REMARKS

ON

FIVE CASES OF AMPUTATION OF THE HIP-JOINT.

Read before the Edinburgh Medico-Chirurgical Society.

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FOUR of the five cases which I desire to bring under the notice of the Society have been already published; three in the *Edinburgh Medical Journal*, and one in the *BRITISH MEDICAL JOURNAL*; so that I will only detain you with a very short *résumé* of these. The fifth case is as yet unpublished, and of it I may have a little more to say. The cases were all treated in the Cumberland Infirmary.

CASE I.—N. R., male, aged 10, was admitted April 2nd, 1880. The boy had been ill for three weeks. His first symptoms were acute pains in his joints, and fever. The pains gradually became localised in the left lower limb.

On admission, the whole of the left lower limb was swollen, white, and tense. Touching or moving it caused acute agony. In a fortnight an abscess opened at the back and also at the inner side of the thigh, and a probe reached the upper part of the femur, bare to a considerable extent. The boy's parents decidedly declined to sanction any operation. His condition in every way became steadily worse.

Seven weeks after his admission, his parents asked me to do what I thought best; and as there seemed some prospect of recovery if the cause of the discharge of pus were removed, although the boy's general condition was most unfavourable for operation, I amputated at the hip-joint. For a week all went well; the wound healed except where the drainage-tube came out, the boy gained in flesh, and felt so well that he wished to get up, but from this time he retroceded; his appetite failed, he complained of pain in the left iliac region, and pus collected in the iliac fossa. Three weeks after the operation, an abscess burst just internally to the left anterior superior spine of the ilium. Two days afterwards I explored the cavity, and found the ilium extensively bare. The boy's general condition became so reduced that the skin ulcerated over his other anterior superior iliac spine; and five days after the opening of the abscess, and twenty-six after the operation, he died from exhaustion.

CASE II.—A. P., male, aged 17, was admitted September 24th, 1879. He had been ill for eight months, and had a sinus in the lower part of the right thigh. Three days after admission the boy was chloroformed, and a sequestrum, amounting to about a third of the right femur, was removed by an incision at the inner side of the thigh, a little above the condyle. For a few weeks the patient improved, and the cavity from which the bone had been removed became less. In the middle of October he had an attack of erysipelas, lasting nearly a fortnight, and soon after this improvement ceased. In January he was again chloroformed, the cavity cleared out, and a counter opening made at the outer side. For a time improvement followed, then a period of no progress, and then occasional attacks of pyrexia. In the end of February he was again chloroformed, all soft bone gouged away, and most effective drainage established by two large openings, one on each side of the limb. Again improvement occurred for a time; then he had a recurrence of the attacks of pyrexia, with deep swelling of the whole limb, profuse discharge, and general exhaustion. Towards the end of May his condition was evidently becoming critical; he was much emaciated, and suffered much pain; and there was reason to believe that subperiosteal suppuration was progressing. On May 25th the limb was removed. He made a good recovery, and two and a half months after the operation he was discharged, with the wound healed, except a small superficial sore. He is now well. The femur, when examined, was found hollowed out at the lower end into a large cavity, and there were some small abscesses in the cancellous tissue. The whole shaft close up to the trochanters was very much thickened by deposit of new bone, in which also were several little pockets of pus.

CASE III.—J. L., male, aged 20, was admitted June 9th, 1880. He had been ill for six years with disease of the left hip-joint, and during the last four years various abscesses had formed and burst. In 1878-79 he was in the Cumberland Infirmary for five months, and was treated by extension and drainage, without any improvement. He declined operation, and was discharged in March 1879. For a time after this

he improved in health, was able to get out of bed, and even occasionally out of the house; but when winter returned he was reduced to a condition of extreme weakness. At last he made up his mind to run the risk of having the limb removed. When admitted to the Infirmary he was bloodless, and emaciated. Four sinuses discharged in the neighbourhood of the hip, and the head of the femur was ascertained to be bare. The limb was amputated on June 14th. The cartilage and a good deal of carious bone were removed from the acetabulum. The most of the wound healed well, but profuse discharge continued from two of the old sinuses and from the inner angle of the incisions. On October 21st I removed a considerable portion of the pelvis, which was bare, soft, and semi-detached. It comprised the whole tuberosity of the ischium, the ramus, and a good deal of bone from the neighbourhood of the acetabulum. On February 23rd, 1881, he was discharged, so far improved that he could get about the ward. He has since made steady though slow progress to recovery, and is now well, and works regularly at his trade as a watchmaker.

