CLINICAL LECTURE ON SURGICAL DIAGNOSIS.

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GENTLEMEN,—As the Special Professor of Clinical Surgery, it is my special duty to instruct you to the best of my ability in the diagnosis and treatment of surgical disease and injury. Much of my teaching must necessarily be at the bedside; but the clinical lecture which I shall deliver each Monday in this theatre will give me the opportunity of commenting more freely upon the cases you will find in the wards, than would be convenient before the patients themselves. The weekly clinical examination of actual patients by yourselves, or, at least, by the seniors of the class in your presence, will also, I hope, help to train you in the diagnosis of surgical cases; and I propose to devote this lecture to giving you some practical hints on the subject.

Many surgical injuries and affections are so obvious that no great skill is required for their recognition; but, on the other hand, similar outward appearances may depend upon very different causes; and it is here that the skill in diagnosis of the surgeon gives him the advantage in prescribing appropriate treatment. Symptoms may be conveniently divided into "objective" and "subjective"; the former being those open to the observation of the surgeon, the latter those experienced only by the patient. It is to the objective symptoms of disease and injury that I propose to direct your attention to-day; for I do not mean, on this occasion, to bring a patient before you, but simply a living model with no special ailment, to illustrate some points in diagnosis.

It must be your great object to cultivate your eye, hand, and ear; and you cannot safely omit the use of any one of the three. Practically, one uses, as a rule, the ear first; because you are bound to hear something of the patient's own account of his ailment, in order to know to what part of his frame you are to direct your attention; though you must not put too much trust in a patient's own account, and still less in his diagnosis of his own malady. Thus, pain referred to the knee frequently depends upon disease of the hip, and pain in the loins from supposed kidney-disease, upon stricture of the urethra. The eye will take in many of the leading features of a case at a glance, such as the general aspect of the patient, his mode of walking or standing, etc.; and, when the affected part is exposed to view, it will in many cases, if sufficiently practised, complete the diagnosis. Let me warn you, however, against "jumping to conclusions" too rapidly; for those who are foolish enough to pride themselves on rapidity in diagnosis not unfrequently make mistakes, which a little more time would have enabled them to correct. You can no more afford to leave out steps when tracing the nature of a case by progressive induction, than you can venture to omit one or more tests when examining a complicated fluid in the chemical laboratory. Lastly comes the hand, which may require to be fitted with various instruments for special purposes; but which, in its simplicity, is the surgeon's most powerful ally if properly educated. The much-talked-of *tactus eruditus* is to be acquired by all who will take the trouble to practise their fingers in the manipulation of healthy and diseased subjects, and will, at the same time, use their mental powers. For, of course, no amount of examination of a patient will tell you what is the matter with him, unless you elaborate the facts thus ascertained in a mind which has been trained by previous study to comprehend the importance of the several symptoms; and this is the reason why, at first, beginners must be at a disadvantage, lacking the experience necessary for a clear appreciation of symptoms. You will find, however, that with a little help from the surgeon, you will soon begin to see the "why" and the "wherefore" of diagnosis and treatment; and let me beg of you not to be afraid of asking questions—so long, at least, as the questions are put for the purpose of increasing, and not of displaying, your own amount of information. One pitfall I must just allude to; and that is the tendency to over-elaboration of a diagnosis which besets some men, and seems to stick to them through life. They never can take the plain obvious facts of a case, and from them draw a conclusion; but must dig and delve so deeply that they sometimes get, so to speak, "out of their own depth"; and never come up

again so far as any utility to the patient in question is concerned. Superficial carelessness is bad; but too great profundity is not much better.

