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SOME APPLICATIONS OF THE SURGICAL LESSONS OF WAR TO CIVIL PRACTICE

BY

W. H. OGILVIE, M.Ch., F.R.C.S.

Major-General

Now that the European phase of the second world war appears to be entering its final stages, it may be well to consider briefly what war has taught surgery and what it has taught surgeons, and how the lessons learned in the field can be applied to the teaching and practice of surgery in civil life.

The surgery of wounds in this war has passed through three phases. In the first, treatment by the closed plaster method was the rule; in the second, which was a period of long communications and poor supplies, wounds were excised and drained, the limb was immobilized in a padded plaster case or some form of plaster box splint, and closure by secondary suture or skin grafting was attempted about the third week, or as soon as the surface was covered with healthy granulations; in the third phase, which has been helped by the advent of penicillin, the wounds are excised by the forward groups and closed by delayed primary suture at the base between the fourth and the sixth day.

These successive steps should be regarded as a gradual evolution to meet changing circumstances rather than as an advance in method due to surgical enterprise. Each step was the right one at the time. The closed plaster method is safe and gives excellent results under desperate conditions, when the wounded arrive in numbers too great to allow frequent supervision after operation. Free drainage, immobilization without constriction, chemotherapy, and the provision of skin cover at a later date are the only possible line of treatment in a swiftly moving campaign where all supplies are poor and many days of rough travel separate the forward operating units from the base hospitals. Such conditions are liable to recur, and where they do three-hourly penicillin, wound dressing under theatre conditions, and all the ritual of war surgery in the British armies of 1945 would be out of the question. When, however, conditions become good in a surgical sense—that is, when advance is steady and retreat unthinkable, when air cover ensures good hospital facilities and uninterrupted supplies, when advanced surgical centres are well placed and well administered and base hospitals are within easy reach by a good evacuation route—early closure, by delayed primary suture or by skin graft, becomes the rule. Even better conditions prevail in civil traumatic surgery, for the injured usually receive their first-aid and definitive treatment at the same hospital, and we can expect that the same methods will prove their value.

Two-stage Closure

The policy of delayed primary suture is a return to that which prevailed in the closing years of the war of 1914–18, but there is one important difference. In the last war delayed primary suture led, in many centres, to the practice of primary suture. In this war primary suture has been condemned for all wounds except those of the head, face, and trunk, partly because it has been tried repeatedly and found more than wanting, still more because it transgresses those basic principles which each war teaches us afresh. Recent wounds freshly excised look so like clean operation wounds that inexperienced surgeons, and also experienced surgeons new to a theatre of war, are tempted to suture them; unfortunately, they sometimes succeed, and persist in spite of warning, till the loss of a limb or a life teaches them their lesson. Except in the case of purely surface injuries, war wounds can never be rendered entirely healthy and entirely sterile by surgical toilet. The limits of tissue damage cannot be decided with any accuracy, and bacteria, blasted in by the cushion of air that precedes the projectile or displaced along tissue planes by movements of the limb, may lie well outside the visible confines of the wound track. Where the bacteria are few and the remaining damaged tissues small in amount, the defences of the body will soon turn out the invaders unless they are hindered by tension. In a sutured wound the hyperaemia which should give protection is limited by the unyielding surroundings and finally replaced by ischaemia, and the outpouring of defensive fluids is brought to a standstill when the interstices of the wound are filled; the bacteria, on the other hand, find in the trapped discharges an ideal pabulum and in the anoxic tissues an easy prey.

The wounds of road and industrial accidents are, like those of war, lacerated and contaminated, though they never show the extreme devitalization that is a fundamental factor in the pathology of wounds caused by modern weapons, nor are they often contaminated to the same extent. Nevertheless the same problems are present in each, and methods which have been found to confer safety and give good results in war wounds should be safer and better in the traumatic surgery of peacetime. The wisdom of unrestricted drainage during the first few days after an open laceration, when an unprepared body is summoning its defences against an unexpected invasion by pathogenic bacteria, the value of closure by suture or skin graft as soon as the defences are established and before the changes of repair have come to leave their train of deformity, pain, scar tissue, and limited movement—these are principles that we cannot well afford to ignore.

