to the laws of humanity. I make these promises solemnly, freely, and upon my honour."

President

ASIF ALI MANSURI





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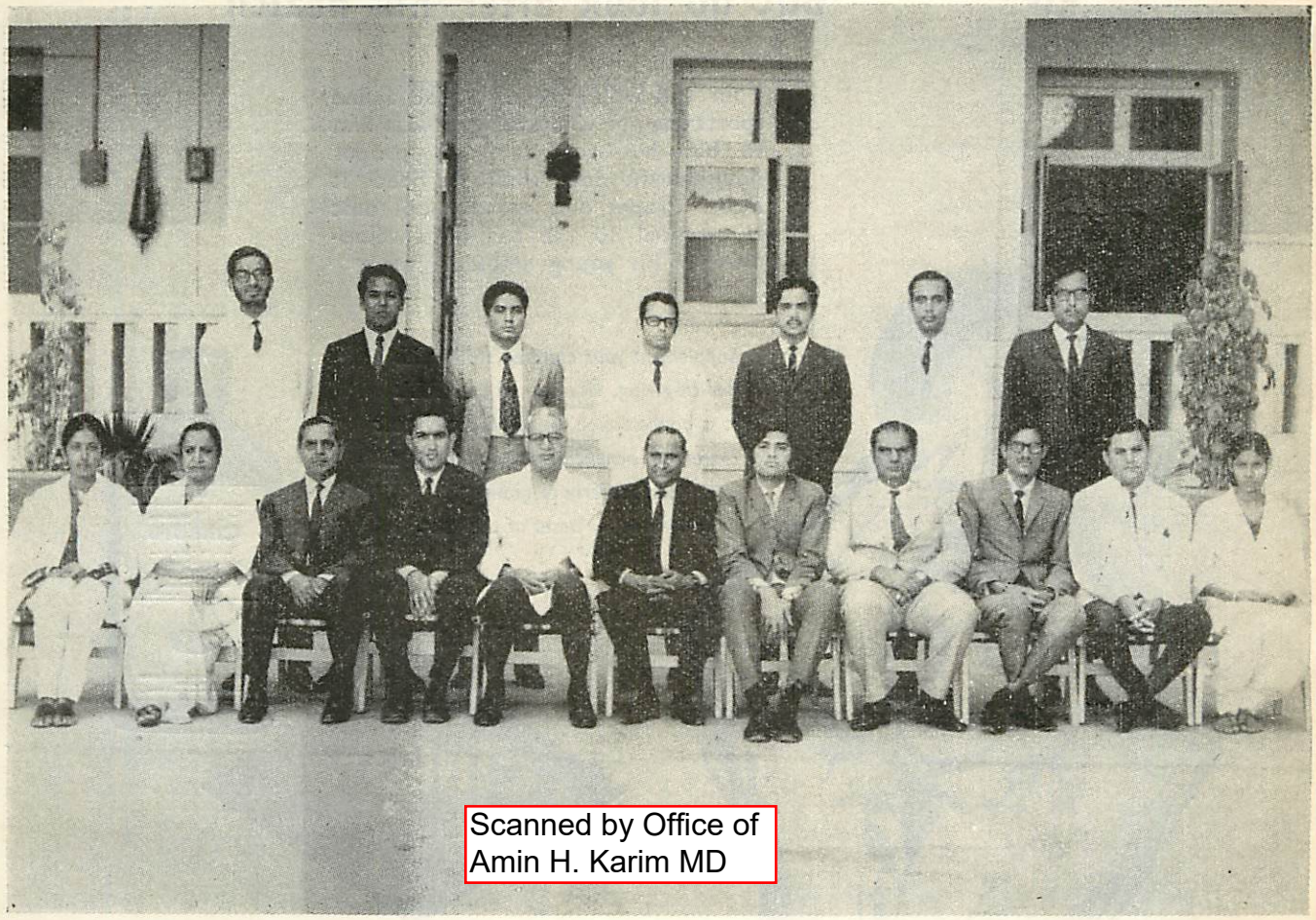

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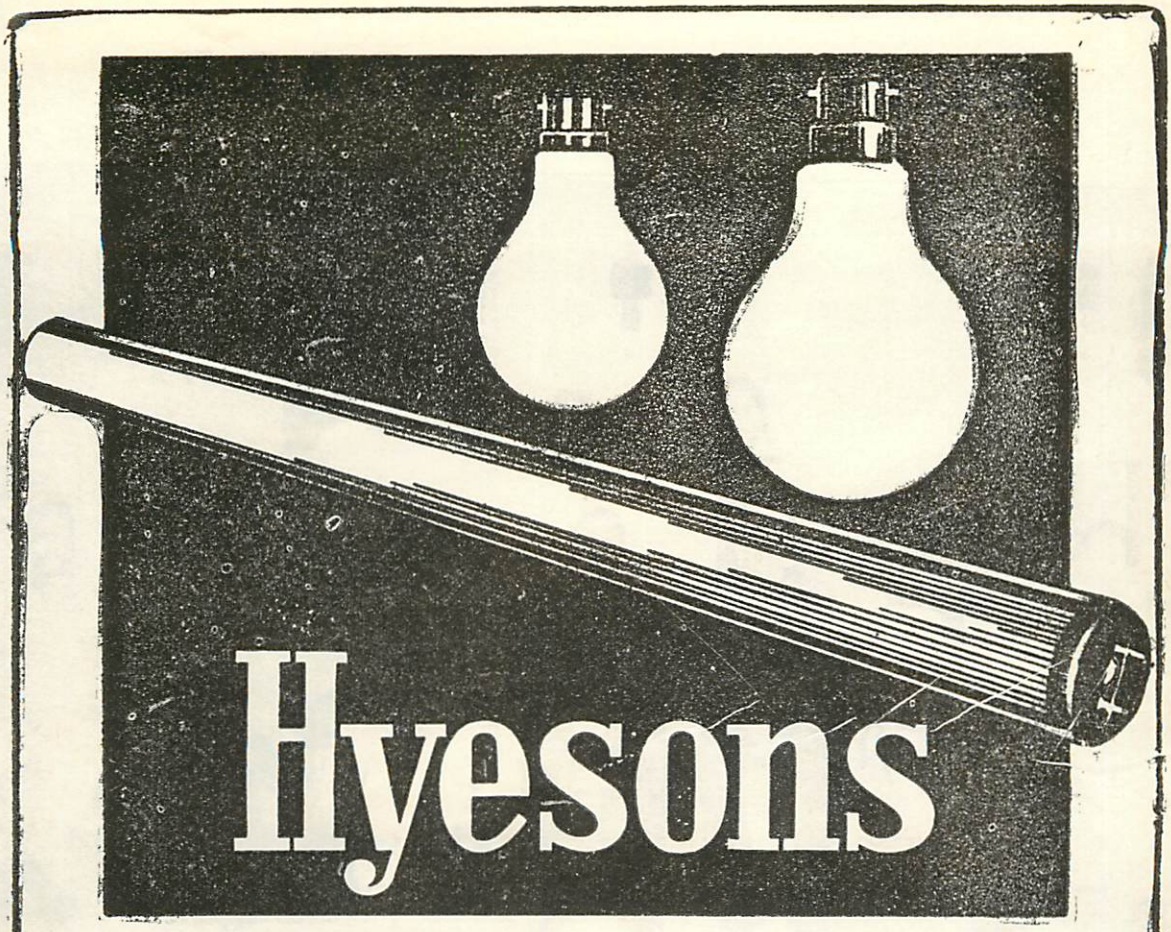

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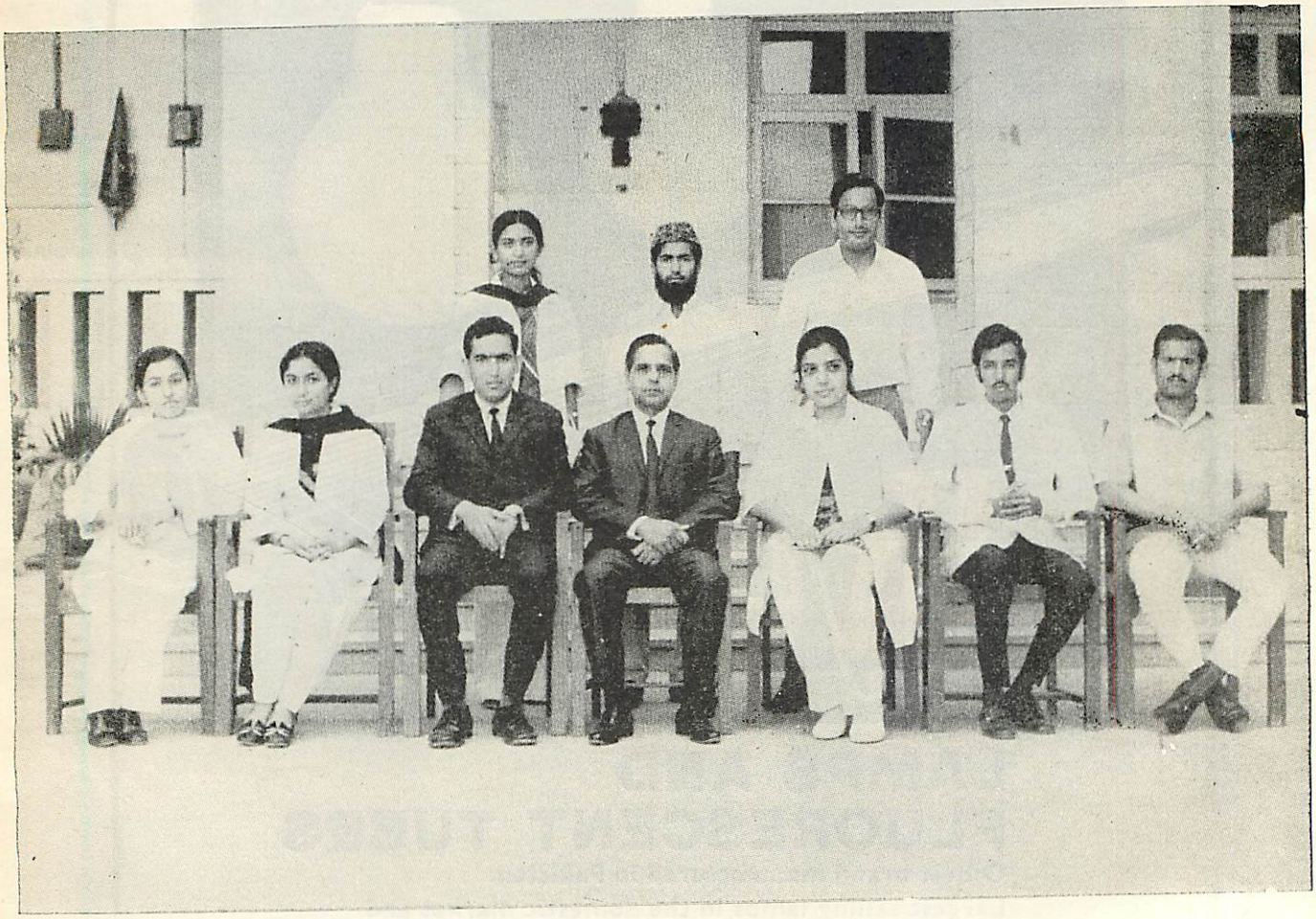

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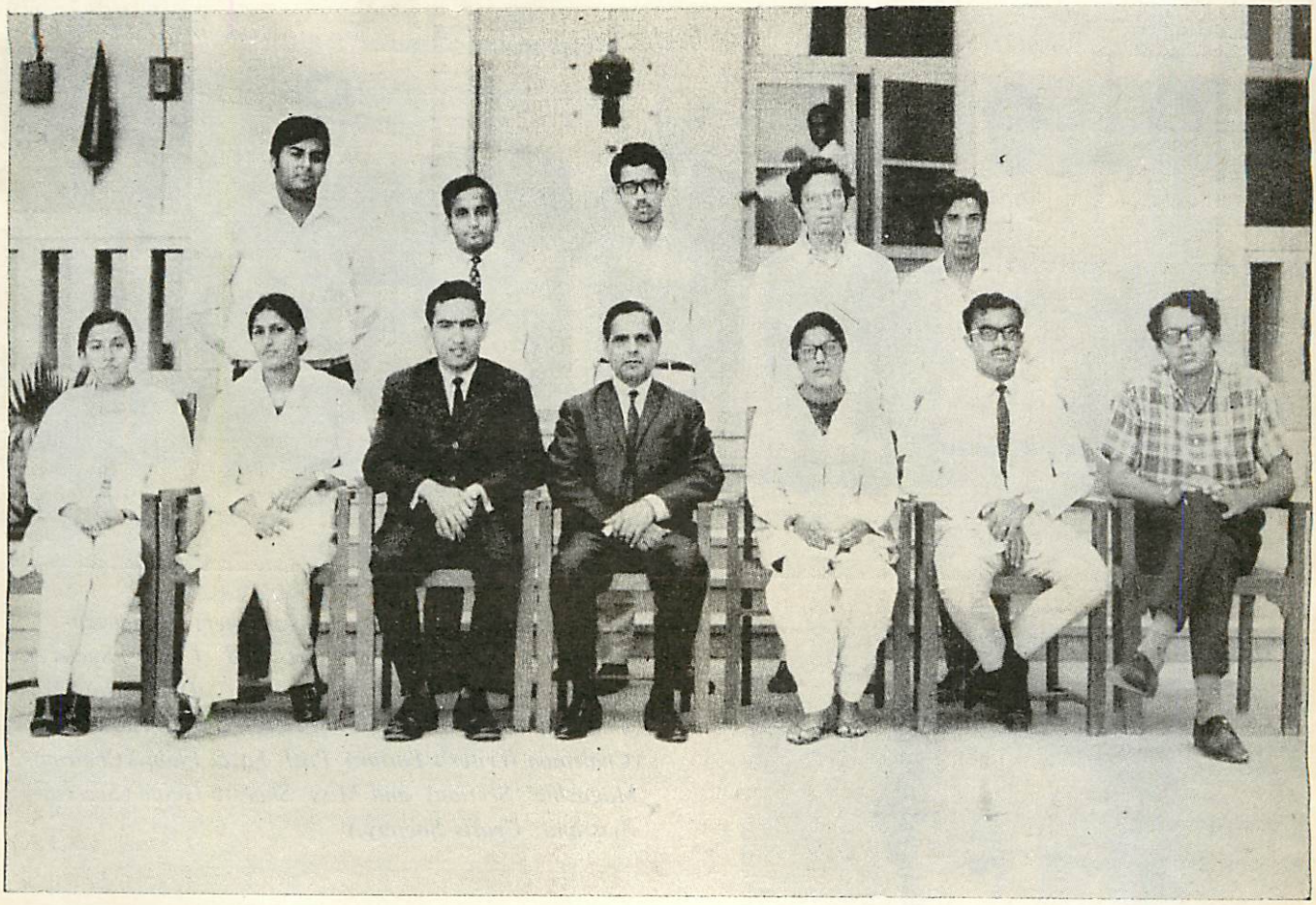

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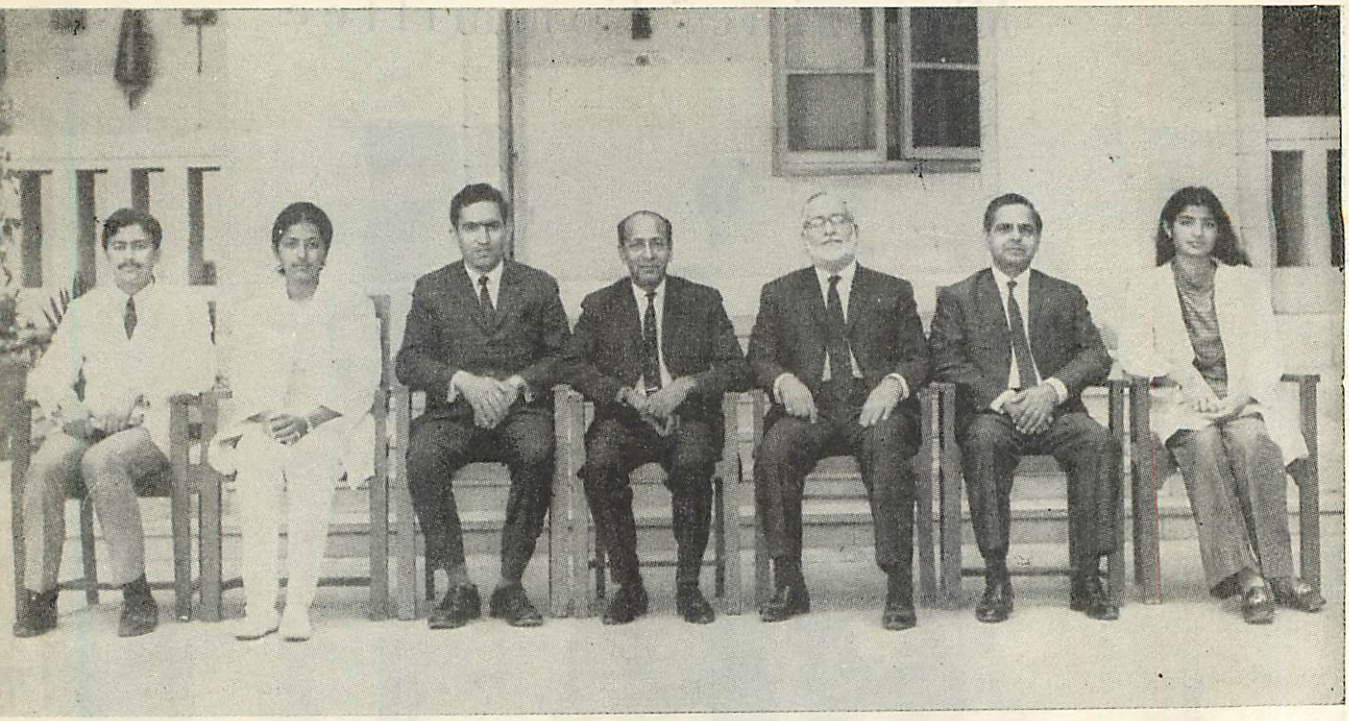

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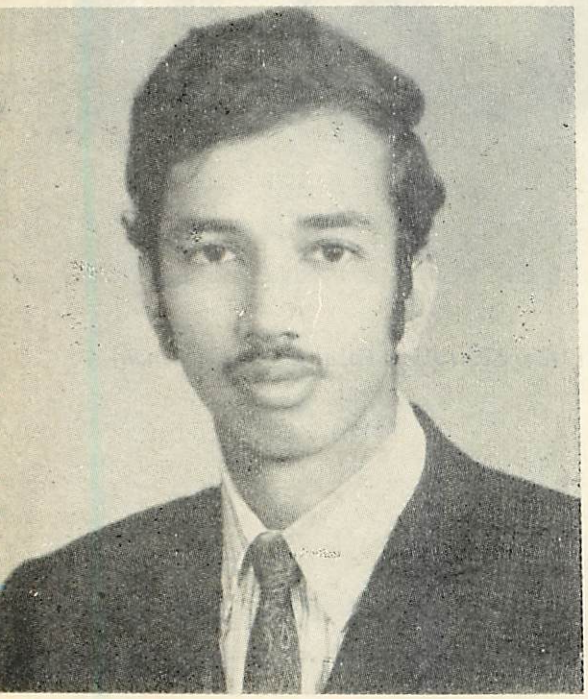

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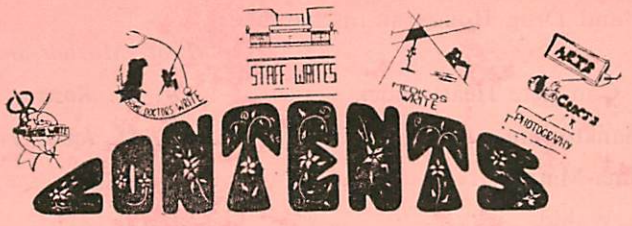

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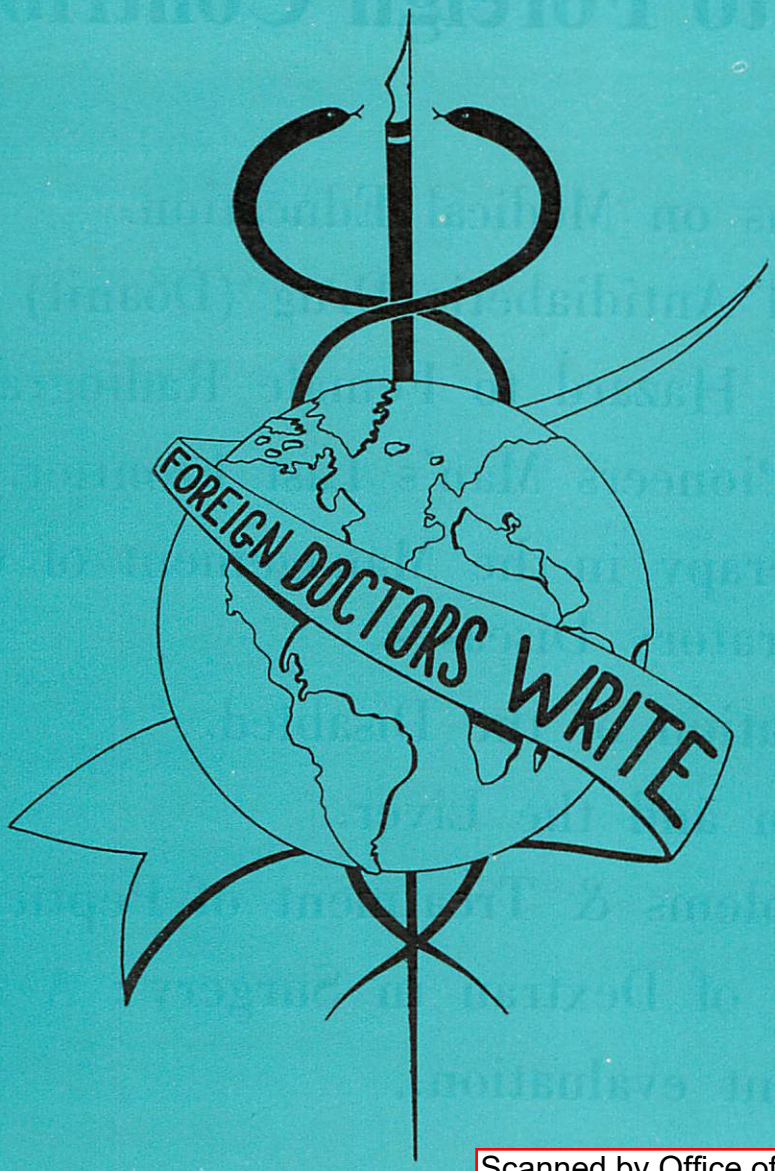

Index to Foreign Contribution

Reflections on Medical Education

T. E. LEAR
M.R.C.P.I., D.P.M.

CONSULTANT PSYCHIATRIST
ST. CRISPIN HOSPITAL
NORTHAMTON, ENGLAND

THE doctor is an expert about the body to which he devotes years of study and examination. The anatomy, physiology, pathology and genetics of the body absorb him throughout his medical school years and afterwards in his general hospital experience. Body systems and body symptoms are considered minutely. Symptoms and signs are classified as syndromes or diseases treatment is directed to dealing with symptoms. Psychology introduced to the curriculum sometimes gets regarded as another system to be studied by the conscientious practitioner.

In the general hospital the clinician deals with the body by the bed-side and in the laboratory the doctor examines the chemicals, tissues and invaders of the body. This is the practice of body medicine, symptom medicine and individual medicine. The more curious doctors wonder about their patients own impressions of their personal body experience, not only in terms of their medical information which they apply to themselves, but the spontaneous, unique and sometimes primitive feelings associated with body experience. This is, perhaps, a more sophisticated practice of psychosomatic medicine, but still the patient, although considered a whole person, is regarded as an individual. This is the extent of the hospital medical model, but the practitioner practising in a social community is confronted by more complex experience than this, because he cannot fail to notice that his patients are family members and members of work and other social groups. Recently a doctor reported the case of a young woman about to be married who complained of many symptoms and there were no physical signs on examination. Soon after this she arranged that her mother would come to live with her and continue to do so after she married. Her symptoms disappeared. The doctor might consider that his patient, as an individual, was not suffering now and feel satisfied that she was better, or he might have a serious doubt that his patient had in fact made a healthy life adjustment in having her mother with her and he might question this with her.

The general practitioner in England frequently refers to himself as family doctor and a physician to a family is different from a physician to an individual patient. The difference was long disregarded in medical education. Psycho-analysis provided the study in detail of the interaction of two people who worked together in a rather special doctor/patient relationship. For many years skills were developed and used in what remained a

rather elite specialist practice and research.

About twelve years ago Michael and Enid Balint, and soon after several psycho-analysts in London, led a trend towards appreciating the importance of studying the doctor/patient relationship, not only in the psychiatrist's office but in the general practitioners surgery as well. For the first time general practitioners and psychiatrists co-operated in a fruitful learning experience in "Balint type" seminars. In the seminars doctors learn to present their work with patients, paying particular attention to the doctor/patient relationship, not omitting to examine the doctors feelings as well as his patients. The work presented is a sample of the doctors usual range of work and not a special psychiatric part of it. Only doctors who are interested in understanding their transactions with patients in detail would be prepared to make what is a considerable investment of time and trouble, during from two to four years. (Compared with the time of a general medical training this is rather less). This style of seminar is used now by various professional workers in many countries for training and development of interpersonal skills.

In concentrating on the doctor/patient relationship, the doctor shifts from his traditional view of individuals to a view of two individuals. Although readily stated, the learning is much more challenging before the doctor reaches a sophisticated position where he can choose to view a situation in different ways and use the traditional skills and his new skills appropriately. In Northampton we have a seminar in which our work is to study the relationship between psychiatrist and patient in the out-patient clinic. The majority of psychiatrists are from India and Pakistan and I was daunted at the outset for two reasons among others. First, I realised that to work together meant extra work for English psychiatrists and for those from overseas to deal with our differences. Secondly, India and Pakistan seemed differently developed socio-economically and if these psychiatrists were returning to practice in their own countries, I was not sure how far a psychotherapeutic model was relevant at this time and that available resources in these countries might best be devoted to a medical psychiatric model. Then again, the pre-dominant model in English psychiatry is still the medical model of which they were well aware.

When we started working I was rather surprised at the sustained interest and determination of these psychiatrists in relationship work. I do not know how far they are motivated by the needs of their future practice as they see it, or to work out a more comfortable experience with the people with whom they are working while they are here. An important early consideration of the psychiatrist/patient interaction in the out-patient concerns the reasons for the general practitioner referring his patient, e.g. how far for consultation and how far for specialist treatment. The emphasis in the former being discussion between two doctors, the general practitioner continuing with the treatment, and in the latter between hospital doctor and patient, the hospital doctor continuing with the treatment.

The triangle of general practitioner, patient and hospital doctor is a fascinating study, with many practice variables described by Dr. R.B. Coles and H. Bridger in an illuminating paper.

In a psychiatric ward the training of psychiatric nurses by long tradition was not very different from that of their general hospital collegues, and yet the job is so different. The person in the general hospital ward is asking for his painful or weak body to be taken over until he can manage it himself again, whereas the person in the psychiatric ward is asking for help with some difficulty in his personal, family or social situation. There are, of course, occasions when both pleas for help are made at the same time, when the highest sophistication of nursing techniques would be called for. I am trying to show how immensely difficult it is for a psychiatrist with his medical training to begin to consider personal or relationship medicine.

I would define psychodynamics as the branch of science concerned with personal and interpersonal experience and the study of the forces which move a person or a group of people. This branch differs from traditional sciences and particularly traditional medical sciences in at least two respects. First with regards to measurements and secondly in the study of relationships rather than individuals.

Let me illustrate what I mean about measurement, from a report of a family doctor. A married woman came to see him saying, "I've got a lump in my breast, its painful and I am worried because my grandmother died of cancer two years ago". Now his job to start

with was with traditional measurement. He compared her account of her symptoms with other accounts of symptom clusters. He observed the size and texture of the skin of one breast, comparing it with that of the other and with many breasts which he had examined previously. When he was feeling the lump he noticed the characteristics and again compared it with other lumps which he had examined when he was learning this measurement. In this learning he compared his own technique with those of other doctors until some standardization was possible. This measurement is crudely in line with that used by physicists and chemists. It was important when he was making this measurement that he should not allow his feelings to distort his observations. For example, it would not do if this woman pushed her fear of cancer into him as it were, so that he expected to find hard glands in the axilla. Thus when the doctor makes his measurements in traditional medicine, he quite properly remains detached from his feelings as far as he can. All sorts of measurements of the body and body systems, somatic and psychological, symptom patterns and behaviour patterns are possible and are the basis of much of traditional medicine, including text-book psychiatry.

