CLINICAL OBSERVATIONS ON THE SUBCUTANEOUS LIGATURE OF VARIX AND VARICOCELE.

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GENTLEMEN,—I show you to-day a case of varix, which may serve as a text for some remarks on subcutaneous ligature. When the patient was admitted to the infirmary, his leg was much swollen, the veins stood out like large tortuous knotted cords, and an ulcer lay above the ankle. There remain now only a scar and its surrounding pigmentation.

The treatment has been rest, with the leg elevated, appropriate dressing to the ulcer, and subcutaneous ligature of the veins. To the last I desire to draw your attention. Some years ago I pointed out a mode of applying Dittel's elastic ligature to the treatment of nævus. It consists in the passage of the ligature round the nævus subcutaneously. With the aid of whipcord this can be easily accomplished, and it has the effect of cutting off the tumour from all blood-supply, except that which may reach it through the skin. I have since employed this method occasionally in suitable cases; not often, because other forms of treatment are usually more appropriate. Thus, when a scar is unseemly, electrolysis is safe and certain; when the cicatrix is of little moment, external ligature and excision are speedy and effectual. But in very large nævi in very young children, subcutaneous ligature is less tedious than electrolysis, less dangerous and disfiguring than other operations.

To appreciate the advantages of subcutaneous surgery, it is only necessary to compare a bruise with a bruised wound, a simple fracture with a compound. Antiseptics have done much to minimise the difference, but they are themselves irritants, and their use is subject to manipulative errors. The result, therefore, must be more perfect if, by operating through a wound, small and speedily healed, we can at once avoid the contact of antiseptics with a raw surface, and prevent the admission of septic influences.

My experience with the elastic ligature is in this respect instructive. The ends of the India-rubber thread must be left out that it may be tightened as required, and withdrawn when it has cut its way through. The operation is not, therefore, truly subcutaneous, because there is a persistent possibility of the entrance of putrefactive influences to the injured tissue. In some cases, pretty severe suppuration occurred; and although this inflammatory action is undoubtedly beneficial in obliterating the nævus, it contains an element of danger, especially in connection with the imperfect drainage, which, under the circumstances, cannot be avoided. In later operations, I employed the usual antiseptic precautions with marked advantage. If, then, the ligature be entirely embedded in the tissues, one source of evil will be avoided.

So long, however, as the material thus embedded may cause irritation, either from its own nature, or from the conveyance of septicity in its texture, the wound is not in a rigid sense subcutaneous. There has, in this respect, been a curious variety of experience. On the one hand, the cutting short of the silk used for the ligature of arteries on the face of a stump has been tried, but abandoned on account of the frequency with which the knots suppurred out. On the other the intraperitoneal method of ligature has proved most successful in ovariectomy. The explanation doubtless lies in the fact that the human tissues are capable of neutralising or destroying noxious influences when not presented in overwhelming amount, and that, the healthier the tissue, the smaller the quantity of septic material, and the drier and less suitable the soil for its growth, the more certain is the action of this germicide power. But the introduction of a ligature capable of absorption and in itself harmless, has altered the nature of the problem; and experience has established the use of carbolic catgut, or some similarly prepared material. I have accordingly utilised it for subcutaneous ligature. It has not the elasticity or the strength which is necessary in nævi of large dimensions; but I have passed it with perfect success round one of the size of a walnut. The swelling slowly dwindled away, without suppuration, and with little tenderness. There are other diseases, however, in which it will, I think, be found more satisfactory, and of which the case before you is an example.

The treatment of varicocele always presents a certain difficulty to the surgeon. This disease is not dangerous to life, nor does it seriously interfere with ordinary functions and avocations; but it is a source of harassing if not severe pain, is a matter of solicitude to the patient, and in some cases leads to wasting of the testicle. The former considerations have led some to recommend palliation by suspension, the vein-truss, and the cold douche; while the immense number of operative measures which have been devised, and which are not devoid of danger, bear witness to the importance of the latter. In the subcutaneous ligature by catgut we have a means of meeting the difficulty. It is singularly easy of application, free from risk, and very certain in its results. The mode of applying it is as follows. The veins are carefully separated by the fingers from the artery and vas deferens, and a needle armed with catgut is thrust through at the point of separation; it is again introduced at the orifice of emergence, made to pass between the veins and the skin, and finally brought out at the original entrance. The two ends are then firmly knotted with as much force as strong catgut will bear, and cut short. By traction on the loose skin of the scrotum, the knot is made entirely to disappear, and the punctures are covered with salicylic wool saturated with collodion. The same manoeuvre is repeated at a distance of an inch or a little more. I have now performed the little operation six times with complete success. In two cases, three ligatures were applied; but, in the others, to tie the vein at two points has been found sufficient. The effect is the formation of a hard lump of coagulum between the ligatures, at first slightly tender, but which soon becomes perfectly callous. I have just examined a patient on whom I operated more than a year ago. He gives me the most satisfactory assurances of complete relief. A small hard nodule is still to be felt; the testicle is a little larger than its fellow; and the superficial scrotal veins are somewhat distended. But he feels no inconvenience, and has given up the suspensory bandage which he wore before the operation. The other cases have turned out equally well, and in one of them there has also been a year's probation. In two of them there had been previously some wasting of the testicle; but I hear that this has not as yet progressed further.

