Observations

ON

THE "OPEN METHOD" OF TREATING EXCEPTIONAL CASES OF SEPTIC ARTHRITIS OF THE KNEE.

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BEYOND the loss of a limb, the risks attending the amputation of a thigh for acute suppurative arthritis are acknowledged to be very great, and it was with the double object of saving the leg and reducing the risks to life that I recently obtained the permission of a patient to substitute the open method, instead of following the hitherto orthodox line of procedure, which in this particular instance would undoubtedly have been the immediate amputation of the thigh.

HISTORY OF CASE.

The patient was the victim of one of those unavoidable misfortunes which occasionally result from opening the knee-joint, notwithstanding the most elaborate and correct aseptic precautions. The only explanation I can suggest for this untoward event is that during the removal of the cartilage I accidentally discovered a small pustule on the opposite side of the joint, which the pressure of my finger had burst during the operation. Whether the septic contents could be held responsible for the after-consequences or not, I am not prepared to say, but that such a contingency might have occurred is well within the bounds of reasonable conjecture.

In this instance, the internal semilunar cartilage had been removed under the most rigid code of aseptic rules, nevertheless within five days it was obvious that something had gone wrong. Local pain and constitutional symptoms developed. Free drainage and irrigation were promptly and systematically conducted, but without lessening in the least the gravity of the symptoms. The condition of the patient became exceedingly critical, a high temperature, 103° , rapid pulse, delirium, and extreme exhaustion contributed convincing evidence that unless prompt measures were immediately adopted the patient would rapidly sink. The patient was given the option of either having his leg amputated or taking the risk of having the joint treated on the open method, original, so far as I am aware, and he chose the latter.

METHOD OF OPERATION.

The details of the operation, which was performed on the fifteenth day after the cartilage was removed, were briefly as follows:

1. A transverse incision was made through the skin over the centre of the patella.
2. The patella was sawn across in a line corresponding with the skin section.
3. The joint was fully flexed and thoroughly opened, and the crucial ligament divided.
4. All exudations on the surfaces and in all the cavities of the joint were carefully scraped away with a surgical spoon, and immediately afterwards all the surfaces were freely swabbed with lint saturated with turpentine.
5. The whole of the exposed surfaces, and every crevice, was gently packed with iodoform gauze.
6. With the joint well flexed (beyond a right angle), layers of wood-wool were so adjusted by bandages that they not only afforded a compact support to the back of the knee, but also acted in firmly retaining the knee in an acutely-flexed position—a position which made it all but impossible for any discharges to accumulate without bringing them in contact with the iodoform gauze packing.

RESULT.

The result was immediate and most striking. All pain disappeared, the temperature fell, the patient had refreshing sleep, the tongue cleaned, the appetite was restored, the delirium subsided, and the patient became hopeful and cheerful.

The dressings were left undisturbed for two days, and when removed the tissues not only looked clean, but healthy granulations were actually visible. Each succeeding day the surface of the joint and the crural pouch were gently syringed with a warm solution of izar and repacked with iodoform gauze, and the dressings reapplied. Similar dressing was repeated daily until the fifth day, when it was observed that the granulations were unduly exuberant and flabby. To repress this tendency, all the exposed surface was covered with strips of oil silk. This was continued for four days, when it was found that the granulations had coalesced into a smooth, compact surface. During the time the oil silk was made use of, the temperature rose at night to 101° F.; nevertheless the general condition of the patient and that of the joint continued to be everything that could be desired. After the oil silk was discontinued, the temperature immediately dropped to normal, leading to the conclusion that the silk had retained beneath it the secretions and affected the temperature.

On the thirtieth day after the original operation and the fifteenth day after the open method was commenced, the leg was straightened and placed on a long back splint, with a foot-piece attached, and the limb carefully adjusted so as to check any tendency to either axial rotation or lateral displacement. At the same time the upper fragment of the patella was removed, but the lower portion was left undisturbed as it had mysteriously disappeared among the granulations.

As the granulations advanced the articular cartilage, although it appeared to retain its vitality, gradually melted away by a process, I suppose, of molecular disintegration and gradual absorption. From this point there is little to add; the granulations restored the natural contour of the knee, and when cicatrization had advanced circumferentially quite a third of an inch the whole surface was covered with large layers of cuticle by Thiersch's method.

COMMENTARY.

This case is a forcible illustration of the necessity in all surgical procedures of being guided by those unerring principles which tolerate no departure from the simple common-sense teaching they inculcate. What is true in big matters is equally applicable in small ones and vice versa.

A small abscess is generally opened by a comparatively large incision, whereas a large abscess is not liberated by an incision proportionate to its size, and consequently a sound surgical principle is ignored at the patient's expense.

The essential and tangible advantage of this method of treatment is that it affords the only opportunity of completely evacuating the joint of its deadly contents. By any other plan there is always the risk of a residual ferment being left behind capable of infecting the secretions which so rapidly accumulate.

I am not aware that the knee-joint has ever before been deliberately and successfully laid open in this manner for acute suppurative synovitis. J. L. Petit, however, recommended the practice of freely opening joints when the seat of traumatic suppuration, but the openings were limited to free incisions and did not extend to the complete and continuous exposure of the entire joint cavity. Unfortunately for the progress of surgery, unsatisfactory results followed Petit's practice, owing, as I believe, to the comparatively small openings being frequently plugged with *charpie*, which was introduced immediately after they were made to arrest the haemorrhage, which was an ever-present dread in the minds of surgeons of that time. This unnecessary and absurd precaution naturally aggravated instead of mitigating the very condition which called for this treatment. Pyaemia, which in those days was endemic in Paris, frequently followed the incisions, and naturally contributed to destroy the confidence in Petit's otherwise sound, though inadequate, teachings.