CASE IV.—T. B., male, aged 6, admitted June 21st, 1882. He had been ill for four months, and an examination showed the femur to be dead throughout the whole extent of its shaft, the lower epiphysis alone remaining healthy. There was a large discharge of pus from the thigh, and the boy was exceedingly thin. Five days after admission, I amputated the limb at the hip-joint. He made a rapid recovery. The stump was entirely healed in about five weeks. In another week, he was put on crutches. Bone formed in the stump, which he was able to move with some power, flexing, extending, adducting, and abducting it. He is now in vigorous health.

CASE V.—M. A. S., female, aged 12, was admitted June 20th, 1883. Her history, as recorded in the case-book, was, that, three years before admission, she was walking through a field, and fell into a ditch. She felt nothing amiss at the time; but, a few days afterwards, she became lame, and had pain at the right knee. She walked about for a month, gradually becoming worse, and then began to suffer from pain in the right hip. Six months after the accident, she was admitted to the Cumberland Infirmary, with the signs and symptoms of disease of the hip-joint. She was treated for nine weeks by rest, extension, and the long splint, without any improvement occurring. I then, on May 17th, excised the head of the femur, removing at the same time a good deal of loose and carious bone from the pelvis. The operation was done under spray, and the wound dressed with gauze; but the next day it was found to be smelling badly, and the antiseptic dressings were discontinued. The patient continued to suffer a great deal of pain, and to have a large amount of discharge. She had usually a morning temperature nearly normal, and an evening one of 103°. Seven weeks after the excision, a large surface of the pelvis was found bare, and as much as possible was gouged away. Her condition, however, became steadily worse. Fresh abscesses formed, one of them inside the pelvis. The hectic state remained and she became more and more emaciated. Not the least effort at repair was made. She was so bloodless and feeble that it seemed unjustifiable to submit her to the risk of removal of the limb; and arrangements were made by some kind friends, who had taken an interest in her, to have her admitted into the Home for Incurables—to linger out, it was supposed, the little of life which remained to her with somewhat more comfort than in the wards of a general hospital. She left the infirmary five and a half months after the excision. During her residence in the Home, I had repeated opportunities of seeing her, owing to the courtesy of my friend Dr. Barnes; and her case was frequently under the consideration of the staff of that institution. When she had been there a little while, albumen appeared in her urine, and was present for many months. Her liver enlarged, and diarrhoea appeared. When she had been there for about a year, the albumen began to diminish, and presently disappeared; but the diarrhoea continued, and neither the general nor local condition improved. For some months her state remained with little change, and it was determined to give her such chance of life as an amputation of the limb would afford. She was accordingly readmitted to the Cumberland Infirmary eighteen months after she left it. Her condition was as follows. She was very attenuated and feeble, looking literally like skin and bone—I think the thinnest human being I ever saw. The right leg was from four to five inches shorter than the left. There were large irregular sinuses over the position of the great trochanter. The head of the shaft of the femur could be felt for a couple of inches covered with granulations, but separated from the soft tissues. There was another sinus over Scarpa's triangle, and a third close to the superior spine of the ilium, all of these discharging a large quantity of pus. There were superficial bed-sores over the sacrum. There was no albumen in the urine. The liver was normal in size. The patient was kept in hospital for a month, until the bed-sores healed; and then, on July 10th, 1883, I removed

Table of twenty-five cases of Amputation at the Hip-joint by the Furneaux Jordan Method.

