done daily. If pneumonia is present, aspiration should also be employed until the active inflammation in the lungs has ended. In streptococcic cases the pus becomes localized later than in the pneumococcic, and the pus is usually thin.

In meta-pneumonic empyæma which is localized, open anæsthesia is quite satisfactory but local anæsthesia is better when there is active inflammation in the other lung. Failing local anæsthesia, gas and oxygen and ether with the face-piece strapped on to the face to increase the intrapulmonary pressure is probably the best.

Operative Treatment.—In two patients aspiration only was performed. In one, patient 7, a meta-pneumonic pleural effusion, this sufficed, but in the other patient 8, a syn-pneumonic streptococcic pyothorax, the patient died three days from the onset of the disease.

In thirteen patients rib resection with open drainage through a tube was done. In five patients rib resection with closed drainage through a tube. In these the empyæma healed more rapidly, and in children where the expansion of the lung is slow this is the method to be preferred.

Irrigation is best avoided in children, except in very chronic empyæmata with secondary infection.

Four patients died. Two were streptococcic and two pneumococcic. The mortality in this series is low because the streptococcic cases did not come under the care of the surgeon; some form of continuous aspiration being employed for these patients, because rib resection carries such a high mortality.

When open drainage is employed a thick layer of antiseptic dressing should be used to prevent secondary infection.

Blowing through Woolf's bottles is the best method of promoting re-expansion of the lung in children.

Artificial sunlight in half the usual therapeutic dose was used in many of the patients with great benefit.

FRACTURES AT THE WRIST-JOINT.

By E. G. SLESINGER,

O.B.E., M.S., F.R.C.S.

Assistant Surgeon and Surgeon-in-Charge, Medical Department, Guy's Hospital.

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GENTLEMEN,—When I was asked to talk to you on some aspect of the treatment of fractures I had no hesitation in choosing fractures at the wrist for several reasons. The first of these is that they are so very common, and the second is that on the whole they are, I think, less satisfactorily dealt with than most of the fractures. Perhaps even more important from your point of view is the fact that the patient, not being confined to bed, does not appreciate the difficulty or seriousness of the injury, and is very apt, quite unjustly, to blame his doctor for not securing a perfect result in what appeared to him a simple accident. I think there is no subject more unsatisfactory from the doctor's point of view than the treatment of fractures. If they do well he gets no credit, because the patient thinks that anyone ought to be able to set a broken bone, and if they do badly he receives a quite unmerited amount of abuse, which is usually accentuated when his moderate account is sent in. The fractures I want to discuss to-day are mainly those of the lower end of the radius, sometimes associated with separation of the styloid process of the ulna, and equally important, though far less common, are the fractures of the proximal row of the carpus.

The first group, fractures of the lower end of the radius, are usually fairly true to type and fall conveniently into four groups, namely, Colles' fracture, separation of the lower epiphysis, chauffeur's fracture and fracture of the lower quarter of the shaft.

Of these Colles' fracture is by far the commonest and the most important. This

fracture is through the lower broad end of the radius usually about $\frac{1}{2}$ in. from the joint surface and running obliquely from behind downwards and forwards. The lower fragment in addition is apt to be cracked, and impaction is common. In a series of 450 cases of upper fractures taken consecutively from the fracture department at Guy's Hospital, Colles' fracture occurred seventy-three times, and including those where in addition the styloid process of the ulna was fractured eighty-one times, being second only to fractures of the clavicle in frequency.

It occurs far more frequently in women than in men. In my series the proportion was as 47 to 26. This is very striking when it is remembered that taking all fractures into consideration the proportion is two in the male to one in the female, so that the figures in regard to Colles' fracture represent more than four times the normal liability in women. Another interesting feature about this injury and one that materially affects its treatment and prognosis is the age at which it occurs. In the women in my series more than half were over 50, and only one patient was under 30. In men the age distribution is lower. In my patients the average age in women was 53.2 years, and in men 42. This fracture almost always results from a fall on the extended hand, usually with the elbow bent, and it is due partly to hyper-extension and abduction at the wrist, and partly to the direct transmission of the blow through the thenar eminence to the lower end of the radius.

In some cases where the abduction is extreme, in addition to the Colles' fracture there is rupture of the internal lateral ligament of the wrist or separation of the styloid process of the ulna. I have seen two cases where the abduction force had gone even further, and produced, as one would expect, in addition, a transverse fracture of the ulna above the inferior radio-ulnar joint. The mechanism in this last and rare type is the same as in Dupuytren's fracture at the ankle,

except that the attachment of the inter-articular cartilage to the ulna determines the transverse fracture of that bone, instead of the tearing off of a flake with separation of the bones such as occurs in the ankle.