Let us return to the woman and her family doctor again. What he noticed was that she did not expose her breast fully at examination and seemed embarrassed and she told him that she sleeps on the sofa downstairs after her husband has gone to bed upstairs. Is this information to be ignored or does it require examination as well? It means that she aroused her doctor's curiosity and he noticed her embarrassment. What he did was to notice what she was doing to him and what he was doing to her. He observed his feelings and used them to examine the doctor/patient relationship. If this is something worth examining, is it worth measuring?, and how is the doctor to measure?, because using traditional measurement he is up a gum-tree for it goes something like this; how can he keep his feelings out to make a measurement when his feelings are what he examines with. It is only too easy to assume that because traditional measurement cannot be used, relationship work is unscientific. I suspect that this is one reason why physcis and chemistry faculties in Universities are so respectable and social science less so. This may be why interpersonal training in the medical curriculum has a low priority. The challenge of course is to find means of measuring interpersonal phenomena.

In recent years techniques have been developed but are not widely known or understood. In Professor Coplin's introduction to the book "The Use of Small Groups in Training" by Gosling, Miller, Turquet and Woodhouse he writes, "To meet the challenge to develop more effective group methods for changing behaviour, professionals from a wide range of disciplines have entered the arena with approaches that proceed logically out of their various theories and practices. Thus there is now emerging an expanding array of approaches based on psychoanalytic principles, role theory, mathematical models, group methods, group therapy, sociometry, psychodramatic and sociodramatic techniques and several schools of social psychology. Each approach has its own paradigm, special language, developed expertise and research method. For a field of enquiry, scarcely out of its infancy, it is perhaps too early to insist on irenic movement towards concensus. Much is to be gained in this first phase of the development of the scientific approach to the understanding of group behaviour by relatively independent studies carried out by students of different persuasions".

Returning to the family doctor, if he reported his experience with the same woman to a third person, his feelings could be examined and if there were several people to whom he was reporting such experiences, he might go some way towards standardizing the observations of his own feelings by mutual checking. Many relationship experiences can be collated in such a seminar and areas of overlapping experience begin to gain a validity with limitations of group bias.

Early experience in development is essentially body experience for the baby as an individual or in his beginning relationship with mother, dualism of mind and body is almost untenable when psychological experience and body experience are almost indistinguishable.

As long as early beginnings influence us therefore, so long will body experience be immensely important and doctors who are body experts will have their skills highly valued. There is a trap here, however, for it may be supposed that learning about the body is sufficient with education for doctors. I doubt if it is enough and, particularly for

doctors practising in the community rather than in the hospital, body medicine may be too narrow in its scope. To introduce further opportunities into the medical course however, is not an easy task and may be best postponed, without doctors skilled in family medicine and with understanding of group techniques participating.

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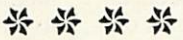

New Oral Antidiabetic Drug (Daonil)

THROUGH COURTESY OF

Hoechst Pharmaceutical Company Ltd.

THE introduction of oral antidiabetic preparations of sulphonylurea type inaugurated a new era in the treatment of diabetes mellitus. Among them tolbutamide, by virtue of its therapeutic excellence, has been the standard for more than a decade. Their use has meant that many diabetics have been able to do without insulin injections.

HB 419 (DAONIL) was discovered after testing some 8,000 compounds of this type and proved to be the most potent and yet least toxic antidiabetic agent so far produced.

Chemistry:

DAONIL (HB 419) is N—4—[2-[5-chloro-2-methoxybenzamido) —ethyl]-phenyl-sulphonyl-N'-cyclohexylurea and has the following structural formula:

PHARMACOLOGY

Hypoglycaemic action :

In relation to the effective dose, DAONIL is several times more potent in hypoglycaemic action than any of the antidiabetic sulphonylureas or sulphonamide derivatives so far introduced. At the same time, it does not produce other effects. In man and various animal species the threshold dose is in the range of 10-20/mg/kg body weight.

Even at a dose of 0.07 mg/kg body weight by mouth its hypoglycaemic effect lasts for at least 24 hours. As the dose is raised, the duration of action lengthens, but the intensity of the effect is limited. Even when doses several times higher than the threshold dose are given, the maximum blood sugar reduction does not exceed 35%.

As far as comparative effectiveness is concerned, 5 mg. DAONIL is approximately equivalent, in man, to 1.0 g tolbutamide, 0.5g carbutamide, and 0.25g chlorpropamide.

Absorption, breakdown, and excretion :

After a dose of 5 mg DAONIL given by mouth to human subjects, the peak serum concentration is reached after 4 hours. In accordance with the elimination rate the concontration falls within 24 hours to less than 5% of peak value. Pharmacokinetic studies have shown that no accumulation is to be expected, even after repeated doses. In man the biological half-life in the plasma is approximately 5-7 hours.

In the human body, breakdown takes place by hydroxylation of the cyclohexyl group. The principal metabolite of DAONIL also has a hypoglycaemic effect, but this is weaker than that of the unaltered substance and is of no importance, when therapeutic doses are given.

Toxicology:

In animal experiments DAONIL displays remarkably low toxicity, both acute and chronic.

To determine the oral LD**50** the experimental animals were given the largest quantities capable of being administered by mouth in a single dose, yet no toxic symptoms were observed. The LD**50** for white mice, rats and guinea pigs was found to be more than 15 g/kg body weight, and for rabbits and beagles more than 10 g/kg body weight.

Teratological tests were carried out in rats

and rabbits. Scrutiny of the intact foetuses, followed by examination of transverse sections and of the stained skeletons, showed no evidence of any teratogenic action.

Mechanism of action

As in the case of other sulphonylureas or sulphonamide derivatives with hypoglycaemic effects, the action of DAONIL is closely linked with the pancreas. In pancreatectomized animals and humans, and in animals with complete alloxan diabetes, it fails to produce any hypoglycaemic effect. Histological studies of the pancreas have shown that in animals DAONIL causes changes in the B-cells of the islets of Langerhans—changes that are interpreted as evidence of insulin discharge and increased functional activity.

In perfusion experiments with DAONIL carried out in dogs, there was evidence of an immediate discharge of insulin from the pancreas. Even in vitro, DAONIL causes insulin release from rat and rabbit pancreas sections.

Also in man a release of insulin could be demonstrated after oral and parenteral administration of DAONIL.

Clinical experience in the oral treatment of diabetes has established that sulphonylurea derivatives are more suitable than insulin for the management of maturity-onset diabetes.

DAONIL has no antibacterial properties.

Clinical Experiences :

Prof. A. Loubatieres who is considered to be an authority on sulphonylureas has reported his findings on DAONIL in "Hormone & Metabolism" vol. 1:8-24 (1969) as follows:-

"Glibenclamide (DAONIL) is a new particularly active hypoglycaemic sulphonylurea.

When chronically administrered in the mouse, HB 419 (DAONIL) provokes a neogenesis of the beta cells and an increase in the islet weight. This drug is endowed with the betacytotrophic property."

J. Anderson et. al in BMJ (1970) No. 5709 have reported their findings as follows:—

"The drug is a potent stimulator of insulin release in maturity onset diabetes.

The drug is effective in doses as low as 2.5 mg; and the maximum effective dose is about 15 mg. No significant side effects were found during the period of study.

The metabolic investigations have shown that the drug has some actions which are as yet unexplained."

In the same issue of BMJ another two articles have appeared on DAONIL and findings of the authors are reproduced below:-

D.R. Hadden et. al on Pp. 570-572.

"In an initial trial of Glibenclamide in the treatment of maturity onset diabetes mellitus 28 patients were treated for upto one year and no toxic effects or side effects were encountered. The hypoglycaemic potency of this drug is such that 5 mg of Glibenclamide corresponds to about 1500 mg of tolbutamide and 375 mg of chlorpropamide."

D. J. O' Sullivan et al; Pp 572-574.

"Thirty patients were treated with Glibenclamide for periods upto 16 months. The drug is a potent hypoglycaemic agent, and taken in a single daily dose controls blood glucose levels over a 24 hours period in maturity onset diabetes. A definite dose-effect relationship exists and the drug may be used in doses of 5 to 20 mg daily. There were no appreciable side-effects or toxic effects during the period of study."

Contraindications :

Juvenile diabetes mellitus.—Serious metabolic decompensation with acidosis, in particular diabetic precoma and coma.

Serious impairment of renal function, especially if due to glomerular lesions.

In circumstances of unusual stress (e.g. accidents, emergency operations, febrile infections, etc.) it is usually advisable to change to insulin.

Side-effects :

Clinical experience in the use of DAONIL has shown that side-effects serious enough to

compel discontinuation are uncommon, even during long-term therapy. Gastrointestinal symptoms such as nausea, anorexia or feelings of pressure or fullness are seldom encountered.

Allergic skin reactions have only occasionally been observed and as a rule rapidly subside when treatment is discontinued.

Haemopoietic reactions (leucopenia, thrombocytopenia) occasionally observed in any kind of long-term medication, are uncommon and transient in patients taking DAONIL.

Dosage :

The initial dose of DAONIL should be 1/2 tablet (2.5 mg) daily taken immediately after breakfast or the first major meal. If smooth control is attained the daily dose of 1/2 tablet of DAONIL is continued as maintenance therapy.

If necessary, the daily dose can be gradually increased in steps of 1/2 tablet upto 3 tablets. Single daily dose upto 2 tablets (10 mg) of DAONIL can be taken immediately after breakfast. When the daily dose exceeds 2 tablets the excess should be taken immediately after the evening meal.

After every increase in dosage it is essential to check the blood and urine sugar.

Change-Over from other Oral Antidiabetics to DAONIL :

This change can be made from one day to the next.

(a) When control has previously been unsatisfactory:

The initial dose of DAONIL should be 1 tablet daily immediately after breakfast or major meal.

(b) When the control has previously been satisfactory but a change-over is necessary; Treatment should normally be started with 1/2 tablet of DAONIL daily immediately after breakfast or major meal.

Change-over from insulin to DAONIL :

The change-over can be carried out as follows:—

(a) Low insulin doses can be replaced at once. Then the dosage should be adjusted in the way prescribed for patients being treated for the first time.

(b) If the patient's insulin requirement is moderate or high, a gradual changeover is advisable. This can be done by giving insulin and DAONIL simultaneously and gradually cutting down the dose of insulin.

Bibliography :

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Radiation Hazard to Female Radiographers

SALMA HATIMALI
M.S.R. (D)

Royal Sussex County Hospital-Brighton, England.

A radiographer, after becoming pregnant, may well be anxious as to whether continuing at work is likely to constitute an appreciable hazard to her coming child, and it is felt that some guidance on this question may dispel anxiety.

Experience in Great Britain has shown that very few, if any, radiographers working in radiodiagnostic and radiotherapy departments receive doses of radiation as a result of their work sufficient to cause any appreciable hazard. Present safety precautions are such that the personal dose seldom if ever approaches the maximum permissible dose recommended by the International Commission on Radiological Protection and referred to in a recent amendment to the M.O.H. Code of Practice, and as long as such normal precautions are observed, and care is taken to avoid an accidental exposure, the risk to the baby will be very small indeed when compared to the many other risks of everyday life.

Radiographers in Diagnostic Departments other than those whose duties include the radiography of radium and radioisotope cases will not need to take any additional action in regard to radiation safety in the event of pregnancy, but they should, as always, be careful consistently to employ good practice, and should be particularly careful to wear protective aprons whenever this is indicated, to avoid holding children, infirm or injured patients while an exposure is being made, and to guard against accidental exposure.

Radiographers working in X-ray and r-ray beam therapy departments will not normally need to take any special action in regard to radiation safety in the event of pregnancy, but they also should be careful consistently to employ good practice.

Radiographers working either diagnostically or therapeutically with radium and radioisotopes and those whose duties include the radiography of radium and radioisotope cases may, in some circumstances, need to have their duties modified in the event of pregnancy, but in all cases the doses recorded on their film badges or protection dosemeters will indicate to the Protection Officers what steps, if any, need to be taken.

It will be appreciated that it is essential for a radiographer who believes that she is pregnant to inform in confidence, the head of her department. This is particularly important for staff working with radium and radioisotopes in order to ensure that the maximum permissible dose to the foetus is not exceeded, and it will permit, where necessary, appropriate variations to be made in respect of the duties during the subsequent period of employment.

In all hospitals the doses recorded by the monitoring films of female staff are regularly checked where appropriate to verify compliance with the recommended maximum permissible dose for women of reproductive capacity, and particular care will be taken after pregnancy has been reported to ensure compliance with the lower maximum permissible dose that is recommended for the foetus.

Historical and Scientific Background—I.C.R.P. Recommendations :

A thorough study of hazards to personnel from exposure to ionising radiations has been made by the International Commission Radiological Protection. Resulting from this, the

Commission has recommended maximum permissible doses for staff occupationally exposed to X-rays, r-rays and other radiations. These doses have been so chosen that it is believed that any resulting hazards will be at an extremely low and acceptabie level. The recommendations include specific references to the exposure of women of reproductive capacity and of pregnant women from radiation sources external to the body.

Recommended maximum permissible doses

The current maximum permissible dose to the gonads, red bone marrow and the whole body recommended by the International Commission on Radiological Protection is as follows:

Radiation workers—5 rems in a year but not more than 3 rems in any quarter.

This is, however, qualified in respect of females as follows:

The abdomens of women of reproductive capacity—1.3 rems in a quarter.

Pregnant woman—1 rem to the foetus during the course of pregnancy after diagnosis.

Interpretations :

The limitation of the maximum permissible dose to the abdomens of women of reproductive capacity to 1.3 rems in a quarter is intended to ensure that the dose to an embryo during the critical first two months of organogenesis will normally be less than 1 rem, a dose which the Commission considers to be acceptable. With regard to the dose to the foctus during the course of pregnancy after diagnosis, the Commission indicates that for diagnostic X-ray workers, the recommendations will usually be satisfied even if the woman continues to be occupationally employed under circumstances where the dose to the abdomen is limited to 1.3 rems in a quarter. (This implies that it is the dose to the surface of the abdomen that is so limited.) The Commission further indicates that in the case of workers with high voltage diagnostic X-ray equipment it will usually be necessary to assess the dose received by the foetus. (This is because the depth dose may by the foetus. (This is because the depth dose may be such that limiting the dose to the surface of the abdomen to 1.3 rems in a quarter will be no guarantee that the foetus will not receive more than the maximum permissible dose.)

Discussion :

The recommended maximum permissible dose of 1.3 rems in a quarter to the abdomen of women of reproductive capacity is equivalent to an average of about 400 rems in a month. The figure of 1 rem to the foetus during the course of pregnancy after diagnosis averages at about 150 mrems in a month during the subsequent period of pregnancy. In all but the most unusual circumstances (involving supervoltage equipment, when the depth dose might possibly exceed the surface dose), it follows that if the dose received by the surface of the abdomen (that is, as measured by personal monitoring) never exceeds an average of 150 mrems in a month, compliance with the recommendations of the I.C.R.P. is ensured.

Experience of personal monitoring shows that it is unusual for a radiographer working in a diagnostic or therapeutic X-ray department to receive a monthly dose to the surface of her abdomen as high as 150 mrems, and that it is extremely unusual for it to be as high as 400 mrems. Typical of many departments are monthly doses of less than 20 mrems. The risk of radiographers in such departments being excessively exposed is obviously extremely small, and the further risk that an excessive foetal dose might occur is remote. *Only if the average monthly surface dose of a pregnant radiographer exceeds* 150 *mrems and she is using X-ray emergies over* 100 *kVp* would the question of assessing the foctal dose arise, and, as the Commission has indicated, there would be no need to assess foetal dose in the case of workers with low-voltage diagnostic equipment provided the monthly surface dose does not exceed 400 mrems.

Experience of personal monitoring also shows that it is unusual for radiographers working with r-ray beam units to receive more radiation than workers with X-ray equipment (*i.e.* 20 mrems per month) and provided that monthly doses no higher than 150 mrems are received, the foetal doses would be well below the recommended limit.

The position may, however, be different in the case of radiographers who work with radium or radioisotopes. Somewhat higher doses are also possibility in the case of radiographers whose duties include the radiography of patients undergoing radium or radioisotope therapy. Depending on the circumstances, radiographers in these groups may receive doses to the surface of the abdomen which exceed 1 rem in nine months. Although the doses will be controlled within the recommended maximum permissible dose to the abdomen of a woman of reproductive capacity, they may be excessive in relation to that recommended for the period subsequent to the confirmation of pregnancy, and therefore a rearrangement of the duties performed by such radiographers may be necessary after they have become pregnant, Such a rearrangement will, of course, take into account the results of previous personal monitoring.

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Lederle Pioneers Man's Last Frontier

By

CHARLOTTE D. CUFF

THE sea is a rich brew of life and life forms, covering 70.8 per cent of the planet Its depths conceal many mysteries It is man's last frontier

To a world which has watched men walk on the Sea of Tranquility, exploration of the "inner" space of the oceans may, by comparison, seem dull. But to a growing number of people, the fruits of ocean research may make the plunge both exciting and rewarding for mankind

To these pioneers, the oceanologists, oceanographers and marine biologists, the sea holds a potential wealth of food, fuel, drugs, minerals and, perhaps, great underwater cities for a burgeoning population

Man's search for medicines from the sea is both old and new. A thousand years before Christ, the Chinese and Babylonians were using seaweed and its extracts as soothing agents and emollients for ulcers, wounds and other painful skin conditions

Potash obtained from kelp was an important ingredient in skin cleansing agents for thousands of years. The Vikings ate codfish livers claiming it helped their vision for navigating

Until recently, however, marine pharmacognosy, or drugs from the sea, has been restricted by man's limited knowledge of the biology of the oceans and his inability to recognize, collect and process it resources. Being a land-based creature, man has concentrated his search for drugs on the terrestrial sources which surround him, such as soil, plants and animals

But with the advance of science and technology and a new emphasis on oceanography, biologists, chemists and pharmaceutical and medical researchers have taken up the challenge of the sea as the source of new medicines to fight human disease

Cyanamid's Lederle Laboratories, a research leader in natural drug products, such as the soil-derived broad spectrum antibiotics, is actively engaged in a "wet" space program to explore the oceans for potential drugs

To select plant and animal species for study, Lederle's Dr. Paul Burkholder is retracing a

course which has taken him below the ocean from Bermuda to Australia in his 15 years as a marine biologist. He came to Lederle from the Lamont Geological Observatory at Columbia University where he chaired the marine biology program.

Famed for his discovery of chloramphenicol, the most effective drug against typhoid fever, psittacosis and Rocky Mountain spotted fever, Dr. Burkholder has a long and distinguished career as a biologist, botanist and bacteriologist. He has held important positions at Yale, the University of Georgia and the Brooklyn Botanical Garden.

Dr. Burkholder's assignments in the Lederle program include going back to the sites of earlier undersea explorations in the Caribbean and Pacific to collect samples of seaweed, plankton, jellyfish and gorgonias (soft corals) that he suspects hold medicinal promise.

Dr. Burkholder's specimens are preserved in alcohol, dried or frozen and shipped to Lederle's 550-acre research complex in Pearl River, New York.

There a structure and analysis team begins testing extracts of the specimens. Those that show interesting activity are purified until the compound that shows activity can be isolated. Testing continues to determine the active compound's therapeutic activity. The complicated process eventually leads to the identification and synthesis of compounds that show promising medicinal effectiveness.

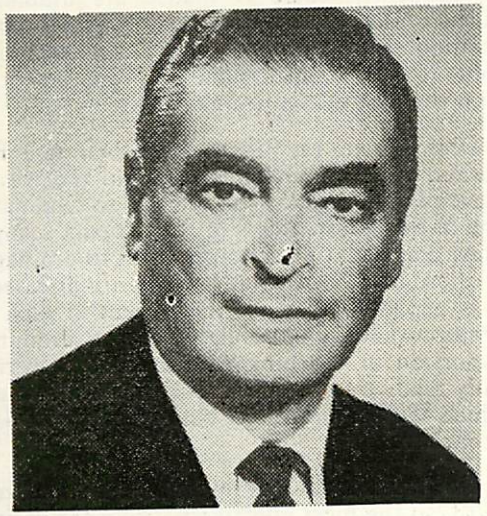
The laboratory hunt is filled with suspense. Will the Lederle team turn up a new life-saving drug? Perhaps. Other scientists studying ocean life have found potentially useful medicines. For example, extracts from the green sponge have shown antibiotic activity and sea cucumber derivatives have inhibited the growth of malignant tumors in mice. Other scientists have shown that the starfish excretes insulin and clams contain heparin-like antibiotics. In the field of heart and circulatory research, it has been learned that the stonefish secretes a poison which lowers blood pressure in animals and the octopus has a substance in its salivary gland which is more effective in correcting irregular heartbeat than quinidine sulfate.

In addition to the record to date, the Lederle scientists know that only a small fraction of sea life forms have been examined. According to Chmical Week magazine, "... of the many organisms that are known—or thought —to contain biotoxic susbstances, perhaps less than one per cent have been examined for biological activity. Of that one per cent, only a dozen or so have been evaluated for chemical and pharmacological properties."

The Lederle scientists also believe that many forms of marine life may turn out to be simpler in structure than their terrestrial counterparts, making easier the task of synthesis. Since a product from a living organism is usually more compatible with another living organism, the Lederle team reasons that side effects might be minimal in drugs from the sea.

Only time and meticulous work in the laboratory will tell. If the researchers' expectation and experience are correct, the 1970's may yield life-saving drugs spawned by strange creatures now living in the sparkling waters of man's last frontier..the sea.

Physiotherapy in the Management of Chronic Respiratory Disease



LOUIS CHERNIACK,
M.D. ,F.R.C.P.(C), F.A.C.P.

Associate Professor of Medicine, University of Manitoba, Winnipeg
Associate Director, D. A. Stewart Centre for Repiratory Diseases, Winnipeg, Manitoba

THE beneficial effects of breathing exercises have now been well established in the management of chronic respiratory diseases which are associated with an obstructive bronchial element: bronchial asthma, chronic bronchitis, pulmonary emphysema, bronchiectasis, and cystic fibrosis. The aim of controlled breathing techniques is to alleviate the effects of physiological changes which have developed as a result of the bronchial obstruction, with a tendency towards the retention of bronchial secretions, increased work of breathing, overdistention of the lungs, and impaired distribution of gas.

The common factor in all these conditions is an increase in the effort required to make an expiration. This may not be a serious matter while the patient is resting, but it becomes so when he must carry out some activity which requires an increase in ventilation. Breathlessness then develops as a result of intensification in both the degree of air trapping and distention of the alveoli.

Furthermore, the breathing pattern in these patients has become abnormal. The overinflated lungs cause a flattening of the diaphragm, with loss of its domed shape and restriction of movement, thus causing it to be a less efficient inspiratory organ. Consequently, these patients expend inspiratory efforts in actively elevating the upper parts of the chest and, at the same time, they tend to rush into the next inspiration before the previous expiration has been completed. This abnormal pattern is further exaggerated by ineffective, paroxysmal coughing which leads to increased air trapping.

In the management of patients suffering from chronic obstructive lung disease, a comprehensive therapeutic program is essential which should vary with each individual depending on the degree of physical disability. The work of breathing must be reduced not only by decreasing airway resistance with bronchodilator therapy, but also by thinning and decreasing bronchial secretions and providing for their effective elimination.

Physiotherapeutic techniques to accomplish these purposes consist of teaching relaxation, re education in breathing control, elimination of retained bronchial secretions, and increased exercise activity. Tension and apprehension are reduced by explaining to the patient in simple terms the physiologic abnormalities which have developed because of his disease, the aims of treatment, and the benefit from exercises. A simple and realistic program is organized which the patient carries out regularly at home; it is reviewed periodically by the physiotherapist and the attending physician.

Relaxation

The attainment of both mental and physical relaxation is fundamental. Not only do these patients hold themselves stiffly, but the accompanying anxiety and worry about their disability favors the use of accessory respiratory muscles.

Relaxation of the muscles of the chest wall will conserve energy for the performance of more useful functions by other voluntary muscles of the body. The patient is taught to relax his accessory muscles, drop his shoulders, and eliminate the elevation of the upper part of his chest during quiet respiration. This can be achieved only if the patient is also mentally relaxed.

Breathing control

Education in breathing control is directed toward a more efficient breathing pattern, with more time expended in expiration and a reduction of the resistance to airflow by the use of pursed lip breathing.

Premature collapse of the bronchial airways during expiration is the most serious factor in chronic obstructive lung disease. This is due to the pressure differences which exist between the higher pressure in the intrapleural space and lower one in the tracheo bronchial tree. This difference in pressure is largely the result of the diminution in the elasticity of the walls which tends to support these airways. Because of premature collapse of the bronchial airways, air trapping with overdistention of the alveoli takes place.

It is a common clinical observation that many of these patients will spontaneously exhale through pursed lips, especially when they have become unusually short of breath. An obstruction to the outflow of air at the lips produces an increase in the pressure within the mouth which is reflected backward into the bronchial tree, presumably leading to a reduction in the tendency of the airways to collapse. In an attempt to overcome the ill effects of premature collapse of the bronchi during expiration, the patient is taught to reverse his usual pattern of breathing. Expiration is made a more active and prolonged phase of respiration and, at the same time, the patient is encouraged to purse his lips during expiration

To restore the normal efficiency of the diaphragm, the patient is made to assume the head down position at an angle of approximately 20 degrees. In this position, the weight of the abdominal viscera pushes the diaphragm upward. This effect can also be achieved by having the patient tilt his trunk forward at an angle of approximately 20 degrees.

Postural drainage

Adequate drainage of the more dependent areas of both lungs is adversely affected by gravity and also by the position of the trachea and the larger bronchi which are tilted toward the posterior aspect of the thoracic cage. Consequently, there is inadequate drainage of the bronchi when the patient is in a supine position. The effect of gravity can be overcome if the patient assumes a prone position with the foot of the bed elevated.

Drainage of the tracheobronchial tree by mechanical means is important in the treatment of bronchiectasis as it helps to eliminate one of the major causes of the patients' symptoms. Particular attention is given to drainage of those lobes of the lung which are diseased. It is necessary to place the patient in such a position that the particular bronchus draining a portion of the lung will be situated vertically relative to the bifurcation of the trachea which should lie directly below this particular bronchus.

The bronchus of the upper lobe runs downward, so the most effective position for drainage is an upright position. The bronchi of the middle lobe of the right lung and the lingular segment of the left upper lobe both run horizontally and forward; effective drainage occurs in the supine position with the body tilted opposite to the side being drained at an angle of 45 degrees. The bronchi to the superior segments of both lower lobes run in a horizontal and backward direction, so the proper position for their drainage is a prone position with the body turned on the side opposite to the lung being drained. For drainage of either lower lobe, the foot of the bed is elevated 12 inches; the patient is in a prone position and tilted so that the lobe being drained is situated above the bifurcation of the trachea. At least ten minutes is required for proper drainage of each segment or lobe; during this time, the patient should cough at regular intervals. Drainage should be carried out each morning on arising and in the evening before going to bed.

To aid in the removal of the thick, viscid bronchial secretions which adhere to the walls of the bronchi, vibration and clapping of the chest wall are performed manually by the physiotherapist. Vibration is accomplished by producing a fine shaky movement of the hands with one hand placed on top of the other on the chest wall overlying the lobe being drained. Clapping is carried out by cupping the hands slightly and allowing them to fall by their own weight on the chest wall. Both these procedures are performed over the particular lobe being drained during the expiratory phase of respiration when the patient is also encouraged to cough.

Physical activity :

General physical activity is of great importance in maintaining muscular efficiency, since inactivity leads not only to atrophy of voluntary muscles but also to circulatory insufficiency. A programme of gradually increasing exercise is instituted to improve the patients' general physical fitness. First, the patient is made to walk on the level, assisted by the administration of oxygen if necessary. Activity is then gradually increased to riding a stationary bicycle and, finally, to climbing stairs. The exercises are synchronized with the patient's breathing, so that inspiration occupies one third and expiration two thirds of an exercise unit.

This graded exercise program results in more efficient use of the available oxygen by the exercising muscles and also considerably improves the mental outlook of the patient.