And now I bring before you a man with no special deformity or ailment, in order that I may be able to show you a few noteworthy points which you can readily appreciate at a little distance, and which will assist you in studying disease and injury in the wards. With his back towards us, you have the opportunity of examining a healthy spine; and you may notice that, while the spinous processes are readily visible in the dorsal region (and particularly when the arms are folded), they are not so visible in the lumbar, and still less so in the cervical, region, where they are covered by muscles and ligaments, the seventh, or *vertebra prominens*, being the only one really seen or felt. Here, in a healthy adult, we have the average anterior and posterior curves in the lumbar and dorsal regions; but you must remember that, in young children, the spine is nearly straight, while in disease we may have great exaggeration of either curve. Thus, in the back, we find *cyphosis*, or angular curvature, the result of caries of the vertebrae; while in the loins we have *lordosis*, an exaggeration of the healthy curve, and generally connected with old hip-disease. Of the latter, I now place an example before you; and, of the former, there is an instance in No. 1 Ward, in a man whose foot I removed last week.

The model is now standing at "attention", with his knees straight; consequently the two sides of his pelvis are perfectly even; and you see that a tape carried between corresponding points on the two sides is horizontal. Let us now make him "stand at ease", with the left knee bent and foot slightly advanced, and you see that at once the left side of the pelvis is lowered. But this is not all. Corresponding with the obliquity of the pelvis, we have a lateral deviation of the spine to the left in the lumbar region; and if the man could sufficiently relax his muscles at the moment, we should have a curve in the opposite direction—to the right—in the dorsal region. By placing a book beneath the right heel, and thus increasing the obliquity of the pelvis, I exaggerate the lumbar curve; or, of course, by tilting the pelvis in the opposite direction, I could throw the spine over to the opposite side. Of course, the same thing holds good if the patient be seated instead of standing; for, by tilting his seat, we are able to produce a marked lumbar and a certain amount of dorsal curve at will. Fortunately, we have here to-day also a case of old hip-disease, in whom the obliquity of the pelvis is well-marked, and the resulting twist of the spine better seen than in the healthy subject. You see, then, how important it is in any case of lateral curvature to ascertain whether it depends upon some obliquity of the pelvis (from atrophy of one leg or old hip-disease), or upon other causes; and you also see what effect upon an existing curve may be produced, as has been well pointed out by Mr. Barwell, by raising the side of the pelvis by means of a thickened sole or a sloping seat.

Turning, now, to the neck and shoulder, I pass my finger along the clavicle, which is subcutaneous, and shows its curves well enough in a thin muscular subject. The notch between the clavicles is important in connection with aneurisms of the great vessels of the neck; but the inner end of the bone is very rarely dislocated, except by extreme violence. The outer end of the clavicle is continuous with the acromion process, and I now run the chalk along them; but it may be dislocated (as we have lately seen), and then the flattened end of the bone is readily felt beneath the skin. If I make the man swing his arm round, you will be able to appreciate better than you perhaps have hitherto done the great range of motion in the sterno-clavicular articulation, which, in fact, admits of "circumduction", and has a most important relation to the movements of the arm.

There is no joint, I suppose, about which more mistakes are made than about the shoulder. An "obscure injury about the shoulder" has often damaged a surgeon's reputation, because he has not sufficiently studied the anatomy of the part to be quite sure of his diagnosis and treatment. The chalk-line I have already made marks the bony arch formed by the clavicle and acromion; but you will notice that the head of the humerus projects beyond this in front, and gives the roundness to the healthy shoulder. There is a hollow immediately behind the head of the humerus and below the prominent acromion; and another in front, to the inner side of the head, in which the coracoid process can be more or less distinctly felt, according to the muscularity of the subject. In the healthy subject, there is just room to lay the finger between the coracoid process and the head of the bone. When the head of the humerus is *dislocated*, the roundness of the shoulder is lost, and the acromion stands out prominently beneath the skin, with a depression below it; while the head can be felt in some unnatural position, and out of its proper relation to the coracoid process. The direction of the whole limb is altered too; so that the patient cannot place his hand on the opposite shoulder with the elbow touching the chest-wall, as he can in health. In a *fracture* of the neck

of the humerus, the roundness of the shoulder is not lost; but there is a depression below the head, which does not move when the arm is rotated, unless, indeed, the fracture be impacted. The two accidents may be combined; but this is a rare complication.

