Intramedullary cervical spinal cord abscess

Case report

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✓ A case of spontaneous intramedullary cervical spinal cord abscess is presented. The clinical and laboratory findings in cases of spinal cord abscess vary. Prompt diagnosis and drainage are stressed as critical factors in effectively managing the disease.

KEY WORDS • intramedullary spinal cord abscess • myelography • cerebrospinal fluid

We are reporting a case of spontaneous intramedullary cervical spinal cord abscess. This is only the second such patient with an acute onset (less than 7 days) who survived, and the second case in a patient older than 70 years of age.

Case Report

This 71-year-old right-handed retired machinist presented on July 7, 1981, with the chief complaint of severe upper back pain and inability to stand and walk. He complained of right-sided weakness of 5 days' duration and pain in the right forearm, hand, and intrascapular area. The onset of pain and weakness was reported by the patient as having been sudden, with progression of symptoms and the development of neck pain, especially on movement. He had difficulty in voiding, beginning 18 hours before admission, and noted drooping of the right eye on the day of admission.

There was no history of infection, fever, or cervical spine disease. His past medical history was significant for alcohol abuse, adult-onset diabetes mellitus controlled by diet, and left total hip replacement in June, 1980, for degenerative joint disease.

Examination. He was alert, but complained of neck pain. Temperature was 98.4°F, blood pressure 170/80 mm Hg, and pulse 100/min. The head and mouth were free of infection and abnormalities. No sinus tracts or dimpling of skin could be found on the neck or the midline of the body. The neck was tender over the lower posterior cervical area. There was a Grade II systolic heart murmur.

The patient was fully oriented but showed some impairment of recent and remote memory. There was a mild right Horner's syndrome. He had marked weakness of the right arm, worse distally, and moderate weakness of the right leg, worse proximally. The left extremities had normal power. Sensory examination showed decreased pain sensation in the C-6 dermatome bilaterally, worse on the left. Vibration and position sense were impaired in both legs. The myotatic reflexes were absent in the arms; both patellar reflexes were brisk, and the Achilles reflexes were normal. Babinski's sign was present bilaterally. Rectal tone was preserved, but bladder catheterization was necessary.

Laboratory studies on admission were as follows: hemoglobin 10.9 gm/dl, white blood cell count 10,300/cu mm with a normal differential, platelets 450,000/cu mm, sodium 128 mEq/liter, potassium 4.1 mEq/liter, creatinine 0.8 mg%, and blood urea nitrogen 16 mg%. Urine culture and six blood cultures were sterile. An electrocardiogram showed frequent premature ventricular contractions with occasional bigeminy and trigeminy. Chest, cervical spine, and thoracic spine radiographs were normal. Computerized tomography (CT) of the head without contrast enhancement was normal.

On the day of admission, a cervical myelogram with 24 cc of Pantopaque instilled by lumbar puncture showed an increase of the normal cervical enlarge-
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Intramedullary cervical spinal cord abscess on the right (Fig. 1 left). The differential diagnosis included an intramedullary abscess or neoplasm, syringomyelia, hydromyelia, or hematomyelia. Cerebrospinal fluid (CSF) analysis showed 1170 leukocytes/cu mm (93% polymorphonucleocytes), 10 erythrocytes/cu mm, protein 187 mg%, and glucose 87 mg%.

Following myelography, the patient's temperature rose to 104°F, and intravenous chloramphenicol and penicillin were administered. A lumbar puncture was repeated; the CSF contained 129 leukocytes/cu mm (85% polymorphonucleocytes) and 121 erythrocytes/cu mm. The patient was transferred to the medical intensive care unit because of frequent premature ventricular contractions, and his temperature dropped to 100°F. His neurological status remained unchanged.