The success of the treatment of varicocele by this means induced me to apply it also in varix of the leg. So long as a varicose vein is not a source of inconvenience or danger to the patient, the general opinion seems to be that the use of the elastic stocking is all that is necessary. If that be not effectual as a cure, at least it prevents further deterioration. I should be inclined to say that, even in advanced cases, the stocking ought first to be tried; but when solid œdema and eczema and ulceration cannot thus be kept in check, or perpetually recur, some more radical measure becomes plainly desirable. There are also cases in which a limited portion of a single vein is greatly distended, and in which, although giving rise to little inconvenience at the time, it is, from its high situation, difficult to control by pressure, and likely, therefore, to spread and increase. In such cases, if a radical remedy be simple and safe, it ought to be applied. Some have objected to all operations involving the obliteration of a vein, that there is a likelihood of others becoming varicose; and that the deep-seated varicosity thus induced is apt to be painful. But I am sure that must be rare. Undoubtedly the same causes which were originally at work may be allowed to continue their action in other veins through want of care; but it is not consistent with experience that, when one vein or set of veins is obliterated, others become varicose. On the contrary, veins on which backward pressure is thrown tend to varicosity; but parallel channels only enlarge and dilate. There is a long step between varicosity and simple dilatation. Large portions, for example, of the femoral vein often become obstructed in fever and other blood-diseases. The leg may afterwards remain permanently enlarged; but the veins are little more prone to varicosity than in the sound limb. But, even if such were the case, a problematical future evil would not justify abstention from what otherwise is beneficial; and the improvement that follows obliteration of a varicose vein is rapid and distinct.

The operation is performed precisely as for varicocele. The needle is passed first under the vein, and then between the vein and the skin, entering and emerging by the same punctures. It is not so easy to draw the skin over the knot after ligaturing as in varicocele; and this will be facilitated by slightly enlarging the puncture by means of a tenotomy-knife. When, as is sometimes the case, the limb is swollen and brawny, and the veins run, as it were, in gutters cut out of the solid œdema, the difficulty of operating is considerably increased. In such cases I have, as a preliminary, kept the patient at rest, and applied the India-rubber bandage for a few days. It is always of advantage, during the operation, to have the limb gently constricted by a bandage above the point of ligature, in order that the veins may be distended with blood, which afterwards coagulates.

I have now operated on eight patients with very satisfactory results, so far as obliteration of the veins and improvement in the condition of the leg are concerned. Perhaps, instead of going into the dry details of the cases, involving much repetition, I shall best fulfil my object of appraising for you the value of the operations by a few general remarks upon them. And, first, those of you who were present would notice that I performed the operation under the spray. I believe this may almost be regarded as a work of supererogation. Nevertheless, in dealing with veins, it is impossible to be too cautious, and it adds little to the difficulty or trouble. For the same reason, I applied to each little puncture some layers of salicylic cotton and flexile collodion. I find this a most admirable antiseptic dressing for small wounds of all kinds. After carefully cleansing the wound with carbolic oil, the least irritating solution, I cover it with the wool and collodion, with the most perfect faith that, when the covering drops off, the wound will be healed. I have several times referred to points in the treatment of nævus. Let me do so once more. If a nævus be ligatured in the usual manner, it drops off after a little inflammatory action, and leaving a sore to heal. But if, after ligature with carbolic silk, it be covered with a broad shield of cotton-wool and collodion, when it is ready to come away (the period varying with the size), it will be found that there has been no suppuration, and that the wound has healed. It is a very perfect imitation of the method of healing under a scab. In subcutaneous surgery of all sorts, I therefore regard the application as one which adds distinctly to the certainty of success.

I find that some care must be exercised in the selection of the spots to be ligatured. A single ligature cannot be relied upon to obliterate a vein. To produce a permanent solution of continuity in the lumen at any one point, it is necessary to apply two ligatures, with perhaps an inch between them. Now, it is essential that no branch be given off between the ligatures. I have twice had to repeat the operation from, as I believe, not attending to this point. It is necessary also to study carefully the map of the veins which are varicose, and to ligature at judiciously selected places. In one intricate, but by no means unusual case, after double ligature at four separate spots, I found that a zig-zag channel of previous varicosity still remained, which I had not afterwards an opportunity of attacking. These difficulties, however, have to be met, whatever the mode of treatment; and, so far as my experience goes, they do not prove more troublesome with this than with other methods.

On one occasion, suppuration occurred at a ligature applied over the patella. It happened in this wise. The patient (who was afterwards dismissed for unruly conduct) got up contrary to orders four days after operation, and thus caused the dressing to loosen, and a little blood to flow from the puncture. It immediately inflamed. I expected to find the suppuration which followed septic; but, careful microscopic examination showed that the pus was quite free from organisms. It was, therefore, allowed to drain from the little puncture, under antiseptic dressing, and healed in three days.