The methods in use to-day are simple, as all methods in the field must be, and the tests applied are clinical ones. At the primary operation the wound is carefully excised. Foreign bodies and dirt are removed and all damaged tissues are cut away. The skin is freely incised to allow access to every pocket, but only the barest edges are trimmed off. A simple dressing, usually vaselined gauze, is applied to the surfaces of the open wound, and the limb is immobilized in plaster.

As soon as the patient reaches hospital the possibilities of suture are assessed by the study of his general condition and of the notes of the first operation. He is rested for one day, during which any deficiency in his blood count is made up by transfusion. The wound is not inspected. The dressing is removed in the operating theatre under full aseptic ritual as the first step in the operation of closure, which is usually on the fourth to sixth day. Experience has shown that if the wound appears clinically healthy at this stage it can be sutured safely, even though it may prove on culture to harbour pathogenic bacteria. The wound surfaces are disturbed as little as possible, though some tags or pieces of exposed tendon left at the primary excision may be trimmed away before closure. The skin is brought into apposition by interrupted sutures of some unabsorbable material, which may also take up deeper layers, but no buried sutures are used. The limb is again immobilized in a plaster case, and the stitches are removed on the tenth to twelfth day.

Skin Cover

It has been found that at this interval after the primary operation a certain amount of tension may be used to approximate the skin without danger. A covering of normal skin with subcutaneous fat gives a result so much better than the best graft that every effort is made to approximate the edges, and this is generally possible over the greater part of the wound. Where the skin edges cannot be made to meet, many surgeons prefer to mobilize them as swinging flaps to cover the wound of the deeper parts, and to cover the gap thus produced, whose base is undamaged muscle, with a graft. Normal skin over scarred muscles or an epithelial graft over normal muscle is functionally more satisfactory than a skin graft over an underlying scar.

The need to provide skin cover at the earliest possible date is now an article of surgical faith that will remain. Not till a wound is epithelized does the formation of granulation tissue stop and the scar left by previous granulations become absorbed or moulded along lines of stress in response to the call of function; not till then does the fight against infection cease to be a constant struggle to keep away or kill pathogenic bacteria. The technique of skin grafting has been perfected to a remarkable extent and, for the simpler procedures, brought within the scope of the non-expert. For covering unhealthy granulations to provide temporary epithelial cover, split-skin grafts cut into small pieces—so-called "postage stamp" grafts—have proved more satisfactory to the recipient and donor areas than pinch grafts. For large areas the Padgett dermatome has made it possible to cut split-skin grafts of any chosen thickness up to an area of 40 sq. in., for smaller areas to cut them to any desired shape, and to take skin from places, such as the abdominal wall, that could not formerly be used. The method of glueing grafts to their bed by a living adhesive made from mixed plasma and leucocyte extract, as described by Sano of Philadelphia, has proved an outstanding advance, permitting the provision of skin cover to surfaces that cannot be immobilized and to deep and irregular holes.

I would suggest that the principle of two-stage closure may prove applicable to the treatment of infections other than those caused by wounds or accidents. For more than 20 years drainage in abdominal emergencies has been unfashionable. It has had a poor press. Phrases such as "The peritoneum can look after itself" and "A tube in the belly drains only its own track" are freely used by young surgeons who never drain if they can help it, and the dangers of adhesions, of faecal fistulae, of erosion of vessels are quoted in further support. I would challenge most of these statements. A healthy peritoneum can deal with a considerable amount of infection recently introduced, but the peritoneum in the neighbourhood of a chronic abscess has lost much of its phagocytic power. A tube introduced into the normal peritoneum of an experimental animal may seal itself off, but one put into the infected belly of a man goes on draining while there is anything to come out and allows egress to infected fluid in the whole region from which it emerges. Faecal fistulae or haemorrhages may have been caused in the past by rigid tubes of glass or hard rubber left for long periods, but they do not follow the use of soft tubing or corrugated rubber. As to adhesions: which will cause the more—a tube-track or a collection of fibrin or pus slowly absorbed? In three years of service in Africa I observed many hundreds of patients with abdominal wounds, operated on by surgeons of varying outlook under many different conditions. I found that those who drained most got the best results. Not to drain, when in doubt, is needless bravado at the patient's expense.

