FURTHER OBSERVATIONS
ON THE
LIGATURE OF ARTERIES;
TO WHICH IS ADDED
A CASE OF POPLITEAL ANEURISM,
ATTENDED WITH SOME UNUSUAL CIRCUMSTANCES.

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SINCE I communicated to the Society the description of “ a New Method of tying the Arteries in Aneurism, Amputation, and other Surgical Operations,” which is printed in the Sixth Volume of the Transactions, I have constantly employed the method therein proposed, both in Saint Bartholomew’s Hospital, and in private practice; and have now tried it in many operations of almost every description. The general result of my experience is, that this plan, by diminishing irritation and inflammation, and simplifying the process of dressing, very materially promotes the comfort of the patient, and the convenience of the surgeon, while it has

not produced ill consequences, or any unpleasant effect, in the cases which have come under my own observation.

I have found in my own practice, what has been confirmed by others, who have communicated to me the result of their experience, that the small knots of silk generally separate early, and come away with the discharge; that, where the integuments have united by the first intention, the ligatures often come out rather later, with very trifling suppuration, and no painful inflammation; and that, in some instances, they remain quietly in the part.

In two or three instances I have been told that it was thought the ligatures seemed to have caused irritation and pain. These were amputations; and we are accustomed to see effects quite as considerable as were alluded to here, produced by the state of the bone and other causes, where the ordinary method of securing the arteries is practised; so that I could not, on close inquiry, find any reason to ascribe what was complained of to the use of the silk ligatures, and the practice of cutting off their ends close to the knots.

I do not wish to conceal or explain away any objections, but merely to put the Society in possession both of what I have experienced, and been informed of. I should state then that I have seen

much advantage, and no bad effects from this plan of tying the arteries; and that the objections made in one or two instances have not been grounded on any consequences that could be closely traced to the ligatures, even by those who made them.

Under some circumstances the method will be attended with peculiar advantages, as in crowded military hospitals, where the destructive hospital gangrene either exists, or may make its appearance. Every measure tending to accelerate the union of wounds, whether after operations or under other circumstances, is of great importance in averting the probability of this calamitous occurrence.

When I communicated the former paper to the Society, I had not tried the method in the operation for aneurism: the opportunity of doing this has occurred to me since, and some gentlemen have kindly informed me of the results of their experience.

My friend Mr. Carwardine, of Thaxted, tied the femoral artery in a case of popliteal aneurism with a small silk ligature, and cut off the ends close to the knot. The patient, James Newell, thirty years of age, was a sadler, and ascribed the complaint, which had existed two months, to a sudden exertion in pulling off a tight coat. The wound united entirely by the first intention, not a particle

of pus having been formed at any time; and it continued perfectly sound at the distance of some months from the operation.

I operated for popliteal aneurism on Thomas Goodhew, a healthy countryman, thirty-three years old, in Saint Bartholomew's Hospital, on the 29th of March, 1817; tying the artery with a single small silk, and cutting off the ends close. The tumor was large, and situated in the inner and lower part of the thigh, just where the artery passes through the triceps. He described the swelling as having shewn itself first without any beating on the back of the limb, towards the calf of the leg, and having subsequently advanced towards the front, and began to pulsate. Mr. Hott of Bromley, who sent him to the hospital, corroborated this statement. With the exception of the integuments, the wound united by adhesion. The great restoration of power in the limb, with the excellent state, both of the part and of the general health, induced me to allow him to get up, and move a little about the ward in eight days; an indulgence which however, generally speaking, I should not consider as proper at so early a period after tying a large artery. He left the hospital, and returned to his ordinary country occupations on the 17th of April. The wound continued to discharge a small quantity of matter till the end of May, when the ligature came away, and it healed firmly.

During the operation it was accidentally discovered that this patient had another aneurism in the precisely corresponding situation of the opposite thigh. It pulsated strongly, and was rather smaller than a hen's egg. He said it had existed twelve years, and at one time had been as large as an orange. During the short time of his remaining in the hospital it underwent no change; and I conclude that it is still unchanged, as Mr. Ilott, from whom I have received a letter respecting this patient, says nothing about it.