When I turn the model with his back to you, and make him raise his arm, you will appreciate how important the movements of the scapula are. The deltoid alone can only raise the arm to a right angle with the trunk; and the subsequent elevation of the limb depends upon a rotation of the scapula on the ribs, so that the angle comes forward to the margin of the axilla. The scapula is held in its place by the muscles passing from the spine to its base, and by the serratus magnus. If these be paralysed, the scapula falls forward, and the power of the arm is greatly lost.

Let us pass on to the elbow. With the forearm bent, you see at once the prominent olecranon process of the ulna. When this is broken off by falls on the elbow, the fragment is drawn up by the triceps, and an interval can be felt between it and the bone, which, however, is rapidly filled up by the effusion immediately following any injury to the elbow-joint. A much more common result of a fall on the elbow, however, is an injury to the bursa which lies between the subcutaneous triangle of the olecranon and the skin. In health, this bursa cannot be recognised, except in individuals whose occupation has produced enlargement of it—e.g., miners or sweeps; for though it is technically called the "student's bursa", I must confess to have never seen an enlargement of it due to long poring over medical treatises. When the bursa is inflamed, it causes a swelling over the olecranon, which is evidently quite superficial, and does not mask the general outline of the joint, as would be the case were the effusion in the articulation. You may remember that, last week, a patient with suppurative of this bursa was treated by an early and free incision in Ward 1.

The condyles of the humerus are readily felt in this thin arm; and you will notice that the internal is the more prominent, and stands out beneath the skin. Immediately behind it is the groove in which the ulnar nerve lies, as you may ascertain for yourselves by "twanging" it; and then comes the olecranon, with only just space for the nerve between the bones. This close relation of these two prominent points of bone is of great service in the diagnosis of dislocation of the forearm; for, so long as they lie close together, the deformity cannot be caused by a dislocation of the ulna. The outer condyle is more rounded; and immediately below it is the head of the radius, which can be felt rotating when the forearm is pronated or supinated. It is not often dislocated, for it is firmly held by ligaments; but it is sometimes thrown forward, and then prevents complete flexion of the forearm, by coming against the front of the lower end of the humerus.

At the wrist, you may notice that the end of the radius is lower down than that of the ulna, and that the styloid processes of both bones are to be felt. Dislocation of the carpus from the radius is rare; but separation of the lower epiphysis of the radius is by no means uncommon in young persons, and is sometimes mistaken for dislocation. The triangular fibro-cartilage which binds the radius and ulna together at the wrist, sometimes becomes displaced in children who are dragged forcibly by the hand, and then the little patient cannot supinate the forearm and hand; but if you hold the hand firmly, and then supinate, you hear a slight click, and all is well. It is well always to bear in mind that, in supination, the bones of the forearm are parallel, and in pronation are across one another; so that supination in the posture in which fractured bones of the forearm should be set, although it is convenient, when the bones are firmly held by splints, to turn the thumb upwards—i.e., to place the hand midway between pronation and supination.

In the hand, I need only point out that the superficial palmar arch does not correspond precisely to any one of the lines in the skin of the palm; but its convexity reaches generally to the middle one of the three, while the deep arch is much nearer the wrist. The bifurcation of the digital arteries is between the heads of the metacarpal bones, and about midway between the line to which I have referred and the web of the fingers; so that incisions should always be made in the line of the fingers, and not between them. As you may have, early in your career, to amputate a crushed finger, I would remind you, also, that the prominence of each knuckle is formed by the proximal bone of the articulation; and that the joint through which the knife must pass is below this in every case.

Descending to the groin, you see that the fold of the groin corresponds to Poupart's ligament; and an inguinal hernia is above, while a femoral hernia is below, this line—at least at first. Of course, a large inguinal hernia will descend into the scrotum, and a large femoral hernia may turn up over Poupart's ligament, and closely simulate the inguinal variety. But you ought to have little difficulty in distinguishing them if you will invaginate a piece of scrotum (or labium in the

female) on the forefinger, as you see me doing, so as to carry the finger into the external abdominal ring. This will enable you to settle at once whether the protrusion has taken place through the inguinal canal or not. Let me also remind you always to ascertain the presence of two testicles in the scrotum; for an undescended testis may closely resemble a hernia, especially if inflamed.