Instances could easily be cited in which knee-joints, after having been torn open by accident, have recovered without suppuration, even in the absence of any special precautions. Other cases have been recorded in which knee-joints have been opened by accident and healed by granulations, and in one case of this kind the patient was subsequently described as being "as well as ever."

There are also numerous other cases on record where cures

have been rapidly effected by incisions into the knee-joint and the evacuation of the contained pus without any further accumulations of pus taking place.

Perhaps it is a little premature to publish a solitary instance of a treatment which, so far as I am aware, is original, but the possibility that, under similar circumstances, a life might be spared or even a limb saved by the early publication of this single case must be my excuse for the course I have taken.

A NEW PRINCIPLE OF CURING CLUB-FOOT IN SEVERE CASES IN CHILDREN A FEW YEARS OLD.

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OPERATING surgeons meet with many cases of club-foot which have either not been treated in the first year or two of life, or in whom the treatment at that age has not been satisfactory. Especially when school life begins to approach, the question of remedying the hideous deformity before the child mixes with other children presses itself upon the parents, and they bring it up for treatment.

Those who have had much experience of cases of this kind will admit that, though a great deal can be done by selecting the proper operation for each, or by combining operations, yet none of our plans of treatment are thoroughly satisfactory; all require great and prolonged care and observation of the patient, and after-operations are frequent. Rectification by tenotomy, myotomy, open incision, cuneiform excision, resection of the cuboid, resection of the astragalus, and supra-malleolar osteotomy is imperfect, whether these be used singly or in combination. Phelps's open incision in some cases, and Lund's excision of the astragalus in others, combined with tenotomy of the tendo Achillis, have in my hands given the best results, although far from ideal ones. The former operation is preferable where the deformity is not of the extremest form, the latter where it is so.

A study of the radiographs of such patients, as well as of those from normal children of a like age, suggests a more perfect method than any of them and a more nearly ideal one. I suppose every surgeon nowadays agrees that the aim of all treatment of club-foot is to restore the bones to as nearly as possible a normal shape and position. This, at least, is my view, and the object of this paper is to show how it can be accomplished in suitable cases better than by any method which I have hitherto seen described and myself put on its trial.

The tarsal bones, which oppose the chief obstacles to the rectification of club-foot, do not complete their ossification for many years. In healthy children they consist of a rounded kernel of bone enclosed in a thick layer of cartilage, whose ossification will eventually complete their external configuration (Fig. 1, p. 1525).

In club-foot their ossification is an even slower process (Fig. 2, p. 1525); and when we excise them, as is done in Lund's excision of the astragalus for club-foot, they are always in children seen to present a thick layer of cartilage surrounding a relatively small, somewhat spherical bony centre (Fig. 3).

If the whole or a considerable part of a tarsal bone be resected for club-foot, that bone, or portion of bone, is lost; it is not restored. But if an incision be made through the soft parts at some suitable spot, and deepened so as to divide the enclosing layer of unossified cartilage, the bony kernel may be partially or completely removed by a Volkmann's sharp spoon, and the bone will be restored by ossification from the shell of cartilage which remains.

A tarsal bone which has in this manner been deprived of its osseous centre is soft and plastic, like a squeezed orange, and very moderate pressure upon it suffices to mould it into any required shape, so that it ceases to offer any notable opposition to the rectification of the deformity of the clubbed foot. And several bones can, by gliding the wound of the soft parts in the required directions, be dealt with in the same way through the one external wound in such a manner that the

whole or any required part of their osseous centres can be spooned out where they oppose rectification, until sufficient has been taken away to enable the deformity to be entirely corrected. If this be done with antiseptic precautions, the interior of the scooped out bone is filled by a blood clot, which is, as in a simple fracture, gradually replaced by cartilage which slowly ossifies; and the bone, with all its ligaments and joints, is intact, yet in such a shape that, while perfectly useful, it is accommodated to the form required for the abolition of the deformity.

Fig. 3.—Radiograph of two astragali removed by Lund's operation for club-foot.

The only other structure requiring division is the tendo Achillis, which should be cut in the usual way by a tenotome at the same sitting.

The manner in which the operation is performed is as follows. After the usual disinfection an Esmarch's tourniquet is applied to the leg and tenotomy of the tendo Achillis is performed. An incision through the skin is made in a gentle curve beginning in front of the external malleolus and extending forwards, with its convexity towards the sole, until it terminates over the calcaneo-cuboid joint on its dorsal aspect. When its edges are retracted the outline of the astragalus is visible. The soft parts covering it and the cartilaginous shell surrounding its osseous centre are then divided by a shorter incision in the same line as the cutaneous one, the knife being made to sever everything down to the bony kernel. A Volkmann's spoon, slightly curved forwards at its neck, is passed into the wound, of the cartilages and the whole bony centre, save the upper part constituting the pulley between the two malleoli, is cautiously scraped out. The feeling conveyed through the spoon at once tells when the cartilage is reached. The foot is now placed in the attitude of rectification, and usually the improvement is very great. If the correction be not sufficient, as will be the case in very severe deformity, it is necessary to apply the same treatment to the cuboid and calcis, which stand in the way. The skin incision is glided over the cuboid till its outline can be seen and felt, and it also is incised and its bony centre completely scraped out, sparing all its cartilaginous shell. The anterior end of the calcis is similarly treated and then the rectification is satisfactory.

Fig. 4 shows the foot before operation.

Fig. 4.—The club-foot before operation.