But if the peritoneum can look after itself in the presence of a recent infection the tissues of the abdominal wall are less able to do so. It is a common experience after an operation for appendicitis or duodenal perforation to find that the peritoneal cavity recovers but the abdominal incision becomes infected and breaks down. The lesson of the surgery of soft-tissue wounds in war may well be applied to those cases in which the layers of the abdominal wall have been bathed in infected fluid during an emergency operation. After the intra-abdominal mischief has been dealt with the peritoneum alone is sutured, and the remaining layers dressed with gauze soaked in flavine or one of the newer acridine antiseptics, but left entirely open, or at most protected from evisceration by a few stout sutures through all layers. In four days' time, preferably after the bowels have been opened, layer closure is done under local or pentothal anaesthesia.

General Health of the Injured

But the surgical care of a wounded man to-day implies, besides the treatment of his wound, the restoration or maintenance of the general health, on which the health of the wound depends, and an attack on the bacteria that invade it. We seek to help his general powers of resistance by restoring lost blood early and in full amount and making good any later deficiency as it occurs, by keeping fluid reserves fully charged at a time when synthesis, elimination, and temperature regulation are calling for water, and by maintaining that positive nitrogen balance which is essential to the processes of immunity and repair. We can, for the first time in history, attack bacteria in the wound itself without harming healthy tissues. These things are now so much a matter of everyday routine that it is hard to realize that at the outbreak of war continuous intravenous therapy was by no means universally practised, transfusion was seldom given in greater quantities than two pints a day, stored blood was a curiosity and stored plasma unknown, and the use of sulphonamides was being tentatively explored. Penicillin and accurate methods for bedside estimation of haemoglobin and plasma protein have been available only within the last two years. These methods will remain an essential part of the care not alone of our injured but of our sick in civil life.

Blood and Protein

That tissues require a supply of blood fully charged with cells and proteins to carry out their processes of repair, that the most effective antiseptic against anaerobic invaders is oxygen and the most effective applicator of oxygen is the erythrocyte—these are truisms when set down on paper; yet their truth has been realized only slowly, as the result of the clinical observations that men with a haemoglobin of less than 70% show little evidence of repair in their wounds but start to do so after a transfusion of two pints, that men whose blood loss has been fully restored within a few hours of wounding seldom get gas gangrene. Anaemia must be constantly watched for and suspected in any patient whose progress is unsatisfactory; for it tends to appear insidiously, quite apart from any recognizable blood loss, in the wounded, the burnt, the sick, the victims of any infection, not alone those by organisms known to be haemolytic, and to reappear after correction.

The greatest surgical advance of this war, more important even than penicillin, is the development of the transfusion service. This advance we owe entirely to two British officers —Brig. Sir Lionel Whitby, who designed the instrument, and Lieut.-Col. G. A. Buttle, who taught us how to use it. It was in the Middle East, during the thrust of the Eighth Army across Africa from Alamein to Tunis, that the provision of whole blood to the forward operating units was first organized on a satisfactory scale, and that the life-saving importance of early, rapid, and adequate restoration of blood volume in haemorrhage and shock was first learnt. To-day we know no limits, in amount or rate of administration, other than the needs of the patient. I need hardly remind you that plasma loss is the chief feature in burns shock, and that fat embolism and the absorption of products of muscle breakdown are occasional factors in the shock syndrome of injury. But for practical purposes—and the stretcher-side outlook of the field surgical unit and the accident reception ward must be practical —shock is due to loss of circulating volume, and wound shock is due to loss of blood. The treatment of wound shock is the replacement of lost blood by blood: early, before irreparable damage is done; rapidly—that is, at the rate of a pint in 10 to 15 minutes—till the systolic blood pressure has reached 100 mm.; and adequately, till the restoration is within 90% of normal. A wounded man insufficiently resuscitated, or one resuscitated with plasma alone, may have a reasonable pulse and blood pressure, but he is not fitted to stand operation or anaesthetic, to be sent on a journey, or to repel the invasion of bacteria. Fit men recently wounded can take any amount of O (IV) blood from a reliable blood bank;

reactions are seen only where the source of blood is unreliable, or in men who have, after repeated transfusions, developed antibodies against almost any blood but their own.