The pelvis is so firmly bound together that a dislocation of one of the innominate bones can only be produced by extreme violence; but disease of the sacro-iliac joint is by no means uncommon, though often overlooked; and one leading symptom is lameness, which is erroneously referred to the hip-joint. But if I make the man before us stand on one leg, you will see at once how the whole weight of the body falls upon the corresponding sacro-iliac joint while he is throwing the other leg forward; and it is this which gives rise to the pain, and prevents the walking of a sufferer from sacro-iliac disease. Taking this man, who has a healthy pelvis, I may compress his two innominate bones without giving any pain; but a woman who has recently had a severe labour, and has, perhaps, incipient sacro-iliac mischief, will cry out at any such rough treatment, though the steady support of a good pelvic belt would give her great comfort, and restore her powers of locomotion.

The hip-joint in health is freely movable in all directions, as you see, and independently of the pelvis; but, the moment the joint is inflamed, the muscles instinctively contract, and fix the joint to some extent; and then, when the limb is moved, it carries the pelvis with it. This man's back is naturally more curved than a child's; but even in him, if I make him lie flat on the table, you will see that the thigh can be fully extended without tilting up the pelvis, and so increasing the curve of the lumbar spine. In a child, whose back is naturally flat on the table, the effect of early hip-disease is readily seen (as I have frequently demonstrated to many of you); for the attempt to bring the thigh down, at once elevates the pelvis, and causes that curvature of the lumbar spine which, in old hip-disease, becomes permanent.

The prominence of the great trochanter will vary in different individuals, according to the muscularity of the buttock and the length of the neck of the femur; and it is important, therefore, to compare the two sides in every case of suspected disease or injury. The head of the femur can be indistinctly felt on deep pressure, either in front of or behind the trochanter; and, in health, the two move together; for if the trochanter can be freely moved by rotating the femur without affecting the head of the bone, it is clear that the neck must be broken. The length of the neck will very much affect the power of rotating the limb; thus, if the neck be shortened, either by an impacted fracture or the absorption of old age, the arc in which the upper part of the thigh moves will be found to be much smaller than in health. When I stretch a tape from the anterior superior spine of the ilium to the tuberosity of the ischium, you see that, in health, it touches the top of the greater trochanter; now, if the bone were dislocated or the neck broken, the trochanter would be above or below this line.

When the knee is extended, you see the patella forming a prominence in front of the femur; but, when the joint is flexed, it sinks into the hollow between the condyles. With the leg fully extended and the muscles relaxed, there is, as you can prove in your own limbs, considerable lateral movement of the patella possible in the healthy joint; and the mistake is sometimes made of attributing this mobility to the presence of synovial effusion. When fluid is poured into the knee-joint, however, not only does the patella float so as to be freely movable in any position of the limb, but the synovial pouches on each side of and above the patella are distended, and give the characteristic roundness to the knee. If one kneel down on a flat surface, and particularly if the body be bent forward, as in scrubbing a floor, the patella and the bursa between it and the skin are exposed to considerable pressure; and hence the chronic enlargement of that bursa, termed "housemaids' knee", which causes a globular swelling in front of the joint, altogether different from that of effusion. Kneelers on hassocks or foot-boards do not run any risk of the housemaids' fate; for the pressure in their case comes on the tubercle of the tibia, and the bursa between it and the *ligamentum patellæ* would suffer if the pressure were sufficiently prolonged—but I never met with such a case. In falling with the knee bent, the patella reaches the ground first, and receives the force of the impact, which may simply bruise or cut open the bursa; or, if very severe, may "star" the patella itself. The transverse fracture of the bone is produced through the effort of the patient to save himself, by which the great extensor muscles catch the bone across the condyles, and either break it or rupture the ligament; then the upper fragment is drawn up in front of the femur, and a space is left in which the condyles can be felt, as in a patient recently in the wards.

