EXTRASPINAL LUMBAR MENINGOCELE*

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Extraspinal meningoceles in the upper lumbar or thoracic region are a great rarity. Pohl reported a meningocele in the thoracic cavity in a 47-year-old woman. On the basis of roentgenological examination of the chest, the patient was thought to have a neurofibroma. At operation, however, a large sac of spinal fluid was found in the thoracic cavity communicating through an opening, 2 cm. in diameter, with the spinal canal at the level of the 4th thoracic vertebra. The patient unfortunately developed an empyema and died. At autopsy a synostosis of the 3rd thoracic vertebra was found. The intervertebral canal at that level was widened and communicated through a walnut-sized hole presumably at the intervertebral foramen with the meningocele in the chest.

Ameuille, Wilmoth and Kudelski reported a somewhat similar case in 1940. In both of these cases the meningocele within the thoracic cage was found by roentgenography of the chest. In the case reported here the paraspinal meningocele was present in the lumbar region and a visible, palpable mass was present in the loin.

* The work described in this paper was carried out while the authors were on active duty, A.U.S., assigned to Ashford General Hospital, White Sulphur Springs, West Virginia.
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CASE REPORT

A 32-year-old Negro soldier was admitted on April 23, 1945, to Ashford General Hospital, complaining of pain in the lower portion of the back, headache when bending over and suddenly raising up, and a slightly tender mass in the left loin. The patient stated that he was quite well until May 1944 when he sustained a crushing injury to his back as the result of being caught between a tractor and a truck. At that time he was admitted to a hospital. On two occasions he was said to have had bloody urine. After 10 days' hospitalization he was returned to duty, but in February 1945 he complained of backache, and pain at the base of the

Fig. 1. Roentgenograms of the lumbosacral spine to show: A, The deformation and displacement of the four upper lumbar transverse processes to the lateral margin of the cyst; B, the upward and lateral displacement of the left kidney by the mass; C, the cyst outlined by air with the vestigial transverse processes lying along the lateral margin of the cyst; D, pantopaque injected intrathecally within the cyst.
skull and head when bending over. At that time a large mass in the left lumbar region was observed. Aspiration of the mass was carried out and clear fluid, thought to be spinal fluid, was obtained. Air injected into the sac was seen in the intracranial cavity in roentgenograms of the skull. The pressures of the fluid in the mass and the spinal fluid were found to be the same. A retrograde pyelogram made on May 24, 1945, revealed the right kidney displaced upward and the ureter slightly forward (Fig. 1B).

Examination. The patient was a well-nourished, adult Negro male, appearing to be approximately his stated age. His general physical examination was not significant except for the

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Fig. 2. Pantopaque myelogram showing the communication between the subarachnoid space and the cyst through the 12th intervertebral foramen.

findings referable to the left lumbar region. On the left side of the back, extending from the 12th dorsal vertebra to the 4th lumbar vertebra, there was a large fluctuant, slightly tender mass. On coughing, the mass distended. Neurological examination was essentially normal.

Roentgenograms of the spine revealed an absence of the spinous processes of the 11th and 12th thoracic vertebrae and of the left transverse processes of the 1st, 2nd, 3rd and 4th lumbar vertebrae. The tips of these transverse processes were visualized in the flank at the outer aspect of the mass (Fig. 1A).

A lumbar myelogram was carried out, 5 cc. of pantopaque being injected. The canal appeared to be normal until the 12th interspace, at which point the pantopaque was seen to pass from the left side of the spinal canal through an opening into the large mass (Fig. 2).
A diagnosis of extraspinal lumbar meningocele was made.