A cervical metrizamide myelogram was repeated via C-2 puncture 36 hours after admission. This study showed a marked increase in expansion of the cervical spinal cord from C-4 to C-7 (Fig. 1 right) compared with the myelogram obtained 24 hours earlier. The CSF at this myelogram contained 320 leukocytes/cu mm (53% polymorphonucleocytes) and 1430 erythrocytes/cu mm. ACT scan of the cervical spine performed immediately after the myelogram verified an intramedullary enlargement of the spinal cord without hemorrhage. The patient was started on dexamethasone.

Operation. The patient underwent laminectomy at C3-6 and intradural exploration. The spinal cord was widened from C-3 to C-6 without evidence of superficial suppuration. The enlargement was more prominent on the right side. A No. 27 needle was inserted into the prominence on the right, and purulent material was aspirated. A right paramedian myelotomy revealed a cavity containing 7 cc of purulent material.

The cavity was irrigated with saline and a biopsy obtained. Intraoperative chloramphenicol, penicillin, and oxacillin were given intravenously. The dura was marsupialized to the paraspinal muscles, and the wound was closed in layers. No drains were placed in the abscess cavity or in the neck.

Streptococcus viridans and Haemophilus parainfluenzae were cultured from the abscess. Acid-fast bacilli and fungi were not identified. The biopsy showed acute inflammation. All three CSF samples were sterile.

Postoperative Course. The patient had a transient right hemiplegia which improved to marked paresis of the arm and moderate paresis of the leg within 1 week. On the 2nd day, he had a florid alcohol withdrawal syndrome. By the 3rd postoperative day, he was afebrile and remained so. When the bacterial sensitivity was reported, medication was changed to intravenous chloramphenicol and penicillin in high doses for 3 weeks, and then oral penicillin for 2 additional weeks. Dexamethasone was tapered, and stopped after 1 week. The wound healed without leakage of CSF.

Because of the organisms cultured, an oral surgery consultation was obtained. Mild periodontal disease without evidence of chronic or acute infection was found on detailed examination of the oral cavity.

Three months after surgery, the patient had normal strength on the left side and minimal weakness and incoordination of the right leg. The right arm is still paretic, especially distally. He cannot void independently and requires a daily suppository to evacuate. He can walk with assistance.

Discussion

Intramedullary suppuration of the spinal cord is a rare disease. Hart first reported this condition in 1830. In 1944, Arzt reported three cases of spinal cord abscess, and reviewed 37 cases reported previously in the literature. DiTullio and Menezes, et al., independently reported additional cases in 1977; the latter authors found 54 cases in the world literature up to that time. Six additional cases have been reported since 1977 (Table 1).

Spontaneous acute intramedullary spinal cord abscess is exceedingly unusual. Only nine of the 22 cases of intramedullary spinal cord abscess reported since 1944 have had no known source of infection; five had infection outside the central nervous system and four had dermal sinus tracts. A stab wound, an infected epidermoid tumor, a lumbar puncture, and pneumococcal meningitis accounted for the other four cases. Nine of these 22 cases involved the cervical cord. Six cases were idiopathic, two had dermal sinuses, and one was associated with a stab wound. The
TABLE 1
Data in seven cases of intramedullary spinal cord abscess reported since 1977