With the knee flexed, the rounded outlines of the condyles can be readily felt resting on the top of the tibia; and a little distance below

the outer condyle can be seen the head of the fibula—which bone, let me remind you, does not enter into the formation of the knee-joint. The existence of the semilunar fibro-cartilages between the femur and tibia is hardly appreciable in health; but their existence must not be forgotten, as occasionally, in violent wrenches of the knee, one of them becomes displaced, giving rise to extreme pain and inability to use the joint, which are most satisfactorily treated (as also are dislocations of the patella) by a little of that judicious violence for which “bone-setters” have a reputation.

At the ankle, we see at once the prominences of the two malleoli, between which the astragalus fits closely when the foot is at right angles to the leg, less so when the foot is pointed; so that, in this position, some amount of lateral movement of the foot is possible. The fibula is altogether posterior to the tibia, and its malleolus is longer than the internal. The lower third of the fibula is subcutaneous, and its fracture (Pott's fracture) is therefore readily recognised. The tendons of the various muscles surround the ankle-joint; but the only one to which I need call your attention is the *tendo Achillis* at the back, in which, when ruptured, the division is readily both felt and seen. When I flex the knee and point the toes, you can see how completely the muscles of the calf are relaxed; and this is an important point in the treatment of a divided tendon, or of a dislocation of the foot, or oblique fracture of the tibia.

The prominences of the foot are chiefly important as guides to the amputations; thus the tuberosity of the scaphoid on the inner side marks the transverse tarsal joint, or site of Chopart's amputation; whilst the base of the first metatarsal on the inner or prominent fifth metatarsal bone on the outer side, marks the position of Hey's amputation. The metatarso-phalangeal joint of the great toe is not unfrequently diseased through gout or the pressure of boots which have developed a bunion; and other toes are not unfrequently deformed from the same cause. The only surgical point with regard to the toes that I need mention is that the base of the first phalanx is more expanded and more deeply placed than young operators are apt to imagine.

I have thus run briefly through the more salient points on the living body which it is important for you to recognise thoroughly in health before attempting to treat disease; and, in future lectures, I shall have to direct your attention to matters regarding which the knowledge acquired to-day will be of service in enabling you to recognise deviations from the standard of health.

THE TREATMENT OF ANEURISM OF THE ARCH OF THE AORTA BY MEANS OF GALVANO-PUNCTURE.*

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I SHALL, in the first place, read the notes of two cases of aneurism of the arch of the aorta, in which galvano-puncture was employed with success, and afterwards refer shortly to the rules to be observed in carrying it into effect.

James Dunn, aged 36, clothlapper, was admitted into the Glasgow Royal Infirmary on December 19th, 1873, complaining of cough, pains in the shoulders and nape of the neck, and inability to swallow solid food. He had led a very irregular life, admitted having had gonorrhœa several times, and, for the last six years, he had been very intemperate in his habits. For three or four years, he had been more or less troubled with cough; and, for two years, he had complained of pain in the region of the heart, and of gradually increasing dyspnoea, but he never spat blood. About eight weeks prior to admission, as the result of a wetting he thought, the cough became more severe and was accompanied by sore-throat and pains in the shoulders and nape, especially on the left side. This was soon followed by gradually increasing difficulty in swallowing solid food, which was sure to return into his mouth unless it were thoroughly masticated; the seat of the obstruction he referred to the top of the sternum.

On admission, he was found to be a well formed and well-nourished man, but in his face were mirrored the ravages of his favourite vice. His tongue was coated with a white fur, his appetite was good, and his bowels regular, but he had great difficulty in swallowing solid food. The urine was normal. He was much troubled with cough, and bronchitic *râles* were audible throughout the chest, especially at the bases of the lungs. The air entered both lungs with equal freedom,

and the respirations were natural; his voice was unaffected, and the pupils natural.