1st Operation. On June 8, 1945, the patient was anesthetized with intravenous sodium pentothal. A semi-circular incision was made starting at the midline in the region of the 11th dorsal spine, carried laterally on the left side along the costal margin to the posterior axillary line and then downward to the crest of the ilium and hence along it to the spine of the 1st sacral vertebra. The lumbodorsal fascia was exposed. The sacrospinalis muscles were re-

tracted medially to bring into view a thin-walled sac. An attempt was made to separate the sac from the overlying muscle tissue but it was impossible to do so near the neck of the sac. The sac was opened and a great amount of clear fluid gushed forth. Inspecting the interior of the sac, it was found to be even larger than suspected preoperatively, extending down under the crest of the ilium into the pelvis. The sac wall was smooth and glistening. After the fluid had been removed the sac partially collapsed (Fig. 3). Along the lateral margin of the sac, small firm masses believed to be the displaced transverse processes of the lumbar vertebrae could be palpated. The stumps of the transverse processes could be felt along the medial portion of the sac. The sac was found to communicate with the subarachnoid space through a hole on the medial wall between the 12th dorsal and 1st lumbar vertebrae. This opening was
bisected by a strand of tissue approximately 6 mm. in diameter. An attempt was made to close the opening with fine cotton sutures and patch it over with flaps cut from the wall of the sac. Specimens of the wall were removed for examination. The wound was then closed in anatomic layers.

Course. The patient had an uneventful convalescence but the swelling recurred in the left lumbar region within a few days after operation and repeated aspiration failed to result in permanent reduction of the swelling. On July 30, 1945, phenolphthalein was injected into the spinal fluid and recovered by aspiration of the meningocele, thus establishing the continuity between the subarachnoid space and the lumbar sac.

2nd Operation. On August 4, 1945, the patient being under ether anesthesia, a left hemi-laminectomy was carried out by one of us (A.E.W.). A midline incision was made from the spine of the 9th thoracic to the spine of the 3rd lumbar vertebra. The muscles were separated from the spinous processes and laminae on the left side. The spinous process of the 12th thoracic vertebra was missing and the left lamina of this vertebra was very poorly developed, there being a defect between the two laminae in the midline. The interspinous ligament, however, filled the space usually occupied by the spine. The laminae of the 1st lumbar vertebra were fused but the spinous process was poorly developed. The laminae of the 12th thoracic and 1st lumbar vertebrae were then removed on the left side, exposing the dura mater. Without difficulty the epidural fat was removed and the dural sleeves of the 12th thoracic and 1st lumbar nerves were readily identified. The dura mater was opened and an opening to the meningocele was identified approximately halfway between the anterior and posterior surfaces of the dura mater and just below the 12th thoracic intervertebral foramen. The dura mater was retracted medially. The dural sleeve was then cut between ligatures. A stitch suture was used to complete the closure of the dural sleeve and several clips were applied to make the line still more secure. A piece of fibrin foam was inserted between the two cut ends of the dural sleeve. All bleeding having been controlled, the dura mater was closed with in-

Fig. 4. Photographs of the patient’s back to show: A, The mass in the left loin after the 1st operation and B, the absence of a mass six weeks after the 2nd operation.
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interrupted black cotton sutures. A piece of fibrin foam was laid over the line of sutures in the dura mater. The muscles were then allowed to fall back in place against the laminae and spinous processes. The fascia, subcutaneous tissues and skin were approximated in anatomic layers by cotton sutures.

Course. The patient had an uneventful convalescence. Three months after the last operation the mass in the loin had completely disappeared. There was no pulsation on coughing. The patient no longer complained of headache upon bending and lifting up and had no complaints referable to his back or legs.

DISCUSSION

This unusual case of paraspinal lumbar meningocele in all probability was the result of a congenital abnormality of the spine. It seems difficult to correlate the absence of the spinous process of the 12th thoracic vertebra and the marked displacement of the transverse processes with a purely traumatic condition. The ossification centers in the tips of the transverse processes appear about the 16th year, and fuse with the rest of the vertebra about the 25th year. In this case the transverse processes should have been fused about six years before the patient’s first injury in 1944. It is quite possible that the congenital abnormality had been present for a long period of time and that the trauma initiated inflammatory changes in or about the sac which caused it to enlarge and to produce symptoms. Certainly the patient had adequate trauma to the area and in all probability a certain amount of bleeding occurred in or about the sac at the time of his original injury.

That the spinous processes should be so displaced suggests that the meningocele was present in intra-uterine life. It is of interest to note that the communication between the subarachnoid space and the meningocele while through the intervertebral foramen did not follow the sheath of the nerve root but lay in an opening between the sheaths of the nerve roots. The cyst resembles, in some respects, the epidural cysts that are sometimes associated with kyphosis dorsalis juvenilis. The type of cyst, its communication with the subarachnoid space and its fluid contents are similar in the two conditions. The cyst in this particular case instead of being situated within the spinal canal extended through the intervertebral foramen into the loin.

