HORSLEY (J. S.)

Some Remarks on Amputation at the Hip-joint, with Report of a Case by Wyeth's Method

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Reprinted from the MEDICAL RECORD, *June* 8, 1895

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SOME REMARKS ON AMPUTATION AT THE HIP-JOINT, WITH REPORT OF A CASE BY WYETH'S METHOD.

THE first plan of amputation at the hip-joint, "the most formidable of justifiable surgical procedures," is supposed to have been conceived by Morand, who, with two of his pupils, executed this operation on cadavers in 1738. In 1743 Ravaton devised an operation (practically the same as the modern operations of Lister, Furneaux, Jordan, and others) which he intended performing, but was prevented from doing so by the consulting surgeons.

In 1759 Barbet was awarded a prize by l'Académie Royale de Chirurgie over forty-four competitors for the best essay on hip joint amputations. In this essay he placed on record what is now considered the first hip-joint amputation performed on a living subject. The operation was done by Lacroix, at the Hospital of Orleans, on a boy fourteen years of age, who suffered from gangrene of both lower extremities from eating smutty rye. On the right thigh the gangrenous process had extended higher than on the left, and the line of demarcation had formed at the hip-joint. This limb was almost separated from the trunk by suppuration, when Lacroix completed the separation by dividing with scissors the sciatic nerve and the ligamentum teres. The patient did so well that four days later his left limb was cut off in the upper third of the thigh, which was followed by death in eleven days.

The first successful hip-joint amputation was done in 1772 by Perault, in a case very much like that of Lacroix, in which gangrene following an injury had nearly separated the limb from the body. This surgeon as-

sisted nature by severing the few remaining tissues, and his patient recovered in eighteen months.

The first deliberately planned amputation at the hip-joint through living tissue was done by Mr. Henry Thomson, surgeon to the London Hospital, in 1774. In 1778 Mr. Kerr, of Northampton, also did this operation. Both of these cases were for hip-joint disease, and both resulted fatally. Kerr used an oval incision, the queue terminating externally, and after disarticulating through the outer part of the wound, divided the soft parts on the inner side of the thigh.

Baron Larrey in 1793 was the first to perform a hip-joint amputation in military practice, and from this date to 1809 he did this operation seven times, and one of his cases is supposed to have recovered. This is said to have given it a standing among surgical procedures! The elder Blandin, Larrey's assistant, did the operation three times in 1794 with one recovery. His cases, however, are not very authentic.

The first hip-joint amputation performed in this country was done by Dr. Brashear, at Bardstown, Ky., on a negro, seventeen years of age. He made a circular incision, securing vessels as the operation progressed, then disarticulated by a longitudinal incision on the outer side of the limb. If Blandin's cases of doubtful authenticity be excluded, this is the first successful case on record done through living tissues. In 1812 Brownrigge, a British army surgeon, did the operation successfully.

The three dangers from the operation are hemorrhage, shock, and septicæmia, hemorrhage being the most formidable. The shock is also great. Poppert calls attention to the fact that seventy per cent. of all deaths from hip-joint amputation are from hemorrhage. Therefore, in considering the operation itself, the modes of controlling hemorrhage occupy no unimportant place.

The difficulty in controlling hemorrhage during this

operation lies in the facts that the shape of the hip renders the application of an unsupported tourniquet that must be out of the operator's way impossible ; that the wound surface is necessarily large, and that the tissues about the hip are very vascular.

The many ways of controlling hemorrhage at the hip-joint may be grouped in four classes :

1. The femoral artery may be ligated or secured before it is divided. This may be done by separate incision, or while fashioning the flaps, as in the external racket incision, or in the transfixion operation of Liston, where it is secured by the assistant's fingers. This is a very old method, having been used by Larrey in 1793, Dr. Brashear in 1806, Sir Astley Cooper in 1824, and later by Roser, Verneuil, and others. Though quite good, it is open to many objections. Ligating the femoral artery in continuity increases the liability to secondary hemorrhage. Securing it does not, of course, interfere with hemorrhage from the branches of the internal iliac artery, which may be quite free.

2. Aortic and abdominal tourniquets, variously shaped, to compress the aorta were used by Pancoast, Lister, Skey, and others. They are very faulty, being only applicable to thin persons, liable to injure the abdominal viscera, and uncertain in controlling hemorrhage.

