branch of the posterior intracranial circulation was found and trapped, with successful outcome.

Variations from the "normal" arterial tree in this region are described.

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UNUSUAL CASE OF MENINGOCELE IN AN ADULT

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Cases of meningocele with increase in the size of the protrusion and progressive neurological changes beginning in adult life must be very uncommon. No similar case appears in the records of the Johns Hopkins Hospital and a review of the literature1,2,3,4,5 failed to reveal any case quite similar to this one, which was therefore felt to be worth reporting.

CASE REPORT

History #373455. C.W.S., a white married male, aged 53, was admitted to the Brady Urological Institute Jan. 16, 1946, with the chief complaints of difficulty in urination and progressive weakness of the lower extremities of about 17 years' duration.

Family history did not reveal any congenital abnormalities. His father died of heart trouble and his mother of unknown cause. There were 3 siblings; 2 living and well and 1 dead at 55 years from cerebral hemorrhage.

Present Illness. Ever since birth the patient had had a small, nodular protrusion with the shape of a small rudimentary tail in the lumbosacral region, which did not show any increase in size throughout his development until the age of 32, when it began to gradually enlarge. Originally this protrusion caused no symptoms and was not tender but as the patient approached early manhood it became apparent that pressure over this area produced a headache and also pains in the lower extremities. At the age of 32, when there was first noted some increase in the size of the protrusion, there was also increased tenderness in this region, accompanied by very slowly progressive weakness in the lower extremities with pain and para-
esthesias which also involved the lower abdomen. At the same time he became aware of difficulty in starting his urinary stream with slight dribbling at first, progressing to what was apparently incontinence of the overflow type. About 1 year after onset of urinary symptoms he started to catheterize himself and had done so on an average of 3 times daily ever since. The weakness in the legs became so marked as to necessitate the use of a cane for about 10 years. He suffered from chronic epididymitis with acute exacerbation, secondary to the catheterizations which for 3 years prior to admission had been severe enough to require the habitual use of $\frac{1}{2}$ gr. morphine for relief. The lump in the lumbosacral region had in the meantime been growing steadily.

Physical Examination. TPR were normal on admission, B.P. 188/90. The patient appeared to be a chronically ill, wasted man with a haggard expression, who was very apprehensive. There was marked wasting of the lower extremities (Fig. 1) and the patient found it necessary to curl up on either the right or left side to achieve a comfortable position in bed because of a large mass present in the lumbosacral region. The most striking finding in the examination was this large, dome-shaped swelling over the upper sacral and lower lumbar region with a small teat-like protrusion on the right, which was apparently the original protrusion noted in infancy (Fig. 2). The mass was the size of a large grapefruit and was fluctuant and slightly tender, and continuous pressure over it produced headache. The overlying skin appeared essentially normal and in good condition. The mass could be transilluminated. No solid elements could be felt. Examination of the genitalia revealed a normal well-developed penis but both epididymis were enlarged to about twice normal size and were indurated and very tender. The prostate was slightly larger than normal, showing second degree induration throughout. Remainder of the examination was negative except for the neurologic findings. There was incomplete, flaccid paralysis of both lower extremities, which were held in partial flexion. There was marked wasting of all the muscle groups of the lower extremities, this being more pronounced in the glutei and in the flexors of both thighs and calves. Marked fasciculations were seen in the posterior aspect of both legs above the hamstring tendons. The patient stated that he had better control over the left leg than the right and that there was more power in flexor than in extensor movements. No voluntary movements of the toes were elicited. He could make an occasional, poorly coordinated effort at dorsiflexion of the left foot but was otherwise unable to control or move his ankles. He could flex and extend at both knees, but this was accomplished only by strong effort. The hip joints showed slight limitation of both internal and external rotation. There was complete saddle anaesthesia and analgesia. Pain and tactile sensation were also lost in the glans penis and in the lower extremities from the feet up to a level about 3 inches below the knees. A band of hyperaesthesia was found just below each knee about 3 finger breadths in width. Position sense was absent in the toes but present in the ankles and knees. Vibratory sensibility was absent up to both iliac crests. The ability to discriminate between hot and cold was impaired below the knees and completely absent below the ankles. In the upper extremities there was moderate atrophy of the interos-
sci, the basis for which was not clear. There were no fasciculations or sensory changes in the upper limbs. The deep reflexes were equal and active in the upper extremities and were absent in the lower extremities. The abdominal and cremasteric reflexes were absent. There was no response to plantar stimulation. Hoffmann was bilaterally negative. Abadie's sign was bilaterally positive. Cranial nerves were intact. The anal reflex was absent with complete relaxation of the external sphincter, which admitted 3 fingers with ease. Laboratory findings were essentially normal. Serologic tests for syphilis were negative. Urine: 1–2 wbc. X5-6 rbc./hpf.