Results of physiotherapy

Results are governed largely by the severity of the patient's disease, the degree of his disability, his co-operation, and the time spent by the attending physician and a competent physiotherapist on individual treatment. The treatment cannot be successful unless the patient co-operates. Each patient is an individual problem and should receive individual instruction by a competent physiotherapist until he has mastered these exercises sufficiently to carry them out safely at home.

Acknowledgement :

(I wish to thank Miss Ruth Grant, Department of Physiotherapy, Winnipeg General Hospital, for her invaluable assistance in the preparation of this paper.)

Rehabilitation of the Disabled

(*Corrective Spinal Braces*)

By

JAMES JALAL

U. S. A.

THE use of "Corrective spinal braces" (back supports) is limited almost completely to the treatment of scoliosis of the spinal caused by idiopathic and paralytic factors. It is doubtful if so-called active corrective braces do actually exert continuous corrective force upon the deformity, which requirement is an essential feature of any appliance designed to correct a structural deformity of the spine. Many orthopaedic surgeon's experience is that correction of scoliosis can be obtained only by treatment with some form of rigid hinged cast or by means of multiple traction or by combination of both. The Milwaukee Brace, however, provides these traction and corrective forces in an ambulatory (up-walking) appliance.

Maintenance and correction by this retentive apparatus must be continued throughout the period of growth or the involved vertebrae must be surgically fused. Spinal braces also have a place in the retentive treatment of structural or congenital scoliosis to accomplish one of the following purposes:

(1) To prevent a progressive increase in deformity during the period of rapid growth so that there may be hope in the early cases of avoiding surgery or in children too young for surgical fusion.

(2) As a retentive or holding appliance, to prevent recurrence following operative fusion.

(3) To overcome weakness and instability.

(4) To relieve pain.

It is beyond the scope of this text to describe the operative methods and techniques used in the treatment of scoliosis by means of spring corrective supports attached to vertebrae.

The section includes only a description of those metal supports, which are most commonly used in other countries as post-operative treatment of scoliosis. Many of these appliances are of complex design and present difficult problems to the appliance-maker in their construction and fitting so much so that it may well tax the skill and patience of the appliance-maker. Moreover, careful selection of materials and design should be made in the detailed prescription. Constant supervision of fitting and frequent follow-up inspection, both on the part of the physician and the brace-maker, is essential if the appliance is to function comfortably and effectively. A negative and positive cast carefully made of plaster of Paris from the torso is an essential requirement for the construction of most of these corrective brace supports, and meticulous attention in the application of cast and shaping of the form is of utmost importance.

ENDOTOXIN AND THE LIVER

M. VILAYAT ALI, M. D.* AND
JAMES P. NOLAN, M.D.**

**Assistant Professor of Medicine, State University of New York at Buffalo. **Professor of Medicine*

THE intimate anatomical and functional relationship of the liver and the gastrointestinal tract in maintaining the metabolic integrity of the human body is well known. In health or in disease, the liver plays a central role in the metabolism of carbohydrates, proteins, and fats before they are dispensed to vital organs of the body. A key problem is whether the intestinal tract by virtue of being a host for gram negative micro organisms influences the "defensive role" of the liver in situations where it becomes pathologically involved. We report some of the studies carried out in our laboratory in investigating the role of the reticuloendothelial system in modifying the extent of hepatic injury in experimental nutritional cirrhosis This investigation we carried out to test our hypothesis that such an altered host and defense relationship is indeed an important contributory mechanism by which the hepatic injury is initiated and developed in "nutritional cirrhosis."

Excerpts from the data and the results derived from our earlier published reports (1,2) are presented in the following paragraphs.

As shown in table (1) when I^{131} labelled microaggregated albumin is injected intravenously into rats on choline deficient and control diets and the half clearance time measured at various dietary periods, it is found that a significant prolongation is evident in treated over control animals at the end of one and two weeks. The prolongation of half clearance time in rats on a choline deficient diet clearly indicates impairment of the reticuloendothelial function in the early phase of the development on the cirrhotic lesion. The significance of this observed phenomenon is yet to be clarified.

In a similar experimental model, we then studied lethality of rats on a cirrhotogenic diet. Table(2) shows the comparison in lethality of endotoxin in treated and control animals. As shown, at an endotoxin dose of 0.5 mg. not a single death was encountered in control animals, whereas all the animals on the choline deficient diet for two week periods died.

Fig. (1) shows the hepatoxic effect of sublethal doses of endotoxin in treated and control animals. It is evident that the serum glutamic oxalic and pyruvic transaminase levels of control animals showed little change from normal at 0.10, 0.05, and 0.01 mg. of endotoxin administration. At the same endotoxin doses, these enzymes in the animals on a choline deficient diet were much above the saline injected controls.

Since the reticuloendothelial system is known to be of importance in the detoxification of endotoxin, it is tempting to speculate that the decreased R.E.S. activity in choline deficient animals accounts for the enhanced susceptibility to the effects of endotoxin. Further studies are in progress to see whether the absorption of endotoxin is greater in nutritionally cirrhotic animals.

TABLE 1.

Clearance of Microaggregated Albumin [AA] in rats on Choline-Deficient [CD] and Choline-Supplemented [CS] Foods at various time periods

Type of diet	No. of paired rats	Period on diet	AA-I^{131} batch	Half-clearance time			t
				Mean	S.D.	S.E.*a*	
		wk.					
CD	7	1	A	; 26.4	±8.02	±2.97	; 3.0
CS	7	1	A	; 17.0	±4.04	±1.49	
CD	10	1	B	; 14.2	±2.01	±0.63	
CS	10	1	B	; 11.0	±1.56	±0.49	7.3
CD	6	2	A	; 18.3	±2.18	±2.53	
CS	6	2	A	; 14.7	±2.44	±0.99	NS*b*
CD	7	2	B	; 11.6	±1.75	±0.66	NS
CS	7	2	B	; 11.5	±2.32	±0.87	
CD	8	4	A	; 20.2	±4.09	±1.44	NS
CS	8	4	A	; 19.5	±5.02	±1.76	
CD	6	4	B	; 15.0	±1.82	±0.74	NS
CS	6	4	B	; 13.8	±2.66	±1.08	
CD	7	8	A	; 22.2	±3.53	±1.30	NS
CS	7	8	A	; 23.7	±5.04	±1.86	
CD	4	8	B	; 15.3	±1.88	±0.94	NS
CS	4	8	B	; 15.2	±3.24	±1.62	
CD	7	15	C	; 26.7	±7.72	±2.90	NS
CS	7	15	C	; 26.4	±7.10	±2.66	

*a*95 per cent confidence level. *b*NS, not significant.

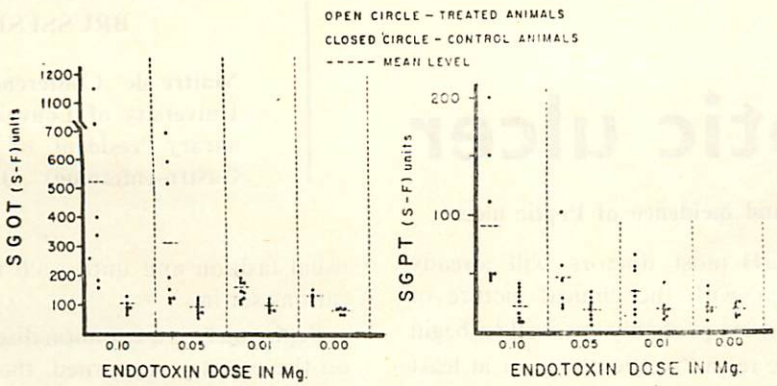


FIG. 1. Comparison of transaminase values 24 hr after endotoxin in animals treated with a choline deficient diet and with a control diet for 21 days.

TABLE 2.

Comparative Lethality of Endotoxin in Choline Deficient and Control Animals.

Group		Time on diet (weeks)	Endotoxin dose (mg)	No. dead/ total	
Deficient	Control	2	0.25	5/10	0/10
-do-	-do-	—	0.50	10/0	0/10
-do-	-do-	—	1.50	9/10	0/10
-do-	-do-	4	0.50	8/10	0/10
-do-	-do-	—	1.50	10/10	3/10
-do-	-do-	6	0.50	4/5	0/5
-do-	-do-	—	1.50	5/5	2/5

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The Problem of Peptic ulcer

Dr. JOSEPH MASSION,
BRUSSESLS

Maitre de Conferences at The University of Louvain and Honorary President of the World Gastro-enterology Organisation.

Definition and incidence of Peptic ulcer

ALTHOUGH most doctors will already be familiar with the clinical picture of petic ulcer, it is probably as well to begin by defining the term "peptic ulcer" or at least indicating what it is normally taken to mean.

To quote one definition, a peptic ulcer is "an ulcer of the oesophagus, stomach, or duodenum in the causation of which the gastric secretions are believed to play some part". Since, however, the term is usually applied only to ulceration of the stomach or duodenum, the present monograph will deal solely with the problem of gastric and duodenal ulcers. Although these two types of ulcer each exhibit certain distinctive features that are characteristic of their respective anatomical and clinical pictures, they have a great deal in common. In both instances, the loss of substancer extends deep into the tissue, beginning in the form of circumscribed erosion of the mucous membrane, including the muscularis mucosae, and then eating through the submucosa into the underlying layers of muscle fibres. After a while, the margins of the ulcer generally become sclerosed.

Typical of the clinical course in cases of gastric or duodenal ulcer is its periodicity. Peptic ulcers show a cyclic pattern of development marked by acute exacerbations which may last anything from several days to several months, the average generally being a few weeks; diurng the intervals between these attacks complete remissions occur, at least so long as the ulcer continues to develop in the usual fashion and until such time as complications set in.

Peptic ulcer is a common disease Depending on the country concerned, the morbidity rate may be as high as almost 10% Though occasionally found in children, peptic ulcers do not usually make their appearance until after the age of 20 years From about 60 years of age onwards they become less frequent, although death due to perforation or haemorrhage is by no means a rare occurrence among old people suffering from peptic ulcers.

Men are more often affected than women; it should be added, however, that in women the disease trends to run a milder course and may even escape notice altogether.

In our experience, which agrees with that of LEVRAT, duodenal ulcers are roughly twice as common as gastric ulcers. Multiple ulcers, either of the stomach or of the duodenum, are sometimes encountered; in a case described by SIMON, for instance, as many as seven ulcers were present Nor it is rare to find a duodenal ulcer (or an ulcer of the pyloric canal) in combination with a gastric ulcer—in which case the ulcer in or near the pyloric region will probably have been the first to develop.

As already mentioned, gastric and duodenal ulcers differ in several respects; a duodenal ulcer is associated with increased gastric secretion, for example, whereas in the presence of a stomach ulcer gastric secretion is only slightly above or below the norm. Gastric ulcers show a stronger tendency to bleed, but usually respond to treatment better than duo-

denal ulcers. Both forms of ulcer, however, are morphogically similar, and both are quite often met with in members of one and the same family. Thus, despite the differences between them, the practice of lumping gastric and duodenal ulcers together under the heading "peptic ulcer" is in point of fact justified.

The following review deals firstly with the aetiology, pathogenesis, and location of peptic ulcers, then with their clinical picture and diagnosis, and concludes with a more detailed discussion of their treatment.

Aetiology :

As in the case of migraine or asthma, for example, a predisposition towards the disease seems to be the most important factor contributing to the development of a peptic ulcer. Since peptic ulcers tend to run in families, we would agree with LEVRAT that hereditary influences are probably involved, although it is impossible to determine with certainty whether the trait is dominant or recessive.

Apart from the question of specific predisposition, other aetiological factors include those responsible for the onset and intensity of an exacerbation. Foremost among these is undoubtedly psychological stress—at least insofar as it serves to reinforce, as it were, the spontaneous cyclic pattern of the clinical course, to accelerate an acute attack, or to aggravate the symptoms. Moreover , since such aggravation of the symptoms adds to the patient's suffering, particular attention should be paid to this stress factor when deciding upon the treatment to be given.

Besides emotional strain, nutritional factors also exert a certain, albeit less pronounced, influence; this—as the studies in geographical pathology undertaken by PISI and BARBARA would appear to confirm—applies particularly to malnutrition. It should perhaps also be mentioned that the incidence of peptic ulcer is relatively higher in patients suffering from liver cirrhosis or from chronic respiratory failure.

Of major importance in the aetiology of peptic ulcer are the side effects exerted by various drugs. The list of medicinal substances conducive to ulceration is headed by cortisone and its derivatives, closely followed by phenylbutazone; next, to name only the more important drugs, come acetylsalicylic acid and—further down the list, but still definitely incriminated—reserpine. In patients with a history of peptic ulcer, these drugs may cause a recurrence, which generally proves to be of a painful nature; in subjects who have never previously suffered from peptic ulceration, they are also liable to provoke an ulcer, which in such cases is often located in the region of the pyloric antrum or the greater curvature of the stomach.

Since corticosteroids suppress inflammation, ulcers induced by them frequently give rise to no symptoms whatsoever; even perforations may remain largely asymptomatic and lead to the formation of intestinal fistulae which—astonishingly enough—sometimes heal spontaneously after the corticosteroid has been with-drawn.

In cases where phenylbutazone and other antirheumatic drugs, such as indometacin, cause old ulcers to flare up again or possibly even provoke fresh ulcers, they generally do so quite soon after the start of treatment and irrespective of the route by which they are administered. Following a series of phenylbutazone injections, for instance, we have ourselves seen a massive haemorrhage in a woman with a previous history of gastric ulceration.

In view of the huge scale on which acetylsalicylic acid is consumed, we believe, like LEVART, that its use entails relatively little risk of causing ulcers. Nevertheless, it does quite often give rise to bleeding either from a pre-existing ulcer or from the superficial lesions that are characteristic of erosive gastritis.

Ulcers due to treatment with reserpine and its homologues, though even less common, are also a possibility to be borne in mind. We do not propose to discuss here ulcers occurring as a sequel to burns and operations or ulcers developing in the course of diseases affecting the central nervous system; these can probably be classified as stress-induced ulcers (LEVRAT).

Pathogenesis:

About the pathogenesis of peptic ulcer it is probably true to say that even less is known than about its aetiology, Although hydrochloric acid undoubtedly plays a role in the pathologenesis of post-operative jenunal ulcer (the only from of ulcer to which in French medical parlance the term *ulcere paptique* is assigned), it is less certain whether the same applies to the causation of gastric ulcers. On the contrary, in patients suffering from gastric ulcers, subacidity rather than hyperacidity is the usual finding, i.e. both the production and the concentration of hydrochloric acid tend to be subnormal.

Whether the wall of the stomach and duodenum succeeds in resisting the action of the gastric juices, or whether it fails and sustains damage as a result of autodigestion, is a question depending on factors that are still obscure. Current studies on the pathogenesis of peptic ulcer seem to be concentrating largely upon two lines of research: firstly, pathological changes in the mucus secreted and, secondly, vascular factors in the shape of circumscribed areas of ischaemia.

One of the most mysterious features of the disease is the periodicity characteristic of its clinical course, which it has so far proved impossible to imitate in animal experiments.

To date, research in this connection has thus yielded meagre results. As the eminent American gastro-enterologist BOCKUS remarked a few years ago, in this domain we are simply marking time and repeating ourselves from one congress to the next.

Clinical aspects :

Dual periodicity

Regardless of where the petic ulcer is located, a study of the case history almost invariably discloses a dual periodicity—a diurnal and an annual rhythm—which is distinctly pathognomonic. This extremely important fact has been particularly well emphasised by GUTMANN.

There is quite often a recognisable connection between the ingestion of food and the diurnal rhythm of the pain associated with peptic ulcer. In exceptional cases the pain sets in immediately after a meal; as a rule, however, either it is of delayed onset and is not felt until several hours after the ingestion of food or, alternatively, it takes the form of hunger pain occurring on an empty stomach.

The annual rhythm of peptic ulcer is marked by periodic excerbations usually lasting anything from a few days to a few weeks and occasionally perssting for several months. In most cases this periodic pattern of the pain remains typical of peptic ulcer for years, i.e. until such time as complications develop or as the ulcer penetrates in depth.

Though the pain is generally of a spasmodic nature, it may sometimes also assume a different character, such as a feeling of pressure or a burning sensation in the epigastrium. The most distinctive feature of the symptoms is their regular, rhythmic pattern; this in itself is sufficient to arouse suspicion of an ulcer and to justify further investigation of the case, including X-ray examination in particular. Incidentally, the patient often finds that he can obtain relief from the pain by ingesting food, by taking antacids, or by lying on his back. During severe exacerbations, attacks of pain may also occur at night; this, however, is not necessarily, a sign that the ulcer has penetrated in depth.

Sites of predilection:

An ulcer in the duodenal bulb, i.e. in the first part of the duodenum immediately after the pylorus, is initially almost always confined to

the anterior or posterior wall and thus appears *en face* in the X-ray picture. It is less common to find an ulcer situated beyond the superior duodenal flexure or in the descending portion of the duodenum, roughly down to as far as Vater's ampulla. Ulcers located in this region are often overlooked; consequently, when X-raying a patient with a history of "dual periodicity", one should also search systematically for an ulcer here as well. Another reason why it is very important to pay special attention to this area is because ulcers lying beyond the duodenal bulb prove particularly refractory to treatment and also tend to bleed more readily.

The majority of stomach ulcers are to be found within a zone which has been clearly delimited by MOUTIER This zone has the shape of an inverted isosceles triangle, the tip of which coincides with the angular notch of the stomach—i.e. with the point where the vertical and horizontal portions of the gastric wall meet—and the base of which is situated in the lower part of the fundus; the triangle thus largely occupies the posterior surface of the stomach. Ulcers occurring roughly on a level with the angular notch are usually located in the vicinity of the lesser curvature. If situated further down in the stomach, they tend to be restricted to a strip of the gastric wall formed by the anterior surface of the stomach and gradually widening as it approaches the pylorus.

As regards their sites of predilection, a distinction can therefore be drawn between the following types of gastric ulcer: ulcers near the lower part of the fundus, ulcers of the posterior wall situated above the angular notch, ulcers lying within the angular notch itself, ulcers on the anterior surface of the antrum, juxtapyloric antral ulcers, and ulcers of the pyloric canal. At this point, it should perhaps be noted that "pyloric canal" is a term more appropriate to radiography than to surgery, because when carrying out an operation the surgeon identifies the junction between the stomach and the duodenum by reference to the pre-pyloric vein, which originates from the lesser curvature.

Gastric ulcers may, of course, sometimes also develop at other sites, e.g. in the central portion of the anterior or posterior surface of the stomach or, by way of exception, in the greater curvature; ulcers present in such locations are correspondingly more difficult to discover.

Reference should also be made here to a rare disease known as Zollinger-Ellison syndrome, typical of which is the presence of one or two ulcers located usually in the third or fourth parts of the duodenum (and sometimes in the duodenal blub, but never in the stomach) or at the commencement of the jejunum. These ulcerations arise in patients suffering either from islet-cell tumours of the pancreas, which are often malignant and in which the *B*cells do not participate, or from other types of tumour affecting the endocrine system. The conditions is extremely painful and copious vomiting is a frequent accompaniment. Another characteristic feature is marked gastric hyperacidity which persists day and night and is due to the fact that both the quantity and the concentration of the hydrochloric acid are abnormally high; there may also be an increase in the secretion of pepsin. Diarrhoea is present in approximately 20-50% of cases, and in some patients it may be the only symptom; this diarrhoea appears to be attributable to a substance secreted by the tumour, a substance which is also responsible for provoking the ulcerations.

Cases in which peptic ulcers have continued to recur despite repeated gastric resections may sometimes prove to be due to Zollinger-Ellison syndrome. In such instances, renewed recurrences must be expected until such time as total gastrectomy is performed, accompanied if possible by excision of the tumour, Although the latter is sually located in the pancreas,

multiple tumours involving other sites as well have also been encountered.

Now let us turn to the diagnosis of peptic ulcer, i.e. to the methods available for obtaining objective evidence of the presence of the lesion.

Diagnosis :

Confirmation of a diagnosis of peptic ulcer is almost invariably based on the results of X-ray examinations, which if necessary can be supplemented by gastroscopy. Analysis of the gastric juice, though possibly of some interest, merely provides additional clues, and it is thus only in exceptional cases that there is any need to resort to it in practice.

Reference will be made here, not to radiological techniques as such, but to certain of the more typical findings in X-ray pictures of patients suffering from peptic ulcer. Needless to say, a painstaking radiological investigation is indispensable in every case, and it should always be borne in mind that even negative X-ray findings do not mean that the possibility of an ulcer can be excluded with certainty.

Radiodiagnosis of duodenal ulcer :

In its early stages, a duodenal ulcer appears as a niche seen *en face*; later, after sclerosis of the lesion has set in, it becomes visible in profile, usually along the edge of the duodenal bulb on the same side as the lesser curvature. Double niches, indicative of "kissing ulcers", are not uncommon; in this form of ulceration, there are two craters located opposite each other in the bulb of the duodenum.

Spasms due to inflammation, coupled with sclerotic processes, subsequently lead to various types of deformation affecting the duodenal blub. These are not always easy to interpret, except in the case of a so-called "clover-leaf bulb", which is virtually unmistakable.

Once treatment for an ulcer of the duodenal bulb has been successfully completed, it is generally unnecessary to carry out another X-ray examination, unless there is reason to suspect a stenosis.

Post-bulbar ulcers—whether located immediately beyond the duodenal bulb or in the upper half of the descending portion of the duodenum—may be difficult to find. If anterior shots taken from the right at an oblique angle, with the patient either lying or standing, fail to yield a clear picture of the post-bulbar duodenum, it may be necessary to resort to an angle of approach that is otherwise seldom employed, i.e. obliquely from the left with the patient lying horizontally. A post-bulbar ulcer will then appear either *en face* or as a niche outlined in profile at the edge of a contracted zone in which the contraction is not necessarily of stenotic but often simply of spasmodic character; this picture is one described by GUTMANN as *perle enfilee*.

Radiodiagnosis of gastric ulcer :

Though of varying sizes and shapes, gastric ulcers usually have a niche larger than that of a duodenal ulcer. Owing to the presence of oedema and spasm in the region of the lesion, a gastric ulcer tends to appear bigger and deeper than in fact it is.

Whenever X-ray examination reveals a niche in the wall of the stomach, a careful watch should be kept on it, because carcinoma of the stomach may sometimes resemble a peptic ulcer. There are, moreover, certain radiological signs that are strongly suggestive of malignancy, one example being a so-called "meniscus niche", i.e. a saddle-shaped and often carcinomatous ulceration of the lesser curvature. X-ray pictures showing recessed niches in the gastric wall likewise point to malignancy.

On the other hand, there are also some radiological signs that are indicative of a benign process, e.g. niches in the lesser curvature which clearly protrude beyond the contour of the stomach. Frequently, however, proof that

a lesion is indeed non-malignant can be obtained only if X-ray examinations repeated at short intervals show that not only the niche but also the pathological changes in its vicinity have completely disappeared.

Malignant degeneration of a stomach ulcer—i.e. the development of a neoplasm at the site where an ulcer has either healed or formed a scar—seems on the whole to be a rare occurrence. If and when the X-ray picture does seem to suggest a neoplasm, the chances are that the lesion will prove to be either a benign Cruveilhier ulcer (a chronic ulcer characterised by particularly severe involvement of the muscle layers) or a carcinoma resembling an ulcer in appearance. It should be emphasised that, however large the lesion may be, whatever shape it may assume, and however deeply it may have penetrated (as revealed by X-ray evidence of a prominent Haudek niche), these factors have no bearing on the question of malignancy. Even the craters of callous ulcers can be induced to disappear in response to appropriate medical treatment.

Ulcers in the region of the antrum, and situated either on the anterior or posterior wall or on the lesser curvature, can often only be seen in the X-ray picture in response to compression of the abdomen. Incidentally, it should be borne in mind that, in the process of forming a scar, ulcers of the antrum may give rise to deformities which, when examined by X-ray, are of what GUTMANN describes as "pseudoneoplastic" aspect.

Ulcers located in or near the pyloric canal also appear either *en face* or on one of the curvatures. Frequently an ulcer at this site causes displacement of the pyloric canal as well as deformities at the border of the duodenal bulb on the side of the lesser curvature.

Gastroscopy :

Ulcers whose location—e.g. on the posterior wall of the stomach—is such that they might be missed by X-ray can be visualised by gastropscoy. Recourse to gastroscopy is therefore particularly indicated in cases where the clinical picture is suggestive of ulceration, but where X-ray examination has failed to reveal an ulcer either in the stomach or in the duodenum. It should be stressed, however, that on the basis of gastroscopy alone one cannot determine with certainty whether a lesion of the stomach is benign or malignant; gastroscopy usually does no more than convey a rough impression—an impression which has to be supplemented by a biopsy before any final verdict can be reached.

By using a so-called fibroscope, i.e. a flexible gastroscope of the type recently developed in Japan, it is now possible to explore the whole of the stomach and to inspect and photograph even the fundus and the pyloric antrum, which were previously regarded as "blind" zones because they could not be visualised by conventional gastroscopy.

Examination of gastric juice :

Although undoubtedly of theoretical interest, analysis of the quantity and concentration of the hydrochloric acid secreted is not essential in practice. Duodenal ulcers, as already mentioned, are generally associated with hypersecretion, with an increase in the acid concentration, and with a correspondingly low PH; in other words, the overall production of gastric acid is appreciably higher than in a normal subject. It must be pointed out, however, that hypersecretion does not always go hand in hand with ulceration; it may, for example, also occur in certain forms of gastritis and it may even be encountered without any accompanying inflammation in young persons whose gastric mucosa features an unusual abundance of border cells.

In the presence of a gastric ulcer—in contrast to a doubdenal ulcer—the output of hydrochloric acid is as a rule subnormal.

Where a Zollinger-Ellison syndrome is suspected, analysis of the gastric juice is mandatory. In this disease, hypersecretion persists day and night, the 12-hour production of gas-

tric juice rising to levels which may be even higher than 2 litres and the acidity attaining values of 100—200 mEq./litre. Healthy subjects, by contrast, respond to the stimulus of a histamine injection by secreting during the following 2 hours approximately 150-250 ml. of gastric juice, the acidity of which is in the region of 15 mEq./litre.

This short account of the diagnosis of peptic ulcer will have sufficed to show that, once the suspicion of a peptic ulcer has been aroused by the patient's case history and symptoms, the final diagnosis will depend first and foremost upon the X-ray findings, supplemented if necessary by gastroscopy.

Complications :

The following review of the main complications liable to occur with peptic ulcer—i.e. stenosis, perforation, and haemorrhage—should perhaps be prefaced by a brief reference to the question of penetration.

It is this property of penetration that accounts for the progressive character of certain types of gastric or duodenal ulcer. In cases where the inflammatory reactions accompanying an ulceration have caused adherence of the serosa to the wall of a neighbouring segment of intestine, the ulcer subsequently eats its way through the serosa and penetrates into the adhering portion of gut. This penetration in depth, involving invasion of the fibromuscular tissue, serosa, and adjacent organs, gives rise to the following clinical manifestations: firstly, the individual exacerbations tend to run into one another, with the result, that it becomes largely impossible to distinguish any annual periodicity; secondly, instead of experiencing the diurnal fluctuations in pain that are typical of peptic ulcer, the patient complains of continuous and often violent pain.

Stenosis :

The form a stenosis assumes may vary greatly depending on whether it has resulted from a gastric or from a duodenal ulcer (cf. Fig. 2).

Where the cause is a gastric ulcer, the stenosis develops gradually owing to retraction of the lesser curvature; the stomach takes on a more compact appearance, its shape first resembling that of a clog and later—when the pylorus has moved up towards the angular notch—that of a snail. One special type of stenosis resulting from gastric ulceration takes the form of what has been termed "fibromuscular atresia of the antrum," its highly distinctive aspect being reminiscent of a fingerstall. Stenosis affecting the middle portion of the stomach, which occurs more frequently in women but now seems to have become re-relatively uncommon, is caused by an ulcer seated high up in the stomach; typical of this form of stenosis is an identation which runs from the greater towards the lesser curvature and leaves only an eccentric isthmus as a link between the upper and lower parts of the stomach.

Stenosis due to a duodenal ulcer presents quite a different picture. Here, the pylorus remains in position and the stomach steadily increases in volume; the antrum becomes so displaced that it extends further to the right than the pylorus, and is at the same time also depressed downwards. When the condition has reached a very advanced stage, the stomach has the shape of a bowl; but cases of this kind are becoming increasingly rare, thanks to the fact that patients nowadays tend to receive earlier and better treatment.