The displacement in Colles' fracture is constant in type, but varies, depending, as in all fractures, on the fracturing force. The lower fragment, as you would expect from the obliquity of the cleavage plane, passes backwards, and at the same time rotates backwards. To these two displacements the characteristic so-called "dinner-fork" deformity is due. Further, owing to the abducted position of the wrist in which the fracture takes place, the lower fragment is also displaced and rotated radially, though not to the same degree as it passes back. Lastly, the whole lower fragment is bodily displaced upwards on the shaft, and indeed the latter is not infrequently impacted into it, or short of impaction it may produce a fracture of the lower fragment itself.

The diagnosis of Colles' fracture is usually obvious at sight if the characteristic deformity is present. In those cases with little or no backward displacement, however, it may be far from clear, and in these most reliance is to be placed on the relative position of the styloid process of the radius. Normally this is at a lower level than the corresponding process of the ulna, but in Colles' fracture it is displaced upwards so as to occupy the same plane, or an even higher one. It is better to rely on a comparison of the two wrists, and if that is done a diagnosis is usually possible.

Movement of the wrist-joint is usually limited, and the patient complains of pain most often just below the extremity of the ulna, due to injury of the ligament.

Crepitus is seldom obtainable, and should not be sought for. In my opinion crepitus should practically never be relied on for the diagnosis of a fracture, partly because of its deceptiveness, but, much more important, because of its painfulness. The sight of anyone endeavouring to elicit crepitus from

a fracture, except under anæsthesia, is to my mind both reprehensible and unnecessary. Pain is a warning, a safeguarding mechanism, and the unnecessary production of pain is a senseless and dangerous procedure.

The most important method of diagnosis is by X-rays, and I cannot too strongly urge you always to have every fracture or suspected fracture X-rayed. There are those who chide us for placing too much reliance upon X-rays, and who fear that reliance upon them may detract from our clinical acumen. I have no doubt that the same objections were raised to the use of the clinical thermometer and the stethoscope! It is our business to make a diagnosis, using all the means at our disposal, with the greatest possible certainty and the minimum of discomfort to the patient. It must be very exceptional nowadays for X-rays not to be available, and if they are available they must be used in every case of fracture. Stereoscopic X-rays will afford you the greatest assistance in forming a mental picture of the displacement you have to overcome, and although many rather decry their advantages, I find them of considerable help.

The most important question in connection with Colles' fracture is that of properly reducing the displacement, and it is partly because so many cases are inadequately reduced that I chose this subject to-day. Every case of Colles' fracture should be capable of perfect reduction if seen within twenty-four hours of its recurrence, and often later, although the longer the interval after the accident the greater the difficulty of proper reduction. The usual obstacles to reduction, such as the distention with blood of the longitudinal ties of the wrist or the interposition of muscle or fascia between the fragments, do not occur with Colles' fracture, and the disablement which results from imperfect reductions, is such a big one that it is most important to aim at perfection and to try very hard to obtain it. Because of the relationship of

the tendons of the wrist to the site of the fracture, a very small degree of displacement produces a marked limitation of movement in the wrist and fingers, and this fact forms a useful guide to the completeness or otherwise of the reduction. If when a Colles' fracture has been reduced the wrist can be passively flexed to a complete right angle, it can safely be assumed that reduction is perfect. You should never be content with a reduction unless this criterion holds good. For reduction an anæsthetic is essential if there is more than a minimal amount of displacement, and in almost all cases, as many elderly women are not good subjects for gas, a general anæsthetic is preferable. The few hours' delay which the necessary preparation entails is of little consequence, and it is much better to be able to carry out an unhurried and complete reduction than to make half hearted attempts upon blue and struggling patients under gas. The common or "hand-shake" method of reduction I find most unsatisfactory since it puts an undue strain on the ligaments of the wrist.

The easiest method is to have the forearm resting on a table with the hand projecting, and to press firmly in a downward and forward direction on the upper edge of the lower fragment and at the same time to abduct the wrist sharply. Usually reduction is easy, and knack rather than strength is required.

If a small amount of backward displacement remains, it can usually be overcome by laying a wool pad on the projecting edge and hitting it smartly but not too forcibly with the hand. The reduction must be carefully tested by the flexed wrist test, and if the wrist will not flex to a right angle you can be sure it is incomplete, unless there is a very abnormal degree of swelling of the soft parts. The position of the styloid process must be compared with the other wrist, and if it still remains high the abduction has not been fully overcome and this must be corrected.

