REFRESHER COURSE FOR GENERAL PRACTITIONERS

INTERPRETATION OF WOUNDS

BY

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A medical practitioner may at any time be called upon to treat a case of injury which has some medico-legal implication. In some cases it may be an obvious criminal assault, such as stabbing, when the nature of the case is clear and hence advertises the necessity for a careful examination and proper notes of the findings. On the other hand, with a less sensational injury such as a bruise or abrasion the possibility of subsequent proceedings may not even cross the mind of the doctor until he is asked to provide a statement or he receives a subpoena. If by chance he has failed to keep any notes or has carried out only a perfunctory examination, he may find himself in the embarrassing position of having to admit it in open court, which will neither increase his self-confidence nor enhance his reputation. Apart from the selfish aspect, he has also a duty to the public, who are entitled to an opinion which may help either to acquit the innocent or to bring the guilty to justice. It is frequently upon such an opinion that a decision whether or not to take legal proceedings will depend. The practitioner will therefore be required not only to describe the injuries, but also to express an opinion on how they were caused, their severity, and possibly their age.

Broadly speaking, there are two ways in which a request for such an opinion can occur: there may be a specific request for the practitioner to examine some injuries and report upon them, or, alternatively, he may be asked for an opinion upon some injuries he has seen and treated. In the first case he must, of course, obtain consent from the person who is to be examined (if a child, from the parent or guardian) before carrying out the examination; in both he must have permission from the patient to disclose the information. The reason for the examination should always be disclosed. Such consent should never be implied, and should be obtained either in writing or in the presence of a third person. When an examination is requested it should cause no difficulty, because the practitioner is forewarned and would be unlikely to undertake it without some experience in such work. It is quite a different matter when a doctor who has treated an injury is suddenly asked for an opinion upon it. With this in mind certain fundamental principles in the examination of wounds and the conclusions to be drawn from them must be observed:

First examine the injuries, if necessary with a lens, and take measurements. If there is a doubt about their cause obtain a photograph before carrying out any major repair which will destroy the appearance. The photograph can then be shown to a colleague if a second opinion is wanted. If the patient dies, the actual lesion should be retained.

Secondly, try to decide how the injuries happened before hearing the patient's story. Many practitioners have been misled by assuming that an injury was sustained in the way the victim said. Weigh up your opinion carefully before committing yourself, for on it a charge may be made and you will have to substantiate the opinion in court.

It is clear, then, that a knowledge of wounds is necessary to every qualified practitioner, not only to medico-legal

experts. However, this should not prevent the practitioner from seeking expert advice when he feels any doubt. A wound may be defined as "a disruption of the continuity of any of the tissues of the body caused by injury." A legal definition is unnecessary, as the legal wording is sufficiently comprehensive to apply to any injury whatsoever. This stresses the fact that in interpreting wounds trivial lesions such as scratches and abrasions may be just as important as the more severe effects of trauma. Much attention is usually paid to recording the appearance of a major injury such as a stab wound, the interpretation of which may be easy, while the less dramatic abrasions are treated in a casual manner or even completely overlooked. The incorrect interpretation of these minor injuries may easily lead to grave miscarriage of justice.

The reason for the examination of any wound is to determine, so far as possible, how and by what it was caused, how much force was required to produce it, the risk to life, and the likely amount of permanent damage. With these objects in mind it is proposed to discuss in detail the various types of wound, with particular attention to the mechanics of their production. We have to consider abrasions, bruises, lacerations, incised wounds, and stab wounds.

Abrasions

Abrasions are caused by injury of the superficial layers of the skin. Although the least serious, they may be the most significant of all wounds. They can be described in three groups according to how they have been caused, but all are produced by the skin coming in contact with some rough or sharp object, or by such an object coming in contact with the skin.

Scratches are due to a sharp object passing across the skin and moving the surface layer in front of it, thereby heaping up the cuticle and showing the direction. The appearance of a scratch may be characteristic: with a thorn, for example, the scratch is narrow throughout and tapers off, while a finger-nail scratch will usually be broad at its commencement.