A transfusion service, with blood banks sufficient to meet any needs, must be available for the resuscitation of the injured and the restoration of the sick in civil life. It will hardly be possible to retain in its entirety that spirit of willing service for others that has bound us together during the war, and many who now attend four or five times a year to give their blood for the wounded will not volunteer with the same readiness in peacetime. Nevertheless if the importance of the service in any scheme of national health is broadcast in the right way, and if the collecting centres are managed with due regard to the time and comfort of those who attend, we need have no fear that the supply of donors will be insufficient for any genuine need. We, on our part, should see to it that transfusion is used freely when needed, but that it is never allowed to become a stunt or an automatic gesture. Since my return to England I have been distressed to see how many surgeons start a blood drip going at the beginning of such straightforward operations as gastrectomy or resection of the rectum. If the value of blood is in replacing lost blood, it should not be wanted during an operation unless severe haemorrhage is expected during its course, as when the patient has a bleeding ulcer or a vascular tumour. The surgeon who expects to lose two pints of blood during a gastrectomy (and a smaller loss does not demand immediate transfusion) should confine himself to circumcision. If the patient is anaemic on admission to hospital the blood deficiency should be fully made up before the operation starts; if during its course he loses more than usual, replacement should, in most cases, be deferred till his reaction to the anaesthetic and operative handling is over and his circulatory requirements can be assessed, calmly and accurately, in the ward.

The need to maintain a positive nitrogen balance during sickness has long been known, but it was not till the publication by van Slyke of a simple copper sulphate method for bedside estimation of plasma proteins that the importance of the study of protein metabolism in clinical medicine received full recognition. The circulating proteins include the antibodies, and they furnish the building material needed for tissue replacement. They are constantly being used, and constantly renewed from proteins in the food. Normal wastage is added to by actual loss in wounds and burns, and when in addition the intake is low, as it is in starvation or during a diet low in proteins as the average invalid diet is wont to be, the protein content of the plasma may sink from its normal 6.7% to not more than half that figure. At this level the whole metabolic machinery is out of gear.

Proteins may be replaced in many ways, of which the simplest is a diet rich in eggs, cheese, and other easily absorbed proteins. In the ill, transfusions of plasma furnish an easy means of replacement. When the need is extreme the intravenous administration of amino-acids can maintain a positive nitrogen balance even in the presence of excessive loss or destruction. By such means some of the victims of the Coconut Grove fire at Boston, who had suffered burns involving more than 50% of their body surface, were kept alive till their skin loss could be made good. More recently the value of intravenous amino-acids in combating liver damage has been shown. At the present time pyrogen-free preparations suitable for intravenous use are scarce and are therefore kept for research purposes, but they will soon be obtainable by all who need them.

Chemotherapy

The value of war as a large-scale experiment in which new methods can be tried and improved is seen particularly in the field of chemotherapy. From a tentative beginning, when we had only sulphanilamide and sulphapyridine and knew little of either, we have progressed by the observation of hundreds of thousands of experiments to a reasoned estimate of the value of both the sulphonamide group and their newer and better-publicized rival, penicillin. No more than a few general observations are possible on this occasion.

Both the sulphonamides and penicillin are bacteriostatic rather than bactericidal. When distributed by the blood stream they reach only those parts which have a blood supply; when applied locally they are effective only in areas they can reach. Neither can therefore be expected to eradicate bacteria lying out of reach of the blood stream and of local attack, as they are in abscess cavities, round foreign bodies, and in the depths of a wound containing dead tissues. Meleney's very careful investigation of 1,700 accidental injuries treated in American hospitals has shown that the sulphonamides, however given, are unable to prevent local infection in a contaminated wound, but that when given by mouth they appear to reduce the incidence of systemic infection. The same may be found to be true to a lesser degree of penicillin. Applied locally, it appears to exert a definite bacteriostatic effect when injected into simple spaces like the meninges, the joints, and the pleura, but its power to sterilize lacerated wounds is by no means proved. In general it may be stated, as Burns has recently pointed out with regard to penicillin, that chemotherapy keeps a local infection local, and will therefore reduce the danger of spreading infection in war wounds and of a systemic flare-up after an operation on infected areas.