Late cases are far more difficult. It is sometimes possible to reconstitute the fracture by the aid of a Thomas' wrench, and then to effect satisfactory reduction; while in others operation may be required, the fracture being reproduced by a chisel. In these late cases there is a definite sign of damage to nerves, especially the median. Again, in cases in which there is an associated fracture of the styloid process of the ulna, if reduction is not performed at once the styloid unites in bad position and forms a bar to any attempt to correct the radial fracture. These cases, however, should not occur, and a perfect functional result should be obtained in all recent cases of Colles' fracture, with the exception of one special type. The exception to which I refer is the type of patient who develops a severe œdema of the whole hand within a few hours of the fracture, and who is frequently the subject of rheumatoid arthritis at the time of the injury. Such a condition is not uncommon in elderly patients, and in these it is wise to give from the first a very guarded prognosis of the range of movement which will result.

I find it of great value to put these cases on a course of thyroid. Their power of repair is stimulated, and although I can give no statistical evidence I feel satisfied that their recovery is considerably hastened. The question of the splinting of these cases is an important and difficult one. As in many of the fractures, splints are usually kept on too long, and I feel sure it is true to say that far more harm is done in the aggregate by too prolonged splinting than by inadequate splinting. In cases where there is negligible displacement, no splint at all is required. The tendency to displacement, other than by the original fracturing force, is negligible and these cases should be treated by massage and movement from the very beginning.

In the cases with deformity which has been satisfactorily reduced we adopt one of two different plans.

If there is a good deal of swelling and especially if the patient has marked difficulty in fully supinating the forearm, we put them up in what we call a supination plaster. This is a light plaster put on with the elbow at right angles, and the wrist dorsiflexed, and with the forearm in full supination, such supination being maintained by carrying the plaster from front to back between the thumb and the index finger. This is left on for one week, and is then removed and massage is begun with no further splint.

In other cases after reduction an anterior angular splint is applied to keep the hand flexed to a right angle for forty-eight hours. At the end of this time it is removed, and gentle massage is begun. A lot has been written about early massage, and the production of callus. I feel confident that except in very exceptional cases the callus varies directly with the degree of displacement, and if reduction is perfect the callus will be minimal. At the end of forty-eight hours the fracture should be protected from accidental knocks by putting it between the periods of massage in a Levis' splint. At the end of a week all splints are left off and massage movement and hydrotherapy can be begun in earnest.

I cannot speak too highly of the value of the whirlpool baths at this stage. This is a bath of comfortably hot, rapidly moving and freely aerated water, and it produces a hyperæmia more rapid and more intense than anything else I know of. It is followed by massive and active movements of the fingers and wrist, as well as active and passive supinations. As I have pointed out elsewhere, it is those muscles which normally act against the force of gravity which suffer most during the enforced rest after a fracture, and attention must be concentrated on these during the period of movement restoration. In Colles' fracture the anti-gravity muscles concerned are the supinators and dorsiflexors of the wrist. Very little pain will be felt by the patient after reduction. *The painful cases are the imperfectly reduced*

ones, and once the bone is in good position the only pain usually complained of is over the ruptured internal lateral ligament. It will take some time before full and free movement is restored: the older the patient the longer the time. In my cases the average time in the women was 5·9 weeks and in the men 4·5 weeks. Results, except in patients with rheumatoid arthritis, are, on the whole, good, provided that the all-important reduction is complete.

Of the 73 cases I have mentioned, 8 were lost sight of, but were doing well when they stopped attending. Of the remaining 65 cases, 51, or 78 per cent., had perfect results; 7, or 10 per cent., had results 75 per cent. of normal, and 7, or 10 per cent., which includes several very old rheumatic patients, had seriously crippled wrists.

SEPARATION OF THE LOWER EPIPHYSIS.

This injury is, as in all so-called separations of epiphyses, really a diaphyseal fracture, and is not very common, representing about 5 per cent. of all upper limb fractures. The mechanism is always the same as that of Colles' fracture in adults, and like it, it may be complicated by separation of the styloid process of the ulna. Owing to the more rectangular fracture surfaces, the displacement is less complicated than in Colles' fracture. The lower fragment is displaced backwards, and sometimes radially, but is very little rotated. As a result the deformity is unlike the "dinner-fork" of Colles' fracture, being far sharper and more angular. Impaction does not occur, but the lower fragment may be compressed or even split into two.

