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SPINAL CARIES:

OPERATIVE TREATMENT.

LAMINECTOMY,

(13)

OR SO-CALLED

TREPHINING OF SPINE.

BY

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SPINAL CARIES: OPERATIVE TREATMENT— RESECTION OF LAMINA, ETC.

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[Read March 6, 1889.]

THE *operative treatment of spinal caries* may be considered under three heads:

1. Evacuation of pus.
2. Erasion or removal of carious bone.
3. Vertebrectomy or excision of the lamina for the relief of pressure paralysis.

1. EVACUATION OF PUS.—Until very recently the expectant plan of treatment of spinal abscess was generally adopted by surgeons, since they had learned from the failures of their predecessors that septic poisoning and death were frequent results of interference.

At the present time, with thorough antisepsis, such results are rare, and we can with confidence open any abscess, acute or chronic, with the full expectation that benefit will be obtained by the evacuation of an injurious material, the retention of which in the body may lead to most serious consequences from bacillary or tuberculous infection.

That such evils do not more frequently occur from pus retention is due to the fact that nature attempts to escape the baneful influence by intrenching herself behind a firm wall of inflammatory tissue.

a. Aspiration. My own practice is to use the aspirator in cases of doubt, when the abscess is very small, and when it is

still very deep beneath the skin. After drawing off the pus, and noting carefully its consistency, etc., I then inject from 15 to 30 grains of iodoform dissolved in glycerine and distilled water, 1 to 3. This is allowed to remain, and assists in producing the object which I have specially in view in this preliminary tapping, namely, the strengthening and thickening of the sac wall. I do not practise hyperdistention of the sac wall with sublimate solution, as entrance of the more powerful agent into the circulation might occur.

b. Evacuation. Ten days later, or after a longer delay, provided the abscess does not become distended, I freely open the sac under strict antiseptic precautions, and draw off the pus thoroughly, but only as freely as it will run without pressure. A drainage-tube is then inserted and the sac is thoroughly irrigated with hot sublimate solution, 1 : 2000.

An abundance of sublimate dressings are then firmly placed about the wound, and are changed only when they become offensive. In post-pharyngeal abscess from cervical caries the irrigation is omitted.

2. ERASION OR REMOVAL OF CARIOUS BONE.—Treves, Boeckel, Israel, Reclus, Ashhurst, and others have practised the plan of cutting down upon the diseased vertebra and removing the diseased tissues with spoon, gouge, etc.

Treves¹ made his incision along the edge of the erector spinæ muscle, about two and a half inches from the lumbar spinous processes. The muscle was then drawn inward until the transverse processes were found, when the quadratus lumborum was divided and the psoas incised. The abdominal branches of the lumbar arteries may require ligation. Should a sinus exist, it may be followed down to the bone.

In the dorsal region it is obvious that the body of the vertebrae, where the disease is usually situated, cannot be reached without removing a section of one or more ribs.

To remove successfully all the disease would require the thorough exploration of the entire body of the bone, a proced-

¹ Med.-Chir. Trans., vol. lxxvii. 113, 1884-5.

ure which one surgeon, who had even had experience in this particular method, abandoned during the operation.

The results of the operation are not favorable, as the cases have been only temporarily benefited, and several have promptly succumbed.

For drainage purposes it offers inducements, however, and in the lumbar or cervical regions it would be a simple matter to cut down in the course of a sinus and deposit a large drainage-tube in direct contact with the diseased bone. Irrigation and the speedy release of all broken-down tissues would then hasten the cure.

The objections to erosion are :

a. That a sequestrum is rarely present, and if so, would be situated in the body of the vertebra.

b. That it would be impossible to reach the body, save in the lumbar region, without the sacrifice either of the articular process or of a portion of several ribs.

c. In caries it would be almost impossible to judge of the exact amount of devitalized bone, and as in other osseous structures, the process of removal with gouge would certainly destroy the underlying layer of bone, and thus become a fresh source of osteitis.

In so far as good drainage is secured I most heartily approve of the practice, but as regards the complete removal of carious tissue, I have great doubts.

3. LAMINECTOMY (so-called trephining of spine) for the relief of pressure upon the cord, is now awakening much interest from the profession.