Both groups at present have their own sphere. The sulphonamides are cheap, stable, and compact. They can be kept indefinitely and used in any climate, and simple clinical controls alone are needed during treatment. Their disadvantages are the malaise and nausea to which they occasionally give rise, and the dangers of agranulocytosis and renal suppression, which, however, should not occur when the danger is known and guarded against.

Penicillin is a more efficient bacteriostatic than any of the sulphonamides over a wider range. Staphylococci and spirochaetes, against which sulphonamides are ineffective, are particularly sensitive to its action. It appears to bring no dangers, and to be entirely innocuous to human tissues, even in concentrations much higher than any used in clinical work. The disadvantages of penicillin are its instability and the elaborate control that is necessary in its use.

At the present moment the sulphonamides are preferred for infections by the *B. coli* group, which are sulphonamide-sensitive but penicillin-resistant; they will therefore usually be chosen for the post-operative treatment of peritonitis and for the pre-operative prophylaxis in such procedures as closure of a colostomy and resection of the colon or rectum. They are the drugs for treatment in the home and in the wilds, and for lesser infections when it is not considered necessary to mobilize the heavy artillery of the bacteriological laboratory. As soon as penicillin can be produced cheaply and in a stable form that can be given by mouth, the sphere of sulphonamides will almost disappear, unless fresh compounds are found which will cover blind spots in the penicillin range.

Penicillin has already written a new chapter in certain infections. In gonorrhoea it has been able, in a 24-hour course, to give a higher percentage of cures than any method of treatment previously known. In syphilis it appears to do the same, but a much longer period must elapse before it can be said that the disease has been cured and not merely suppressed. In the acute osteomyelitis of children it is able, when given early, to eradicate the infection and allow the involved bone to reconstitute its normal architecture. In the surgery of damaged and infected bone it has given what is perhaps the most striking proof of its value. Gunshot fractures have, under the protection conferred by penicillin, been closed by delayed primary suture with a high proportion of success. Gaps following compound fractures have been grafted as soon as, or even before, the wound was healed. Compound fractures have been fixed by plates, and reamputations have been performed while the provisional stump was still discharging. These procedures had been attempted before, but the attempt had usually led to failure or even disaster. That they now succeed is an index of the debt we owe to penicillin.

Old Methods on Trial

If war is a trial ground for new methods it is also able to throw a new light on many old ones. In the last five years the problem of the infected hand has once more come to the fore. A soldier with a wrecked hand can no longer serve as a soldier, and the months of physical and vocational training that have gone to make him one are wasted. When the hand has been wrecked through faulty incisions for the

drainage of sepsis the tragedy is one that emphasizes the supreme importance of this branch of surgery in the training of students.

I feel most strongly that the inculcation of correct methods for dealing with infections of the hand is one of the chief tasks of teachers on the surgical side of any hospital. The curriculum is already overloaded. Important subjects such as psychology and radiology are skimped, and new subjects are constantly clamouring for admission. To make room for these I, for one, would gladly remove the whole teaching of operative surgery, including attendance at operations, from the pre-graduate course. The student cannot learn enough in such attendances to be of any value to him; on the other hand, he is present as an unskilled assistant or an unsterile spectator at a performance which should be relegated to a team of skilled experts. He gets a superficial acquaintance with a few operations and does not learn enough to do them himself, but, thinking he has, he may be tempted to try them before he is properly trained.