The average age in twenty cases was 12 years (considerably older than in similar injuries to the humerus), and there were eighteen males to two females. Reduction is very easy, and can be readily accomplished by pressing on the lower fragment, and there is very little tendency to re-displacement. It is most important to correct any radial displacement or irregular growth may take

place, this being the growing end of the bone. The majority of cases require no splint at all, massage being begun at once, but where there is much extravasation of blood and swelling they have been treated exactly as I have described in similar cases of Colles' fracture. Of the twenty cases mentioned, nineteen had perfect results, and one which was not reduced until late had some limitation of movement. The average period of treatment was three weeks.

CHAUFFEUR'S FRACTURE.

This is a fracture of the styloid process of the radius, and is almost always perfectly true to type. The line of fracture runs from the middle of the joint surface upwards and outwards, and separates the styloid process and a triangular portion of shaft. The obliquity of the fracture varies with the car, and in the fracture department it has usually been possible to recognize the commonest agent of these fractures, the Ford lorry, by the X-ray plate. The mechanism of this injury is a sudden sharp blow against the thenar eminence. In the textbooks some confusion exists on the subject of chauffeur's fracture, but the injury just described is the only one that can be properly so called. There is usually very slight displacement, and if the patients are kept on a cock-up splint for a few days and then given massage, the results are invariably perfect. The average period of treatment is 3·5 weeks.

FRACTURE OF THE LOWER QUARTER OF THE SHAFT.

The remaining fractures of the lower end of the radius form a somewhat motley group. Occasionally you find cracks running upwards from the articular surface, and only diagnosed on X-ray examination. These require no treatment beyond the ordinary massage and hydrotherapy applicable to a sprained wrist.

Another type of injury, which has been called Smith's fracture, represents a reversed

Colles'—that is to say, the plane of fracture passes from in front downwards and backwards, and the lower fragment is displaced forwards. Some authors have misnamed this injury "chauffeur's fracture," but if it does occur as a result of starting a car it is only if the handle is released and swinging round strikes the back of the wrist. Reduction is not easy in these cases, and when it is completed the hand is best put up on a full cock-up splint. It is a rare injury, and usually associated with considerable damage to the soft parts.

Fractures of the carpus are not very common, and are not infrequently overlooked in cases of so-called sprained wrist. If such a case fails to clear up in the usual time an X-ray examination will often show a fracture of one of the carpal bones.

By far the commonest carpal bone to be fractured is the scaphoid, though fractures of the other bones, especially of the proximal row, do occur. Fracture of the scaphoid results from a fall on the extended hand and is commoner in men than women. The fracture is usually transverse across the waist of the bone, and in some cases there is little or no displacement. Tenderness in the so-called "anatomist's snuff-box" and pain which is increased by dorsiflexion and radial flexion of the hand are typical, and there may be a localized swelling on the radial side of the wrist. If there is little or no displacement the hand should be put up on a cock-up splint, and if in cases with displacement the bone can be manipulated into position the same course should be followed.

The maintenance of dorsiflexion is most important, as if it is not maintained these patients readily develop a flexion deformity of the wrist with great disability.

If there is much displacement, and if, as usually happens, it cannot be removed, the bone must be excised surgically. While in such cases a perfect result cannot be guaranteed, I think it gives the patient the best chance.

A cock-up splint should be worn for

ten to twelve days, and after that massage and movement can be begun. Although this fracture often looks a trivial injury in an X-ray plate, it is frequently responsible for much disability, and the patient must be persuaded to agree to vigorous treatment from the start.

RIDDING THE EMPIRE OF LEPROSY.

A FAR-SPREAD CAMPAIGN.

By a variety of methods the British Empire Leprosy Relief Association is working toward "the wonderful ideal," to use the phrase of its patron, H.R.H. the Prince of Wales, of eliminating leprosy from the British Empire within a generation. Statistical estimates give the number of sufferers from the scourge within the King's dominions as 416,000; but there are high authorities who hold this figure to be far below the mark. Dr. Muir, the Leprosy Research Worker at the School of Tropical Medicine, Calcutta, has stated that a carefully conducted but limited survey which has recently been made tends to show that there are in India alone between half a million and a million lepers. It is to be remembered that efforts to conceal the disease are widespread on the part of the sufferers and of their families, especially where the facilities for out-patient treatment provided by modern discoveries are little known.

The methods by which the Association seeks to fulfil the great mission for which it was founded in 1924 are indicated in the Annual Report for 1928, issued by the Association from 24 Cavendish Square, W.1, under the title of "Some Questions of Empire Suffering." Six questions are asked and answered. The first is "Who" are the people concerned, and it is shown in reply that there are lepers of all ages and