3. Van Buren, of New York, first suggested compression of the common iliac artery through the rectum, and from this suggestion Davy, of London, devised a lever to be held in place by an assistant during the operation. This is very liable to injure the rectum, and is in the operator's way.

4. The elastic tourniquet, though not perfect, is probably the best method in use. It was employed by Sir Joseph Lister, by Mr. Jordan Loyd, and others. Lister used it to compress the aorta, Loyd to compress the external iliac. Both methods require the use of a special assistant, and are frequently inefficient.

By far the best method now in use is that of retaining the elastic tourniquet in position by the use of skewers. These were used by a number of surgeons, among them Spence, Trendelenburg, Hewson, and Myles. All of these used one steel skewer, to be thrust through the thigh, and a figure-of-eight elastic bandage was carried around it till a flap was made. Then the skewer was removed entirely, or placed in another position, to secure the other flap. Of course, these methods were by no means bloodless, though an improvement.

Trendelenburg's skewer was more complicated than the others. He used in 1876 a steel rod fifteen inches long, one-fourth of an inch wide, and one-eighth of an inch thick, with a movable point attachment. "The rod was pushed through the soft parts, the point removed, and a rubber tube wound round its ends in figure of eight."

It remained, however, for Dr. John A. Wyeth, of New York, to so perfect these methods as to make amputation at the hip-joint practically a bloodless operation. His method is as follows:

"While the member is elevated, or before the Esmarch bandage is removed, the rubber-tubing constriction is applied. The object of this constriction—and it is the chief point in the method—is the absolute occlusion of every vessel at the level of the hip-joint safely above the field of operation." He uses two large skewers or mattress-needles about three-sixteenths of an inch in diameter and ten inches long. One is introduced one inch below and slightly to the inner side of the anterior superior spine of the ilium, "and emerges on a level with and about three inches from the point of entrance" on the outer side of the hip. The second needle is inserted one inch below the level of the crotch, internal to the saphenous opening, and emerges an inch below the tuber ischii. The points of the needles are then shielded with bits of cork to avoid

injuring the operator, which Trendelenburg accomplished by a complicated arrangement of a movable point.

The chief and in fact the only objection to this mode of controlling hemorrhage during a hip-joint amputation is the after-oozing. Dr. Wyeth says that this, if

excessive, may be completely checked by introducing silkworm gut to be used as secondary sutures, and packing the wound with hot sterilized gauze, which may be removed within forty-eight hours.

As to the methods of operating, which are numerous,

Treves gives four classes as covering in principle all these operations :

"1. **Disarticulation Through an External Racket Incision.**"—This is a very popular operation, and in its various modifications has been associated with the names of Ravaton, Malgaigne, Furneaux, Jordan, Lister, Esmarch, and others. Wyeth's method is a modification of this. It consists of a vertical incision from five to seven or more inches long, commencing over the tip of the trochanter major. This is then carried around the inner and back parts of the thigh and joins the end of the vertical incision at the starting-point of the second incision at an obtuse angle. This may be carried out in many ways. Wyeth's method is to make a circular incision through skin and fascia, commencing about six inches below that portion of the tourniquet on the outer part of the thigh. He joins this by a vertical incision from the tourniquet over the trochanter major, and then dissects up the skin to the level of the trochanter minor, where a second circular incision is made to the bone. The attachments of the muscles and the capsular ligament are then divided and the bone disarticulated.

"2. **Disarticulation Through an Anterior Racket Incision.**"—Here the head of the femur is disarticulated through the straight part of the incision, which commences at the middle of Poupart's ligament. This operation is used in conjunction with the first method of controlling hemorrhage, as on account of the nature of the incision no tourniquet can be applied.

"3. **Disarticulation by Antero-posterior Flaps (Transfixion).**"—This method recommended itself to the surgeon before the days of anæsthesia on account of the speed with which it can be executed. It is frequently known as Liston's method. In it the thigh is transfixed by a long knife entering midway between the anterior superior spine of the ilium and the tip of the trochanter major, and is brought out on the inner side

of the thigh below the tuber ischii. It is then carried down close to the bone for eight inches, an assistant seizes the femoral artery, and the knife is turned out. The limb is disarticulated and a short posterior flap is cut about on a level with the gluteal fold.

