A 10-Year-Old Boy with Fever, Sudden Onset of Lower Back Pain, and Gait Change

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A 10-year-old, previously healthy boy presented to the pediatric emergency department with fever, acute lower back pain, and change to his gait. His symptoms began 10 days prior to presentation with subjective fevers at home. After a week of fevers, he presented to an outpatient pediatric clinic. At that visit he denied any recent cough, runny nose, ear pain, headache, abdominal pain, nausea, vomiting, diarrhea, rash, or dysuria. A urine dip was unremarkable. He did admit to some nasal congestion and 1 day of a sore throat that had since cleared. His measured temperature in clinic was 38.0°C. He was examined and given the diagnosis

Figure 1. Lateral (A) and frontal (B) plain films of his pelvis and lumbar spine demonstrate normal appearance of the hip joints, normal mineralization, no fractures or dislocations, and no soft tissue abnormalities.

For diagnosis, see page 179

Editor’s note: Each month, this department features a discussion of an unusual diagnosis. A description and images are presented, followed by the diagnosis and an explanation of how the diagnosis was determined. As always, your comments are welcome via email at pedann@Healio.com.
of “fever, likely prolonged viral infection.” He was discharged from clinic with the advice to “return if fever persists for longer than 2 weeks.”

The following day he returned to school, but by that afternoon he was noted by the school nurse to have a temperature of 40.0°C. He proceeded to a second pediatric clinic where he shared a similar history of continued fevers. A physical examination was done, and he was prescribed a 5-day regimen of Augmentin (GlaxoSmithKline, Middlesex, UK) for assumed bacterial infection of unknown location or etiology. He took his first dose of oral antibiotic that evening. The next morning, before school, he began complaining of lower back pain, continued to be febrile, and his mother noticed that his gait was abnormal. He stayed home from school and had continued fever and worsening pain, which prompted his mother and father to bring him to the pediatric emergency department.

Upon arrival at the emergency department, the boy’s mother shared a similar history as previously mentioned, and added that he had first complained of the lower back pain that morning. He had previously been walking normally, but since that morning his gait was different.

On examination, his vital signs showed his temperature to be 38.4°C, heart rate of 128 beats per minute, blood pressure of 129/72 mm Hg, respiratory rate of 24 breaths per minute, and an oxygen saturation of 95% on room air. He was pleasant and in no acute distress, lying on his back in bed. The exam showed two healing abrasions over the left elbow and one small, scab-covered abrasion under the chin. He was quite tender to palpation midline over the lumbosacral vertebrae from approximately L3 to just superior to the gluteal crease. His ambulation consisted of a wide-based gait with a shuffling movement and a mildly lordotic posture that rotated the pelvis slightly anteriorly. His examination was otherwise normal, with full range of motion on musculoskeletal exam, and he was neurologically intact without deficits.

His laboratory evaluation showed a complete blood count with 11,000 white blood cells, a normal hematocrit and platelets, and 79% neutrophils on differential. His C-reactive protein was only 1.9 mg/dL, but his sedimentation rate was elevated to 87 mm/hour. His electrolytes, including calcium, magnesium, and phosphate, were normal, as was the urine analysis. His fever and elevated sedimentation rate begged the question, “why”? Upon further questioning, he remembered that he had fallen from his scooter 2 weeks previously, causing the abrasions to his left elbow and chin, as previously noted on his physical exam.

Plain films of his pelvis and lumbar spine (Figures 1A-1B) were obtained and showed normal hip joints and mineralization, no fractures or dislocations, and no soft tissue abnormalities. A magnetic resonance imaging (MRI) scan of his thoracic and lumbar spine (Figures 1A-1B) were obtained and showed normal hip joints and mineralization, no fractures or dislocations, and no soft tissue abnormalities. A magnetic resonance imaging (MRI) scan of his thoracic and lumbar spine was then obtained, showing abnormal enhancement in the epidural space posteriorly from the L4 to L5 disk level to the distal spinal canal. Noted on the sagittal T1 post-gadolinium images at L5-S1 in the posterior epidural space was a small, fluid-containing collection causing mass effect upon the thecal sac, resulting in moderate spinal stenosis (Figure 2A). There was intense enhancement and edema seen in the posterior paraspinal tissues (Figures 2B-2C).
Diagnosis:

Epidural Phlegmon with Associated Spinal Epidural Abscess

These findings were consistent with extensive paraspinal muscular inflammation with epidural phlegmon and a focal epidural abscess at the L5-S1 level, which resulted in moderate spinal stenosis.