<table>
<thead>
<tr>
<th>Authors, Year</th>
<th>Age (yrs), Sex</th>
<th>Location, Infection</th>
<th>Duration of Symptoms Preop</th>
<th>Surgery</th>
<th>Abscess Organisms</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rahoria, et al., 1978</td>
<td>18, M</td>
<td>T7-10, unknown</td>
<td>9 days</td>
<td>yes</td>
<td>Staphylococcus aureus</td>
<td>survived; status unknown</td>
</tr>
<tr>
<td>Bean, et al., 1979</td>
<td>15, M</td>
<td>C1-T1, dermal sinus</td>
<td>5 days</td>
<td>yes</td>
<td>Proteus mirabilis</td>
<td>good recovery</td>
</tr>
<tr>
<td>Fortuna, et al., 1979</td>
<td>21, M</td>
<td>C2-7, unknown</td>
<td>2 mos</td>
<td>yes</td>
<td>sterile</td>
<td>good recovery</td>
</tr>
<tr>
<td>Maurice-Williams, et al., 1980</td>
<td>21, M</td>
<td>L-2, infected intramedullary epidermoid tumor</td>
<td>6 wks</td>
<td>yes</td>
<td>Staphylococcus aureus</td>
<td>good recovery</td>
</tr>
<tr>
<td></td>
<td>20, F</td>
<td>conus at L-4, dermal sinus</td>
<td>3 wks</td>
<td>yes</td>
<td>anaerobic streptococcus</td>
<td>good recovery</td>
</tr>
<tr>
<td>Morrison, et al., 1980</td>
<td>32, M</td>
<td>C3-6, unknown</td>
<td>14 days</td>
<td>yes</td>
<td>Listeria monocytogenes</td>
<td>good recovery</td>
</tr>
<tr>
<td>Blacklock, et al., 1982</td>
<td>71, M</td>
<td>C3-6, unknown</td>
<td>5 days</td>
<td>yes</td>
<td>Streptococcus viridans &amp; Haemophilus parainfluenzae</td>
<td>moderately disabled</td>
</tr>
</tbody>
</table>

infecting organisms have varied. Proteus species were cultured in the two spinal cord abscesses associated with dermal sinuses. The traumatic wound contained organisms typical for wound infections. The spinal cord abscesses of unknown origin all grew organisms not commonly cultured from abscesses in general.

Menezes, et al., 9 noted that patients with precipitous symptoms were associated with a worse survival rate. Bean, et al., 2 reported the first patient with cervical spinal cord abscess with an acute onset (less than 7 days) who survived, and our patient is the second. Thirty-two percent of cases with intramedullary spinal cord abscesses have a history of 7 days or less. Two of the 19 patients (10%) in this group have survived. Patients with symptoms lasting longer than 7 days have a 33% survival rate. Of the nine patients described since the report of Arzt 4 with involvement of the cervical spinal cord, two died; both deaths were associated with a brain abscess. 7,11 The functional outcome of patients with surgically treated cervical spinal cord abscess has been good in the survivors.

The CSF analysis of patients with intramedullary cervical cord abscess varies; CSF protein ranges from normal to very high. The leukocytic reaction in the CSF is also variable. Cervical spinal cord abscesses have been associated with sterile CSF in all but one case, in which a single colony of Escherichia coli grew on CSF cultures from a patient with Klebsiella and Streptococcus in the abscess. The peripheral white blood cell count can be normal, although most cases have an elevation of leukocytes or shift in the differential count.

The nature and level of spinal canal infections may not be immediately obvious. Lumbar puncture followed by myelography offers the most effective means of obtaining CSF for analysis, smear, culture, bacterial sensitivity testing, and of visualizing the full length of the spinal canal. Our patient had CSF leukocytosis, suggesting acute bacterial meningitis. The clinical and myelographic findings indicated a lesion localized to the cervical region, however, and a repeat myelogram demonstrated an enlarging cervical spinal cord. The diagnosis of intramedullary abscess should be considered in cases of neurological deterioration referable to the spinal axis. Neck pain has occurred in most cases of cervical intramedullary abscess, as is the case with epidural abscess. Radiographic bone changes are often associated with epidural abscess, but rarely with intramedullary suppuration. The CSF findings in cases of intramedullary abscess are similar to those in patients with epidural abscess; in each, the findings are variable. 6

The myelographic appearance of a spinal cord abscess is that of an intramedullary process with widening of the cord shadow. A complete block may be present. Our patient showed a definite enlargement of the cervical spinal cord over a 36-hour period.

All the surviving patients with cervical spinal cord abscess have been treated with laminectomy, myelotomy, and high-dose antibiotics. Fortuna 4 has advocated the use of the operative microscope for extirpation of the abscess. Prompt diagnosis and drainage are the keys to survival and a good neurological outcome. Computerized tomographic scanning is a useful adjunct for diagnosing and following these lesions.

References
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