Surgeon.	Age	Sex.	Disease.	Date.	Journal.	Result.	Remarks.
Dr. Reeves, Carlisle	6	M	Acute necrosis of femur	1867	Unpublished	Recovery	Now alive and well.
	16	M		1876		"	"
Mr. Furneaux Jordan, Birmingham	16	M	Necrosis of femur	1879	<i>Lancet</i> , March 22, 1879	"	"
"	19	M	Hip-disease, excision	1879	Unpublished	Death	"
"	17	F	"	1880	"	"	"
"	11	M	"	1881	"	Recovery	"
Mr. J. F. West, Birmingham	46	F	Epithelioma of stump	1879	<i>Lancet</i> , October 4, 1879	"	"
Mr. Beddard, Nottingham	24	M	Hip-disease, excision	1879	Unpublished	"	"
Mr. Littlewood, Nottingham	5	M	"	1879	"	"	"
Dr. Marshall, Nottingham	6	M	"	1879	<i>Lancet</i> , January 10, 1880	"	Died three months after, from visceral disease.
"	7	F	"	1879	"	"	"
"	24	M	Hip-disease	1879	BRITISH MEDICAL JOURNAL, October 7, 1882	"	"
"	5	M	"	1880	Unpublished	"	"
"	11	M	"	1881	"	Death	"
Mr. Plicher, Boston	12	M	Hip-disease, caries of ilium	1880	"	Recovery	"
Dr. MacLaren, Carlisle	10	M	Acute necrosis of femur	1880	<i>Edinburgh Medical Journal</i> , December, 1881	Death	"
"	17	M	Chronic suppurative osteitis of femur	1880	"	Recovery	Now alive and well.
"	20	M	Hip-disease	1880	"	"	"
"	6	M	Acute necrosis of femur	1882	BRITISH MEDICAL JOURNAL, January 27, 1883	"	"
"	12	F	Hip-disease, excision	1883	Unpublished	"	Has still sinuses going to pelvis.
Mr. Spofforth, Kidderminster	20	M	Hip-disease	1883	<i>Lancet</i> , May 6, 1883, by Mr. Jordan Lloyd	"	"
Mr. Jordan Lloyd, Birmingham	10	M	" excision	1882	"	"	Died seven months after, of acute tuberculosis, stump solid.
Mr. Bennett May, Birmingham	5	M	Acute periostitis of femur, osteomyelitis, septicæmia	1882	Unpublished	Death	"
"	13	F	Hip-disease, necrosis of femur and ilium, excision	1883	"	Recovery	Still has unhealed sinuses.
Dr. Ledlard, Carlisle	4	F	Hip-disease, excision	1883	"	"	Has one unhealed sinus.

the limb. Since then she has made slow but steady progress to recovery. She can now walk a little on crutches; she sits up most of the day; her diarrhoea has ceased; and she has gained largely in flesh. Sinuses still lead down to her pelvis; but the amount of purulent discharge is not considerable, and I have no doubt she will ultimately get perfectly well.

Her case is of interest in many ways, to which time permits me only to allude. It illustrates the wonderful power which children often have of recovering from most grave conditions. It is probably an instance of recovery, not the only one I have seen, from what used to be considered an absolutely fatal condition, albuminoid degeneration.

My principal object in bringing these five cases before you is to ask your attention to the method of operation, which is that proposed by Mr. Furneaux Jordan. The essential peculiarity of his operation is division of the soft parts low down. Mr. Jordan makes an incision along the femur from above the great trochanter to one third or half way down the bone; he then disarticulates the femur, and finally divides the soft parts of the thigh transversely, at the lower end of the vertical incision. I very much prefer to make a circular incision, somewhat above the middle of the thigh, getting down to the bone in two sweeps of the knife, and then an incision along the femur, clearing it and disarticulating. I believe the operation can be more quickly done in this way, and everything cut is exposed at once, so that the vessels are easily got at if the control of the circulation be at all inefficient. But the exact method of performance is a matter of comparatively small detail, so long as the transverse division of the soft parts is at, or close to, the middle of the thigh.

For controlling hæmorrhage during the operation, in three cases I have used Davy's lever, in one case Lister's abdominal tourniquet, aided by digital pressure on the femoral artery, and in one case digital pressure on the femoral alone. Of these, I much prefer the lever. I daresay you all know it; a small wooden rod to be introduced into the rectum, and placed on either common iliac. Pressure with it easily and absolutely stops the circulation in the vessel. In the cases where I used the lever, two of the limbs were left ones, and the other a right one. In another amputation, a right one, I tried to use it, but quite failed to place it on the right common iliac, and substituted the abdominal tourniquet, as above mentioned. In my last amputation, my patient was so feeble and wasted that I did not venture to risk the introduction of the lever into the rectum, for fear of injury to the bowel, and trusted to digital pressure on the common femoral at the groin; it was not so satisfactory as the lever; there was more loss of blood than I liked, and I had to use great expedition in tying all vessels. There is yet another method of controlling

hæmorrhage which is well spoken of by some surgeons; the proposal is that of Mr. Jordan Lloyd to use elastic pressure with a rubber-bandage. He first empties the limb of blood, then takes two yards of Martin's rubber-bandage, doubles it, and passes it between the thighs; he next places a common roller-bandage over the external iliac artery; and then "the ends of the rubber are firmly and steadily drawn by an assistant upwards and outwards, one in front and one behind, to a point above the centre of the iliac crest of the same side." The front part of the band, passing across the compress, occludes the external iliac; the back half prevents bleeding from the branches of the internal iliac. In my last case, I tried a spica of Martin's bandage, but, as it threatened to slip over the tuber ischii, I preferred digital compression. In another case, if there were any difficulty about, or objection to, the use of Davy's lever, I would certainly try Mr. Jordan Lloyd's plan.