The ritual of the theatre, and the gradual apprenticeship of undertaking operations of increasing difficulty, should be left to the postgraduate training of those who intend to pass to higher qualifications and to adopt surgery as a career. The student, thus freed, should spend the time at his books or by the bedside, or should watch occasional standard operations from the safe seclusion of an observation floor. But the operative treatment of the infected hand is an exception. The correct operations should be taught to every future doctor; they should be practised on the cadaver and demonstrated in the casualty department. Only so can the hand wrecked by incompetent treatment, by drainage left too late or done through midline incisions for pulp or tendon infections, or by dorsal incisions for infections of the tissue spaces, be avoided. Here I would plead for the final abolition of two methods of drainage still advocated in some books but proved by the extensive experience of war to be disabling. I refer, first, to the horseshoe incision round the pulp of the finger, which after healing leaves a hideous and disabling "frog-mouth" deformity: two lateral incisions meeting across the front of the bone and separated by an intact bridge of skin at the tip give just as effective drainage and leave no disability. Secondly, I refer to incisions into the tendon sheath of the fingers, which, though placed in the correct lateral plane, transgress the joint level: incisions may be made into the sheath for the whole length of each phalanx, but the thin portion which holds the tendon in place at the joint should be left.

Varicose veins provide another common and disturbing problem in the Army. I have come to feel—and most other consultants who see these cases in large numbers agree with me—that the injection treatment has no place in the Services; indeed, I would go further and say the time has come to consider seriously whether the injection treatment of veins has any place in legitimate therapy. For those who would dally on the slippery slopes of cosmetic surgery it has its attractions, for it is a cosmetic procedure and no more. The injection of a prominent vein will cause that vein to disappear, but it does nothing to relieve the back-pressure that made it appear in the first place. The same back-pressure will soon dilate another collateral vein, which will in turn be attacked by the injecter, till finally all veins in the leg, including many of the deep ones, are destroyed and the patient is left with a heavy, aching, and oedematous limb. To-day many of the victims of the injection craze of the 'twenties are coming to the out-patient departments of hospitals seeking in vain for relief.

The only successful treatment for true varicose veins which are causing symptoms is Trendelenburg's operation, properly done. Unfortunately the very simplicity of the operation tempts the cosmetically minded to perform inadequate ligatures through small incisions, and the hangover from injection days tempts him to obliterate the veins in the calf by sclerosing fluids. Unless every collateral in the upper two inches of the saphenous vein is tied—and these may be up to 20—and unless the vein is tied flush with the femoral, recurrence is only too likely. Injection of the calf varices, particularly retrograde injection down the saphenous channel, is a frequent cause of failure, for either the sclerosing fluid is diluted in the varices to a concentration at which it is ineffective or it spreads through the communicating veins and damages those under the deep fascia. Surgical extirpation is tedious, but is the safest and most satisfactory way of destroying these calf varicosities without harming the deeper channels.

Surgeons and Surgical Organization

What of the war surgeon himself—the man we shall know by the British warm, dyed blue, in which he drives around, and by the battle dress he dons for fishing and digging in the garden? What has he learned from his years in the Army, the Navy, the Air Force?

The war has taken men to so many parts of the world, from the frozen mud of Iceland to the scorching sands of Somaliland, and thrown them into campaigns of so many kinds—the shattering horror of Crete or the soul-destroying idleness of the Sudan hinterland—that generalization is impossible. The surgeon who is reasonably fortunate will have served a spell in the forward areas, with a field surgical unit or a casualty clearing station, and he will also have worked at a general hospital at the base or on the lines of communication.

In the forward areas he learns the importance of decision, the need to decide not merely the right procedure but the right time to do it, the realization that there is only one best time for any operation and that, once past, it will never come again. He learns that while a decision may be the right one on the facts as they present themselves when it is made, in the seriously ill or wounded facts are never static but are changing in either direction, so that a course of action that is right at one moment may have to be reversed an hour later. He acquires manual skill, anatomical knowledge far transcending the surgical approaches of textbooks, speed without haste, courage, and physical endurance. He learns to look on the operation as part of a plan of restoration of which it is by no means the most important one, to make allowances for the difficulties of those who have gone before him, and to plan his steps to make the work of those who will follow him easier and more satisfactory. He learns, in the comradeship of the battlefield, to love and respect the patient, Thomas Atkins, who has given all and suffered all, and to resolve all doubts and difficulties by reference to one standard alone—"What is best for this particular man?" He learns, by long periods of work to this high standard, self-respect and self-confidence, without which no surgeon can carry on through the dark days when everything seems to go wrong.