Grazes, although mechanically a modification of scratches, differ because the object causing them is usually a rough surface. The texture of the surface, however, varies from the coarse rough surface of gravel to the finer surface of asphalt. A variation in depth from place to place will occur. Direction is shown by the clear beginning and the tags of skin at the finish. There may be slight undercutting if there has been some associated lateral movement.

Imprint or pressure abrasions are self-descriptive, and the mechanism is a localized pressure applied to the skin. According to the elasticity of the surface the imprint of the object causing it will show varying degrees of distortion, but often the shape of the mark will permit identification. Cord marks in strangulation and radiator marks in road accidents are good examples.

In interpreting abrasions it may be possible to define: (1) the surface or object which has caused them, from the appearance and from the presence of foreign material, such as grit or glass; (2) their direction, as already discussed; (3) their age, from appearance and stage of healing; and (4) their position, including height from ground. A good example of the importance of the position of an abrasion occurred during the war.

A man walking down from a Home Guard meeting at the top of a hill was found unconscious in the road. He was taken to the

local hospital and later died. At necropsy, on the outer side of the left thigh were seen linear pressure abrasions which coincided in spacing and height from the ground with the shock-absorber adjuster of a vehicle which had passed down the road, a motor-cycle and side-car.

Bruises

Bruises are extravasations of blood into the tissue beneath the skin. Although nearly always due to trauma, which may vary from firm gripping to gross violence, spontaneous extravasations may occur in diseases such as purpura and leukaemia or even after the administration of anticoagulants. A bruise can be easily distinguished from hypostasis by incision, for in the latter case the blood will exude from the capillaries. If there is doubt, microscopy will decide the issue.

Superficial bruises are easily seen, but deep bruises may not appear for some time, if at all, and may be identifiable in life only by tenderness, with possibly some swelling, or at necropsy by dissection. Bruises are of particular importance in motor-vehicle accidents, and hence in such cases the situations where bruises may have occurred, such as calves, hips, buttocks, and back, should be carefully examined with a view to reconstructing the mode of impact. Although the amount of bruising is related to the degree of violence to some extent, it is not a reliable guide, as the following factors will modify the appearances:

Condition and Type of Tissue.—Loose tissues, such as the skin around the eye or after wasting, bruise easily. The presence of subcutaneous fat also allows extravasation. Tissues which are strongly supported with fibrous tissue will bruise less easily.

Age.—The bodies of children, because of the looseness and delicacy of the skin, and of old people, because of vascular changes and loss of flesh, bruise particularly easily.

Texture and Colour of Skin.—Fair people naturally bruise more obviously than dark.

Sex.—Women, especially if obese, bruise more easily than men.

Natural Disease.—Persons suffering from hypertension or blood disease tend to show unusually wide extravasation from slight injuries.

The fact that a bruise may be disproportionate to the violence causing it indicates the need for caution in expressing an opinion about the severity of the blow that caused it. Firm gripping will cause rupture of small capillaries and bruising, which may merely show itself by local blushing. Bruises—and this also applies to abrasions—will be more obvious after a lapse of time, and hence should be re-examined after an interval. The age of bruises can to some extent be gauged by colour changes, which are not, however, altogether reliable, for in old people the extravasated blood can remain without alteration in appearance for quite a long time.

Lacerations

Lacerations, like abrasions, can be classified by the way in which they are produced.

Splitting.—This is due to crushing of the skin between two hard objects (bone and a blunt instrument or hard surface). Here once again it is contact *by* or *against* some object that does the damage. Blunt round-ended weapons will frequently cause stellate splitting. On the other hand, if the weapon is rodlike there may be a Y-shaped end to the wound. Broader blunt objects or flat surfaces may cause a simple split which may be confused on cursory examination with a wound from a sharp instrument, such as an incised wound of the scalp. Such lacerations usually show certain characteristics—namely, rough irregular edges with some bruising and at the edges denudation of the hair, which may be forced into the wound itself. The underlying bone may be fractured or even depressed. If the object is sharp the wound will be clean-cut, the edges tend to gape and may be undercut, and the underlying bone may show grooving by the weapon. In splitting from con-

tact with the ground or a flat surface there is usually a surrounding abrasion with contamination by dirt. Sometimes lacerations will take on a characteristic appearance of the blunt object, as, for example, a hammer-head.