Mr. Kenrick Watson, of Stourport, in Worcestershire, gave me the particulars of a case, in which he tied the humeral artery for an aneurism produced by wounding that vessel in the operation of phlebotomy. He states that "the ligature was put on the humeral artery upon the 2d of March; the wound was quite healed by the 10th of April. On the 3d of May, a small tubercle, which had been felt under the skin in the centre of the cicatrix, appeared above the skin, and proved to be the knot of the ligature. There was no inflammation nor discharge, but the ring of the ligature was firmly impacted in the centre of the cicatrix. In about a week from this time, the whole of it was expelled, apparently in the same state as when it was placed upon the artery.

My friend Mr. Hodgson tied the ulnar artery in the way I have recommended. The skin healed

over, but a firm knot gradually formed under it. He opened this five or six months afterwards, and found it of almost cartilaginous hardness; the knot of the ligature was in its centre without any pus.

Mr. W. Cumin, of Glasgow, was kind enough to transmit to me the knot of a ligature, which had been discharged from a stump at a considerable distance of time, (I think not less than two or three years) from its application. In a subsequent letter, dated College, Glasgow, July, 1817, he communicates the result of his experience, which I now lay before the Society.

“ In my letter, inclosing one of these ligatures, I stated that I had seen the practice followed with good success at the General Hospital, La Corderia, (the rope work) near Bilbao, in the autumn of the year 1813. It was first suggested, *as I understood*, to Mr. Henning, now a deputy-inspector of hospitals, by an hospital mate, (Mr. Hume,) who had seen it practised by a naval surgeon, stationed somewhere on the coast of British North America. The practice appeared peculiarly advantageous in the hospital near Bilbao, where the contagious gangrene was at that time making the most frightful havock, and where of course immediate union of divided parts was above all things to be most ardently desired. I never saw, nor until the publi-

eration of Mr. Guthrie's book, did I ever hear of any bad effects following the use of short-cut ligatures. Neither sinuses nor unmanageable sores, as far as my observation has gone, could in any instance be traced to it. I should be much inclined to pursue this mode of tying arteries in every case of operation, particularly since it has been followed by such encouraging results in your hands. At the same time, I beg to say, that my experience of this plan has been very limited. Nor would any thing have induced me to address you on this subject, if I had not wished to satisfy the doubts expressed in your paper respecting the fate of the ligature. When the cure proceeds favourably, a small pustule or very minute abscess makes its appearance on the line of the cicatrix, which soon after bursts, discharging a small circle of thread which had formed the stricture on the artery. No doubt there may be cases, where the morsel of thread shall remain close to the vessel, without creating any disturbance whatever; just as musquet balls and other extraneous bodies have done for years in multitudes of instances. But the process I have described is the most usual where the cure goes on well, and beyond all question the most satisfactory to the surgeon."

I shall take this opportunity of detailing to the

Society the particulars of a case of popliteal aneurism, which, although it affords an instructive caution, might not have been deemed sufficiently important for a separate communication.

A middle-aged man was received into Saint Bartholomew's Hospital, with a large tumor filling up the whole ham, and extending on both sides of the femur towards the front of the limb. It had begun behind; had existed for five months; had grown latterly with great rapidity, and manifestly increased during a few days, for which we had the opportunity of observing it in the hospital. It had a firm fleshy feel, being a little softer at one of its anterior protuberances, than in other parts. It gave him great pain, though it was not tender on being handled; it had caused considerable œdema of the leg and foot, and had rendered the limb completely useless. The surgeons of the hospital, in consultation on this case, viewing it as a large and rapidly increasing fleshy tumor, determined that amputation of the limb was the only remedy that could be proposed. This I performed high up, having first plunged an abscess lancet into the softest part of the tumor to the whole depth of the blade, without giving issue to any fluid.