Course. Cystometric readings showed marked diminution in the initial bladder capacity to approximately 250 cc. There was no voiding reflex and the intravesical pressure showed a gradual rise in the base line to a level of 16 mm. of mercury. X-rays of the entire spine were negative except for a large, bony defect involving the 5th lumbar vertebra and the upper sacrum. Cisternal pantopaque injection was done Jan. 22, 1946, and most of the oil descended into the sacral region, where it outlined a large sac in the region of the bony defect. A few droplets of oil hung up in the upper thoracic region but this was felt to be of no significance by the radiologist. Examination of the cisternal fluid was normal.

Operation was performed Jan. 26, 1946, under pentothal sodium and nitrous oxide anaesthesia. An elliptical incision was made in a transverse direction, overlying the meningocele. The soft tissues were dissected down to the wall of the sac, which was opened with the release of about 400 cc. of clear, colorless fluid. The dissection was carried down to the neck of the sac, which passed through a palpable, bony defect about 3.5 cm. in diameter. A few attenuated nerve filaments could be seen extending from the neck of the sac out into the wall following some blood vessels. The inner surface of the sac was smooth and glistening. Through the defect in the bony structures the spinal canal could be visualized and several nerve roots could be seen entering the foramina. The main body of the cauda equina could not be seen.

Fig. 2. Pre-operative views of lumbosacral meningocele.
There was no evidence of a lipoma nor was there any involvement of nerve roots in scar. The main part of the sac was then excised. The neck was turned in with a double purse-string suture and then overlapped. The sac was also fixed to the surrounding fascia and thus held firmly in place. The lumbodorsal fascia was quite heavy and flaps of fascia were swung from either side to overlap the defect, giving a very firm closure. The subcuticular tissue and skin were then closed in layers with interrupted black silk sutures.

Histological Note. Appendage is covered with normal epithelium. There are quite a few sebaceous glands present. The lining of the sac is a single layer of cuboidal epithelium covering a fairly dense band of collagenous fibers. The rest of the tissue is loose and fatty. Cross sections of small nerves may be seen in the wall.

Postoperative course was uneventful. Throughout convalescence the patient was kept on straight catheter drainage. On Feb. 8, 1946, a bilateral epididymectomy and partial vasectomy was carried out. He was advised by the urologist to continue auto-catheterization at home as previously. On discharge Feb. 16, 1946, the lumbosacral incision was well healed (Fig. 3). The fasciculations present on admission had disappeared. The lower extremities still showed partial flaccid weakness but to a lesser degree than on admission. Muscular atrophy was unchanged. He was unable to perform any gross movements at either ankle joint, but flexion, extension and adduction of calves and thighs had improved a great deal, and he could perform these movements with ease. There was still marked limitation of abduction of the thighs and calves. Sensory disturbance was unchanged. A weak knee kick was present on the

Fig. 3. Postoperative view showing well-healed transverse incision at site of operative repair.
left but the right knee kick and both ankle jerks were still absent. Subjectively the patient felt much better with complete relief from the paraesthesia in the lower extremities, the only residual pain he complained of being in the right scrotum. It should be mentioned that the anal reflex was still absent and that the sphincter was relaxed as on admission. Three months after operation the picture was as above, the patient continuing to be free of pain with no evidence of any recurrence of the meningocele. There was no sign at any time of increased intracranial pressure and he was free of headache after the first few days postoperatively.

The patient was re-examined October 22, 1947. He had gained 20 pounds in weight and seemed generally in better condition. The operative incision was well healed and there was no bulging. Flexion, extension and adduction of calves and thighs were quite strong. No movement was present at the ankles. Both ankle jerks were absent, as was the right knee kick. The left knee kick was quite active. Patient still had some pain in legs but less than preoperatively. There was no improvement in bowel or bladder function. His morphine addiction was less marked, according to his wife. B.P. was 185/125 and he suffered from suboccipital and vertex headaches. Fundi were normal except for slight increased light streaking and A-V compression, and there was no clinical evidence of increased intracranial pressure.

SUMMARY

A case of meningocele which became suddenly progressive in an adult at the age of 32 years with development of flaccid paralysis of the lower extremities and urinary difficulties is presented without any adequate explanation for the sudden progression. On pantopaque myelography and at operation there was no evidence of any associated lesion such as a lipoma to account for part of the picture. There was some improvement in motor function and definite relief from the pain and paraesthesia following operative repair.

REFERENCES


AN APPARATUS FOR CONTINUOUS VENTRICULAR DRAINAGE AND INTRAVENTRICULAR THERAPY

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Ventricular drainage as a palliative approach to the problem of increased intracranial pressure is by no means a new concept. Occasions do arise, however, when resort to this procedure is tantamount to the best interests of the patient. The technique may be used to advantage pre-operatively in patients who are poor risks by reason of nutritional depletion or dehydration, postoperatively following incomplete removal of infiltrating tumors, and in blockade to the normal circulation of fluid in the ventricular system during the course of pyogenic or more desultory inflammatory processes of the brain.