It is important to realise that, in this form of pyloric stenosis resulting from duodenal ulceration, an inflarmmatory factor which is conducive to spasm of the affected organ plays a role—and often a very important one—in addition to the damage due to scarring as such. This explains why less severe, circumscribed stenoses of the type in question may well regress in response to medical treatment. In contrast to widely held views on this subject, we personally have seldom encountered stenoses due to an ulcer in the pyloric canal.

Performation:

Statistical evidence indicates that perforation into the peritoneal cavity occurs in 4-5% of cases of peptic ulcer, the site of the perforation being usually located on the anterior wall.

Although there are certain typical signs and symptoms, e.g. shock and board-like rigidity of the ebdominal wall, which point to an acute perforation, the diagnosis has to be confirmed by X-raying the patient in the upright position, without of course employing a contrast medium. Radiographic evidence of pneumoperitoneum due to perforation takes the form of a prescent-shaped pocket of air between the diaphragm and liver, or occasionally in the left subphrenic space, Particular importance attaches to this sign in cases where a cortisone-induced ulcer has perforated, since such ulcers may develop and perforate more or less silently; the same applies to aged patients, in whom a perforated ulcer—like a ruptured appendix —stepetimes give s rise to very few symptoms at all.

Occasionally a a peptic ulcer perforates into an, "encapsulated" space within the peritoneal cavity, in which case the perforation may perhaps heal spontaneously or, alternatively, result in formation of a subphrenic absecess. Another possibility is that closure of the perforation may be effected by adherence of the ulcer to an adjocent organ, i.e. to the liver, the lesser omentum, or the pancreas.

Haemorrhage :

Haemorrhage is a common complication of peptic ulcer. Despite this, we agree with LAM LING that, although 15-30% of all peptic ulcers probably bleed at some time during their development, the incidence of massive haemorrhage does not exceed 3—5%. Bleeding often sets in at an early stage in the course of the disease and may indeed sometimes be the very first of the signs and symptoms; it is able to occur not only during an acute exacerbation, but also in a period when the patient is completely free of pain. Particularly dangerous is the occurrence of massive bleeding in elderly patients suffering from peptic ulcers.

Haemorrhage as a complication of peptic ulcer seems to be attributable to either of two causes, between which a clear distinction can be drawn also as regards treatment. On the one hand, the bleeding may be due to vascular arrosion, in which case haemorrhage from a ruptured arteriole or from an crosion will be found if an operation is performed. Alternatively, the bleeding may take the form either of erthrocyte diapedesis from the ulcer margin or of extensive capillary haemorrhage indicactive of concomitant haemorrhagic gastritis.

TREATMENT FOR UNCOMPLICATED PEPTIC ULCER

Acute exacerbations :

In most cases of peptic ulcer, we treat acute attacks on an ambulant basis. This does not mean that we underrate either the major role played by cerebrocortical and psychic factors in patients suffering from peptic ulcer or the beneficial influence which bed-rest can exert on the bouts of pain. In our experience, however, acute exacerbations can in most cases quickly be curtailed by inducing the patient to adopt a more careful mode of living and, if necessary, to take things easier at work.

As regards the choice of medicinal therapy, we give preference to bismuth preparations and—in patients aged 15 years or older—we recommend to grammes of bismuth subnitrate to be taken twice daily, i.e. after rising in the morning and before retiring to bed a night. This dose in well tolerated and hardly ever causes constipation. In patients whose bowels are functioning normally, good results can also be obtained with bismuth aluminate or bismuth aluminium carbonate, both of which are easy to handle.

We make it a practice to advise the patient to take a few tablets of a silicate or aluminate preparation as soon as he begins to feel delayed pain after a meal; similar drugs in gel form are effective as well. Although calcium carbonate and magnesium oxide often afford better relief, we think they should be prescribed only temporarily, so as not to run the risk of alkalinuria. The use of sodium bicarbonate should at all events be avoided, since it not only has the disadvantage of provoking reactive hypersecretion of hydrochloric acid, but in rare cases may also cause renal damage, e.g. in the form of nephritis accompanied by alkalosis, as en countered in Burnet's syndrome (milk-alkalisyndrome).

Preparations containing, or derived from, liquorice—which enjoy great popularity in the Anglo-Saxon countries—can likewise be relied upon to provide good symptomatic relief. But we continue to view their use with reserve, the reason being that, owing to the glycyrrhizic acid which they contain, they are liable to induce disorders of the water and electrolyte balance when taken in large doses.

Another routine measure which we adopt is to prescribe an anticholinergic agent, i.e. either 0.5 mg. atropine sulphate after the morning and evening meals or a synthetic anticholinergic drug such as Antrenyl* Duplex, which has less marked side effects and a duration of action of up to 12 hours. Though experimental studies appear to show that anticholinergics exert only a short-lasting effect on the muscular tissues of the stomach, clinical observations indicate that in practice their action is more prolonged. Their chief contra-indications are glaucoma and prostatic hypertrophy; in patients in whom anticholinergics are contra-indicated, a tranquilliser may usefully be prescribed instead. It has been our experience that anticholinergics, injected subcutaneously, prove particularly effective in cases where a duodenal ulcer is associated with evidence of stenosis due to inflammatory processes.

In somewhat more severe attacks of peptic ulcer we administer intramuscular injections of casein peptone, which has an anti-inflammatory effect. Alternatively—especially in patients suffering from large gastric ulcers—we resort to Oxyferriscorbone* sodique, which is also said to promote scar formation; be that as it may, it certainly seems to bring about a rapid imProvement in the patient's general condition.

Like GUTMANN, we tend to relax dietary restrictions fairly soon, placing particular emphasis on the importance of a wholesome and varied diet. If possible, the patient should take four or five meals within each 24-hour period; alcohol, cooked fats, and spices should be avoided and, in accordance with theoretical concepts, the salt intake should be reduced in cases of duodenal ulcer. At the beginning, fish and white meat are better tolerated than other types of meat. If necessary, a diet of milk and/or gruel may be imposed, but should not be continued for more than a few days. We have seen cases in which an excess of milk in the diet appears to have actually prolonged acute exacerbations and encouraged gastritis during the intervals between attacks.

Of cardinal importance is a healthy mode of living—a requirement, however, which patients often find most difficult to fulfil. For this reason, if a painful attack does not subside within 3—4 days, we advise the patient to spend a few days either in bed or relaxing at home on a couch, after which he is allowed to resume his normal occupation.

Where an exacerbation proves particularly unresponsive to treatment, we arrange for the patient's admission to hospital. Hospitalisation is often sufficient in itself to elicit a marked clinical improvement within only three days or so. If necessary, as an additional measure we administer 1/2-1 litre of a 1:1,000 procaine solution daily by intravenous infusion. The strict diet initially imposed can soon be relaxed.

Maintenance therapy :

Once an acute exacerbation has subsided, is it sufficient—as certain authors claim—to provide the patient with advice on his diet and especially with psychological guidance designed to ensure that he learns in future to avoid situations of stress?

The value of maintenance therapy given between acute attacks is very difficult to assess; this applies particularly to duodenal ulcers, gastric ulcers being somewhat more amendable to such treatment.

A study undertaken by my colleague BARBIER, who analysed 250 cases of peptic ulcer selected at random from amongst the patients treated in my private practice, seems to indicate that maintenance therapy does not help much to prolong the interval between one acute episode and the next, but that it does make life considerably more comfortable for the patient between attacks.

What form does this maintenance treatment take? Having remainded the patient once again how important it is that he should adhere to a well-ordered pattern of life and a sensibes diet, we prescribe daily doses of bismuth subnitrate over a period of two or three years; as a rule a dosage of 10 g., taken once a day upon rising in the morning, is enough. The only parenteral therapy to which we have resorted at all frequently consists of minute histamine doses administered in a series of subcutaneous injections once or twice a year during the intervals between attacks; these injections of histamine—in the form of Theramine*—are given every other day for 40 days. It is my impression that this medication serves to improve the patient's general condition and often makes it easier for him to cope with foodstuffs which he might otherwise have difficulty in tolerating. The injections are tantamount to inflicting on the patient a series of "microshocks", in the therapeutic action of which a diencephalic mechanism is probably involved.

Finally, we think it advisable to instruct our peptic ulcer patients to report for a check-up now and again (every six months, for example), over a period of several years. Many patients prove co-operative in this respect and are quite willing to undergo these periodic examinations. Such surveillance may perhaps help to prevent complications; to prove this, however, would require vast quantities of comparative statistical data, which unfortunately are not available to us.

Treatment for complications

Perforation :

Acute perforation of a peptic ulcer calls for immediate transfer of the patient to hospital. Surgical treatment was at one time invariably resorted to in such cases, i.e. the abdominal cavity was opened, the lesion sutured, and appropriate measures taken to ensure postoperative drainage. Nowadays surgeons are less unanimous in their opinions as to the best procedure, although the average approach can probably be summed up as follows:

If little time has elapsed since the perforation occurred, and if all the requisite equipment is to hand, continuous aspiration of the gastric juice using TAYLOR's method may be practised—unless, of course, the perforation took place shortly after a meal, in which case there would be reason to fear a massive escape of chyme into the abdominal cavity. If continuous aspiration fails to produce the desired response within a few days, it will still be possible to operate.

In all other circumstances, some surgeons make it a rule to carry out gastric resection, some prefer simply to suture the perforation, whereas other resect or suture depending on the nature of the case. Since we have seen quite a number of recurrences of perforation in patients treated by suturing alone, it is our personal opinion that, where the decision has been taken merely to suture the lesion, gastric resection should nevertheless be performed at

a later date without awaiting a renewed perforation. Exceptions to this recommendation can perhaps be made in the case of perforation of an acute ulcer in a young patient, because here there seems to be less danger of a recurrence.

Haemorrhage :

The general consensus of opinion as regards the need for surgery in cases of massive haemorrhage appears to be as follows: if, despite adequate transfusions, the bleeding has still not ceased after 24 to 48 hours, an operation should be undertaken without further delay; the risk which such an operation entails is one that simply has to be accepted. In cases of this kind, severe arrosion of an arteriole in the crater of the ulcer is a common finding.

One difficulty met with in this connection is recognising haemorrhage due to ulceration in a patient with no previous history of peptic ulcer. Here, however, a cautiously conducted X-ray examination often enables one to discover the site of the bleeding, e.g an oesophageal varix or an ulcer crater. Some authors resort to gastroscopy. which is carried out preferably under anaesthesia in the operating theatre, so that if necessary it can be followed immediately afterwards by a surgical intervention. In a certain number of cases, gastric haemorrhage is due not to the presence of an ulcer but to erosive gastritis or, occasionally, to a very small haemorrhagic lesion of the mucosa referred to as exulceratio simplex.

Assuming that the bleeding has been successfully arrested by conservative measures, the question then arises as to whether an operation ought still to be performed. If the haemorrhage is the first and only one that the patient has ever had, or if it is obviously due to a drug-induced ulcer, we think it may well be possible to postpone surgery. On the other hand, all cases of peptic ulcer associated with recurrent haemorrhage should in our opinion be dealt with by the surgeon. Surgical treatment is particularly indicated in elderly patients, in whom increased vascular goes hand in hand with impaired blood regeneration.

Stenosis :

Stenosis of inflammatory origin due to the presence of a duodenal ulcer often subsides in response to medicinal therapy instituted at the start of an acute episode, provided the treatment—including especially anticholinergic medication—is continued for a sufficiently long time.

Stenosis in the form of an organic obstruction, whether caused by a gastric ulcer or by an ulcer in the duodenal or pyloric region, calls for surgical treatment. Instead of gastro-enterostomy, which at one time was generally carried out in such cases, the usual practice nowadays is to resort to gastric resection; the majority of surgeons, in fact, rightly regard gastric resection as the method of choice.

Where "fibromuscular atresia of the antrum" (i.e. fibrous atresia together with hypertrophy of the muscular elements) has developed as a sequel to gastric ulceration, this special form of stenosis will also require surgery if it is severe enough to interfere seriously with evacuation of the stomach. Surgery is, of co course, likewise indicated whenever a neoplasm in the region of the antrum is suspected.

Refractory peptic ulcer

In the case of a gastric ulcer which proves refractory to treatment, even the slightest suspicion of cancer is sufficient to justify gastric resection. One should, indeed, refrain from operating only if medicinal therapy has proved successful and if one is convinced in the light of the X-ray findings that the lesion is non-malignant.

Where the refractory ulcer is located in the duodenum, it is not always easy to decide whether or not an operation is indicated. There is at all events an indication for surgery if the ulcer gives rise to continuous piercing pain, which often radiates dorsally and may also persist at night.

We likewise consider an operation advisable in middle-aged men if failure of the ulcer to re-

spond to treatment, or if the occurrence of acute attacks in rapid succession, proves an occupational handicap. For women we are much more reluctant to countenance surgery, because it has been our experience that the post-operative course is usually fraught with far greater difficulties in women than in men.

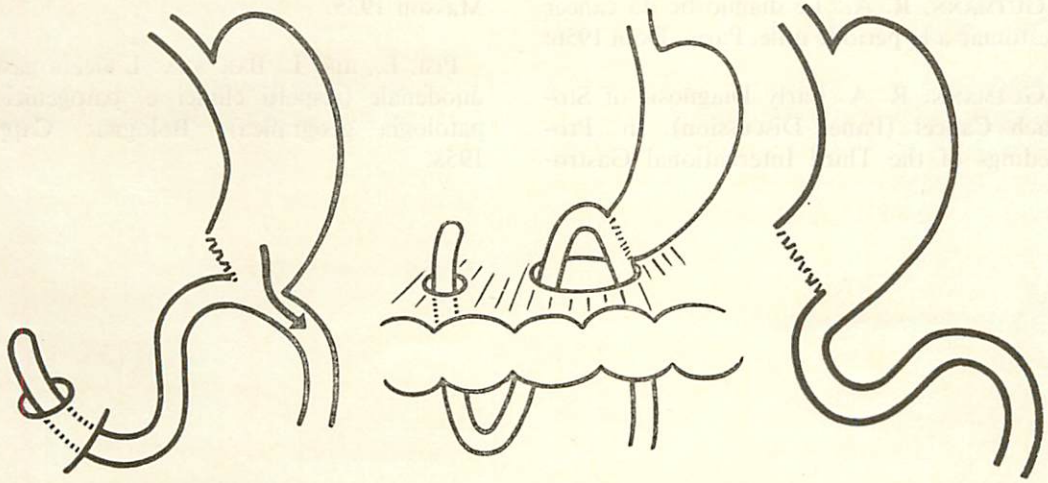
There are also certain circumstances in which, unless grave complications are present, surgery is contra-indicated; among these contra-indications are, for example, severe neuroses and superimposed functional disorders, including in particular allergic migraine and other related allergic manifestations. In such cases we have observed disappointing results not only after gastrectomy but also after vagotomy—which is hardly surprising in view of the evident causal connection with autonomic nervous dysfunction.

Finally, it should be added that—particularly in cases of duodenal ulcer—the need for surgery because conservative treatment has failed does not arise very often. Of the 250 patients covered by the statistical analysis mentioned earlier, only 6 have so far had to undergo an operation for this reason. Though the latter figure will probably increase in the further course of time, we doubt whether it will ever rise as high as those quoted by other authors.

CHOICE OF SURGICAL METHOD

The decision as to the most suitable surgical procedure is, of course, primarily the surgeon's responsibility. A statistical analysis of the cases selected by us for surgical treatment—in which gastrectomy was performed in accordance with the POLYA method or, in patients with gastric ulcer, occasionally also according to the technique described by PEAN (Fig.3)—shows that satisfactory results were obtained in 80-85% of cases.

As for vagotomy, which is combined sometimes with resection of the antrum and always with either pyloroplasty or gastro-enterostomy, the value of this procedure remains debatable. The technique is question is still in the experimental stage, and we feel that not enough experience has yet been acquired with it to permit of any final judgment.



Gastric resection with gastrojejunostomy (Billroth II):
as modified by Hofmeister-Finsterer (a) and as modified by REICHEL-POLYA (b)
Gastric resection with gastroduodenostomy (Billroth I) : as modified by PEAN (c)

Conclusion :

In the treatment of peptic ulcer, a common but curious disease about whose pathogenesis so little is yet known, both the medical and the surgical approaches adopted are still based by and large on purely empirical methods. Although it is to be hoped that further progress will be made in this field thanks to the acquisition of fresh knowledge, the therapeutic possibilities currently open to us already suffice to provide numerous patients with effective relief.

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The uses of dextran in surgery: A current evaluation

M. ATIK, M.D.
LOUISVILLE, KY.
From the Department of Surgery, The University of Louisville School of Medicine

Dextrans were introduced into clinical medicine about 20 years ago to meet the war demand for a safe and easily procurable plasma substitute. The experience with dextrans during the Korean conflicts established their usefulness for limited emergency blood volume replacement.[3] In recent years, primarily through the basic investigation of Swedish scientists, additional indications for the use of dextran for improvement of circulation have been suggested. Concise and compehensive reviews on these issues have appeared elsewhere.[5, 6, 11, 22] This communication is an attempt to clarify certain concepts about dextrans and relate some of the current thoughts for the indication of dextran in the over-all care of sick patients.

CHEMISTRY

Dextrans are a mixture of glucose polymers of various sizes and molecular weights. The crude native dextrans are produced by the bacteria *Leuconostoc mesenteroides* and contain a variable number of glucose units and different molecular arrangements. The molecular weight of the polymer mixture may vary from a few thousands to several millions. These differences in the molecular size and structure are responsible for the differences in the properties of dextran, for their ability to diffuse or not diffuse through semipermeable membranes, and for their influence upon the blood particles and blood viscosity.[29]

There are 2 preparations of dextran suitable for clinical use.

1. Dextran 70 (Macrodex), the older preparation, has been commercially available for several years. The average molecular weight of this dextran preparation is 70,000, with 90 percent of the molecules falling between 25,000 and 125,000. This familiar preparation is usually made as a 6 percent solution in normal saline.

2. Dextran 40 (Rheomacrodex), which has been recently introduced for clinical application, has an average molecular weight of 40,000, with 90 percent of the molecules falling between 10,000 and 80,000. The usual preparation is 10 percent either in normal saline or in 5 percent dextrose in water.

It must be apparent that these 2 preparations of dextran 70 and dextran 40 are not distinct. The lower molecular spectrum of one overlaps the upper molecular spectrum of the other. Therefore, distinctly different properties from these 2 preparations are not to be expected. Any differences that may exist will be a matter of degree rather than of exclusive quality.

PHARMACOLOGIC AND CLINICAL EFFECTS

There are 4 principal qualities of dextrans which form the basis for their clinical application: (1) blood volume expansion, (2) improvement of microcirculation, (3) antithrombogenic effect, and (4) antilipemic effect.

Blood volume expansion. Both dextran preparations when infused expand plasma volume. This volume expansion is mainly due to their colloidal (oncotic) osmotic effect. The duration and degree of volume

expansion following infusion of dextrans depend upon the total amount infused, the rate of infusion, the size and weight of the dextran infused, and upon the rate of disappearance of the dextrans from the plasma. The smaller molecules of dextran pass rapidly through the capillary membranes into the extravascular space and are carried back to the bloodstream via the lymphatic vessels. Some are filtered out into the urine and result in mild diuresis. The larger molecules stay as long as 20 hours or more. Thus, with repeated infusion, there is a tendency for accumulation of larger molecules. A minute quantity of the infused dextran is excreted into the gastrointestinal tract.

The very large molecules which cannot be excreted are taken up by the reticuloendothelial system and eventually are metabolized. There is no evidence that any detectable permanent residue is left behind (unlike PVP and gum arabic). It should be obvious that because of slow excretion, dextran 70 achieves a more effective and prolonged volume expansion effect, and hence, it is a preparation of choice for this purpose. On the other hand, dextran 40, with smaller average molecular size and relatively rapid disappearance from the plasma, has only a limited and transient volume expansion effect.

Improvement of microcirculation. Ample evidence indicates that impaired microcirculation and tissue perfusion are the basis for all forms of shock and circulatory disorders.[23, 26, 34, 48] In the assessment of effective microcirculation, the well-known hemodynamic and recently recognized hematorheological factors both must be considered.

It is now established that blood behaves as a non-Newtonian fluid. Its viscosity, or resistance to flow, is affected by the velocity gradient measured as the rate of shear in units of inverse seconds.[20, 48] The lower the shear rate, as may be present in sluggish circulation, the greater will be the viscosity. The viscosity of whole blood is the net sum of the intrinsic viscosities of the blood particles and the plasma components and the interaction of the two. While the concentration of the blood particles, principally the erythrocytes, is the major determinant of the blood viscosity, the effects of other factors upon the viscosity are also significant. Some factors which increase blood viscosity are: (1) increased concentration of the blood cells and platelets (hemoconcentration, polycythemia, leukemia, and thrombocytosis); (2) increased aggregation of the blood cells (erythrocytes and platelets); (3) decreased internal fluidity of the R.B.C. (affected by genetic factors, osmotic equilibria, and the nature of the red cell membrane); (4) the presence of macromolecules, increased level of fibrinogen, abnormal proteins, and lipids; (5) small and narrowed vessels; (6) vasoconstriction (autogenous or induced); (7) low shear rate (decreased velocity gradient and slow flow rate); (8) low pressure gradient; (9) axial concentration of the blood cells (plasma skimming effect); (10) decreased elasticity of the vessel wall; (11) rough endothelial surface of the vessels; (12) hypothermia; (13) low oxygen tension (as in sickle cell disease); and (14) acidosis.

The interest in erythrocyte aggregation pointed out earlier by Knisely and associates[31] has been recently rekindled. Substantial data are now at hand showing that aggregation does occur with impaired microcirculation and in certain disease states.[22, 24, 45] It can be readily demonstrated that fibrinogen and other macromolecules, such as very high molecular weight dextran, will increase erythrocyte aggregation and blood viscosity, and these can be reversed with low molecular weight fractions of dextran. It must be pointed out that the erythrocyte aggregation may be present under "normal" conditions and cause no overt clinical manifestation. Nevertheless, it is potentially hazardous, and under deficient hemodynamic states the detrimental effect of erythrocyte aggregation upon microcirculation cannot be ignored.

Presence of erythrocyte aggregation not only depends upon viscosity of plasma and attractive forces between the cells, but also upon the shear rate. Schmid-Schoenbein and

associates[45] have recently demonstrated that aggregated erythrocytes from normal individuals deaggregate (disperse) at much lower shear rate than those of sick patients. This phenomenon bears clinical significance in a variety of circulatory disorders in which the normally low blood velocity gradient, and hence, low shear rate, may be critically diminished in the postcapillary vascular bed. Thus, in a vicious circle, erythrocyte aggregation is readily promoted with further curtailment of blood flow. It has been estimated that increased resistance to flow in the postcapillary vascular bed offered by exaggerated erythrocyte aggregation and increased viscosity may be greater than that offered by the arteriolar vasoconstriction.

The phenomenon of plasma skimming effect has been adequately demonstrated. This leads to differential rise in the hematocrit in the microvessel. As the blood flows in the arterioles, the fast-moving cells assume an axial position, while plasma stays in the periphery and is skimmed off into side branches. The relatively high hematocrit of microvessels thus will result in high blood viscosity and impaired perfusion in these regions.[22]

The ability of the red cells to change form in order to slide by each other and to flow

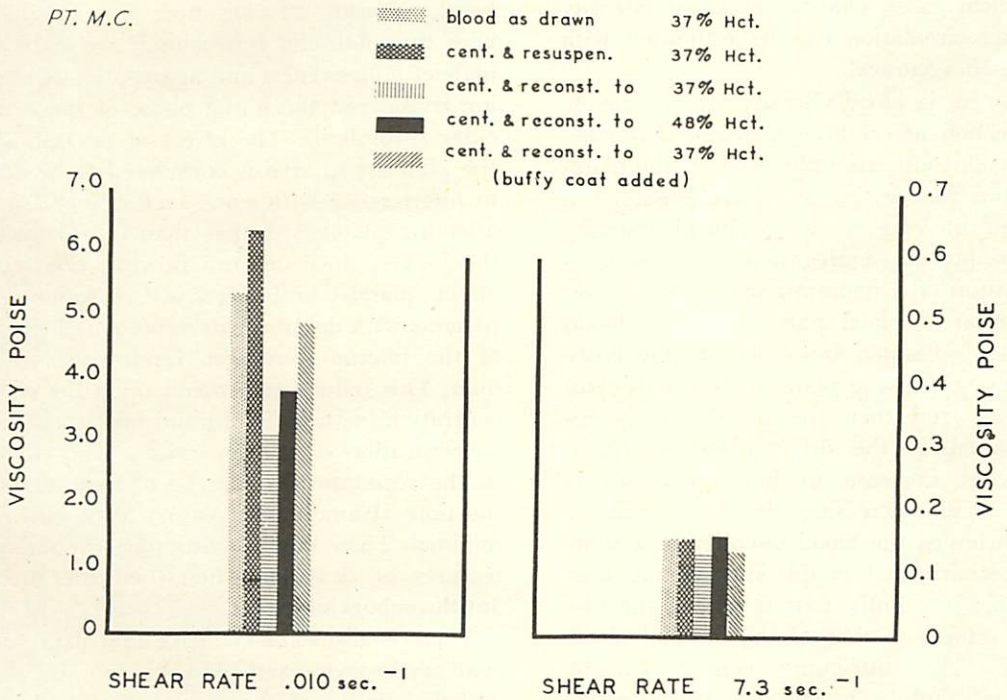

Fig. 1. Effect of platelets upon whole blood viscosity at low shear rate. Note that following centrifugation and resuspension of the cells, the whole blood viscosity is increased (second bar from left) although nothing has been added or subtracted from the original sample. When blood cells and plasma are separated and then remixed to the original hematocrit of 37 percent, but without the buffy coat, the viscosity is lower in the sample (third bar) than in the original sample. Even when the hematocrit is increased to 48 percent in a fourth sample (black bar), the whole blood viscosity remains low. With the addition of the buffy coat containing leukocytes and platelets, the viscosity returns toward that of the original sample. Note that these differences tend to disappear and much lower values are obtained when viscosity is measured at higher shear rate of 7.3 inverse seconds instead of 0.01 inverse seconds (see text).

through narrow capillaries and branching microvessels is important in normal blood flow. This property of the erythrocytes is also shear-dependent. It should be obvious that in the presence of low cardiac output and vasoconstriction flow of the aggregated and crowded rigid blood cells is markedly impeded, resulting in critical microcirculatory insufficiency. These matters are no longer theoretical in nature, but have been demonstrated with high-speed cinemicrophotography in animals and in man.[15]

Blood viscosity measurement in vitro at shear rates far above what is actually present in terminal arterioles, capillaries, and postcapillary venules does not tell the entire story. With improved instrumentation, which allows viscosity measurements at very low shear rates, changes in blood viscosity in microcirculation can be estimated with increased accuracy.

Changes in blood viscosity are not merely a reflection of erythrocyte number and behavior, but also are influenced by the platelets and leukocytes. We have observed a marked increase in whole blood viscosity due to platelet aggregation following centrifugation of a heparinized sample and resuspension of blood particles. When blood cells are separated from plasma, the buffy coat containing the platelets and leukocytes removed, and then the blood sample reconstituted to the original hematocrit, a significant decrease in blood viscosity is noted. With increasing the hematocrit to certain limits, the blood viscosity of a similarly reconstituted sample still remains low, but when the buffy coat is added, the viscosity returns to that of the original blood sample. This intriguing contribution of platelets (and leukocytes) to the viscosity of whole blood becomes apparent only at very low shear rates, such as are operative during impaired circulation. At higher shear rates the viscosity of all samples is found to be markedly decreased (Fig. 1).

Dextran 40 and, to a much lesser extent, dextran 70 lower the viscosity of whole blood (a) by hemodilution, (b) by decreasing aggregation and rigidity of the erythrocytes, and (c) by decreasing platelet adhesiveness and aggregation.[22, 35, 49] Dextran 40 does not improve upon the normal blood, which is a nearly perfect rheologic system, but will improve the flow properties of abnormal blood under unfavorable hemodynamic states.