After removing the limb, I secure the principal blood-vessels, but do not delay to tie every little bleeding point. I then suture the lower edges of the stump, but not the upper. I next firmly plug the interior with sponges which have been soaked in carbolic lotion, and enclosed in gauze. The object of the gauze is to allow the sponges to be easily removed. They can be slipped out from the inside of it, and then the gauze can be rolled into a wisp, and also withdrawn. If the sponges be put in unprotected, the tissues adhere to them, and the removal is very troublesome. The stump and pelvis are then somewhat firmly bandaged; and I have never had the least trouble from after-hæmorrhage. Generally, on the day after the operation, the patient is chloroformed, and the sponges removed.

My second case was operated on under spray, and dressed with gauze dressings. In the other cases, the stump has either been simply laid on a pad of oakum, or, in addition, covered with a single layer of lint soaked in carbolic oil, and frequently changed. In my last two cases, I had the cavity of the stump quite into the acetabulum packed with lint dipped in carbolic oil, with the object of getting the wound to heal by granulation and contraction from the bottom outwards. With all the cases except the second, it seemed to me that the chances of rendering the wound aseptic were very small, and that I did the best for the patient by adopting a method of treatment which involved little disturbance of the patient or the wound, and which, with the help of frequent washing and syringing with carbolic lotion, prevented any considerable degree of putrefaction.

The stumps have all been good, and comfortable for the one use to which they have been put, that is, to sit upon.

In my fourth case, some reproduction of the femur occurred, giving a movable stump; whether this will be sufficient to allow an artificial leg to be adapted, I am not able to say.

Before stating my reasons for preferring this operation, I will read you a few quotations about the flap-operation.

Cooper's *Surgical Dictionary* traces the history of the operation from the first successful case in 1778. The article commences with the following remark: "The very idea of this formidable operation for a long while checked the hand of the most hardy advocate for the use of the amputating knife, and every mind shuddered at so extensive a mutilation." In 1864, Erichsen had collected forty-two cases for chronic disease, of which twenty-four recovered and eighteen died, while, for injury, of forty-seven cases thirty-five proved fatal.

One of the most recent books on surgery (Bryant) says: "Amputation of the thigh at the hip-joint is a formidable operation, and is only justifiable under desperate conditions, when a limb is irreparably crushed or diseased, and resection of the head of the femur with more or less of its shaft is out of the question. When performed for accident, it is almost always fatal, not 10 per cent. recovering; for disease, however, it is more successful, the risk being about equal, though after resection of the head of the femur which has failed it is somewhat better."

For amputation at the hip-joint on account of accident, the low method will, I conceive, be always inadmissible; no injury is likely to require disarticulation at the hip-joint which does not also destroy the soft parts so high up as to necessitate the flap-amputation.

What are the advantages we may expect from the low operation compared with the ordinary double flap? First, much less shock; less of the body is removed, the nerves and vessels are divided further from the trunk, where they are smaller. Secondly, less hemorrhage; the vessels divided are all branches of the femorals, and, though the anastomosis of branches of the deep femoral artery with branches of the internal iliac makes it advisable to control the circulation in the common iliac, there are certainly fewer vessels to tie, and these are smaller. Thirdly, the form of the flaps gives better drainage than the old method, in which the posterior flap formed a cup where discharges collected.

I made a comparison of the two operations in the dead body, with these results. A limb can be removed by either, without any hurry, in about three quarters of a minute. The flap-operation takes eleven seconds less than Furneaux Jordan's. The length of the edge of the skin-incisions in the former was twenty-nine inches, in the latter twenty-six inches. The area exposed by the flaps was forty square inches, by the other sixty-four square inches. I have endeavoured to ascertain how far these considerations are borne out by actual experience.

Our Carlisle cases give a result so exceptionally good, that I could not hope that a wider experience would bear it out. Of eight amputations, two by Dr. Reeves, one by Dr. Lediard, and five by myself, in seven the patients are now alive, five thoroughly well and vigorous, two convalescing. I have, therefore, collected all the cases I could find, and have to gratefully acknowledge the courteous way in which my inquiries were answered by all the surgeons to whom I wrote. I have placed them in your hands in the form of a Table. They amount to twenty-five cases with five deaths, or some may choose to consider them six deaths: you will see that I have noted one as dying three months after the operation. But, in computing the mortality of an operation, I think we should, to some extent, separate between deaths due to the distant effects of the disease for which the operation is done, and the deaths which are clearly and immediately due to the surgical interference.