"**4. Guthrie's Operation.**"—In this operation there are antero-posterior flaps of about equal length cut from without in, the incision being begun "a little above the trochanter, carried downward and across the back of the limb, and terminated in front of the tuber ischii. The anterior flap is marked out by a corresponding incision beginning and ending at the same points and crossing the front of the thigh at least five inches below the joint."

As to the relative merits of these operations, the first with its modifications is the best, as the elastic tourniquet can be used with it more successfully. It possesses an advantage over Guthrie's method in not being so readily infected by discharges from the bladder and rectum.

Undoubtedly Wyeth's method, taken as a whole, gives far better results than any other. Ashhurst gives from a table of 633 authentic amputations at the hip-joint a mortality of 64.1 per cent. Wyeth's is 21.4 per cent. from a series of 42 cases by operators of all grades of experience. Davy has a mortality of twenty per cent. out of 10 cases, but, not to mention the serious objection of a limited number, all the cases were operated on by himself. Dr. Wyeth has personally used his method four times, with no mortality. Dr. W. L. Estes reports a mortality of 14.28 per cent. in 7 cases operated on by him after Guthrie's method. He ligated the femoral artery instead of using a tourniquet. The same objections may be urged against his results as against Davy's. Besides, he offers nothing new.

Antisepsis and asepsis would affect Wyeth's mortality rate but very little, as seventy per cent. of the deaths are from hemorrhage and the remaining thirty per

cent. is to be divided between shock and septicæmia. So present statistics concerning the mortality of hip-joint amputations can be more justly compared with those of the pre-antiseptic era than in the case of any other operation.

B. F——, aged thirty-six, negro, of Nelson County, Va., was operated on by the writer during August, 1893, and a tumor removed from the inner and lower part of the left thigh, after ligating the femoral artery in Scarpa's triangle. This tumor was very large, being about four and a half inches in diameter. The consultant, Dr. Meeks, and I were uncertain as to diagnosis, as neither of us had examined the patient till a few days before the operation. We were of the opinion that it was a form of aneurism. On its removal the femoral artery was found to be attached to it, and this with the fact that in part of it were many layers of what we supposed was fibrin in some thickness made me believe it an aneurism. A portion of the tumor consisted of small sacs containing bloody fluid. Unfortunately no microscopical examination was made.

Later developments proved, however, that whatever might have been the relation between the tumor and the femoral artery, the growth was evidently malignant in character. About nine months after this operation a small spindle-shaped tumor made its appearance in the upper part of the popliteal space. This grew very rapidly, and soon the thigh was involved and seemed infiltrated, so that by October, 1894, all the thigh except the upper third was involved, and at its largest part measured twenty-six inches in circumference. The pain was very great and the patient was rapidly becoming exhausted. Diagnosis of sarcoma was made and operation decided upon.

On October 17, 1894, I operated, doing Wyeth's hip-joint amputation. I elevated the limb and applied mattress needles and the rubber tourniquet, as above described, without using Esmarch's bandage. The cir-

cular incision of skin and fascia was made, then the vertical, the skin dissected up and a second circular made to the bone about opposite the trochanter minor. The attachments of the muscles and the capsular ligament were then divided, and the bone disarticulated, rupturing the ligamentum teres. The vessels were secured and the tourniquet loosened. No more blood was lost than in an amputation through the thigh. The operation lasted about forty-five minutes. Oozing for twenty-four hours was very extensive. The wound was redressed and the drainage-tube removed in thirty-six hours. Most of the wound healed by first intention. A sinus was left, however, by the drainage-tube at the outer portion, which granulated and was not completely healed over till the last of December. When last heard from (April, 1895) the patient was doing well, free from pain, with no signs of the sarcoma recurring.

Microscopical examination of a portion of the involved thigh by Dr. J. S. Davis, of the University of Virginia, proved the growth to be round-celled sarcoma.

BIBLIOGRAPHY.

Ashhurst: International Encyclopædia of Surgery.
American Text-book of Surgery.
Reference Hand-book of the Medical Sciences.
Treves's Manual of Operative Surgery.
Wyeth's Text-book of Surgery.
Medical News, Philadelphia.
International Journal of Surgery.
British Medical Journal.
Lancet.
Bull. de l'Acad. Méd.
Deutsche medicinische Wochenschrift, Leipzig.
Index Catalogue of the Library of the Surgeon-General.