OBSERVATIONS

ON
THE TREATMENT OF ELEPHANTIASIS ARABUM
BY LIGATURE OF THE MAIN ARTERY
OF THE LIMB;WITH A CASE IN WHICH CURE WAS EFFECTED BY LIGATURE OF
THE EXTERNAL ILIAC ARTERY.*

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IN introducing the subject of this communication to the members of the British Medical Association, I should perhaps apologise for choosing what has been so well brought under the consideration of the profession by Dr. Carnochan of New York, and more recently by Mr. Bryant of London; but the proposed treatment is so peculiar that there are few questions in practical surgery which afford so much scope for scientific discussion. The number of cases in which the operation has been performed is so small, that it may still be considered *sub judice*; and I have thought that the narration of an additional example might afford an opportunity to my professional brethren at this meeting, of expressing their opinion as to the propriety of undertaking such an operation, and the principles on which it has proved effectual in the instances already recorded.

That the application of a ligature to the main artery of a limb affected with elephantiasis, should have the effect of rapidly diminishing its bulk and reducing it to the normal size, has seemed to many so extraordinary, that, while they cannot but accept the truthfulness of the cases reported, they regard them as singularly exceptional, and surrounded with accidental circumstances which are not likely to be frequently met with. At all events, many surgeons still believe that the success which has followed the treatment hitherto does not warrant us to adopt it as a recognised mode of practice in cases of elephantiasis in general.

When the patient to whom I am about to refer came under my charge, I found that some of my colleagues in the hospital were adverse to the operation. As it was the first instance in Glasgow of its proposal, I deemed it proper to submit the case to a consultation of my surgical colleagues, and the doubts that were then raised have since suggested to me the propriety of introducing the question here for debate.

1. The first objection is, "The disease not being fatal, but simply causing discomfort, it is not justifiable to perform a dangerous operation in the hope of relieving that discomfort."

This question enters so largely into the decision of many surgical operations, that it is far too general to be discussed in connection with this one individually. So much depends on the circumstances of the patient, and on the danger of the operation, that it is not easy to lay down any general rule; while the wish of the patient must not be disregarded. In an extreme example of elephantiasis, as mine was, the patient is debarred from all exercise, and, as in her case, is deprived of the means of earning a livelihood. In such circumstances, the earnest request of the patient to be relieved at any risk cannot be taken for nothing. It seems to me that, if patients are possessed of ordinary intelligence, the nature and danger of the operation should be fairly stated, and the choice left somewhat in their own hands. With regard to the particular operation under consideration, I have sufficient confidence in its merits to induce me to go further than that, and endeavour to produce a bias in its favour.

2. The second objection is theoretical; "The ligature of the main artery will either cause gangrene of the limb, or, if the circulation be restored in time to prevent that, the object of the deligation will be lost; the blood will nourish the limb as before, and the disease will either not disappear or rapidly return."

The only answer I could give to that was an empirical one. "In the cases recorded, strangely enough, there is not an example of gangrene having occurred; and, in all, the diminution of bulk began immediately after the ligature was applied, and continued to go on till the limb was reduced to nearly the normal size. That gangrene will sometimes happen we have no reason to doubt, but that it will do so rarely, our experience clearly proves."

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How the diminution goes on after the circulation is restored sufficiently to nourish the limb, it may be difficult to understand; but in some points of surgical practice it may be necessary to follow a successful example, even though we are not quite sure of the *modus operandi* of the treatment. It is much more satisfactory when we can give a physiological explanation of the action of any remedy or operation; but when a disease is otherwise incurable, surely we may adopt some exceptional mode of treatment after it has been safely and successfully practised by others.

When these objections arose, it was suggested that trial should be made of continued rest in the horizontal posture and pressure by bandaging.