Antithrombogenic effect. Dextrans have been proved to be effective against experimental thrombosis and beneficial in the management of thromboembolic disease. According to Berman,[12] dextran acts differently from classic anticoagulants. Heparin and Coumadin interfere with thrombin clot formation which requires stasis. These agents in clinical dosages apparently have no effect upon platelet adhesiveness and platelet aggregation, which may occur even in the presence of flowing blood. On the other hand, dextran infusion does not interfere with thrombin clot formation,[12] but reduces platelet adhesiveness and aggregation, which are considered the initial phase of intravascular thrombosis. The effect of dextran on the platelets in vivo is considered to be due to interference with some factors in plasma affecting platelets, rather than the platelets themselves, since dextran in vitro does not affect platelet adhesiveness.[16] Infusion of patients with dextran will result in reduction of the plasma fibrinogen level when it is high. This reduction depends upon the concentration of the dextran and also upon the concentration of the fibrinogen. The effect of the recommended dosage of dextran on the normal amount of plasma fibrinogen is minimal. These characteristics are the safety features of dextrans when used for their antithrombogenic effect.

There is also some evidence that dextrans coat erythrocytes and platelets and the endothelial lining of the vessels, giving them similar electric charges and causing them to repel each other.[14]

In addition to these specific effects on platelets and fibrinogen, dextrans inhibit intravascular thrombosis by the dilution of clotting factors and improvement of blood flow in general.

The superiority of the antithrombogenic effect of one dextran preparation over the

other cannot be assessed at the present time. Dextran 70 may have a slightly better antithrombogenic effect, while dextran 40 shows superior flow-improving qualities. In management of thromboembolism both of these qualities are important, since rheological impairment may promote stasis and an increased tendency toward thrombosis.

Antilipemic effect. This effect of dextrans has been recognized only recently. In 1963 Flotte and Buxton[21] reported that dextrans reduce the serum cholesterol and lipid content of hypercholesterolemic and hyperlipemic patients. These observations have significant clinical implications. Whether chronic administration of dextran affects atherosclerotic processes needs further investigation.

Toxicity of dextrans. There are three untoward effects of dextrans which should be of concern to the clinician: (1) increased bleeding tendency, (2) overloading, and (3) anaphylactoid reaction.

The earlier alarming reports regarding excessive bleeding following administration of dextrans were primarily due to crude preparations, the use of high molecular weight fractions of dextrans, and infusion at a rapid rate and in excessive quantities.[44] With availability of the present preparations, dextran 70 and dextran 40, at the recommended dosage, not exceeding 15 c.c. of dextran per kilogram of body weight in 24 hours, excessive bleeding should be a relatively rare problem. For the reasons given under antithrombogenic effects, administration of dextrans in the presence of pre-existing thrombocytopenia, deficient clotting factors, and consumptive coagulopathy is hazardous. Dextran potentiates the effect of heparin. Quantitative data in this regard are not available. These 2 drugs should be used together infrequently and not for a prolonged period. When the clinical condition demands the effect of both simultaneously, then the dosage of heparin should be reduced empirically to perhaps less than one half of the recommended dosage.

A common fallacy is to give dextran following multiple transfusions and exhaustion of the available blood for a bleeding patient. Under these circumstances, most patients have already depleted clotting factors and platelets, and infusion of dextran at this stage will compound the problem. If one wishes to give dextran for oligemic shock, then it is preferable to start the infusion early, before or along with blood and other necessary fluids. Dextran given in this manner might actually decrease the consumptive coagulopathy and subsequent bleeding tendency which is often seen with shock and multiple transfusions.

The overloading syndrome following administration of dextran is also avoidable. Infusion of dextrans at the recommended dosage of 10 to 15 c.c. per kilogram of weight in 24 hours, given over 1 to 2 hours in the presence of established hypovolemia and over 4 to 8 hours in normovolemic patients, rarely causes any difficulty. Monitoring central venous pressure further guards against this complication.

Minor hypersensitivity reactions, such as rash and urticaria, are of no grave clinical consequence. However, occasional anaphylactoid reactions, manifested in he form of sudden collapse, hypotension, arrhythmia, respiratory difficulty, and choking sensation, are alarming.[41] The frequency of these reactions is related to the higher molecular weight and the degree of branching of the dextran molecules.[25] The nature of the severe anaphylactoid reaction is still unknown. It is questionable whether these represent true antigen-antibody interaction, since the reported cases have not been previously exposed to known dextran administration, and some patients have subsequently received dextran without ill effect. It is possible that some patients may have been sensitized unknowingly by ingestion of dextran with food or through the manufacture of dextrans in the body by the bacteria. Moreover, it has been shown that certain of the pneumococcal polysaccharides may elicit cross-sensitivity with dextran; thus, patients who have had pneumococcal infection may be susceptible to this form of reaction.[8] Another pos-

sible cause of this anaphylactoid reaction may be due to undetected minute quantities of bacterial proteins which have escaped purification and have entered a patient's bloodstream. As far as is known, all of this type of reaction has occurred in patients who have received only a few cubic centimeters of dextran for the first time. Therefore, it is recommended that the dextran infusion be started by a physician and that the first few cubic centimeters of the preparation be given very slowly. The patient should be very carefully observed for ill effects for 10 minutes before the physician leaves his bedside.

Another alleged toxicity which perhaps is unjustifiably attached to dextran is nephrotoxicity. In the past few years, sporadic cases of acute renal failure have been reported in patients who had received dextran.[38] Careful examination of these cases, however, does not exclude the following possibilities: (1) a pre-existing kidney disease or already established renal failure, (2) a clinical setting in which acute renal failure would have developed even without dextran, and (3) the presence of circulatory disorders, renal ischemia, and other nephrotoxin. A diagnosis of acute renal failure merely on the basis of histologic evidence of vacuoles within the renal tubules may be questioned. The vacuoles described are often seen following infusion of sucrose, mannitol, and dextran without any proved clinical ill effect. These substances are diffusible into the renal tubular epithelium and may remain there in the absence of adequate urine output.

The experimental models designed to indicate nephrotoxicity of dextrans are also far from convincing. Oliguria and anuria

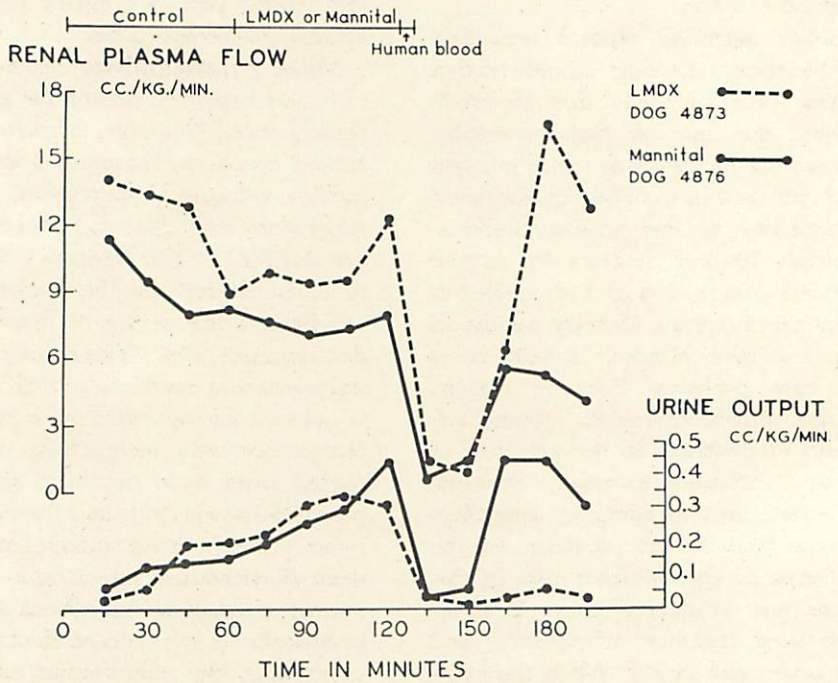

Fig. 2. Renal plasma flow (determined from radioactive iodohippurate clearance) and urine output in dogs subjected to intra-aortic transfusion of incompatible blood and shock. Note that following shock the renal plasma flow in the dog pretreated with dextran 40 *(LMDX)* returns to its control value without diuresis. The renal plasma flow in the dog pretreated with mannitol is less than 50 percent of its control value following shock. The urine volume is copious, but clearance of radioactive iodohippurate, hence, useful function of the kidney due to poor perfusion of tubules, is impaired.

do not necessarily indicate acute renal failure. Failure to produce urine may be on the basis of severe dehydration, interruption of blood supply, and reflex vasospasm. Constriction of renal arteries and even manipulation of the renal vessels often result in prolonged vasoconstriction and anuria. A number of investigators have shown that dextran actually improves perfusion of the kidneys in the face of relative ischemia and helps prevent acute renal failute (Fig. 2).[4, 28, 30] It is perhaps pertinent to note that Bergentz and his associates[10, 11] have reported favorably on treatment with dextran 40 of patients with established acute renal failure. These patients were not dialyzed and apparently had fared better than their counterparts who were dialyzed.[11] We have also treated 4 patients with acute renal failure with small amounts of dextran 40 equal to their daily urinary output during the oliguric phase. Three of these patients recovered without resorting to dialysis. The fourth patient also showed gradual improvement of renal function; however, he died as a consequence of peritonitis and pneumonitis following strangulating intestinal obstruction. Despite these observations, it must be emphasized that administration of dextran in the presence of established renal failure may be hazardous. However, the hazard probably does not stem from any major nephrotoxicity, but rather from overloading and developing pulmonary edema.

One other indirect but potential complication of dextran infusion may be mentioned here, namely, the difficulty in typing and cross-matching the blood. Dextran 70, but not dextran 40, has been known to interfere with this process, according to available information. Therefore, it is recommended that the blood for typing and cross-matching be drawn before dextran is given to the patient. Should the need for transfusion unexpectedly arise after dextran has been given, the blood bank should be informed of it.

CLINICAL APPLICATIONS

With the basic characteristics of dextrans described earlier, numerous potential applications of dextrans may be envisioned. Space will permit description of only a few established ones and the mention of a few others.

Shock. It is generally agreed that in shock, regardless of its etiology, the basic problem is impaired capillary flow and diminished tissue perfusion. This impaired microcirculation may result from inadequate respiration, ineffective cardiac pump, insufficient blood volume, increased vascular resistance due to excessive vasoconstriction, and increased blood viscosity. The rationale for use of dextrans in shock is as follows.

1. Some degree of blood volume deficiency is present in nearly all types of shock. Both dextran 40 and dextran 70 restore blood volume rapidly. However, the entire blood and fluid loss when massive should not be replaced by dextran alone, since excessive bleeding may ensue. Addition of limited quantities of dextran to blood and electrolyte solutions for volume replacement provides better results than either of the latter alone.[11, 37] The maximum dosage of dextran for this purpose should not exceed 15 c.c. per kilogram of body weight over 24 hours. The hemodilution which secondarily occurs following infusion of dextran will also provide for improved blood flow.

2. The presence of excessive red cell aggregation and increased blood viscosity is well documented in patients in shock and in experimental animals. Dextran 40 and, to a lesser extent, dextran 70 prevent and reverse erythrocyte aggregation and reduce abnormally high blood viscosity. This effect has been shown to be superior to that achieved by other means of hemodilution. These qualities of dextran, along with restoration of blood volume, both in amount and in composition, and with measures to improve cardiac and respiratory functions will lead to enhanced microcirculatory flow. The sequestrated and stagnant blood and fluid are brought back into effective circulation. Venous return improves, peripheral resistance is decreased, and cardiac output is further augmented. Better tissue perfusion is maintained, and kidney function is improved even without diuresis.[4, 34, 35, 46]

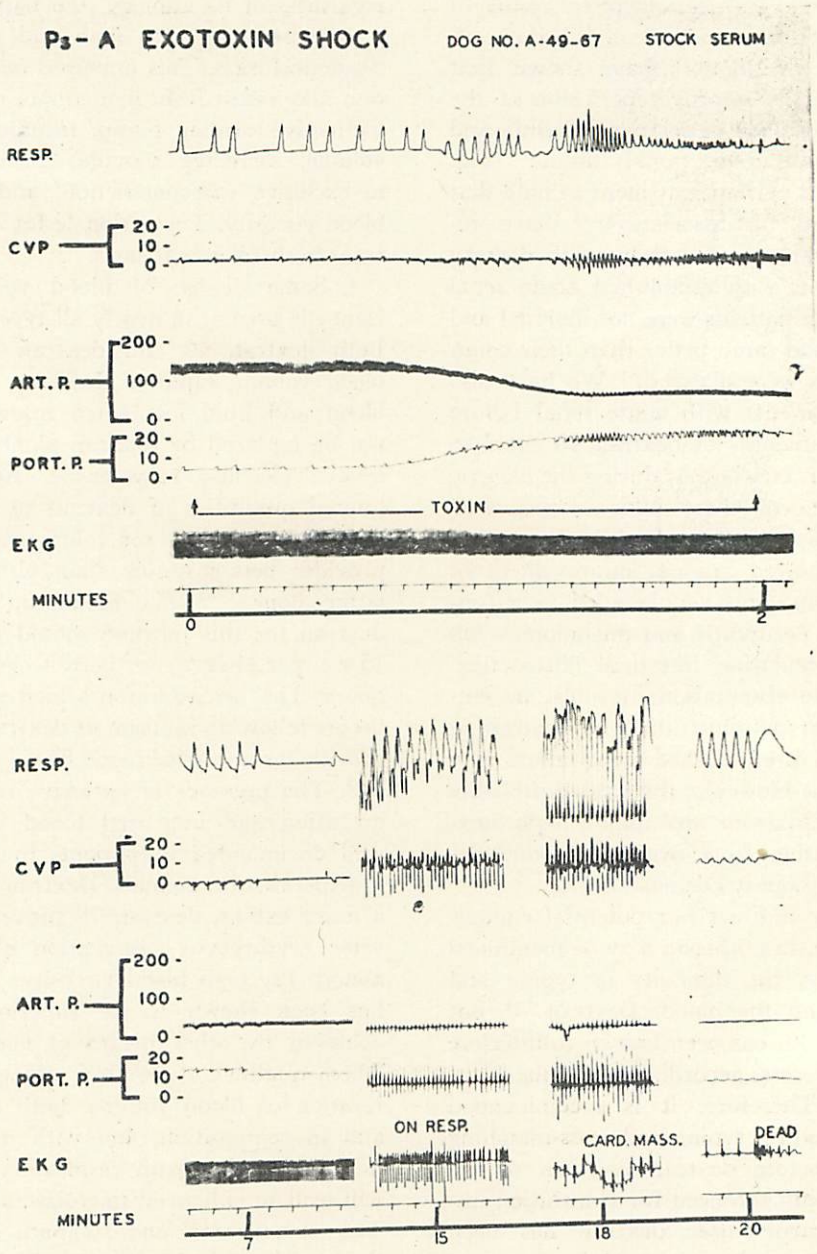

Fig. 3. Tracings of severe anaphylactoid reaction in a dog following injection of *Pseudomonas aeruginosa* exotoxin. Note the rise in portal pressure followed in seconds by profound arterial hypotension and respiratory difficulty. Pretreatment with nonimmune serum offered no protection and the dog died in 20 minutes.[7]

3. By minimizing platelet aggregation and adhesiveness and microcirculatory stasis, dextrans, if given early, will prevent the disseminated intravascular clotting which is a serious complication of shock and which may lead to consumptive coagulopathy.[26]

Gelin and associates,[22, 23] Baker and colleagues,[9] and others have documented the beneficial effects of dextran in hemorrhagic and traumatic shock.[11] Lillehei and associates,[34] Cohn and Luria,[17] and others have reported favorable influences of dextran in the over-all management of cardiogenic and septic shock. Atik[4] has shown the effectiveness of dextran 40 for protection against transfusion reaction and for prevention of acute renal failure following shock. He has emphasized the role of dextran as an adjunct to other standard measures for improvement of circulation. To be effective, shock must be treated vigorously and dextran given early in anticipation of these complications.

Prophylactic use of dextran 40 has also been shown to reduce the anaphylactoid reaction which is seen following intravenous infusion of fat emulsions, bacterial exotoxins, and endotoxins (Figs. 3 and 4).[7] Thus, in shock, as it is known today, multiple derangements may be present. All of these must be treated individually and collectively in order to be successful. Therefore, a salutary effect should not be expected from the use of dextran if: (a) cardiac function is not improved by correction of metabolic acidosis and electrolyte imbalance or by use of digitalis or other inotropic agents, (b) the volume loss is not replaced adequately and rapidly with blood and balanced saline, (c) respiratory acidosis or hypoxia is not corrected, (d) circulation to an organ has been occluded for unduly long periods, (e) the devitalized damaged tissue has not been eliminated when feasible, (f) severe infection is not eradicated, and (g) if damage to the organs has already taken place.

In conjunction with vascular operation. Both dextran 40 and dextran 70 have been used with gratifying results in conjunction with reconstructive vascular operations.[5] They are beneficial in maintaining patency of vessels following angioplasty, insertion of vascular prostheses, and anastomoses of smaller vessels. These beneficial results are due principally to the antithrombogenic effects of the dextran and improved microcirculation. Dextran 40 perhaps has an additional advantage of maintaining better perfusion of tissue through collaterals distal to temporarily occluded vessels. Under the author's supervision, over 250 patients operated upon for various major vascular disorders have been given dextran. There have been no incidents of early thrombosis or progression of ischemia, except in 3 cases in which the circulation could not be reestablished at the time of operation. No major complications from the use of dextrans have been observed in these patients.

In treatment of thrombophlebitis. The effectiveness of dextrans in treatment of thrombophlebitis has been well established.[5, 11, 18, 42] There is no clinical demonstrable difference between dextran 40 and dextran 70 in this regard. On the author's service in the past 4 years, all patients with thrombophlebitis have been treated with dextran in preference to heparin and other anticoagulants. The patients, with very few exceptions, have responded rapidly to the treatment, with relief of clinical signs and symptoms within 24 to 48 hours. A few patients who have been seen late in the course of disease have been somewhat refractory, with much slower responses. There has been no necessity for thrombectomy, even in patients who have had massive iliofemoral thrombosis, with the exception of 1 patient who failed to improve rapidly even after thrombectomy and heparin therapy. There has been no known incidence of pulmonary embolism in these patients who have been treated with dextran. The use of heparin and other anticoagulants was given up because of relative unreliable and slow results, some difficulty with proper dosage control, and failure to prevent pulmonary embolism.

In prevention of pulmonary embolism. Perhaps one of the most rewarding experi-

ences with dextran has been our recent attempt to prevent pulmonary embolism. Pulmonary embolism is one of the most frequent causes of postoperative death and comprises about 10 percent of autopsy cases in most medical centers. The old, obese patients with cardiovascular and central nervous system disease, those with infection, those who have been in shock and have received multiple transfusions, those with serious debilitative disease and blood dyscrasia who undergo major operations, and those who are confined to bed for a prolonged time are considered to be high risk as they are especially susceptible to this complication.

In the last 4 years, in one of the 4 general surgical services of the University of Louisville Hospitals under the supervision of the author, over 600 high-risk patients have been treated prophylactically with dextran for prevention of pulmonary embolism. Dex-

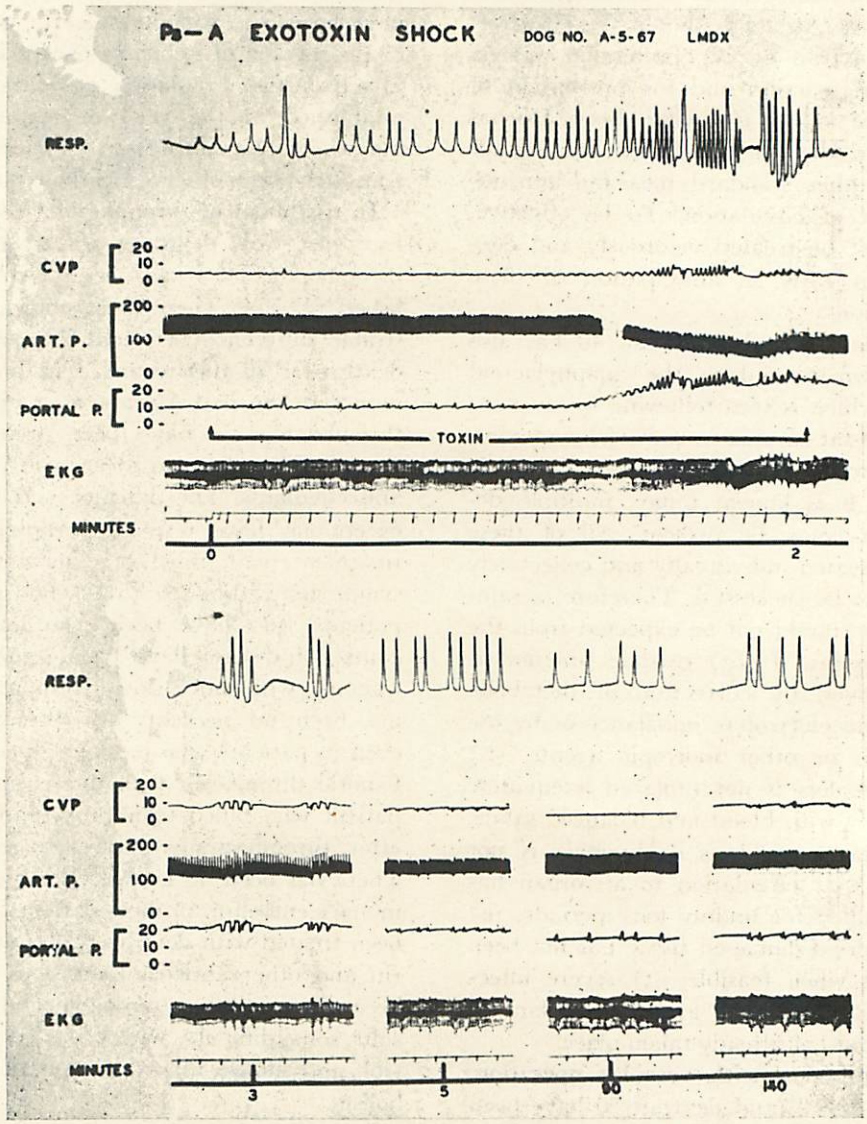

Fig. 4. Tracings of a dog pretreated with dextran 40 *(LMDX)* and injected with *Pseudomonas aeruginosa* exotoxin. Note the mild and brief reaction to the exotoxin (compare with Fig. 2).

tran infusion (7 to 10 c.c. per kilogram of body weight over 24 hours) is usually started just before operation or at the time of admission if the patient is considered to be a potential risk for pulmonary embolism. It is continued during the operation and daily for 2 days postoperatively, and then every other day until the threat of pulmonary embolism diminishes. Only 2 patients in this treated group developed pulmonary embolism—one had generalized carcinomatosis with involvement of vena cavae, the other patient had a fractured pelvis, retroperitoneal hematoma, and traumatic thrombosis of the iliac vein. In this second patient, dextran treatment was discontinued prematurely while the patient was still sick and bedridden. In the other 3 general surgical services, with a comparable population of high-risk patients and under the care of the same resident staff, 59 cases of pulmonary embolism proved by autopsy were observed during this 4 year period.

To establish the efficacy of dextran in this respect, a better controlled study has been recently started in cooperation with our orthopedic service. Ninety-five patients with major fractures of the hip and long bones were randomized according to their odd and even hospital numbers. Thirty-eight patients with odd numbers were infused with dextran 70 intravenously, 500 c.c. per day before, during, and after operation. Fifty-seven patients with even numbers served as the control group and were given 500 c.c. per day of saline intravenously before, during, and after operation. There was no evidence of thromboembolism or complications attributed to dextran in the treated group. One treated patient died with pulmonary embolism 7 weeks after discharge from hospital. She was not considered a failure because of the amount of time that had elapsed. There were 7 cases of pulmonary embolism in the control group, 4 proved at autopsy and 3 substantiated by lung scan. Four additional patients developed thrombophlebitis without pulmonary embolism. A study of platelet adhesiveness indicated a progressive rise to 13 percent above the mean control value in the control patients following the operation, but a 30 percent

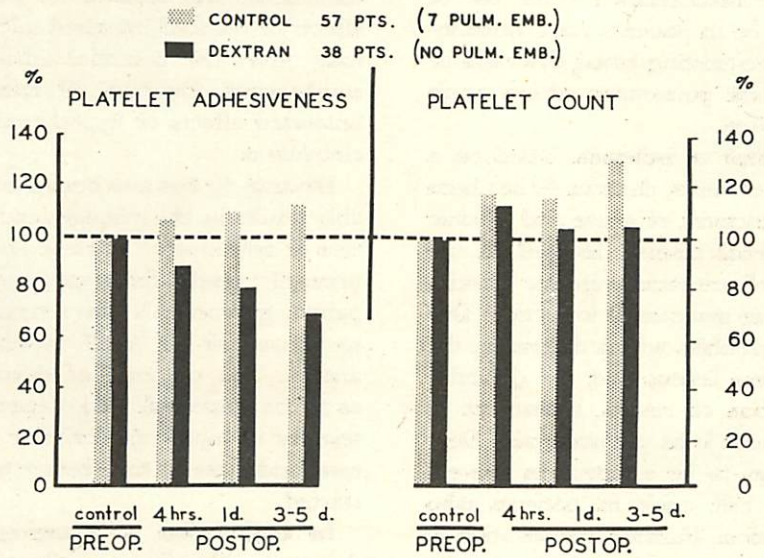

Fig. 5. Platelet counts and percent platelet adhesiveness in 2 groups of patients, one treated with dextran and the other not treated. The control value (100 percent) is represented by the horizontal broken line. Note the rise in platelet adhesiveness postoperatively in the untreated patients, 7 of whom developed pulmonary embolism. Platelet adhesiveness fell in the dextran-treated patients, and none developed embolism.

fall below the mean control value in the patients who were given dextran (Fig. 5). In the control patients who developed thromboembolism, a further increased platelet adhesiveness (over 50 percent) was observed. These differences between the 2 groups are statistically significant, $p < 0.01$. The efficacy of dextran in prevention of thromboembolism has been reported by other investigators, and a similar rise in platelet adhesiveness following major operations has been observed in other laboratories.[16, 19, 32]

While the effectiveness of heparin and Coumadin for this purpose has also been reported, bleeding complications have discouraged the wider use of these anticoagulants in conjunction with major operations. Moreover, a number of high-risk patients in these studies have been excluded because of pre-existing disease or some contraindications to anticoagulation. Unfortunately, these are the very patients who are potentially susceptible to pulmonary embolism, and indeed some of these have developed this dreadful complication. We have not excluded any patient from our study so far. The only contraindications for the use of dextran would be in patients with thrombocytopenia or pre-existing blood dyscrasia or in those in frank pulmonary edema or in acute renal failure.

In management of ischemia. Based on a number of experiments, dextran 40 has been used in the treatment of acute and chronic peripheral arterial disease, as well as the management of cerebral vascular insufficiency and acute myocardial infarction. Due to numerous variables which determine the outcome of these lesions and the difficulty in the evaluation of results, assessment of dextran treatment is as yet uncertain. Dextran 40 appears to be effective in prevention of sickle cell crisis in patients who undergo operation. Further investigation is necessary in this area. Its efficacy in the management of fully established sickle cell crisis is debatable.[6]

In cardiopulmonary bypass procedures. Several investigators have reported favorably on the use of dextran 40 in the priming fluid for the pump oxygenator. Dextran 40 (1) provides hemodilution, which can also be achieved by glucose and lactated Ringer's solutions; (2) provides better organ perfusion by decreasing blood viscosity and red cell aggregates; (3) reduces the hemolysis, platelet agglutination, and fluid sequestration commonly seen following perfusion with blood alone; (4) improves renal function; and (5) diminishes the severity of post-perfusion pulmonary syndrome. Increased bleeding with employment of dextran in extracorporeal circulation has not been a problem unless unduly large quantities are used. Short-term cardiopulmonary procedures may be performed satisfactorily with hemodilution with crystalloid solutions alone or in combination with blood. For long procedures the addition of dextran to other fluids and blood for priming the pump is favored, according to a number of controlled studies.[27, 36, 39]

In conjunction with hypothermia. Hypothermia impairs microcirculation by increasing vasoconstriction and blood viscosity. While it is used to decrease tissue metabolism, hence the demand for oxygen, the ill effects of reduced impaired microcirculation may offset the potential advantage of its employment. Dextran 40 minimizes these untoward effects of hypothermia on microcirculation.

