Herniation of the spinal cord into an iatrogenic meningocele

Case report

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The authors describe a case in which the cervical spinal cord became incarcerated in the mouth of an iatrogenic meningocele or "pseudocyst."

Key Words • spinal cord • meningeal pseudocyst • cervical myelopathy • iatrogenic meningocele

In the following case, the unique postoperative occurrence of a meningeal pseudocyst was solved by re-exploration, in spite of a negative myelogram. Related implications regarding operative positioning and dural closure are discussed.

Case Report

A 39-year-old man was first seen in April, 1968, because of intermittent neck and arm discomfort of 3 years' acute duration, although chronic since a football injury in 1948. In 1965 symptoms of myelopathy and radiculopathy had led to myelography (Fig. 1) which showed C5-6 spondylosis and was followed by operation elsewhere. The C-5 and C-6 laminae were removed, the dura opened, and the opening covered with Gelfoam. Following this, his disability became worse, but repeat myelography (Fig. 2) showed no evidence of cord compression.

Examination. When we first saw him in 1968, flexion of the neck produced tingling in the legs and bladder region. Neck extension caused a disagreeable disabling sensation which he could not describe. There was weakness and fasciculation in the right C-7 myotome with signs suggesting involvement of the posterior column below that level. Electromyography indicated partial denervation of segments C-5 through T-1 bilaterally, more pronounced on the right. We did not at that time appreciate the significance of the unusual dorsal position of the spinal cord in the 1965 postoperative myelogram (Fig. 2).

Operation. The previous operative site was re-explored. In the region of the laminectomy, a cavity was entered posterior to the dura. On the floor of the cavity there was a circular dural opening into the subarachnoid space of the spinal canal into which a 2.0 cm length of spinal cord was incarcerated (Fig. 3). The pia of the cord was adherent to the circumference of the defect. These adhesions were separated, and the margins of the dura defect were excised, enlarging the opening to a rectangular...
shape. The right C-7 root was especially adherent to the margin of the defect (Fig. 4). A siliconized dacron dural substitute was stitched into place.

Postoperative Course. The patient was discharged 3 weeks postoperatively. He gradually acquired improved leg function, the Lhermitte paresthesias remained absent, and he subsequently returned to work. At 13 months postoperatively, full range of motion of the neck was present. Although his neurological examination did not indicate spectacular recovery, he stated that his previously disabling subjective complaints had been relieved.

Discussion

We have not found this complication of the surgical treatment of spondylotic cervical myelopathy reported previously. Something similar has been described in the thoracic and lumbar regions as "pseudo-cysts" or traumatic or iatrogenic meningoceles by numerous authors. Miller and Elder thought that this type of abnormal sac resulted when cerebrospinal fluid (CSF) pressure kept a continuous stream of fluid flowing through a dural defect; they postulated that the fluid is readily absorbed by the surrounding tissues at first, but a connective tissue lining slowly forms, after which the fluid is absorbed less readily, resulting in a cystic collection. They related the size of the cavity to the initial size of the defect in the dura-arachnoid, the CSF pressure, and the resistance of the soft tissue.

These patients showed signs and symptoms of lumbar or thoracic radiculopathy, back pain, and occasionally meningeal irritation. The intervals between operation and onset of symptoms varied from months to years. Shahinfar and Schechter stated that iatrogenic meningoceles may follow insecure dural closure and emphasized the inadequacy of muscle or Gelfoam for the control of dural leaks.

Postoperative cervical meningoceles are not uncommonly encountered at secondary operations following procedures in which the dura was opened. They appear as white- or gray-walled cavities containing clear fluid and communicating through a small channel with the underlying subarachnoid space.
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Fig. 2. Postoperative myelogram in 1965 following laminectomy of C-5 and C-6 shows an abnormal dorsal position of the cervical cord in the lateral view (left) and a more normal width of the spinal cord in the anteroposterior projection (right).

Keim\textsuperscript{4} reported a cervical pseudomeningocele following traumatic root avulsion and Nugent, \textit{et al.},\textsuperscript{7} reported an extradural arachnoid cyst occurring 26 years after a fall.

There are several possible reasons for the greater frequency of traumatic lumbar meningoceles as compared to their cervical incidence. Because of the upright position, the CSF pressure at the site of the potential leak is greater in the lumbar region. Lumbar operations are more frequently performed

Fig. 3. Operative photograph of meningocele as entered (left), revealing a 2.0 cm length of spinal cord herniated into the dural defect. Magnification (right) of the herniated cord shows the pia and right C-7 root (arrow) adherent to the margins of the defect.
than cervical. Perhaps, also, the cervical operations are performed by fewer operators with greater specific experience. Many surgeons rely on muscle or Gelfoam to seal small dural openings that would be better managed with a sutured closure.

Lumbar iatrogenic meningoceles are presumed to arise in dural defects that have not been adequately sutured. In our case, the cervical dura had been left open presumably in expectation that this would improve the decompression. The posterior dura is quite inelastic and strap-like. When it is placed under tension by flexing the neck, as some operators prefer, the tight dura makes contact with the cord. When the dura is opened in the midline, the cut edges tend to slip ventrally on either side of the cord which is then "herniated" into the opening. Perhaps this flexion mechanism can also disrupt a fragile dural closure in the immediate postoperative state. We believe that dural closure or replacement lessens the chances of this complication.

References


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