In a case related by Professor Syme in the *Edinburgh Medical Journal* for 1866, there was enlargement of the left leg as an accompaniment of elephantiasis of the scrotum; and, after describing the successful removal of the large tumour, and its progress for three weeks, he goes on to say: "It is worthy of notice that the left leg, which presented such distinct features of elephantiasis as made me hesitate to undertake the removal of the scrotal tumour, diminished quickly after the operation, so that when the patient left the hospital there was hardly any trace of the enlargement. Had the femoral artery been tied, this spontaneous improvement would doubtless have been attributed to a procedure that, so far as I can see, has no foundation in any sound surgical principle."

Acting on this suggestion, I determined, before having recourse to ligature, to confine the patient to bed for a considerable time. This had previously been done some years before with no effect, but I again tried it, and confined the patient to the recumbent posture for two months, without any marked diminution of size taking place. It became obvious that the girl must remain in her then hopeless state, unless ligature of the main artery should prove successful. At the end of this extended trial of rest, the majority of my colleagues agreed with me that the patient should be offered the hope of cure which the operation afforded. This she eagerly accepted, and the result has been equal to the most sanguine expectation. It was clearly proved by this that rest and pressure are inadequate to produce any satisfactory result; and that ligature of the main artery may be undertaken with every confidence of success.

The following report of my case is abridged from a complete history entered in the hospital journal by my house-surgeon.

Jane O., aged 17, was admitted to the Glasgow Royal Infirmary on November 2nd, 1866, with elephantiasis of the left lower extremity, and the same condition in a minor degree in the right. The patient had been under treatment by Dr. Anderson, at the Skin Dispensary, for four months, where she was submitted to a course of Fowler's solution and other appropriate remedies without much benefit. From the entries in the journal kept at the Skin Dispensary, it appears that the disease began in the left limb five years before admission, and was ushered in by an attack of erysipelas. This soon passed off, leaving the limb somewhat swollen. Repeated attacks of the same sort occurred at intervals, and after each recurrence the leg remained markedly enlarged. In 1863, she had been a patient in the infirmary, under Dr. Lyon's care, where rest and bandaging seem to have been of partial, but only temporary benefit, the disease rapidly advancing as soon as she was dismissed.

On admission to the Royal Infirmary, the condition of the patient was nearly as follows. The left limb was a huge misshapen mass, the natural prominences being obscured by the overgrowth, and the depressions of the flexures converted into deep sulci. The skin had a hard brawny feeling, and was covered with rough scales, while over the dorsum of the foot and toes the whole surface was studded with conical papillæ of scarf-skin, fully an eighth of an inch high. This gave the limb a very peculiar appearance which is not easy to describe. The contour of the foot was entirely lost, there being a deep sulcus in front of the ankle, and a rounded protruding mass between that and the toes. In fact, the term elephant's leg defines the shape better than any written account could do. The measurement of the various parts of the limb were as follows: round the ankle, eighteen inches; calf, twenty-six inches; middle of thigh, twenty-three inches. Although the enlargement of the thigh was not so great as that of the leg, yet at the groin the skin and cellular tissue were so thick that the femoral artery could not be felt. The right leg was also in a state of incipient elephantiasis, presenting in a slight degree the characters described above. It measured, round the ankle thirteen inches, calf sixteen inches and a half, thigh nineteen inches and a half. It should be mentioned that there was a general tendency to hypertrophy of the cellular tissue in every region, and over the abdomen the deposit was so copious that the iliac artery could with difficulty be detected. In all other respects the patient was in perfect health.

As before mentioned, I ordered her to be kept in bed for two months with the limb elevated, a flannel bandage being applied every two or

three days. At the end of that time, there was no perceptible change in the limb.