Dextran 40 has also been used with favorable results in the management and prevention of cold injury.[6, 43] Here again the lesion primarily results from vasoconstriction, impaired microcirculation ultimately leading to thrombosis of small vessels and tissue anoxia. The outcome of dextran therapy, as to be expected, will depend upon the severity of injury, pre-existing vascular disease, and lapse of time before treatment has started.

In conjunction with angiography. That dextrans add safety to utilization of radiopaque material for angiography is supported by a number of reports from several centers and by our own experience.[13, 47]

In organ preservation and transplanta-

tion. Manax and associates[40] have been able to preserve organs in a viable state for hours with perfusion with dextran 40 under hypothermic conditions and in a hyperbaric oxygen environment. Gelin and his associates[23] have achieved similarly effective prolonged kidney preservation with dextran perfusion and hypothermia, but without hyperbaric oxygen. Dextran can also be used to achieve better perfusion of the transplanted organ and help maintain patency of the anastomosed vessels.

Miscellaneous applications. Dextrans have been tried for a variety of purposes, such as, prevention of postoperative intra-abdominal adhesions, cancer dissemination, organ perfusion with cancer chemotherapy, treatment of burns, and fat embolism. At present, sufficient clinical data are not available to appraise the role of dextran for these purposes.[1, 2, 10]

SUMMARY

Dextrans are primarily used for their volume-expanding effects and for their improved blood flow and antithrombogenic qualities. Two dextran preparations are suitable for clinical use: dextran 40, with an average molecular weight of 40,000 and dextran 70, with an average molecular weight of 70,000. Dextran 70 is preferred for volume expansion and dextran 40 for flow-improving effects. No superiority of one preparation over the other has been established regarding their antithrombogenic effect.

Dextrans are to be employed as adjuncts to, and not as substitutes for, blood, plasma, or other fluid replacement. The maximum recommended dosage of dextran solutions over 24 hours is 15 c.c. per kilogram of body weight. This daily dosage is to be reduced or the interval increased if repeated infusions are contemplated.

With the available experimental data and clinical experience, a definite place for dextrans has been established (a) in the management of all forms of shock and low perfusion states, (b) in conjunction with cardiovascular operations, and (c) in the treatment and prevention of thromboembolism. Other indications for the use of dextrans need further investigation before their general acceptance.

Dextrans are suited best for prevention of certain complications and secondary circulatory derangements which often follow a variety of disease and injury, including operations. They must not be considered as therapeutic, since they exert little influence upon the primary disease. The primary disease or injury must be treated by appropriate means. If dextran is to be used at all, it must be used early in the course of the disease or injury before secondary pathologic changes are fully established.

The complications of currently available dextrans are few and mostly avoidable except for occasional hypersensitivity and anaphylactoid reaction. These complications are less frequent with dextran 40.

Dextrans may not have brought revolutionary improvement in the treatment of the sick, but they have brought several scientific disciplines together for the study of rheology and microcirculation, which undoubtedly provides better understanding of a variety of diseases.

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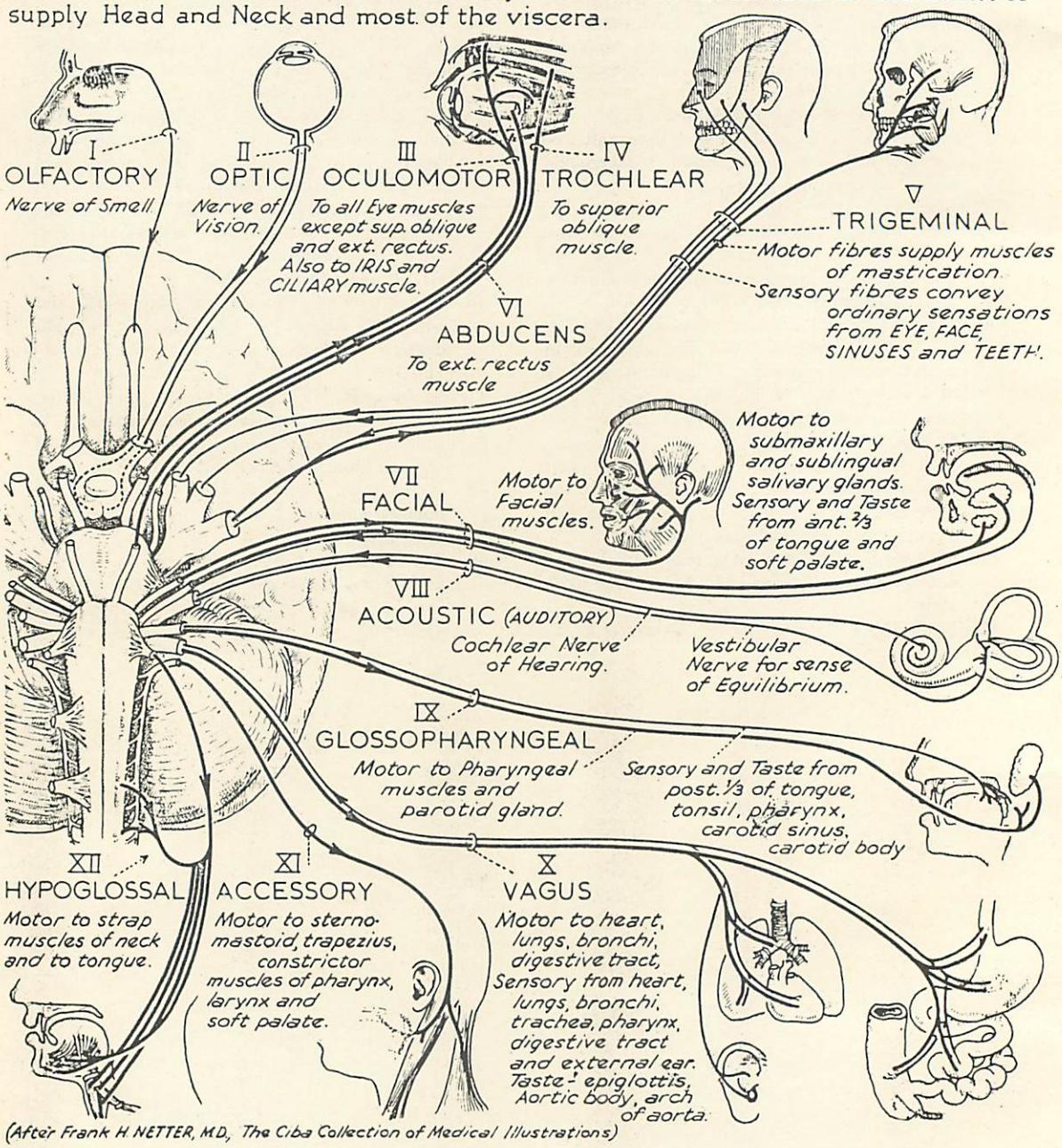

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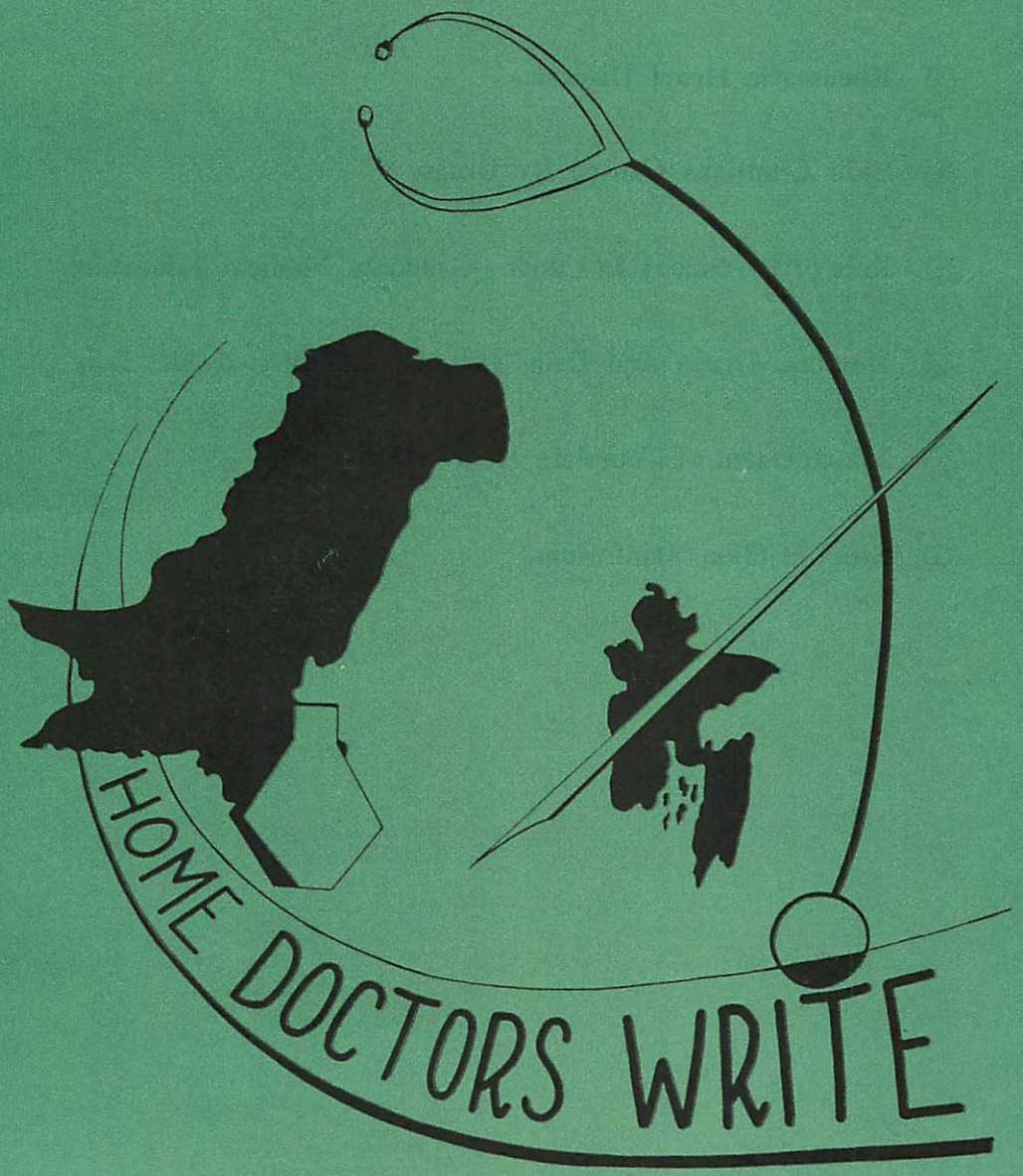
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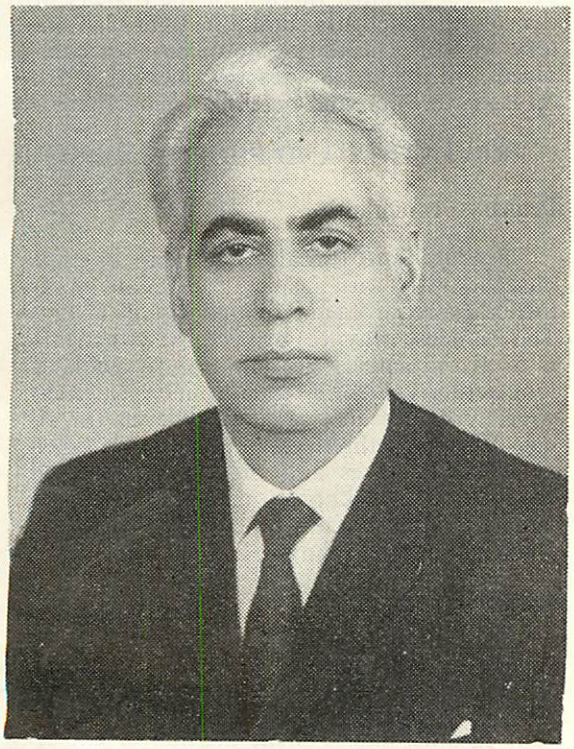

S. A. SYED, SK., TI., F.R.C.P.E., F.A.C.C.

Principal Investigator Cardiovascular Research Project, and Head of the Department of Cardiology, Jinnah Postgraduate Medical Centre, Karachi.

IN many parts of the western world, there has been a steady decline in the incidence and severity of rheumatic fever and its accompanying carditis. In Pakistan, however, the rheumatic fever is still highly prevalent which carries the risk of severe carditis and a high mortality.

This review article is intended to present briefly an outline of etiology, diagnosis, treatment and prophylaxis of rheumatic heart disease.

Etiology :

The association between streptococcal infection and rheumatic fever is now firmly established. Streptococci themselves are not however been found within the lesions of rheumatic fever, at the same time none of the known products of these organisms has the ability to induce these lesions by direct action. The present view is that some immunological response, primarily directed against the streptococci in some way or other involves the host's own tissue.

Diagnosis of Rheumatic Fever :

Fever, rash, arthralgia, tachycardia and heart murmur have been associated with rheumatic fever. American Heart Association have suggested the revised Jones criteria for considering the diagnosis of rheumatic fever (Table—I).

Table—I.

The Revised Jones Criteria for the Diagnosis of Rheumatic Fever (American Heart Association, 1965).

Major	Minor
Carditis	Clinical
Polyarthritis	Previous history of rheumatic fever
Chorea	
Erythema Marginatum	Laboratory
Subcutaneous nodules.	Acute phase reaction ; (E.S.R., W.B.C. count, C-Reaction Protein)
	Prolonged PR interval
Supporting evidence of preceding streptococcal infection O G. raised A.S O. titre.	

The major criteria of which the carditis is the most important, include polyarthritis, chorea, eythema marginatum and subcutaneous nodules. The minor manifestations consists of previous episode of rheumatic fever or rheumatic heart disease, arthralgia, fever and laboratory evidence of acute infection and prolonged P-R interval.

At least two major and one minor or one major and two minor criteria must be presented to consider the diagnosis of rheumatic fever. It should be remembered that none of the criteria is sufficient for the diagnosis, unless there is supporting evidence of preceding streptococcal infection.

TREATMENT

General Management :

Bed rest is an important part of therapeutic regimen for patients with carditis, however, prolonged and severe restriction of activity is unnecessary. Except in cases of acute carditis with failure, children may be allowed to be up and about if they have no symptoms.

The patients treated with steroid therapy, may develop a false sense of well-being and here they have to be restrained.

Penicillin :

Penicillin, preferably intramuscularly, should be administered for at least 10 days. If oral therapy is prescribed, the initial treatment should be started with intramuscular penicillin followed by oral penicillin for the prescribed period. If the patient is sensitive to penicillin, it should be replaced by a combination of one of the tetracycline and eythromycin. It is advisable not to use tetracycline alone as resistance is readily acquired.

Sulphonamides have no place in the acute phase of the disease.

Salicylates :

Salicylates provide symptomatic relief in acute rheumatic fever. Buffered and soluble aspirins are preferred, particularly if used for prolonged periods.

It is not established whether salicylates have any significant effect on carditis.

Salicylates are by no means harmless and one should be aware of their toxic effects.

Steroids :

Steroids have been shown to improve the patient's well-being, provide relief from pain, facilitate the joint movements and reduce the temperature. Recovery is more rapid and ambulation can be started at an earlier stage when steroids are given.

The usual duration of rheumatic activity during which therapy for carditis is advised, ranges from 3—5 months.

Extensive studies carried out have, however, shown that the use of steroids does not greatly influence the ultimate incidence of permanent carditis. In view of the toxicity of the steroids, their use should be under laboratory control. The use of steroids, when combined with salicylates, carries increased risk of gastric erosion and possible haemorrhage.

PREVENTION AND PROPHYLAXIS:

Primary Prevention :

All acute sore throats in general practice must be taken with suspicion for acute streptococcal sore throat and treated with penicillin. The simplest way to protect these patients is to give a single injection of 2 to 5 ml. of long-acting penicillin (Benzathine penicillin) which provides adequate blood levels for 10 days. Ideally, a throat culture should be taken in suspected cases and therapy be reserved until the result is known or started and modified (if started at the time of throat swab) when the result is known.

Secondary Prevention :

A monthly injection of long-acting penicillin (Benzathine Penicillin) 1.2 to 1.5 mega units will help to prevent the development of significant carditis, and it is the method of choice. For oral prophylaxis, methoxymethyl penicillin, 125 mg. twice a day can be given.

It is advisable to continue the prophylaxis during childhood and adolescent years when contact with large community groups is likely and during which period rheumatic fever is most common.

In cases who develop first attack of rheumatic fever in adult life, prophylaxis should be continued for at least five years after the attack.

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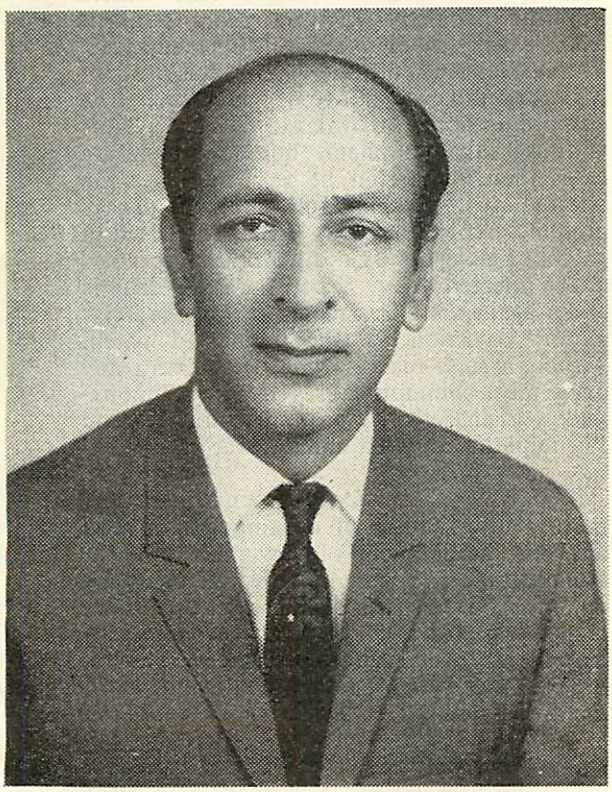
Skins Eruptions Caused By Drugs



DR. NUSRAT ALI SHAIKH,
F. R. C. P. E.

Director, Skin and Social Hygiene Centre, Karachi.

DRUG eruption can be defined as a cutaneous or mucosal reaction which occurs in a susceptible person after a drug is taken in therapeutic doses by any of standard routes of administration.

Although drug eruptions are not uncommon, their incidence is very low if one considers the enormous quantities of the drugs that are being consumed every day.

While these reactions may involve almost any organ of the body, the skin appears to be the most frequent target. The drug reaches the skin in such cases through the blood stream, therefore allergic contact dermatitis is not included in this category.

The same drug can give rise to a different clinical picture in different persons, or even in the same individual at different times. Therefore from the appearance of the rush alone it may not be possible to determine as to which of the several drugs the patient may be taking at the time, is responsible for the reaction. However some drugs are known to produce typical types of skin lesions.

Pathogenesis of Drugs Eruptions :

(a) Cumulative effect: — In this a continuous prolonged use of the drug is required. These reactions are particularly likely to appear on excessive dosage or on body's failure to metabolise or excrete these drugs properly.

Quinacrine produces a yellowish discoloration of the skin if taken continuously for many months. This drug and other antimalarial also produce bluish pigmentation in the pretibial, palatal, facial and sublingual areas. The mechanism of these colour changes is not known Mercurial pigmentation of the nails is also a well recognised condition.

Cation toxicity may occur with renal disease or uraemia when penicillin is given in large doses over a short period. 15 million units of potassium penicillin G gives 25 m Eq. of potassium.

(*b*) *Pharmacological effect:*—Skin changes produced by triparanal are probably produced through their pharmacologic effect. This drug primarily used to reduce serum cholesterol, produces generalised Ichthyosis like skin changes, Blepharitis, alopecia and depigmentation of the hair. This reaction has been

explained as a "Normal pharmacologic effect" of this drug at a site where it is not intended to act, and is produced probably by prevention of epidermal synthesis of cholesterol and other sterols.

(*c*) *Over dosage effect:*—The occurance of these effects are the result of the presence of excessive amount of the drug in the body, and the first evidence of this overdosage may appear in the skin, as is sometimes seen in anti coagulant therapy where bleeding in the skin appears as minute petechiae.

(*d*) *Allergic Reactions:*—For a simple chemical drug to be able to produce an allergic reaction it is necessary that it should first combine with tissue protein to form a complete antigen. The main characteristics of the allergic reactions are:—

(i) Drugs which may have been taken for a long time without any harmful effect, suddenly cause severe eruptions even though taken in very small doses. This reaction will always recur whenever that drug is taken.

(ii) The cutaneous changes are different from the known pharmacologic action of the drug.

(iii) Drug with completely different pharmacological actions can cause similar allergic reactions. Similarly drugs with identical pharmacological properties can cause different allergic reactions.

(iv) The dose of the drug required to produce an allergic reaction is much smaller than that required to produce its pharmacologic effect. The allergic reactions to drugs may manifest as different clinical patterns in different persons. These include Anaphylactic reactions, urticaria, Serum Sickness, Morbilliform and Scarlatimiform skin eruptions.

(*e*) *Photosensitivity Reactions:*—These are usually of two different types.

(*i*) *Phtotoxic:*—In this damage to tissues is produced as a result of chemical changes occurring due to light absorption by the drug which may lead to oxidative reaction and tissue damage.

(*ii*) *Photoallergic:*—In this the radiant energy absorbed by the drug probably causes its conjugation with tissue proteins and results in the formation of a complete antigen. Subsequently the individuals immune responce results in the causation of the reaction.

Onycholysis in patients taking demethylchlortetracycline is an example of phototoxic type of reaction. Chlorothiazide type of diuretics cause photoallergy but not phototoxicity.

(*iii*) *Fixed Drug Eruption:*—This differs from the other types of drug rashes in that it recurs exactly in the previously effected areas. The mechanism is not known, but it is probably an example of delayed sensitivity. The eruption is round or oval, purplish red plaque with a sharp peripheral border. In severe cases there may even be a blister over the affected area. Itching and burning is always present. After the drug in discontinued a patch of greyish black discoloration persists at the affected area. When the same drug is taken again there is a recurrence of the inflamatory reaction at the pigmented patch. Although such reaction can occur with any drug, most common causes are the sulphonamides, Phenacetin, Aspirin, Barbiturates and Phenolphthalein containing laxatives.

(*f*) *Jarisch Herxheimer Reaction:*—In this there is exacerbation of existing lesions, and also the development of new ones after the administration of a highly effective drugs for an infectious disease. It represents a tissue response to toxic or allergenic substances released by the drug susceptible micro-organisms. This is commonly seen in treatment of Syphilis with Penicillin.

(*g*) *Biotropic Effects :*—This represents activation of a latent or dermant skin infection by a drug. An example of this is the flare up of Herpes Simplex by Bariturates.

(*h*) *Ecologic Imbalance:*—This type of reaction is based on disturbance in the normally prevailing balance between different species of micro-organisms. An example is ever growth of candida in the mouth and anogenital region after prolonged use of broad Spectrum Antibiotics

Diagonsis of Drug Eruptions :

A diagnosis of drug eruption is obvious if the rash has appeared suddenly after taking a

drug. If the skin lesions fade when the drug is stopped then the diagnosis is almost certain. With most drugs there will be recurrence if the drug is taken again.

Skin tests are not of much value in diagnosis and may even produce a severe reaction in an already hypersensitive patient. A blood count may be of some assistance in certain cases. An Eosinophilia is often associated with serum sickness, and skin eruptions due to Barbiturates, sulphonamides, and Neoarsphenamine.

Skins Eruptions Associated with some of the Common Drugs

1. *Sera:*—Anti tetanus serum is in common use and given rise to serum sickness and urticaria in a large number of cases. Anaphylaxis is a serious condition that may also develop after injection of Sera especially in the atopic subject.

2. Antibacterial Agents :

(a) *Sulphonamides:*—A variety of cutaneous reactions can occur with sulpha drugs. Pruritus, Urticaria, and morbilliform eruptions are however more common. Purpura and allergic Angitis may also be caused by sulpha drugs.

(*b*) *Para Amine Salicylic Acid* (*P.A.S.*):—Cutaneous reactions include generalised pruritus, erythema, maculo-papular eruptiens and urticaria.

(*c*) *Isonicotinic Acid Hydrazide* (I.N.M.) Skin reactions consist of pruritus, strise, Urticaria, generalised erythema and maculo-papular eruptions.

3. Antibiotics :

(*a*) *Penicillin:*—amongst the antibiotics this is reported to be responsible for most of the cutaneous reaction. Many deaths due to Anaphylactic Shock due to Penicillin injections have been reported from various parts of the world.

Skin reactions to Pencillin G include urticaria, generalised erythema and allergic angiitis.

Semisynthetic penicillins also produce similar reactions.

(*b*) *Tetracyclines:*—The reported cutaneous reactions include urticaria, pruritus ani and photosensitivity. The last symptom is especially associated with Demethyl-colortetracyline which may also cause finger nail changes.

(*c*) *Erythromycine:*—Cutaneous reactions include urticaria, Pruritus and generalised maculopapular eruptions.

(*d*) *Griseofulvin:*—may cause generalised pruritus, maculepapular eruption and urticaria. Photosensitivity—has also been reported due to this drug.

4. Central Nervous System Depressants :—

(a) *Barbiturates:*—Cutaneous reactions consist of urticaria, maculo-papular eruptions, Erythema multiforme, and fixed drug eruptions.

(*b*) *Tranquilizers:*—The phenothiazine derivatives can produce urticaria, maculopapular eruptions, Purpura, Pigmentation and Photosensitivity.

5. Analgesics :—

(*a*) *Acetyl Salicylic Acid:*—has been reported to cause pruritus, urticaria, fixed eruption, Purpura, and generalized erythematous or popular eruptions.

(*b*) *Phenazone:*—Cutaneous effects include erythema, Urticaria and fixed drug eruptions

(*c*) *Aminopyrine:*—can cause urticaia, maculopapular eruption and Purpura.

(*d*) *Phenacetin:*—can cause Urticaria, fixed drug eruption and erythema multiforme.

6. Vitamins :

(*a*) *Vitamin A:*—Possible cutaneous manifestations are somewhat similar to these seen in Vit. A deficiency states. These are roughness and dryness of the skin. Fissures of the angles of the mouth, and hair loss.

(*b*) *Thiamine:*—given by parenteral route can cause pruritus and angioneurotic oedema.

(*c*) *Nicotinic Acid:*—produces dryness of the skin and flushing.

(*d*) *Vit. K.:*—cause petechiae in the skin.

7. Metals :

(*a*) *Arsenic:*—This may result in a brownish grey pigmentation of the skin, Hyperhidrosis of the palms and soles, and cutaneous malignancies.

(*b*) *Gold:*—can cause erythema, Lichenied and urticarial eruptions, Exfoliative Deramatitis and Purpura. Gray brown pigmentation on the exposed parts of body can also occur after gold therapy.

(*c*) *Iron:*—has been reported to cause urticaria after parenteral therapy.

8. Antimalarials :

(a) *Quinine*—causes Scarlatiniform erythema and urticaria Vesicular, Bullous, and purpuric eruptions also occur.

(*b*) *Quinacrine hydrochloride:*—when taken for a period of time often result in yellowish discoloration of the skin especially on the arms, hands and feet. Scleral spigmentations has also been reported.

A lichenoid dermatitis similar to lichen planus also occurs at time with quinacrine.

(*c*) *Chloroquin:*—frequently produces urticaria. Optic atrophy may also occur with chloroquin.

9. Hormones :

(*a*) *A.C.T.H. and other Steroids :* The cutaneous reactions include moon facies, straie, bruising, hirsutism and Ache. These are likely to develop after prolonged administration of these drugs.

(*b*) *Hormonal contraceptives:* are reported to have caused chlosama like pigmentation of the face and neck, Acne, urticaria and hair loss.

10. Other Miscellaneous drugs:

(*a*) *Dilantin:*—Gingival Hypertrophy, gingivitis, and exfoliative dermatitis have been reported.

(*b*) *Piperazine:*—Cancause Purpura, Bleeding gums and urticaria.

(*c*) *Phenolphthalein:* Fixed drug eruption, Bullous dermatitis and stomatis can occur after its use as a laxative.

(*d*) *Ephedrine:*—cutaneous reactions include urticaria, purpura and erythema.

Treatment of Drug Eruptions :

Most reactions to drugs are mild, and all that is required is that the offending drug should be withdrawn. If there is anaphylactic reaction, this should be treated on the following lines depending on the severity of the reaction.