At the base he learns to work as part of a team in his own hospital, as part of a system in the Service of which his hospital forms a part. He finds that he is encouraged to work individually and to put forward his own ideas, but he soon realizes the justice of the control which forbids him to use methods that have been tried and proved dangerous, which discourages him from asking for drugs or instruments as his fancy dictates when the supplies of an army in the field can be made efficient only by some degree of standardization, which gives him every opportunity to study the work of specialist teams so that he shall be able to undertake surgery of every kind should he be put in charge of a unit isolated by time and distance from any help, but debars him from doing intricate operations when others with greater skill and experience and better equipment and assistance are available.

Much that is good in this training and this organization can be applied with advantage to the problems of peace. The chief difference between civil surgery and Service surgery is that the former is based on a loose association of individuals all of whom are free and, in theory at any rate, equal, while surgery in the Services is organized on the principle of the pyramid of responsibilities—a number of experienced surgeons being each responsible for observing, guiding, and encouraging a group of surgeons at a junior level, for co-ordinating their work, and for bringing the lessons they have learned to the notice of those at a higher level. The civil system has the great merit of allowing men of energy and ability to reach the top even though they enter surgery from unorthodox and perhaps despised channels, but it does little to curb or eliminate the incompetent. In the struggle for existence in Nature failures pay for their inefficiency by extinction, but in the free-for-all fight of civil surgery the incompetent and second-rate are

unhonoured but are not debarred from practice, in which, if they have a good sales personality, they may be financially successful.

With the advance of technical surgery to the undertaking of feats of greater and greater difficulty, needing not merely the highest technical skill and anatomical knowledge but the design of a plan embracing the whole pre- and post-operative period to eliminate risks that have brought disaster in the past, the difference between the results of the expert and the would-be expert is increasingly apparent. To-day there is nothing to prevent any surgeon on the staff of a hospital—indeed, any man who has secured a legal qualification to practise—from attempting to pin the neck of a femur, resect a carcinoma of the oesophagus, remove a tumour of the brain, or tie a patent ductus arteriosus, without any more valid qualification for the task than boundless self-confidence and a cursory perusal of an article in one of the journals. The system has in the past produced some brilliant surgical freelances; it has also filled innumerable graveyards.

It seems inevitable, in a world where the rights of the individual will be acclaimed in a universal charter, that the individual who is sick must be assured of a service that is, at any rate, above a datum line of adequate competency. It would be folly in the extreme to attempt to limit surgical enterprise by setting certain standards of orthodoxy which must be followed by all. But it would be less than justice to the patients for whom we stand responsible to allow free rein to the enterprise of the type of surgeon known as courageous—courage in this context meaning willingness to face any risk so long as it is borne by the patient. We must insist that no man shall undertake any of the more hazardous operations till he has been trained for it by apprenticeship in simple tasks, till he has studied its steps in the clinics of acknowledged masters, and till he has practised it under supervision.

The pyramid of responsibility must be the key to our surgical organizations—not the hard and static Pyramid that stands on the Nile as a monument to past oppression, but the human pyramid that forms the finale at the circus, where the man at the top, who is usually the father, is hoisted up and supported by a willing phalanx below, where he feels the stresses of each member transmitted to him and encourages or chides as the performance of the night demands, but where, at the end, he brings all forward to take the bow.

AN OUTBREAK OF HEPATITIS IN A DIABETIC CLINIC

BY

HUGO DROLLER, M.D.Munich, M.R.C.P.Ed.

Clinical Assistant, Medical Department, Royal Hospital, Sheffield

From Jan., 1943, until Jan., 1945, 63 diabetic patients attending the clinic at the Royal Hospital, Sheffield, have been diagnosed as suffering from hepatitis. The clinic supervises approximately 450 patients of all ages; elderly females preponderate.