The localization of the communication between the meningocele and the spinal subarachnoid space was made possible by pantopaque myelography. This knowledge made it possible to ligate the neck of the sac through a hemilaminectomy of only two vertebrae.

Adequate treatment of such a condition appears to be the obliteration of the communication between the subarachnoid space and the sac. The fluid in the cyst seems to be more the result of the passage of spinal fluid from the lumbar subarachnoid space into the sac than to fluid secreted by the sac wall. Had the latter been the case the first operation should have cured the condition since a great part of the sac wall was removed at that time; the second operation, not involving the cyst wall, should not have had any effect upon the condition. That the sac was not due to a chronic increased intracranial pressure which caused a tear in the dura mater seems evident since the closure of the neck of the sac eliminating the absorbing mechanism within the sac, however slight it might have been, did not precipitate a chronic intracranial hypertension. The patient’s complaint of postural headache was the result of rapid changes of intracranial pressure. The mechanism in this instance was probably very similar to that encountered in patients having a large defect of the skull in whom sudden changes in posture induce headache and vertigo.

SUMMARY

A 32-year-old Negro male complaining of pain in the back and headache upon rapid change of position was found to have a large left lumbar fluctuant mass which bulged on coughing. Surgical exposure of the meningocele with an attempt to close the neck was unsuccessful. A partial hemilaminectomy with ligation of the neck of the sac passing through the intervertebral foramen effected a cure.
REFERENCES


ELECTROENCEPHALOGRAPHIC STUDIES AFTER LIGATION OF THE INTERNAL CAROTID ARTERY

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Reports of the patterns of cerebral electrical activity in man following ligation of the internal or common carotid arteries have been uncommon. It has been hoped that electroencephalography might furnish a clue to the status of the intracranial circulatory system both before and after operations so that the ability of a patient to tolerate carotid artery ligation might be more accurately and readily determined. Therefore, this study is presented with a review of the other reported cases.

CASE HISTORY

A 25-year-old man was riding a motorcycle on Jan. 1, 1945, when he struck a pig which had run into his path. He was thrown from the vehicle and lost consciousness for 3 days. He was then unable to see with his left eye, the left periorbital area was swollen and the left side of the face felt numb. For 3 weeks he had generalized, dull headaches and approximately 6 weeks after the accident he became aware of a “pumping” noise within his head. This disturbance was most pronounced over the left temporal area and was especially prominent when the patient lay on his left side or when he was seated and plugged his left ear with his fingertip. It was noted at this time that the left eyeball was more prominent than the right and that the superficial vessels of the sclera and conjunctiva were dilated.

Examination disclosed the presence of advanced left optic atrophy, left amaurosis and a dilated left pupil which reacted consensually, but not directly, to light. A two-phase bruit, the first sound more pronounced, could be heard with the stethoscope over the left eyeball. Compression of the left carotid sinus area promptly obliterated the subjective noise complained of by the patient and the bruit could then no longer be heard with the stethoscope.

Routine laboratory studies including complete blood count, urinalysis, serology and chest x-rays were normal. Skull x-rays showed a smooth irregularity of the greater wing of the left sphenoid with lessened bone density in this area as compared with the right side. It was felt that he had a left internal carotid artery-cavernous sinus fistula.

The patient was instructed in the technique of digital compression of the left common carotid artery and soon was able to compress this area for 25 min. without distress. On April 26, 1945, under local anesthesia, the left internal carotid artery was exposed and dissected free. A strip of fascia lata was fashioned into a cuff about the artery and two braided silk ligatures were applied. The patient remarked spontaneously after the application of the second ligature that the noise in his head had stopped. After several minutes no weakness of the right side, no change in his sensorium and no speech defects were noted, so the ligatures were tied tightly. About 4 hr. after operation the patient again became aware of the noise in his head which was, however, of much less intensity than formerly. By auscultation the bruit could now be heard only over the left eyeball.