(a) Inj. of adrenaline 0.5 to 1.0 ml of 1 in 1000 injected subcutaneously and repeated in5-10 minutes if necessary.

(b) Intramuscular or intravenous anti histamine injection.

(c) Soluble corticosteroids given intravenously if the situation warrants.

(d) Intravenous drip with Noradrenaline to be given in case of circulatory collapse.

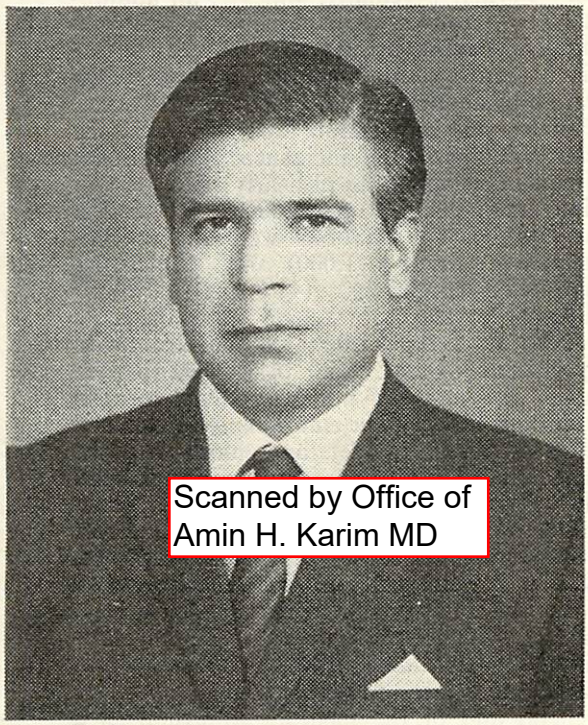
In the management of conditions like exfoliative Dermatitis, steroids should be given in sufficient doses so as to suppress the eruption completely and then the dose should be gradually reduced untill the rash has entirely faded. When the eruption is due to heavy metal like arsenic a full course of Dimercapril (BAL) should be given.

Antihistamines help in the control of itching associated with drug eruptions. These are however much more effective in the management of urticarial drug eruptions.

Conclusion :

Drug eruptions are not uncommon, and most reactions are mild. Urticaria and the Exanthematous type of skin lesions are more common and are easier to manage. But reactions like extensive Purpuras, Exfoliative dermatitis and anaphylactic shock require much more energetic treatment.

Role of Psychiatry In Under-Graduate Medical Education



DR. K. ZAKI HASAN, M.B., F.R.C.P. (*Edin*)

Department of Neuropsychiatry, Jinnah Postgraduate Medical Centre, Karachi.

ONE of the most succinct descriptions of the historical development of psychiatry has been provided in the World Health Organisation Expert Committee on Undergraduates teaching of psychiatry and mental health promotion (1961):

"There were psychiatrists of course, even before psychiatry was recognized as a branch of medicine worthy of being taught in Medical schools. These early psychiatrists were mostly general clinicians who took a special interest in the diseases of the mind and most of them worked in asylums for the insane, apart from the rest of their medical colleagues. It was only round the middle of the last century that medical schools began to accept psychiatry as a subject to be taught in the curriculum, although only as an appendix to general clinical medicine and usually with a certain neurological emphasis.

"Later, psychiatry began to develop into a medical speciality. This was due to a general solidification of its scientific basis, to a great wealth of clinical experience, and finally to considerable improvement in its possibilities for therapeutic and preventative action.

"Advances in the understanding of the function of the central nervous system, derived from the work of Neuro-anatomists, Neurophysiologists and Neuropathologists, all played their part in consolidating the scientific basis of psychiatry. In this connection, special importance has to be attributed to the development of cortical syndromes such as the aphasias, apraxias and agnosias, and later on to the investigation of extra-pyramidial functions and of the finer anatomy and physiology of the vegetative system, particularly at the cerebral level. It is hardly necessary to point out that the Neurophysiological approach is still adopted in modern research, for instance, in the field of epilepsy, cybernetics and brain chemistry."

The aspects of clinical psychiatry which merit discussion are many and varied. For pragmatic reasons it is necessary to confine discussion to a few of the many aspects. These include the role of psychiatry in clinical medicine, its value in the education of medical students and its value in the promotion of mental health in the community. From a review of these the concept of the actual content of instruction will emerge as a logical sequence.

Role or Psychiatry in Clinical Medicine :

The first point to be considered is the increased demand for psychiatric care in the

present day world. The most important reason for this, is of course, the fact that the population of the world has increased tremendously. There are more people living today that have ever been born. This alone would indicate the tremendous need for the treatment of any disease condition which may afflict human beings. The next important reason is that although in many less developed countries there are urgent problems which face physical and preventative medicine in the fields of nutrition, maternal and child health and the prevention of infectious diseases. In all of these fields the actual toll of life has been and remains considerable it is only very recently that consideration has been given to effects of psychiatric ill health on the community's well being and on its economic efficiency. In the more advanced countries this question can be viewed in a very different light where most of the problems mentioned above have either been overcome or reduced at least to a considerable extent so that psychiatric illness along with degenerative dissorders has assumed the pre-eminent position. It is said that approximately 10% of a population in any one year are likely to be handicapped by sort of psychiatric symptoms either mild or severe. Next comes the vexed question of the alleged increase in the incidence mental disorder, and its supposed connection with the artificial life of civilized society.

In the early days, the bulk of information about psychiatric disease was collected from the data relating to the inmates of the asylums for the insane. The development of psychiatry as a medical speciality in the 19th century was also related to the building of these institutions which performed a custodial function for t he more severely disturbed members of the community. The figures were kept mostly for administrative purposes. The investigators who dealt with them were the Medical Officers making use of the records of their own institutions. In England, the Registrar General' Office had a Public Health Officer, William Farr, who published a pamphlet on the statistics of English Lunatic Asylums as early as 1838 (i). Prichard (2) in 1835 also emphasized the different admission rates from urban and agricultural areas and Stark (3) in the 1850's, showed that the insane were drawn more often from the lower than from the middle and upper classes. Workers in the United States claimed a higher incidence of mental illness in the old settled areas than in the new pioneer states (4) other workers compared the figures in different years wondering whether there was an increase in the incidence of mental illness. Maudsley (5) studied the apparent increase in England between 1840 and 1870 concluding that it did not correspond to any real trend.

Even to the present day the controversy has not been unequivocally decided. Most studies that have been done recently are based on General Practices and they point to a high incidence of emotionally determined illness in the population although figures vary considerably. But Hopkins(6) gives 11.1% for "Formal Psychiatric Illness", an additional 31.7% for less clearly definable stress disorders, making a total of 42.8% of all patients seen by him. Shepherd (7) in a recent carefully conducted study based on several Practices in the London area arrived at the conclusion that the incidence of emotional illness in a population of nearly 15,000 at this time amounts to 140 per 1,000 or 14%. The majority of consultations were for Psychoneuroses (88.5 per 1,000) and "Psychiatric associated conditions" (48.6 per 1,000), a category used to include psychosomatic conditions (29.9 per 1,000), organic illness with spychiatric overlay (15.0 per 1,000), psycho social problems (7.5 per 1,000) Shepherd also point out that patient emotionally determined illnesses make greater and more frequent demands on their General Practitioners than the rest of their practice population. About adult in 7 consulted his or her doctor at least once during the survey year with symptoms, wholly or in part of emotional origin. American findings give higher figures of 20% (8) there can therefore be no doubt that emotionally determined illnesses of all kinds constitute a large proportion of the work of general and of the medical profession as a whole.

Inspite of the undoubted importance of emptionally determined illness in all branches of medicine the training of doctors in the psycho-social aspects of medicineis gravely neglected. Both the British College of General Practitioners and the report of the Royal Commission on Medical Education have focused attention on the need to prepare doctors for the large amount of emotional illness they have to deal with. This training is, of course, specially important for the General Practioners who are the first to come into contact with patients needing help with emotional problems. But hospital specialists are equally

involved, although some of them may be less aware of the fact than others that those sent them for specialist opinion may have symptoms which require psychological understanding as well as physical investigations.

If we turn new to the actual content of teaching and its relationship to mental health and its promotion we find we must admit that the purpose of a medical school is to train doctors who have a broad perspective of the whole field of medicine and to allow those who have a special interest and the talent to go into a specialist field. It is essential therefore, that psychiatry which is of such profound importance both to the general practioner and of course, to the specialist himself should be presented by stimulating teachers who have the status and the prestige which equals that of their colleagues who are teaching other physical diseases.

It cannot be denied that the two basic disciplines from which one can enter Psychiatry are Neurology and the Behavioral Sciences. This should be taught in a dynamic rather than in a static fashion with a routine description of their stark and uninteresting anatomical structures and their fibre connections.

The importance of teaching Behavioral Sciences cannot be minimised because not only are they important to the lea rning of psychiatry but they are also essential to enable general practitioners from dealing with a number of their patients whose difficulties are psychological or social and even many specialists who fail to regard the patient as a person rather than the carrier of a certain disease. The Behavioral Sciences include Psychology, Sociology, Social Administration and Ecology.

The importance of Neurology to the study of Psychiatry cannot be over emphasized. It is a trusim to say that psychiatric illnesses have their seat in the brain and therefore it becomes inevitable that there should be many conditions which form the borderland between neurology and psychiatry. It is essential to know both and to be familiar with each. The present day miracle of psychopharmacology is really rooted in neurochemistry and neuropharmacology.

Diagnostic Categories :

Medical Students should see as many and varied examples of every diagnostic category which include major psychoses, mental retardation psychoneuroses, adult and child behaviour problems and addictions. It is essential that the undergraduate should be able to see the cases over an extended period of time, if necessary spread across intervals and also must be able to participate in the treatment of minor psychiatric disorders through the simple but very rewarding process of simple goal directed psychotherapy under supervision. This apart from being the best way of teaching dynamics gives the medical student a sense of participation in a way which he cannot get anywhere else.

Anxiety states which constitute a large proportion of the problems which the medical student will have to face when he goes into practice are very good examples to which he can be exposed under supervision physical conditions associated with anxieties like tension headaches, eneuresis and sexual maladjustments.

Exposure to the work of the almoner or the Psychiatric Social Worker is also likely to be of profound interest and great benefit to the medical student.

The Dynamic Approach :

The young medical student should know that mental disorders are the result of many forces from within the patient as well as his environment; the importance of genetics must be emphasized to him as well as the constitutional factors which are of profound importance. These dynamic interplay of factors provides the basis of the Psychodynamic approach. The fundamental contribution of this approach has been to draw attention to the psychological forces for the understanding of normal and abnormal, human behaviour and all psychiatric illnesses. This has been of great importance in view of the tendency to over emphasize the purely biological and environmental aspects of mental illness the word 'dynamic psychiatry' implies the continuous interaction of psychological and physical phenomena, and the influence of personality development in childhood as well as of social relationships on present day patterns of living and reacting. In the latter case, this concerns itself with the study of intrapsychic phenomenon including conscious and unconscious mental processes along with the interpersonal phenomena specially the doctor-patient relationship.

Interviewing :

The classic method of taking a medical history is from patients who suffer from a well-defined physical illness. Here he can be asked direct questions for which the patient is expected to give direct answers; the purpose being to get a clear description of physical symptoms to decide whether or not it fits into the picture of an organic illness. If the doctors' attention is oriented towards diagnosing physical disease, he is likely to ignore any statement made by the patient which leads him away from this purpose; consequently, the patient is discouraged from talking about certain topics even though they may be of importance to him. In this process a large and important area of the patients' illness and their personal reaction to it is likely to be ignored. The social history has also to be similarly limited to a few questions concerned with housing, finance, work, marital status and number of children.

The correct teachnique should be to teach medical students the very simple, yet, skilful art of Interviewing; the essentials of which are:—

(1) To learn to listen rather than to ask questions.

(2) To follow up the leads that the patients offer.

(3) To open up areas of enquiry the patient does not mention on his own accord.

(4) To use one's own emotional reaction to the patient's suffering and carefully controlled empathy to discover what sort of person he is, what he feels, and what he is going to do to others including his doctor.

(5) Of special importance is a need to find out in detail what was happening to the patient at the time his symptoms commenced, how he reacted to his life circumstances at that time and what they meant to him.

Such methods are, of course, used by many doctors with a natural gift; in fact professional interviewers can give very good examples of highly skilled interviews.

Methods of Investigation :

The most important investigation is a carefully obtained history but the medical student must also be exposed to a few of the investigations which are carried out as a routine in the better institutions. These include the physical tests like the Electro-Encephalogram, a good formal neurological examination, the simpler psychological tests like Raven's matrices and T.A.T.

It is also essential to teach the medical students the awareness of danger signals which include severe Depression and consequent risk of sucide.

Classifications :

It is essential that the medical student who is trained to think in terms of disease entities as separate water tight compartments because of his training and experience in other branches of medicine should be given a simple, under standable and logical method of classification of psychiatric illnesses. Against the background of the basic information that psychiattric conditions are usually not as water tight as those in other specialities from each other, the classification offered to him should be simple enough for him to assimilate.

A consideration of Treatment :

The aspect which is of greatest importance to patients and to practising doctors is the question of treatment. The method of treatment which is most closely associated with psychiatry, and the method in which the psychiatry presents the most original record and the most important contribution is that psychotherapy. The second mainstay of treatment, and this really represents some of the greatest advances of chemistry and pharmacology is the treatment with drugs and other forms of physical therapy. The third important method which is utilised in psychiatric treatment, although not as tangible and perhaps not as well understood is the environmental manipulation that is often required after the drug and physical treatment, and the establishment of a psychotherapeutic relationship, a degree of confidence and stability has been infused in the patient. It is in this area that the psychiatric social worker renders invaluable help.

The general aim of psychotherapy is to improve the patients capacity to deal with his own problems, to adjust himself to the conditions of his life and to make the best possible

use of his own emotional and intellectual resources. Psychotherapy essentially is a form treatment by communication which covers all forms of exchange of ideas, of discussion, of reasoning, of the effort to reach out into the the mind and world of sick person and by comprehending it to make it comprehensible to him, even enabling him to proceed in a different way and to modify his behaviour, along the lines governed by this new and wider understanding and by an increased confidence. This therefore, requires the confidence of the patient in the doctor and skilled understanding by the doctor of the patient's predicament. There are two broad categories into which psychotherapy can be divided. The first is the supportive kind and the second may be called the interpretive kind; it is the area of interpretive psychotherapy which is comprised of the various analytical approaches and within the analytical approaches many schools that have emerged out of the original contribution by Freud.

The supportive psychotherapy is usually simple, less ambitious in aim and easiest in execution, and therefore, more suitable for demonstration and practice to the medical student. It may include all the techniques of counselling direct, sensible and sympathetic advice, and other reassurance and encouragement. The supportive psychotherapy can play a great part in the out patient management of patients who might otherwise receive no help whatever from their doctors.

Interpretive psychotherapy is based upon the number of principles which were established largely by the early study of the Freudian School of psycho-analysis into the elements of human emotional development and the unconscious mental life. The first of these is that behaviour is prompted chiefly by emotional consideration, but understanding is necessary to modify and control such behaviour. The second is that a very significant proportion of human emotions, together with the action to which it leads is not accessible to personal introspection, since it is rooted in the areas of the mind which are below the surface of consciousness. The third principle which is derived from the first two is that any process which makes available to individual consciousness the true significance of these emotional conflicts and attentions which have been repressed will produce a heightened awareness and with it increased stability and emotional control. This in turn will lead not only to improved health but also to a more mature and developed personality.

The essential in the psychotherapeutic interview is an ample time for the patient to describe his difficulty without interruption from the doctor, and the doctor must be disposed to listen to them with unwavering patience and attention. This is a skill which is more easily acquired by example than by precept.

Also included in this group of psychotherapeutic techniques and employed as auxiliary method in any form of therapy are those methods which are designed to provide occupation to the patient in hospital or at home who are unable to carry on the normal work of their daily life. This type of activity is old occupational therapy and the secret lies in arousing the patient's interest and improving his morale by leading him to discover that there are useful things which is still done satisfactorily. It also provides contact and interest which although allied to the general purpose and direction of the medical treatment are separated from immediate supervision and administration of doctors and nurses, it is not simply a means of passing time but an active method of treatment with a profound psychological justification.

The use of drugs in the treatment of psychiatric disorders is too well-known to justify repitition here. Very briefly the two main groups of drugs which are used are tranquillizers and anti-depressants. There is a myriad variety of each of these, and new ones are being added every day with greater claims to afficacy and safety. What is essential for medical students to learn is the correct use of one or two of these drugs which he can master. It is imperative that he should be able to give the right dose for the right period of time before, abandoning the drug or his diagnosis or both.

Electro-Convulsive Therapy despite its alarming name, is one of the safest procedure is psychiatry, and indeed is the most effective form of treatment in depression. In its modified form the patient, who is on an empty stomach is given an intravenous injection of a short acting barbiturate and a short acting muscle relaxant which will paralyse the muscles for two to three minutes. As soon as a patient is asleep and relaxed which takes less than half a minute, a 90 volts current is

passed through electrodes placed on the temples. If it succeedes in firing a fit which will show slight twitching in the hands, feet, and in the face. In the case of a failure a further shock of slightly longer duration is given. After the fit the patient is given oxygen until he starts breathing normally. The whole process takes about 10 minutes and the patient has no recollection of the shock or the fit. Medical student can see this treatment being given and also observe the dramatic results which follow four or six treatment in somebody who is completely and utterly depressed.

After the successful use of drugs physical method of treatment and psychotherapy comes that turn of social measure which seek to alter the patients' environment. These include recommendation about condition about condition of work, provision of alternative employment, or housing, general advice to employers or the members of the family: all aimed at eliminating some of the social difficulties with which the patient has found himself unable to contend. These are the province of the trained psychiatric social worker acting under the general supervision of the doctor.

A medical students should see the various forms of treatment that have been described, and perhaps participate in some of them, and witness the team work which is necessary to achieve improvement in the patient, it emphasises to him the importance of the various emotional social and environmental factors in the development of psychiatric illness. It also emphasises to him the need to seek and enlist the co-operation of a number of agencies that are arranged in support of the patient. that have been described, and perhaps participate in some of them and witness the team work which is necessary to achieve improvement in the patient, it emphasises to him the importance of the various emotional social and environmental factors in the development of psychiatric illness. It also emphasises to him the need to seek and enlist the co-operation of a number of agencies that are arranged in support of the patient.

In conclusion, it may be said that: "The contribution of psychiatry to a fuller understanding of the principles and the practices of medicine was to underline a single fundamental truth: the ultimate wholeness and essential dignity of man. (10)"

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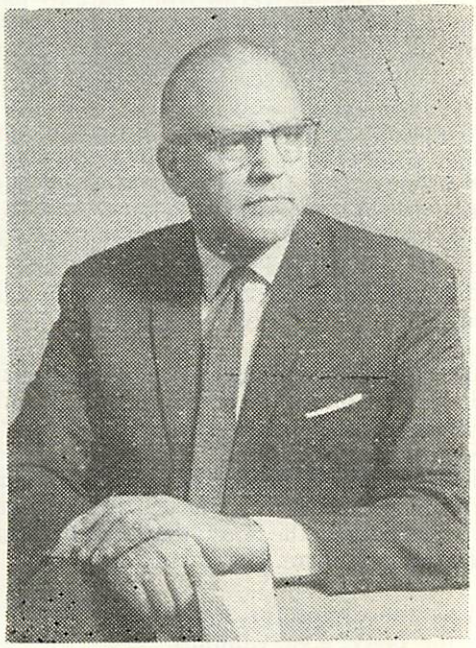
DOCTORS, DRUGS AND DRUG HOUSES-AN INSEPARABLE TRIO*



**Prof. DR. MAZHAR-UL-HAQUE, B. S., M.D.,

Hony. Professor of Pharmacology and Therapeutics, Jinnah Post-Graduate Medical Centre, Karachi, (Pakistan).

TOOTHACHE or tummyache is as distressful in a dweller of caves as in a resident of modern palatial bungalows. The immediate reaction of the unhappy sufferer is to find a wiser man than himself to drive the ache away. Thus has come down through the ages the "Medicine Man" in the robes of a doctor.

Ever since the dawn of history, doctors have been the true and trusted friends of the suffering. They have not only relieved the load of human sorrow but have also dispelled the gloom of the sick chamber. They have even shared the pangs and sufferings of the sick so as to give solace and peace to them and those around. No wonder then that medicine has been the noblest among the worlds trades or professions.

A doctor, because of his ability to relieve human misery, has been looked upon as next to God. He has always held a privileged place in the society. He ushers man into the world at the time of his birth and he is there giving succor and comfort at the time of his death. In the emergencies and exigencies of life it is the doctor who is called on for help and advice. Humility, humaneness, service and sacrifice are the essential characteristics of his profession.What he knows of the most delicate, confidential, personal and family affairs of his patients is seldom known to anyone else in other professions. His responsibilities are enormous also. He has to act not only as the custodian of health but also as a valued friend working for the well-being of the people so as to help and guide them towards healthier and happier existence. He has to be well versed and uptodate with the art and science of medicine both in theory and practice. For him medicine is a constant study to the extent of specialization in different fields of medicine, surgery, pharmacology, pathology, etc.

It has not to be forgotten, however, that the doctor is a human being also. He has his basic needs, urges and short-comings common to all mankind. He has also the desire to live and see his progeny survive and flourish. The society owes him something in return for the good he renders; something which would help him survive and lead an honourable existence. His well-being in fact would be the well-being of the people or the community he serves. In the absence of proper appreci-

* Address to the Rotary International, Karachi on 23rd April 1970.

**Formerly Head of Department of Pharmacology & Therapeutics, Dow Medical College, Karachi.

ation of his services his frustration and dismay are understandable. My pointed reference is to the present day struggle of the young doctor in the country, for the acceptance of his demands which I am convinced are quite reasonable. One may disagree with their approach of the problem but not with the genuineness of their cause.

Man's survival on this planet has depended largely on fighting disease with drugs. It has been said of drugs that they sometimes cure, they often relieve and they always console. Sir William Osler declared that one of the striking differences between man and other primates was the fact that man enjoyed taking drugs. Talking of doctors without refering to drugs would, therefore, be meaningless. Drugs are the tools with which the doctor exploits his knowledge to allay tummyaches and toothaches and thus relieve human suffering. What are drugs? Drugs are chemical agents, other than food, which affect the functions of living protoplasm. The scope of this definition may be elaborated by calling them as any substance or mixture of substances used in the treatment, mitigation, prevention or diagnosis of disease or the restoration, correction or modification of organic functions. A more lively and spirited definition of drug, however, is an agent that may add years to the life of the patient but more so add life to his years.

The science of drugs is known as Pharmacology and it deals with any and every type of knowledge about drugs, their source, physico-chemical properties, actions, doses, dosage forms and their preparation, uses and toxic effects, in health and disease, in humans, animals and plants. No other branch of medicine has progressed and advanced so much during the last 1,000 years as Pharmacology alone during the last three decades. About 80% of the drugs available in the armamentarium of the doctor today were unknown and not available to him in the early forties. The discovery of new drugs during recent years has thus been so out-standing a contribution to the well-being of mankind, that they are today being held responsible for causing "Population Explosion". This impetus to Pharmacology was given to a large extent by the last world war which led not only to the discovery of new weapons for the destruction of mankind but in its wake evolved newer and better means of its preservation also.

Drugs may be obtained from natural or artificial sources. Natural sources are the vegetable, animal and mineral kingdoms and artificial source is the organic chemists' laboratory where he synthesizes from basic chemicals new compounds after more than one complicated chemical reactions. Crude drugs (vegetable or animal) owe their specific actions to their containing certain potent chemicals in them called their active principles. The common example is of morphine in the latex opium, caffeine in tea leaves, nicotine in tobacco leaf, quinine in coinchona bark, thyroxine in thyroid gland, etc. The quantity of active principle varies from part to part, time to time and source to source of the crude drugs and hence the importance of their proper collection and storage. These active principles have been extensively studied chemically and pharmacologically and the doctors now prefer to use them instead of crude drugs for prompt and sure action. Most of these active principles are today being manufactured synthetically thus making obsolete their natural sources. The synthetic product is almost as good as the natural, chemically and pharmacologically.

Drugs act by coming in contact with living cells directly or indirectly but the exact manner how they produce their effects in the body is not properly understood. Often they show a selective action by acting on one type of cells in preference to others. Drugs do not create new functions in the body; they merely modify those already there. Drugs can act:

(1) as substitutes for something deficient in the body, e.g., vitamins,

(2) as anti-infectives to kill or curb infection with foreign invaders, e.g., penicillin,

(3) as depressants, e.g., alcohol, and

(4) as stimulants, e.g., caffeine.

Every new drug has to undergo extensive critical investigations by groups of experts specializing in different medical and allied sciences before being declared fit for use by the doctor. A general plan of investigation is drawn up and the study is carried out first in the laboratory on different species of animals like frogs, mice, rats, guinae pigs, rabbits, cats, dogs, etc., and then if indicated, in clinics on humans under controlled conditions, depending upon the nature of the

ingredients and intended uses. Curiously human response to drugs more closely resembles that seen in the dog rather than the monkey. The main purpose of such a study is a thorough understanding of the usefulness and toxic properties of the drug. The new remedy, to be acceptable, must show its superiority over the remedy already available in being more effective, less toxic, more economic/, more pleasant in administration, etc. The true efficacy of the new remedy vis-a-vis its toxicity, however, is revealed only after it has been put to use and has withstood the test of time.

Most drugs alleviate symptoms, a few cure, but all effective drugs can be harmful. Even water, sugar and common salt may be harmful. A drug claimed to be harmless is likely to be ineffective also. As such drugs should be used under medical advice only. Even then they are known to produce Iatrogenic Disease that is disease induced by the doctor. Being a harmful item there should be proper restrictions and control at Government level on the manufacture, advertisement, sale to public of drugs of any and every kind. Unfortunately such a control in actual practice is far from effective in our country. As a result almost any and every type of drug can be had by the consumer without the doctors' prescription. Such a practice is highly dangerous because of its tendency to promote mis-use of drugs by way of self-medication leading to drug habituation/addiction, drug resistance/poisoning. etc. The remedy lies in more strict Governmental control in practice so that no drug except household remedies can be had from the drug stores without the doctors' prescription.

As has already been stated drugs are scientific tools in the hands of the doctor. They are not the panacea that the advertisements, particularly in the lay press, too often claim. For their successful use they must be genuine and not spurious, potent and not inert, effective and not substandard. In other words they must come up to certain specifications of quality and quantity as described by the manufacturer on their lables. The doctor prescribes a drug with full confidence that it would work and produce the desired results. When the drug fails the doctors' embarrassment and danger to patient's health are understandable. There have been instances of vials of life-saving drugs containing nothing but common salt or material sub-standard in quality and quantity. The doctors' dilemma and patient's fate in such cases is obvious.

That brings us to the importance of drug houses whose responsibility it is to provide, genuine drugs of standard quality. This was also substantiated by pharmaceutical experts during the deliberations of the recently held W.H.O. seminar on the "Quality control of drugs" at Islamabad. The drug houses must ensure that each batch of pharmaceuticals manufactured by them is properly tested before being put on the market. Rather than have make-shift arrangements for drug testing, they should have the services of qualified pharmacists and facilities of well equipped quality control laboratories to handle this problem.

It has to be stressed with all the emphasis that persons engaged in the manufacture and sale of spurious and sub-standard drugs are criminals of a high order. In fact they are killers and deserve punishment accordingly. Unfortunately, as at present, punishment deterrent enough is not awarded to them under the law with the result that the menace continues uncurbed. For the complete eradication of this heinous crime the punishment has to be nothing short of examplary.