Pressure may be occasioned—1st. By the sharp angle in front, resulting from the rapidly disintegrating bodies of the vertebræ; 2d. By inflammatory outpouring of ossific matter due to caries of the posterior part of the vertebral body without breaking down of the shell; 3. By connective tissue infiltration around the theca; 4. By a super-abundance of caseous material about the cord.¹

¹ Hun: Albany Med. Annals, July, 1888, ix. 193. Ridlon: New York Path. Soc. Transac., 1887, 83.

Paraplegia from vertebral osteitis is ordinarily double in type, but when the encroachment upon the cord is lateral, the paralysis may affect only one leg. Motion or sensation may be either partially or totally affected, while anæsthesia, analgesia, and exaggerated knee, ankle, and other reflexes are present.

To Macewen undoubtedly belongs the credit of resuscitating the operation of systematically searching for and removing any existing lesion, although from the time of *Ægineta*, Bell, and Cooper it has been discussed. Only a few years since it was denounced as unjustifiable.¹ Macewen justly claims that he has demonstrated that "the spinal membranes and the cord itself can be exposed, and that neoplasms and encroachments upon the lumen of the canal may be removed therefrom without unduly hazarding life. The old objections that such operations were full of danger from hemorrhage and were unprofitable and unsuccessful, have certainly been thoroughly disproven, and we are now able to offer a measure of success to a class of hitherto hopeless cases."²

Of course, the operation will not be attempted until extension, rest, and fixation have failed to bring about relief. Fortunately, the measures recommended are usually successful, and we may confidently hope for marked improvement under their use.

The operation consists in cutting down upon the spinous processes in the region of the deformity, the incision being slightly to one side of the centre so that the resulting cicatrix will not be unduly pressed upon during recumbency.

All the soft tissues are then stripped bare with a periosteal knife, until the entire lamina is exposed. One-half or the whole of the arch may be removed as necessary, but even an opening upon one side gives ready access to the canal.

A half trephine, a saw with cutting edge upon its convex surface, a chisel, or a pair of angular cutting bone forceps or rongeur forceps may be used for making the section. When

¹ Ashhurst's *Encycl. Surgery*, vol. iv.

² *British Med. Journ.*, Aug. 11, 1888.

cut through the lamina can be lifted off, and then the theca lies exposed. Sometimes the cord can be seen pulsating in its bony canal; again, it lies shrunken.

If the pressure has been due to an inflammatory growth, the connective tissue neoplasm may be dissected away with scissors from the theca, or the latter may require removal with the growth. Should the pressure have been due to bony growths, the ossific material will probably lie in front of the cord and should be searched for as far as safety permits, the cord being lifted with a blunt hook. All discovered portions of dead bone should be removed, and thorough drainage secured laterally, if possible. Even when the anterior bony projection can be neither discovered nor removed, the pressure upon the cord will be very greatly relieved, by the freedom allowed to it for expansion posteriorly. Much of the benefit derived from the operation is doubtless due solely by this relief of pressure. Erasion of diseased bone should be practised, if possible, and the most thorough antiseptic precautions during operation and in subsequent dressings observed. The superficial tissues should be sutured separately from the deeper ones. Hemorrhage may be controlled by forceps pressure, by ligation, or by packing with iodoform gauze. Immediate improvement is not to be expected.

In one of Macewen's cases motion was first noticed on the eighth day, in another it returned much more slowly. In Wright's case no change occurred until the twelfth day, when faint pin-pricks were noticed. In three weeks slight voluntary movement was present. A third case was also successful.

The operation, therefore, is proven to be perfectly feasible, and as safe both as regards the risks of hemorrhage and the exposure of the cord, as any serious operation in surgery. It has been shown that even the theca of the cord may be removed without undue risk, and improvement has taken place even in desperate cases. Both sensation and motion have returned, with control of sphincters and with spastic contractions relieved. It relieves pressure even when the cause is not removed.

CONCLUSIONS.—Viewing the operation of removal of the laminæ for the pressure paralysis of spinal caries only, we have six published cases; three were most strikingly and brilliantly successful, one was not improved, one died in a week, another died in a few months from general tuberculosis.

It is fair to presume that life was shortened in the speedily fatal case; in the second case it may or may not have hastened the result. One case improved for a few days, but in a month was precisely as before.