On examination of the circulatory system, the heart was found to be somewhat depressed, and the left ventricle the seat of dilated hypertrophy, while a soft systolic, probably communicated, murmur was heard at the apex. At the upper part of the front of the chest, there was dullness on percussion, measuring three inches from above downwards, and extending from one inch to the right to one inch and a half to the left of the sternum. In the second left intercostal space close to the sternum, there were some fullness and pulsation, and, on auscultation, a soft systolic murmur was heard. There were also fullness and pulsation in the suprasternal notch, but no murmur was audible in that situation. The pulse was 74, regular, and of fair strength, and the pulses at the wrists and in the carotids were not unequal.

Shortly after admission, the symptoms became much more alarming, the fullness and pulsation in the second intercostal space became much more pronounced, and the dysphagia so great that he could not even swallow fluid food, and required to be supported by means of nutritive enemata. This was on January 2nd, 1874. On the 20th, it was noted that the difficulty of swallowing was not nearly so great, and he could then take fluid food as on admission. The fullness in the intercostal space, however, had so much increased, that there was a distinct appearance of tumour a couple of inches in breadth, and projecting three-quarters of an inch above the level of the surrounding chest-walls. This swelling was very soft, almost fluctuating indeed, and was the seat of expansion as well as pulsation; the murmur remained as on admission.

On January 12th, galvano-puncture was performed, an insulated needle connected with the positive pole of the battery being inserted into the most prominent part of the aneurism after the skin had been frozen with ether-spray, and a zinc plate connected with the negative being applied to the chest-wall in the vicinity of the tumour; a large piece of sponge moistened with salt water intervening, however, between the plate and the skin. The operation was continued for an hour; four cells of the battery being employed for the first half hour, and six for the second. The patient felt no inconvenience or pain during the operation, and, on removing the needle, there was no hæmorrhage. After the operation, however, there was pain in the tumour and increased uneasiness in the nape of the neck and left shoulder; this was speedily relieved by the application of iced cloths. On January 20th, the swelling was thought to be smaller and firmer, and the patient could swallow better.

On January 23rd, the operation was repeated as before, the needle being inserted a little higher up and nearer the sternum than on the first occasion, and again upon February 8th; but this time six cells were employed for the first half hour, and eight for the second, and, on removing the needle, there was a considerable jet of blood. No report seems to have been taken after the third operation until March 13th, when the swelling was stated to be much firmer, but the patient had been a little hoarse, and had been spitting a little blood.

On April 16th, galvano-puncture was repeated for the fourth and last time, and, in the beginning of May, being weary of the confinement and feeling pretty well, he insisted upon leaving the hospital, although strongly urged to remain. Before leaving, an examination showed that the aneurismal swelling, which was firm and hard, had fallen almost to the level of the surrounding surface. It still pulsated, but no murmur could be heard over it. He continued occasionally to spit a little blood, and still complained of pain in the shoulder and nape of the neck. The difficulty of swallowing had varied much latterly; sometimes he had a good deal of dysphagia, while at other times he could swallow almost anything.

From the history I have given, it will be seen that this was by no means a promising case for operation, and the improvement was all the more remarkable if we take into account his dissipated habits, and the fact that, during the treatment, through inadvertence, he frequently got up and walked about the ward for several hours.

Let me compare this case with a somewhat similar one, of which, however, I need only give a short outline, as I have already published it.

Mrs. H., aged 41, married, millworker, was admitted into the Glasgow Royal Infirmary, November 8th 1871. Two years and a half before this, she began to complain of a “violent beating at her breast”, and of hoarseness. This was followed by a feeling as if a heavy weight were pressing upon her chest, and she complained of lancinating pains between the shoulders, which extended down the left arm. Eighteen months previous to admission, she observed a swelling in the front of the chest about the size of a small hen's egg.

On inspection, the swelling was seen at the lower and inner part of the left infraclavicular space, and implicating also the upper sternal

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