Taking the mortality as I have estimated it, we have a rate of twenty per cent. instead of forty or fifty per cent. This, it must be remembered, is in a first series, while the operation is a tentative one, with the conditions of success imperfectly known, and with the weight of the tradition of a heavy mortality hanging over it, tending to induce delay to the last possible moment. I have little doubt that one fatal case would have lived had the parents agreed to the operation when I proposed it, and possibly they might have done so had I been able to give them an assurance that the chances of success were greater than I felt justified in stating; and I now think that, with some others, the limb might have been removed earlier with advantage. Many of the other cases included in the Table were operated on under most unfavourable conditions. Mr. Bennett May says about his two cases: "No. 1 patient, reduced to the lowest ebb by profuse suppuration, acetabulum perforated, pus in the pelvis, amputation, immediate improvement. No. 2. Acute periostitis of the femur (shaft), with osteomyelitis and septicæmia. Operation performed in the face of extreme exhaustion; died in six hours; cause of death independent of any method of operation." Mr. Pilcher sends this note about his case. "Caries of the femur and ilium; sinking with hectic and suppuration through several

sinuses. The conditions seemed almost hopeless, but the lad made a splendid recovery."

As experience increases, I believe the ideas of surgeons will become more definite as to the conditions which justify the operation, and there will be a clearer recognition of the circumstances which preclude natural recovery or excision. The important point is to recognise, as early as possible, when a case ceases to be amenable to other treatment, and to amputate before the patient is reduced to the verge of exhaustion. I hold that we should amputate when there is acute neurosis of the head and any considerable portion of the shaft of the femur; when there is extensive disease of the head of the femur, and also of the pelvis; when there is old standing hip-disease, with great exhaustion from long continued discharge; when excision has been done, and has failed; and, lastly, when there is malignant disease of the femur low down. Amputation after excision should, I think, become an infrequent occurrence; and, if the above indications for amputation be accepted, it would. My views on the subject of excision of the hip, I hope to bring before the Society at some future time. At present, I would only say, very briefly, that, in my opinion, for success, few operations require a more careful selection of cases; and that extensive pelvic disease, or much general exhaustion, should be looked upon as distinct contra-indications.

How is it that amputation may succeed in cases where excision would fail? When the femur and pelvis are both much diseased, amputation removes something like half the disease—perhaps more. It avoids the risk of pus collecting in pockets, and infiltrating the muscular planes. The after-treatment is much less painful, and it directs a larger blood-supply, and consequently, a greater power of overcoming disease, to the pelvis and its surroundings.

I have elsewhere stated that my old friend, the late Dr. Reeves of Carlisle, twice removed limbs in this way—first in 1867, and again in 1876; both cases recovered. With the first, he had planned to do an amputation of the thigh; but, finding the bone diseased above, he ran his knife up the femur, and disarticulated. He was so struck with the advantages, that he read an account of the case to our local Society in 1869, and urged the adoption of the low instead of the high operation. His second case he arranged to do by the low method. I cannot, however, claim for him that he introduced this operation into surgery. He did not publish his cases; a short summary only of the first appeared in the report of the meeting, not conveying any distinct idea of its essential features. For anything that I know to the contrary, many another may be in a like position; but, as the adoption of the operation by surgeons dates from Mr. Furneaux Jordan's account of his first case, it is justly associated with his name.

ABSTRACT OF REMARKS

SOME POINTS IN THE ETIOLOGY, SYMPTOMS, AND TREATMENT OF PNEUMONIA.

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In opening a discussion on this subject at a meeting of the Cambridge-shire and South Midland Branches, Dr. Bradbury said that Dr. Anningson had pressed him to open a discussion on pneumonia, and, as he (Dr. Bradbury) had recently suffered from this disease, the President thought it would be interesting to hear what could be said on the subject from a patient's as well as from a medical man's point of view. At the outset, Dr. Bradbury wished it to be distinctly understood that he had nothing novel to say on the subject; and, as regarded the etiology, he thought the points upon which information was required were those ably put forward by the Collective Investigation Committee in the memorandum on acute pneumonia. He thought everybody would agree with him that exposure to cold and wet, either singly or combined, was a cause of the so-called idiopathic, croupous, or lobar pneumonia, the form to which it was his wish to restrict the discussion, omitting that which was secondary to acute rheumatism, typhoid fever, diabetes, etc. At present, he was attending a patient with pneumonia, who, on the very day he was attacked, felt quite well, but had, when in a profuse perspiration, got out of bed, and gone to see a sick friend when only half dressed. This was