Prodromal Symptoms

Anorexia, loss of weight, and vomiting were often encountered. Vague abdominal pains set a diagnostic problem until the full clinical picture developed. Tingling of fingers and neck rigidity may have been early neurological manifestations (Lescher, 1944). Enlargement of the liver, with tenderness, was noted in 30 patients. The organ was firm, the edge blunted and tender. Splenic enlargement was evident in three patients. In one the spleen was felt 2 in. below the costal margin; in the other two the tip could be felt. Two patients showed macular skin rashes 24 hours before the jaundice appeared and 11 had stiffness of joints.

TABLE I.—*Duration of Prodromal Symptoms before Appearance of Jaundice*

No figures available	8 patients
1–3 days	4 „
4–6 „	7 „
7–9 „	18 „
10–12 „	9 „
13–15 „	8 „
16 days and over	9 „

TABLE II.—*Clinical Features in 63 Patients*

Enlargement of liver	30
Enlargement of spleen	3
Anorexia	53
Loss of weight	47
Vomiting	38
General malaise	14
Stiffness of joints	11
Fever	6
Diarrhoea	6
Pruritus	3
Macular rash	2
Tingling in fingers and neck rigidity	2
No symptoms	2

Course and Complications

Immediate complications occurred in a number of cases owing to the sudden disturbance of carbohydrate metabolism. The disturbance was akin to that seen in diabetics suffering from any infectious disease. The lowering of carbohydrate tolerance and ketosis occurred mainly in younger people, and were temporary. Insulin had to be increased and the diets altered to suit patients who had no desire for food.

Another complication was acute atrophy of the liver. Two patients died from this. One patient showed acute shrinkage of the liver one day after the jaundice became manifest. She recovered, but the severity of the diabetic state has permanently increased, and instead of 60 units of insulin she now requires 120 units. Apart from this she has kept well for the last 18 months.

Delayed complications occurred in 8 cases. They were associated with the persistence of the jaundice for some time and the transition from acute to chronic hepatitis. Two patients died. The 6 who are alive are in various stages of ill-health.

TABLE III.—*Deaths and Cases of Chronic Hepatitis*

Case	Age	Duration of Jaundice	State of Health
1	27	7 days	Died. Acute yellow atrophy (confirmed at P.M.)
2	56	16 „	Died. Subacute atrophy (confirmed at P.M.)
3	73	240 „	Died 300 days after onset of jaundice. Cirrhosis of liver. No P.M.
4	64	90 „	Died 110 days after onset. Cirrhosis of liver (confirmed at P.M.)
5	62	180 „	Severe ascites; 190 pints removed so far
6	67	90 „	Liver no longer palpable. Anorexia. No free fluid
7	65	300 „	Liver 1 in. below costal margin. Anorexia
8	65	105 „	Liver no longer palpable. Liver function tests remain abnormal. Feels quite well
9	67	120 „	Liver 2 in. below costal margin. Anorexia
10	58	110 „	Anorexia; backache. Liver small and nodular (confirmed at laparotomy). Ascites and oedema of legs absorbed

Patients suffering from chronic hepatitis showed little disturbance of carbohydrate metabolism. They all required small doses of insulin before the onset of hepatitis, and continued with them afterwards. There was neither ketosis nor excessive glycosuria.

There appears to be a relation between duration of jaundice and failing liver function. There is also a direct relation between the age groups and the duration of jaundice.

TABLE IV.—*Age and Duration of Jaundice*

Age	Duration in Days									
	10	20	30	40	50	60	70	80	90	100+
–9	1									
10–19		1	1							
20–29	1		1	1	1	1				
30–39		1	2	2						
40–49			4		1	2				
50–59		4	3	3	2		1	1		
60–69		1	2	3	5	2	1	1	2	6
70+			2	2			1			1

In 49 cases jaundice cleared in under 2 months, with an average duration of 33 days. Six patients in whom the jaundice lasted for 3 to 8 months have apparently recovered completely, 6 are still ill, and 2 died after 300 and 110 days' illness respectively.

It is noteworthy that all the chronic hepatitis cases and all but one of the deaths occurred in persons over 55 years of age. The age and sex incidence of cases (Table V) shows a preponderance of older patients, and it is possible that age as well as diabetes played a part in producing the high incidence of fatalities and chronic hepatitis.