These are the accidents I have met with in eight cases. Otherwise, there has been no general or local trouble whatever; and, except in the incomplete case already mentioned, the success has been perfect.

It only remains to compare the operation with other methods—to consider which of the many modes of obliterating a vein is most certain and safe. Now, although excision of the whole vein is certain, it seems to me needlessly severe. You have, therefore, to choose between the introduction of a coagulant into the vein, its ligature, or its division.

Division of the vein subcutaneously is inefficient; the lumen is often reproduced. Division otherwise involves an open wound, and a risk of hæmorrhage. External ligature may be performed by many ingenious contrivances, metallic and others; but to them also the same objection applies as to external division. The coagulants which may be introduced are, practically, two: perchloride of iron and carbolic acid. With due precautions in temporarily arresting the circulation, I believe there is practically little objection to be made to them. I have used carbolic acid with very satisfactory results, only once having had excess of action, and that from an error of procedure. I confess, however, to a lurking fear that, after the temporary ligature is removed, a clot might be carried off, with what serious results we know; and I am not altogether sure that the coagulum might not sometimes melt away, and the lumen of the vessel reopen. At all events, in the subcutaneous ligature, we have a mode of producing adhesion and a coagulum, which must be free from the former risk, and little liable to the second. I believe there are cases of hard and brawny limb in which it would be impossible to apply this ligature. In these cases, I should inject; but, in those to which it can be applied, we have no safer or surer treatment for varicocele and varix than the subcutaneous ligature with catgut.

ABSTRACT OF LECTURES

ON THE

ANATOMY, PHYSIOLOGY, AND ZOOLOGY OF THE CETACEA.

Delivered at the Royal College of Surgeons of England.

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LECTURE IX.—THE TOOTHED WHALES—(concluded).

THE Narwhal (*Monodon monoceros*) is an inhabitant of the Arctic seas very closely allied to the *Beluga*, from which it differs chiefly in its extraordinary dentition. This latter character separates it from all the other toothed whales, and shows that in some instances the teeth may be greatly modified, while in other respects an animal may differ in no way from the other members of its group; thus indicating clearly that, in the classification of animals, too great stress must not be laid on dental characters. The lower jaw of the adult narwhal is entirely edentulous, and the upper jaw of the female also, as a general rule at any rate, exhibits no teeth externally; there are, however, two rudimentary teeth which do not protrude above the surface of the gum, but remain throughout life embedded in the maxillary bone. The male does not possess teeth in his lower jaw; but in the upper jaw, besides some rudimentary deciduous teeth, there are two of considerable size, of which the right lies concealed from view in its formative socket during the whole life of the animal; but the left grows to a large size, frequently reaching a length equal to half that of the entire body of the animal. It is spirally twisted from right to left, and the pulp-cavity extends almost to its anterior extremity. Its formative socket is very long, reaching nearly to the nasal passage. The skull is slightly twisted to the right side, so that the axis of the tusk is in a line with that of the body. The purpose for which the tusk is developed is apparently entirely as a weapon of offence or defence, and not for obtaining food, as that consists of cephalopods, and the like. About eleven instances have already been recorded in which both incisor tusks have been developed in the same skull; and in all of these cases it has been found that each tusk is spirally twisted in the same direction—namely, from right to left. No instance has yet been observed where the right tusk has been developed while the left remains rudimentary, although it is stated in Professor Owen's catalogue that in one skull in the museum this abnormality is present; reference to the specimen itself will show that it is the left tusk which is developed, and that the right is rudimentary.

The next family of the cetacea contains only one genus, of which the *Platanista*, or the fresh-water dolphin, is the only member. It differs from most of the other cetacea in frequenting large rivers, which it does not appear to leave, as it has never been found in the sea. It inhabits chiefly the upper parts of the Indus and Ganges, and some of the American rivers. The anatomy of this creature has been most elaborately described by Dr. J. Anderson, in a large and valuable monograph. The peculiar features of the animal are its long rostrum, constricted form of neck, and broad pectoral fin. The symphysis of the mandible is much prolonged, the temporal fossa is deep, the orbits are small, and there is a great development of the maxillary bones. The cervical vertebræ are proportionately longer than those of other cetacea; the scapula is broad. The eyeball is extremely small, being about the size of a pea, and quite rudimentary, with no lens, and with an optic nerve only of the size of a thread. The aperture of the eyelids only measures about two millimetres. The sense of smell seems to be absent also. The animal appears to grope about at the bottom of the water for its food, which consists of fresh-water fish and crustaceans. The teeth are numerous, and undergo great changes in appearance during their growth. The base or root of the tooth enlarges with osteodentine, while the thin extremity of the crown gradually wears away; this gives an appearance to older animals of having much larger teeth in proportion to those of younger animals. There is, of course, no second set of teeth developed. A cæcum, which does not occur in any of the other cetacea, is present in the *Platanista*.

Two other animals, similar in many respects to the *Platanista*, occur