Overstretching of Fixed Tissues.—This may happen when, for example, a weight passes over a limb or a bone is bent. The mechanism is merely an overstretching of the skin or other tissue until a point is reached when it must tear, leaving a flap. When a wheel runs over a limb on the ground, the crushing force will try to move the limb, but, owing to the resistance caused by the rough surface and weight on the limb, tearing will eventually occur. Similarly, when a long bone is fractured following impact by a hard object, the bending of the broken bone will stretch the skin, which, being taut, will tear when the end of the bone presses against it.

Tearing.—This can be caused by rough objects such as the door-handle of a car, when it catches the eye, fracturing the orbit and tearing the tissues. It is really a stretching mechanism, which is also responsible for tearing injuries in rape and buggery. Such injuries can be of exceptional importance, both in accidental and in homicidal cases, as in the crush type of laceration there must be some contamination of the instrument involved, whether it be with hair or blood.

Incised Wounds

Incised wounds (cuts) are caused by a sharp object, which most commonly is metallic but can also be broken glass. Cleavage wounds caused by choppers are usually contused. The characteristic findings in incised wounds are that the wound is longer than it is deep, it is frequently undercut and gapes, and there is rather more haemorrhage than with a laceration. The appearance of such wounds will vary with the state of tension of the skin; if the skin is loose it will tend to ruck up in front of the sharpest of weapons, but if on the stretch then a clean cut will usually occur. Sometimes fragments of a sharp-edged weapon may become detached if a bone is struck and may lodge in the wound or adhere to the surface. These should be saved for identification of the weapon. A brief comparison of suicidal and

	Suicidal	Homicidal
Site	Site of election and accessible to victim	Indiscriminate or aimed at possible vital spot
Number	Usually multiple and in several places, e.g. throat and wrists, and showing some arrangement; in throat usually superimposed	Usually slashed and grouped but not arranged
Tentative incision . .	Present	Not superimposed
Defence	Absent	Absent May be present

homicidal wounds will be of value. There is one exception to the lack of "arrangement" of homicidal wounds. In cases in which the victim can be restrained there may be definite superimposition of the cuts. This has been seen in a case of a mother cutting the throat of her young baby with a razor blade.

Defence wounds fall into three groups: those due to gripping the weapon, which result in irregular cuts on the palm or fingers or both, depending on whether the weapon has two edges; those due to warding off the weapon, which result in cuts on the back of the wrist or forearm; and those due to holding up the hand, which result in cuts between the fingers or between fingers and thumb.

One characteristic feature which occurs with incised wounds caused by a sharp instrument is the frequent absence of pain and the failure of the victim to appreciate the extent of the injury. This in particular applies to the type of wound not yet mentioned, the "razor slash," inflicted for the purpose of disfigurement. These wounds are usually situated on the face, and may consist of up-and-down and lateral cuts.

Stab Wounds

Stab wounds are caused by the penetration of the point of an instrument, which is usually sharp. If several representative wounds are present it may be possible to obtain a reasonably good identification of the weapon from the wounds themselves. The width can be measured in those wounds which do not show evidence of rocking, and the shape and number of cutting edges can be established from the appearance. The minimal length can be measured by the depth of the wound, but if bruising caused by the hilt of the weapon can be seen then the depth of the wound may be longer than the weapon if the tissues are elastic. Whether or not the wound gapes depends upon the underlying muscle. The appearance and site of the wound may give some indication of the movement of the victim.

Suicidal stab wounds can be most difficult to interpret from appearance alone: sometimes multiple wounds can be self-inflicted, and repeated movements with the knife *in situ* can produce multiple wounds in the viscera. In these cases the site of the injuries may be of assistance. If stab wounds are inflicted with somewhat blunt instruments there may be a "split" in the skin which may be irregular in character.