The operation was performed on December 21st, in the following way. The patient having been rendered insensible by the administration of chloroform, I made an incision three inches in length, parallel to but above Poupart's ligament. The adipose tissue was of great depth, so that the wound was not too long. Division of the tendinous and muscular structures of the upper angle of the wound disclosed the abdominal fascia, and on cutting into it I could easily insert my finger between the fascia and peritoneum, among the loose areolar tissue. I now pushed my finger down behind the transversalis fascia till it lay behind the abdominal wall along the whole extent of the wound in the integument, and, using it as a guide, I divided the tendinous and muscular structures with a probe-pointed knife. I mention this mode of exposing the artery, as I consider it preferable to dividing all the tissues, layer after layer, along the whole extent of the incision. A little separation of the fatty tissue enabled the point of the finger to detect the artery pulsating at the bottom of the wound. There was some difficulty in getting the aneurism needle passed round the vessel, owing to the presence of a mass of subperitoneal fat, but with care this was turned aside, and the ligature successfully applied. Two silver sutures were introduced, the limb was wrapped up in cotton, and the patient placed in a warm bed.

December 22nd. Shortly after the operation she complained of shooting pain in the limb, but it gradually wore off. She rested pretty well during the night and was comfortable this morning; the limb felt moderately warm; and there was no pain in the toes.

December 25th. She continued to improve in every way; the skin was more pliant and softer, and the tibia could be detected and defined by manipulation. Before the operation, bone could not be felt through the dense tissue at any part of the limb. Measurements were taken to-day; round ankle fifteen inches and a half, calf twenty-one inches and a half, thigh twenty-two inches and a half.

After this she had an attack of bronchitis which lasted about ten days, and after that her progress to recovery was uninterrupted. The bronchitis did not seem to interfere with the result of the operation, for on December 29th the wound looked favourable; the limb was softer and smaller, measuring round the ankle fourteen inches and a half, calf twenty inches and a half, thigh twenty inches.

January 3rd, 1867. The ligature came away to-day, the thirteenth day after the operation.

It would be tedious to give further reports. She continued to improve daily. The wound cicatrised, and the limb became still more natural.

At the date of her dismissal the following are the measurements compared with those before the operation.

	Round Ankle.		Calf.		Thigh.
Before operation	18	...	26	...	23
After, at dismissal	14½	...	17	...	20

But the diminution in size was not the only change produced by the operation. The hard, horny, scaly surface was changed into a soft elastic natural coloured substance, which had all the characters of healthy skin. The large horny looking projections of scarf-skin which covered the toes had fallen off, so that the dorsum of the foot and toes were quite smooth and soft. The patient could walk with comparative ease, and expressed herself as highly pleased with the result. On comparing the two limbs, it was found that little difference existed between their size, except in the feet, the elephantine one still preserving its curious contour, though so much reduced in size.

On May 17th, the measurements were again taken, after she had been dismissed from the hospital, and had been taking exercise at home: ankle fifteen inches, calf seventeen, thigh twenty.

There is no doubt therefore, that this case affords another proof that elephantiasis of the leg can be reduced by ligature of the main artery.

It is much to be regretted that we have no subsequent history of the cases already reported. Mr. Butcher's case, published in 1863, is said to have been well eighteen months after the operation, but there is no account of the condition of any patient some years afterwards. There is no doubt of the efficacy of the ligature to produce immediate cure, and that this will last for some months; but what we want is information as to the results years afterwards, when the patients have resumed their ordinary calling. In the case I have just related, the improved condition continued for several months after she returned home, but a few days before I left Scotland I was called to see her, and found her suffering from a slight attack of erysipelas of the leg with some swelling. Whether that may be followed by permanent enlargement it is difficult to predict, but it must be remembered that the disease originally began in that way. I hope, however, that the swelling may be only temporary, as the limb is decidedly cedematous, pits on pressure, and is relieved by the horizontal posture which I have enjoined on her. This

same tendency to temporary œdema occurred in some other cases reported, without affecting the general progress to cure.