As at present drug houses in the country are mostly engaged in packaging imported raw material into different dosage forms which practice is not in the ultimate good or interest of the country. In view of the disturbed international situation and our uncertain relations with some of the neighbouring countries such a state of affairs should not be allowed to perpetuate for long. It is time that our drug houses realised the gravity of the situation and aimed at:

(1) making Pakistan self-sufficient and supporting for drugs of any and every description,

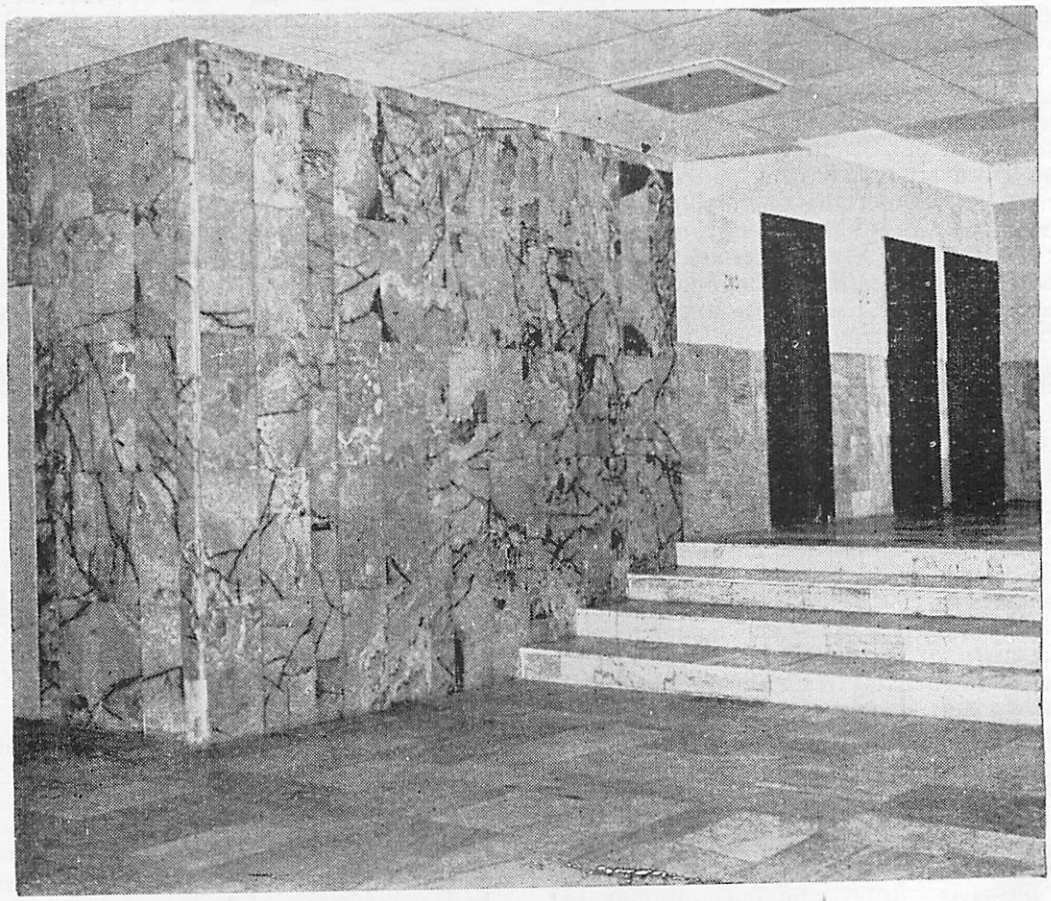
(2) bringing down the cost of drugs within the economic means of the masses.

The achievement of this goal is not difficult provided there is national spirit and will to do so. For this purpose the drug houses will have to exploit the local reasources of drug material and scientific talent of which there is no dearth in the country. The matter of basic manufacture of drugs and their raw material should receive top-priority. Every drug

house should organize a drug research and development unit to find ways and means of developing new processes to improve production and dosage forms suited to our needs and within our economic means thus finding cheap indigenous substitutes for costly imported material. Third would obviously ensuret he availability of quality drugs at reasonable cost to the masses. The drug houses, though fully conscious of their responsibilities, have their own problems also. They want Government's protection of the drug industry, which unlike the chemical industry, is so far not forthcoming.

A word about the profession of pharmacy in the country on which depends the quality of drugs manufactured by our drug houses. The crying need of the hour is availability of adequate facilities for the proper education and training of pharmacists to man the pharmaceutical trade and industry. What a pity that the institutions imparting education in pharmacy in the country, as at present, are not only poorly staffed and equipped but also headed by those who do not possess even basic academic qualifications in pharmacy.

My friends, I have tried briefly to deal with the subject matter of 'Doctors, Drugs and Drug Houses.' Each one of these items has its own significance and importance though intimately linked with the other. Indeed they form an inseparable trio in safe guarding and promoting the day to day health of the nation.



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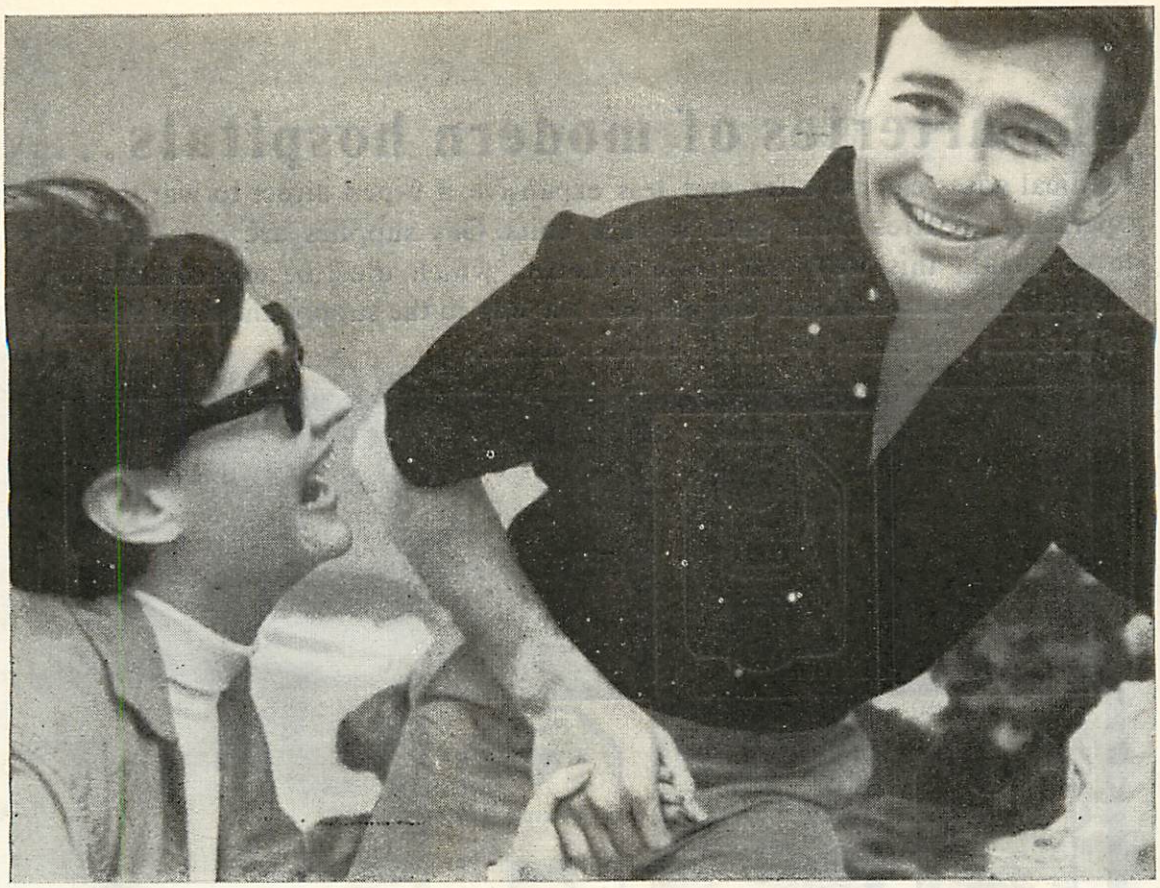

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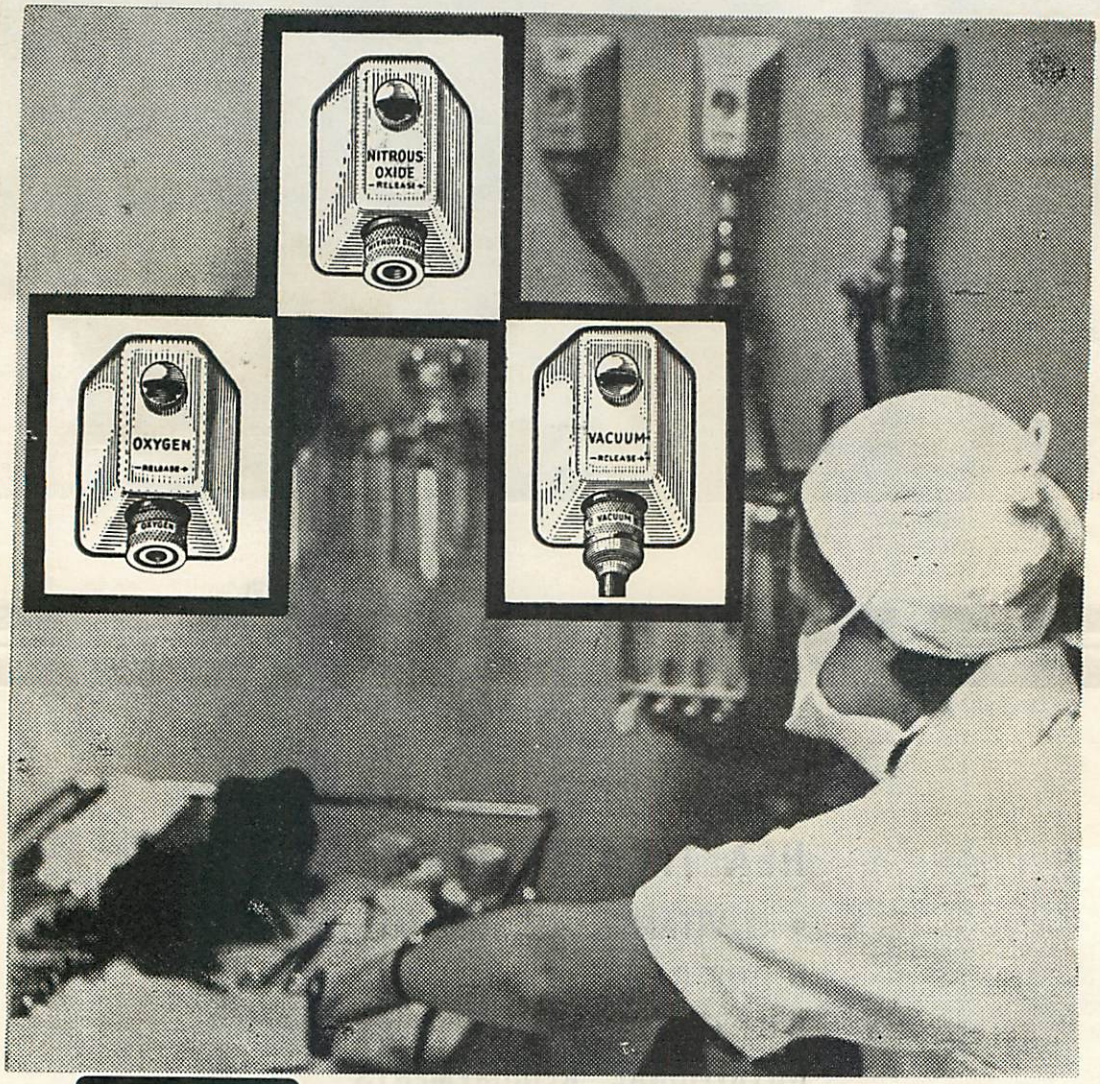

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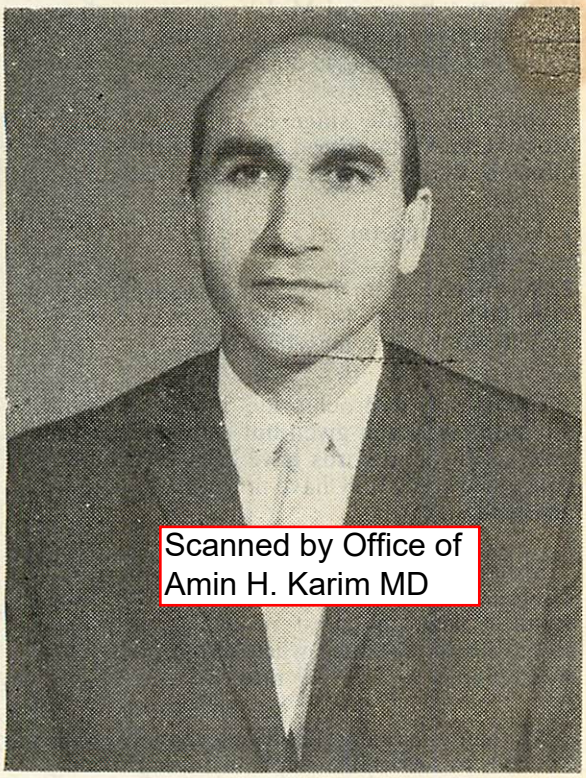
PAKISTAN OXYGEN LIMITED

MANAGEMENT OF COMPLETE HEART BLOCK



DR. M. RAZA-M.B.B.S., M.R.C.P., M.R.C.P.E., M.R.C.P.G, D.T.M. AND H.
DR. SIDDIQUA IBRAHIM M.B.B.S.

Cardiovascular Research Unit Department of Cardiology Jinnah Postgraduate Medical Centre, Karachi-35.

COMPLETE heart block is characterized by the interruption in the conducting pathway between the atria and ventricles. The commonest sites of lesion are both the bundle branches, the bundle of His, and the A.V. node, in that order. Consequent to complete heart block the atria and ventricles beat independently. The ventricular rate being 30-40/min and atrial 70-80/min.

Aetiology :

Common causes of complete heart block are :

1. Coronary Artery Disease—7% patient with myocardial infarction develop complete heart block. The heart block associated with inferior myocardial infarction is often transient where as that associated with anteroseptal myocardial infarction is permanent.

2. Hypertensive heart disease.

3. Rheumatic Heart Disease specially calcific aortic stenosis.

4. Syphilitic Heart Disease.

5. Congenital, in association with ventricular septal defect, Fallots tetralogy, common A.V. Canal and corrected transposition.

6. Acute infections like Rheumatic Fever, Diphtheria.

7. Post operative following repairs of V.S.D. A.V. Canal etc.

8. Drugs like digitalis, quinidine.

Clinical Features :

1. Incidence: The incidence of complete heart block is 50/million of population. In Pakistan for population of 120 million there are at least 6,000 cases of complete heart block each year.

2. Age: The patients are between 50—70 years.

3. Sex: It is more common in males than female.

The heart block may be asymptomatic,

this is specially true about the congenital variety where the heart rate is comparatively faster, or it may manifest as:

1. Adams stokes attack which occur in 55—70% cases of complete heart block. This is is characterized by attacks of syncope with or without convulsion with a slow pulse of less than 20/min. or cardiac arrest.

2. Congestive Cardiac Failure.

3. Poor cerebral perfusion with mental impairment. and confusion.

4. Poor systemic perfusion with symptoms of fatigue etc.

The average duration of life of patients with complete heart block is 2-3 years, it is greater in the rheumatic variety being 7 years. Untreated post operative complete heart block is a serious complication and carries 75% mortality.

Diagnoses :

The diagnosis can be made by history of syncopal attacks, clinical examination, which reveals a slow pulse; cannon waves in the neck and varying intensity of the first heart sound. It can be confirmed by electrocardiogram.

Treatment :

Until lately the drug treatment has been the sheet anchor of the therapy of complete heart block. With the advent of pacemakers, the management of complete heart block has been revolutionized.

Drug Therapy :

The following are the drugs which have been used most:

1. Ephedrine.
2. Adrenaline.
3. Isoprenaline.
4. Steroids.
5. Atropine.
6. Sodium Lactate.
7. Methamphetamine.
8. Diuretics.

Adams Stocks Attacks :

If the patient is seen during the attack, there is no pulse or B.P. External cardiac massage and mouth to mouth breathing is instituted immediately; E.C.G. strip is taken to determine whether the patient has ventricular fibrillation or cardiac asystole. In case of ventricular fibrillation heart is defibrillated by D.C. shock. In case of standstill, external cardiac massage should be continued and cardiac pacing should be done using an external pacemaker. If it is not available an infusion of isuprel 1 mg in 200 ml 5% dextrose is given a rate of 15—20 drops per minute (5-10 microgram/min). In emergency 0.1 mg isuprel may be given I.M. I.V. or adrenaline 0.5 mg may be given I.M. I.V. or intracardiac. With Isuprel infusion the aim is to keep the heart rate between 40-50/min.

Once the acute stage is over and Adam Stocks attacks have been controlled by Isuprel infusion, the recurrences can be prevented by:

1. Isuprel (linguets) 5-15 mg every 1-6 hours.

2. Sustained action Isoprenaline (Saventrine), 30-60 mg every 4-6 hours. A maximum of 250-340 mg/day may be given.

Ephedrine Hydrochioride gr.1/2, 1 every 4-6 hours has been given but isuprel is preferable. Glucocorticords have been used but in controlled trials they have not proved to be of any value.

Molar lactate has also fallen in disrepute. Diuretics are presumed to act by reducing serum potassium. Best results are reported to have been obtained when serum potassium was reduced to 3.5—3.9 meq/litre.

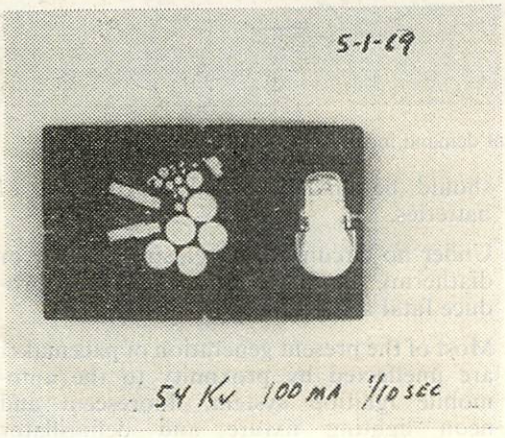
Methamphetamine 20-40 mg may be given SC, IM, IV. Atropine sulphate 1-2 mg IV may abolish heart block if it is due to vegal influences.

Heart failure associated with complete heart block is treated by with holding digitalis, administration of diuretics and by cardiac pacing.

The inefficacy of drug treatment is apparent from the fact that it carries 50% mortality in the first year. Whenever facilities are available for the implantation of pacemaker this is the treatment of choice for symptomatic complete heart block.

Cardiac Pacemaker :

Although Hyman in 1932 reported on the experimental use of artificial pacemaker it was in 1952 that Zoll successfully resuscitated 2 patients by the use of external pacemaker. With the development of open heart surgery post operative complete heart block became a dreaded complication. To tackle this, Weirich in 1957 reported on the use of myocardial electrode and external pacemaker. Lillehei in 1960 adopted the use of transvenous electrode and pacemaker. Since both with the myocardial and transvenous electrode, the pacemaker was placed externally sepsis along the track of the catheter was common. Chardack over came this problem by adopting the use of a totally implanted pacemaker. Since then a number of pacemakers have been available both of the fixed and demand type. The fixed rate pacemakerscarry the hazard of fatal arrhythmia. As a result, now demand pacemakers are recommended. Several makes are available from U.S.A. Europe and Japan. Although the life of battery is claimed to be 3 years, in practice, this has been found to be on average 21 months and many cardiologists replace a pacemaker every 2 years. The necessity of changing pacemaker unit every two years has resulted in the development in two directions. Nuclear powered pacemakers have been used experimentally in France and England. The use of Nickel Cadmium cells engergised by solar energy in the appollo space vehicle has provided another break through in the field of pacemaker. At the John Hopkin Hospital externally rechargeable pacemaker powered by Nickel Cadmium cells has been devised. From the initial trials of this pacemaker with which one the authors (M.R.) was associated it seems to hold promise.



Medtronic pacemaker (pt) externally rechargeable pacemaker (Johns Hospital) (rt.)

Indications for temporary pacing:

1. Complete heart block in patients with acute myocardial infarction carries 80% mortality. The prognosis is greatly improved by pacing which is achieved by inserting a transvenous endocardiac electrode catheter and connecting it to an external pacemaker.

2. Drug induced complete heart block is usually reversible. With holding the drug is usually sufficient but some authorities advise that a temporary pacing should be used in the management of iatroginic complete heart block.

3. In the management of certain arrhythmias.

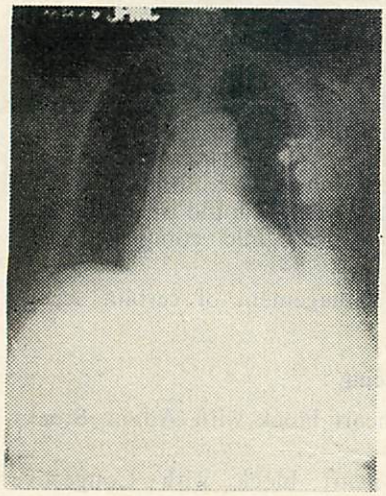
Permanent Pacing :

1. Complete heart block with Adam Stocks attack.
2. Complete heart block with Congestive Heart Failure.
3. Complete Heart Block with impaired cerebral perfusion and mental confusion.
4. For certain arrhythmais.

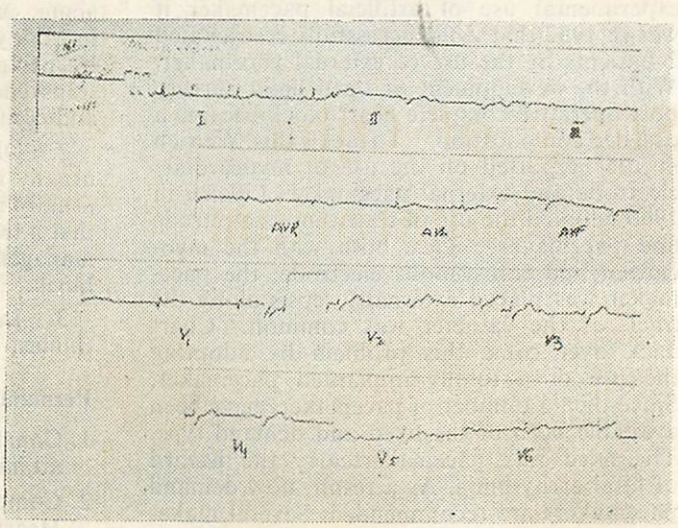
Implantation of Internal Pacemaker :

Of the several Pacemakers available the one made by Medtronic is being widely used. The demand type pulse generator is now considered to be a standard equipment. The implantation is relatively simple procedure but certain precautions are essential. A defibrillator should be available before starting the procedure. A 5% dextrose drip should be running. Drugs i.e. Isuprel, Xylocaine, Atropine should be available. Under local anaesthesia, cut down is done on the left cephilic vein and the catheter is introduced through it into the right atrium and across the tricuspid valve in the right ventricle. The electrode catheter is connected to an external pacemaker. The ideal position for the impaction of tip is determined by finding the threshold of pacing. This should be less than 1.5 ma. Having impacted the catheter tip, the terminals of the electrode catheter are secured to the pacemaker. The rate is usually set at 70/min. A subcutaneous pocket is made in which the pacemaker is implanted. After the procedure has been completed, P.A. & Lateral Radiographs are taken to make sure the catheter tip is in the right ventricle and not in the Coronary Sinus. Facilities have now been developed at the Department of Cardiology, Jinnah Postgraduate Medical Centre for the implantation of

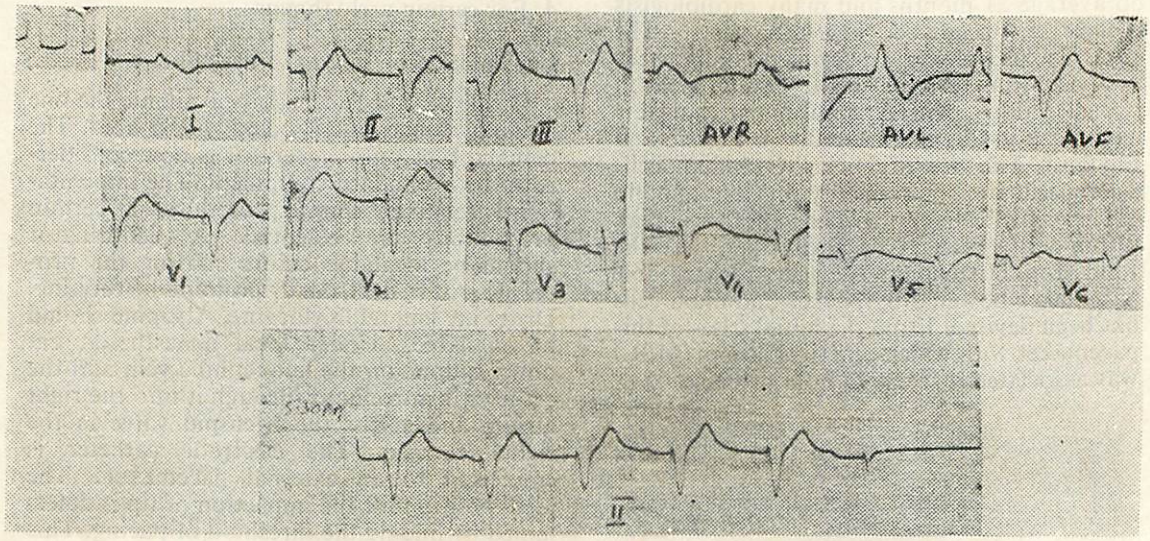
Pacemaker. The photograph shows the first pacemaker which was implanted at this Centre. The patient had complete heart block with Congestive Heart Failure. Adam Stockes attacks. The chest film and E.C.G. before and after pacing are also shown.



Pace maker & the endocardiac electrode catheter



E.C.G. showing 2 : 1 block (before implantation of pace maker)



E.C.G following implantation of permanent demand medtronic pace maker.

After care of patient with pacemaker :

The after care ismost important. A patient with internal implanted pacemaker should be instructed to count pulse daily or whenever the patient notices any irregularity. If the pulse rate varies more than 2 beat/minutes the patient should attend the pacemaker clinic.

1. Every patient with Pacemaker should be examined once a month and E.C.G. taken.
2. Every six month an X-ray of Pacemaker should be taken to evaluate the life of batteries.
3. Under no circumstances electric cautery or diathermy should be used as this may produce fatal arrhythmia.
4. Most of the present generation of pacemaker are uneffected by proximity to the automobile ignition system, fluorescent and neon lighting fixture and defibrillator shocks.

Story of Ojha Sanatorium

MOHAMMAD IQBAL YAD

M. B., B. S., (Pb), T. D. D.; (Wales), F. C. C. P.

Director, Ojha Sanatorium, Karachi

OJHA Sanatorium was constructed by a charitable organisation before the Second World War. It was placed at the disposal of the Central Government (Karachi Administration) in 1949 and transferred to the control of the West Pakistan Government on 5th March, 1962, on the merger of Karachi institutions under the provisions of the Constitution of 1962.

Mr. Deepchand Tejhandas Ojha was a well-known philanthropist of Karachi. He belonged to the renowned family of Ojhas who were vaids by profession. Mr. Deepchand Ojha was also a political figure and a city father.

He died in 1928 probably of TB and left a bungalow, worth fifty thousand rupees at that time, in trust with his brother Mr. Sukhramdas Ojha, to be sold and the amount realised to be utilized for the relief of TB patients. With this initial donation, a voluntary organization by the name of Ayurvedic Tuberculosis Relief Association was founded with Mr. Jamshed Nusserwanji Mehta, the grand old man of Karachi as its first and the last President. This Association applied to the Government for donation of a plot of land for the construction of a Sanatorium for TB patients. After a good deal of survey the present site was selected and Government granted a piece of land measuring 127 acres in Deh Dozan and Safooran situated on the 12th mile of Sehwan Road. The site consists of irregular coral rocks indicating that at some time in the distant past it formed a sea-bed. This is also proved by the numerous small sea-shells found in the bajri on the surface and in the deep strata. It is now 144 feet above sea level.

Dr. Frimodt Moller, one of the pioneers of Tuberculosis work in India and the head of the well-known Mednapalli Sanatorium in Madras was invited to design the Sanatorium. According to the concepts of the time, this Sanatorium was designed in the form of isolated cottages placed 80 feet apart in symmetrical fashion on the two sides of a central road. In addition to these cottages, the design included an infirmary block of 20 rooms and an administrative block of three large rooms. Two houses were also built, one for the doctor, the other for the vaid, in addition to four two-room quarters and 30 single room quarter-block for the servants. A musafir-Khana consisting of five single room quarters was also proposed to be built but only two of the rooms were completed. The modus operandi was to approach individuals/ organizations to donate singly or jointly the cost of a cottage, Rs. 1,400 at that time. The construction was carried out by the Association itself through a residential overseer. When the buildings were completed the name of the donor was inscribed in marble