Conclusion

The interpretation of wounds is a matter of common sense, careful observation, and experience. The most trivial injuries may be of great importance later and should be as carefully described as those of greater severity. Photographic records which can be kept for consultative purposes are invaluable. In a case with a fatal ending the actual lesion itself should be retained.

On no account should the examiner be influenced by the suggestion that nothing is likely to come out of the case and fail to keep a proper record. In all cases in which the presence of gripping or bruising may be of significance the person should be re-examined after 24 to 48 hours have elapsed.

Next Refresher Course Article.—"The Typhus Group of Fevers," by Dr. R. Lewthwaite.

THE GENERAL PRACTITIONER IN THE OBSTETRIC SERVICES OF THE N.H.S.*

BY

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During the last 30 years midwifery in Newcastle has shown a slow but steady advance from a rather poor start. The maternal and foetal morbidity and mortality rates were persistently high in spite of many improvements in technique until recent years, when there was a dramatic change for the better with the advent of the sulphonamides and penicillin and the Flying Squad and blood transfusions.

The maternity hospital 30 years ago—now B.B.C. premises—had 15 beds. It had a small labour ward but no theatre, so that all major work entailing an abdominal operation had to be sent to the Royal Infirmary. The students were not in residence, and I had to give clinical talks to them as they stood in the corridor outside a ward which was too small to allow them to stand near the beds. An Army hut near the entrance to the hospital

was used as an antenatal clinic. This was in 1920, when antenatal care was first officially organized in Newcastle. The bookings for the hospital service were made by a ladies' committee without any medical examination.

It is almost incredible that only 15 beds were available for the teaching of the students and for the medical care of a population of almost a million in Newcastle and Gateshead and their immediate neighbourhood.

The nearest other maternity beds at that time were 16 at North Shields (8 miles), 17 at Bishop Auckland (25 miles), 18 at West Hartlepool (28 miles), 10 at Darlington (33 miles), and 34 at Middlesbrough (40 miles) away.

The following years, including the war, saw a marked increase of maternity beds in the area, and the number is now almost 1,000, of which Newcastle and Gateshead have 220. During these years the home nursing was done by a mixture of handywomen and midwives. Most of the mothers had not had any antenatal care.

Thanks to the late Professor Ranken Lyle a vacant industrial school was taken over and equipped as a maternity hospital of 90 beds. It had a theatre and two labour wards and a well-equipped antenatal department. The students and most of the nurses were now in residence.

At the outbreak of war the hospital was evacuated to its present site and equipped by stages to a 90-bed hospital. Still later the University took over the building and spent much money on improvements. It has now four labour wards, two operating theatres, and a special department for premature and ailing babies.

At this stage the child-health experts and obstetricians shared responsibility for the babies during the antenatal and post-natal periods.

The hospital district, at one time very large, has slowly contracted owing to the larger number of beds available for residential midwifery and to the increasing numbers of municipal midwives; latterly, also, under the National Health Service every pregnant woman has the right to the services of a doctor, and they may prefer to have their babies at home under his care. The hospital authorities have come to an agreement with the doctors and midwives for the students to co-operate with them in their cases. This arrangement is working smoothly. In 1920 there were over a thousand district cases; at the present day they are under 100 a year.

The Flying Squad

In 1935 the Flying Squad was organized as a working unit in Newcastle, based on the maternity hospital. It has saved many lives and been universally copied. The unit consists of a qualified specialist with full equipment for restorative measures and such simple operative treatment—if any—which may be required, and also blood for transfusions. Some squads depend merely on a house-surgeon with blood for transfusion but with no specialist experience.

The Flying Squad has been centred on Newcastle, where we have a team of specialists on call. Independent centres have been established at Sunderland and Middlesbrough, and one is in course of formation at Durham. So long as they have the necessary supply of blood and qualified obstetric officers there is no reason why they should not function. Newcastle still has the major problem of Northumberland and the busy Tyneside area.

For years past the blood of every pregnant woman has been tested for the presence of syphilis. At the present day,

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