Lastly, a few words on the principle on which this operation cures elephantiasis. The observations of Mr. Bryant and those of Dr. Wilks, quoted in the paper before referred to, go to prove that the disease consists of a hypertrophy of the skin and subcutaneous tissue, including the fat. These tissues are thickened and hardened both by an overgrowth of the natural structures and by intestinal deposit of lymph. It seems further that this hypertrophy depends on some local condition, and not on the amount of blood circulating in the limb; for, although Dr. Carnochan of New York attributed it to the enlargement of the artery, still, in cases which have been accurately investigated, it has been found that no such condition of the artery existed. Why then should the ligature of the main artery have an effect on the tissues of a leg affected with elephantiasis, which it has not on one of ordinary size, when the operation is performed for aneurism or wound of the vessel? The answer, I think, is to be found in the difference between the activity of the organs of absorption when acting on normal and on abnormal tissue. The activity of absorption, as a general rule, is in the inverse ratio of that of circulation. When, then, the force of the circulation in any organ or part of the body is weakened, the process of absorption is in unusual energy. But this observation applies particularly to abnormal deposits of a non-malignant kind, in regard to which it may be said that, when the force by which they are formed is diminished, the counter force or that of absorption comes into play. Hence, in inflammatory deposits, the use of rest and pressure to diminish the activity of the circulation, and alternate friction and inunction to stimulate the absorbents. It may probably be the case, then, that ligature of the main artery of the limb not only temporarily cuts off the supply whence the undue nutrition is obtained, but, by diminishing the force of the circulation, produces a condition in which the absorbing power is most vigorous. And this is all the more likely, when we consider how very little is necessary to excite the dormant action of the absorbents. The rapidity with which abnormal collections of solid or liquid matter disappear, is matter of surprise to all who observe these phenomena for the first time. Glandular and adenoid tumours sometimes disappear in an incredibly short time; so also liquid effusions. Not long ago I had a case of chronic effusion into the knee-joint, which had at first been treated with blisters and subsequently by elevation, rest, and pressure by bandaging, Scott's ointment being also applied. After many weeks no change had taken place, when one morning I ordered the reapplication of a very small blister. To my surprise next day, the swelling was visibly reduced, and in a week the joint was of the natural size. From instances like these, which are familiar to every surgeon's experience, it seems that, when the absorbing power is excited by however trifling a cause, it has the power of going on without continuous stimulation. It seems also that, when these growths are reduced, they have little tendency to recur, unless as the result of a fresh attack of the original exciting cause. May it not be that, in the case of the elephantine limb, the permanent reduction of size may be accounted for on the same principle as the removal of abnormal effusions in other situations and forms. Whether that be the true solution or not, experience is certainly favourable to ligature of the main artery as the only hope of cure in what would otherwise be an incurable and distressing affection.

The experience of the operation is as follows. Ligature of the main artery of the limb for elephantiasis has been performed twelve times.

1. Dr. Carnochan, New York, femoral; cure.
2. Dr. Carnochan, New York, femoral; cure.
3. Dr. Carnochan, New York, femoral; cure.
4. Dr. Carnochan, New York, femoral; cure.
5. Dr. Carnochan, New York, femoral; cure.
6. Mr. Statham, London, anterior tibial; cure.
7. Mr. Butcher, Dublin, femoral; cure.
8. Dr. Fayer, Calcutta, femoral; (pyæmia, eighteenth day); death.
9. Mr. Alcock, Stafford, femoral; cure.
10. Mr. Bryant, London, external iliac; cure.
11. Dr. P. H. Watson, Edinburgh, femoral; improved.
12. Dr. George Buchanan, Glasgow, external iliac; improved.

Thus, of twelve instances of ligature of the femoral or external iliac artery, gangrene occurred in none; and only one proved fatal, from pyæmia, after the limb had shrunk as much as those which ultimately recovered—an amount of success comparing very favourably with most major operations.

P.S. Nov. 11th, 1867. Since the above paper was read, my patient has had two or three fresh attacks of erysipelas in the limb, which have caused it to assume an appearance somewhat similar to what it had when I first saw it; so that I fear the disease must be considered as having recurred, at least to a considerable extent.