Of the three successful cases, in one the paralysis had existed for two years, and had resisted both extension and fixation. Both sensation and motion, with control of bladder and rectum, were lost, and the leg muscles were spastically contracted. Reflexes were exaggerated. The recovery was so perfect that he was able to walk in six months, and to play football five years later, although the laminæ of the fifth, sixth, and seventh dorsal were removed, and a fibrous neoplasm outside the theca was cut away.

In the second case, the loss of sensation and motion seemed hopeless, yet in four days she could retain feces and urine, and in eight months walked freely, although at the time of the operation the condition of the cord seemed hopeless, from the pressure of a dense connective tissue tumor between the bone and theca.

In the third case, the angle was sharp at the first dorsal. There was complete motor and sensory paralysis, with spastic contractions and absent reflexes. These reflexes returned to nearly normal condition subsequent to the operation, although entirely absent before, and the feces and urine could be controlled after the fourth day. In nine months the patient walked well.¹

In Wright's² case (Thomson), in a mid-dorsal curve in a

¹ British Med. Journ., August 11, 1888, ii. 308, 323. Glasgow Med. Journ., 1884, xxii. 65. Glasgow Med. Journ., 1886, xxv. 210. Med. Contemp. Napoli., 1884, i. 520.

² Lancet, July 14, 1888, 264. Internat. Journ. Surgery and Antiseptics, October, 1888, 225.

boy of seven, the paralysis was complete, reflexes were increased, there was analgesia and the muscles were tonically contracted. The case grew worse under treatment by recumbency and iodides. The cord was found enclosed in a tough, leathery mass. At the end of a week there was slight return of motion and of sensation, but soon relapse followed, and at the end of three months the condition was unimproved.

In an unpublished case of Dercum and White's in Philadelphia, death speedily followed.

The lamina has also recently been removed with success by Macewen, for traumatic paraplegia;¹ and Jones² (Thorburn) reports a similar case.

The arch has also been cut away by Horsley³ and Gowers for tumor, by Lloyd⁴ and Deaver, by Abbe, and by Weir.

Abbe has also made the section for dislocation and for persistent brachial neuralgia.

A large number of operations for traumatism have been collected by Ashhurst.⁵

The arguments against the operation are:

1. It endangers life, and a certain percentage of cases will die from shock that would otherwise live for years and might even recover.

2. It is uncertain in its relief, since when the compression is anterior it may be impossible to remove the cause.

3. It weakens the only support of the head and shoulders, in the portion of the column upon which alone dependence is to be placed, since the anterior support—*i.e.*, the bodies of the vertebræ—has been already disintegrated.

This weakening process must throw additional strain upon both muscles and diseased bone, and the operation, if done before decided consolidation had occurred, would leave the

¹ Brit. Med. Journ., Aug. 11, 1888, 308. Glasgow Med. Journ., 1886, xxv. 210.

² British Med. Journ., Sept. 22, 1888, ii. 881.

³ Brit. Med. Journ., 1888, i. 191, 1273.

⁴ Amer. Journ. Med. Sciences, December, 1888.

⁵ Internat. Encyclo. Surgery, 2d edition, vol. iv.

trunk without any support, thus increasing the risk of sharp flexion and deformity.

The present state of our knowledge justifies us in concluding :

1. Improvement from pressure paralysis in vertebral osteitis is common, and may be confidently expected when extension and fixation can be properly carried out, provided motion and sensation have not been entirely absent for many months, and when serious cord changes have not occurred. Hence an operation should not be undertaken until these measures have been persistently tried and proven ineffective.

2. Vertebrectomy for the relief of pressure in spinal caries is still most emphatically in its experimental stage.

3. The operation, even if effectual in relieving the pressure upon the cord by permitting posterior expansion, or from removal of bony or inflammatory growths, yet promises no certainty of permanent relief, since degeneration of the cord may already have been far advanced.

4. Early operation would doubtless be much more successful, as it might antedate these cord changes; but our present diagnostic facilities do not permit us to distinguish accurately these cases from those in which a less serious form of treatment will be followed by the rapid regain of lost power. Hence early operation is undesirable.

5. Pending further knowledge, we can say, however, that the operation is permissible where, after persistent treatment by suspension and fixation, complete motor and sensory paralysis, with spastic rigidity of the muscles, exists, together with exaggerated reflexes which have been present, but which have after a time subsided or been lost.¹

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¹ Glasgow Med. Journ., 1886, xxv. 210.