I employed pressure in the groin *, instead of

* I had an instrument made for this purpose, which did not answer the end, in consequence of some inaccuracy in its construction;

the tourniquet; the use of that instrument being very unfavourable, where it is necessary to amputate in the middle of the thigh, and in a less degree in other amputations of this limb, by confining the muscles, and impeding their free retractions. This prevents us from sawing through the bone so high as we otherwise might do, and thus increases the chances of that very annoying occurrence, the protrusion and exfoliation of the bone.

The examination of the amputated limb disclosed to us the very unexpected circumstance that this tumor was a popliteal aneurism, containing an immense mass of firm bloody coagulum; not of that light brown laminated kind, which lines old aneurismal sacs, nor of the loose and soft texture that belongs to recently clotted blood. Hence, although the sac had been freely penetrated by the abscess lancet, no part of its contents escaped.

struction; but I conceive that a similar one, properly formed, might advantageously supersede the tourniquet in amputations of the thigh. The instrument in question consists of a stout semicircle of iron terminating behind in a flat circular piece, and perforated at its front end by a screw connected to a small iron plate. It is placed on the pelvis like a truss. The posterior flat piece affords the counterpressure, and the screw in front will enable us to compress the artery to any degree that may be required. To the flat piece of iron, by which the artery is to be compressed, it will be necessary to fix a portion of cork, and cover it with leather. The circular part behind must also be suitably padded.

The coats of the popliteal artery, and a continuation of them, such as aneurisms ordinarily exhibit, formed the back part of the sac ; while the front and sides were made up of the thigh-bone, the back of the knee-joint, and the neighbouring muscles. The fleshy and tendinous fibres of the vasti were exposed on clearing out the coagulum, which not only covered the back of the femur, but had also advanced on each side towards the front, so as nearly to have insulated the bone. The periosteum was removed at several points.

The popliteal vein, stretched over the back of the tumor, was completely obliterated for some extent. The popliteal artery, similarly extended, was flattened for two or three inches, but quite pervious to the sac, as well as from it ; both its openings into the bag presenting the usual appearances.

When the patient was more closely questioned, after this examination of the limb, he stated that the swelling had continued of a moderate size until five weeks previous to his admission into the hospital, when it suddenly enlarged, and that it had increased considerably from that time. The pulsation, which the tumor no doubt had possessed at an early period, had altogether escaped his notice.

I conclude that the case had been originally a popliteal aneurism of the usual kind ; that the sac had given way in front, so as to convert it from a

circumscribed into a diffused aneurism, and thus to present to us the deceptive appearance of an immense sarcomatous tumor *.

Since this case happened, I have heard of two or three other somewhat similar instances.

The very large quantity of the coagulum, and the state of the thigh-bone, may create a doubt whether tying the femoral artery would have been a successful method of treating this case. However, had I suspected the nature of the affection, I should certainly have made the trial; and should have undertaken it with a confident expectation of success, grounded on experience of the efficacy and extent of those natural processes, by which such effusions are absorbed, and such cavities obliterated. I have stated the case to put others on their guard; and shall be happy if what I have said should in any instance prevent so serious a mutilation as that which my patient suffered.

* An objection may be raised to this explanation, grounded on the general law of the animal economy, in conformity to which aneurisms, as well as abscesses, and tumors in general, are observed to make their way toward the surface of the body; or, in particular situations, towards the cavities of those mucous canals, which have external outlets. To this law there are, however, some apparent exceptions; I say, apparent, because the deviations may arise from some circumstance interfering with the ordinary progress of the tumors, such as a strain, effort, or external violence. I have dissected three or four thoracic and abdominal aneurisms, where

where the sacs had burst into the cellular substance; and I observed the same occurrence in one case of femoral aneurism. The instances in which aneurisms of the ascending or descending aorta burst respectively into the cavities of the pericardium or pleura, do not appear to be exceptions to the general rule; because the surrounding cellular substance, in both these cases, is not sufficiently copious to allow of the formation of a large swelling, the sac therefore gives way when small, and must of necessity burst into the serous cavities just mentioned.