DISCUSSION

Spinal epidural abscesses in the general population are a rare event, and are even less common in children. A review of the literature (ie, EMBASE, PubMed, Medline) over the past 40 years shows only a small number of cases, and the number of pediatric cases reported is less than 90. About 50% of all cases were either misdiagnosed or delayed in their diagnosis. The overall incidence is estimated to be less than 0.2 to 2.8 per 10,000 hospitalizations. However, if left untreated, the outcome may be neurologically devastating. Predisposing risk factors include compromised immunity, disruption of the spinal column, and a source of infection.

Disease processes that enhance the probability of infection include diabetes mellitus (18%-48%), intravenous (IV) drug abuse (7%-40%), and remote infections (ie, respiratory, urinary, and minor skin or soft tissue infections [7%-44%]), but often there is no etiology. There is a suggestion of an increase in incidence secondary to increased IV drug abuse, which likely explains the male predominance of cases. Most patients are older than age 50 years, but as seen in our case, epidural abscesses can occur at any age.

The typical clinical presentation is the classic triad of fever, leukocytosis, and elevated sedimentation rate (Table 1), but one study describes this occurrence as rare (13%). In the pediatric population, hip tenderness is seen more often than back pain, which is thought to be caused by radicular pain as the spinal cord/cauda equina and vascular structures are threatened by compression. Children may complain of abdominal pain or not feeling well in general. It is also quite common to have no neurological deficits.

Spinal epidural abscesses present in four progressive stages. The classic description published by Heusner in 1948 is still used today. The initial stage presents as severe back pain associated with fever and local tenderness, followed by the second stage with signs of spinal irritation. According to Heusner, neurologic deficits are first observed during the third stage and include weakness of the voluntary musculature or fecal and urinary incontinence. This progressive weakness may also include sensory deficits, which lead to the fourth stage and total paralysis. Each stage varies in its duration.

The recommended evaluation includes a complete blood count with differential, erythrocyte sedimentation rate, blood culture, a screening urinalysis (prompted by back pain), plain radiographs of the spine (although these are positive in <30% of cases), and MRI, which is the ultimate determinant of the diagnosis, size, and site and is considered the diagnostic gold standard. Some report its sensitivity being as high as 91%. A lumbar puncture is not recommended due to the concern and potential risk of spreading the infection while passing through the site of the abscess and spinal coning.

The most common etiology is a hematogenous spread of bacteria from a previous infection or trauma thought to be secondary to seeding from a hematoma, or a direct spread from a neighboring vertebral osteomyelitis (although this is rare in children). Staphylococcus aureus is the most common causative agent (57%-93%), with Streptococcus pneumoniae (18%), Escherichia coli, Pseudomonas, Fusobacterium, and Salmonella found less commonly (13%).

The most common (and conservative) approach to management is administration of IV antibiotics for 4 to 6 weeks (and possibly up to 12 weeks). Appropriate initial empiric regimens include ceftriaxone and metronidazole and either cefotaxime or ceftazidime. Our patient was initially started on empiric coverage that included ceftriaxone, metronidazole, and vancomycin (although only ceftriaxone and metronidazole were continued for the entire 3 weeks of therapy).

The non-conservative and second approach is a posterior decompressive laminectomy and debridement, although in some cases an anterior approach may give better access to certain abscesses. This particular approach is not currently

TABLE 1.

Presenting Clinical Manifestations of Spinal Epidural Abscess

<table>
<thead>
<tr>
<th>Common</th>
<th>Backache</th>
<th>Radicular pain</th>
<th>Weakness</th>
<th>Sensory deficits</th>
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<tr>
<td>Fever</td>
<td>Headache</td>
<td>Bowel dysfunction</td>
<td>Irritability</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Frequent</td>
<td>Bowel dysfunction</td>
<td>Headache</td>
<td>Irritability</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Irritability</td>
<td>Headache</td>
<td>Bowel dysfunction</td>
<td>Headache</td>
<td>Abdominal pain</td>
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<tr>
<td>Abdominal pain</td>
<td>Bowel dysfunction</td>
<td>Headache</td>
<td>Bowel dysfunction</td>
<td>Abdominal pain</td>
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</tbody>
</table>

Adapted from Bremer and Darouiche
There are no large pediatric studies found in the literature, with only sporadic case reports. The largest study found was a meta-analysis of reports including 915 mainly adult patients. 

**CONCLUSION**

A mortality rate of 81% was reported in 1926, but that decreased from 34% to 16% from 1954 to 1980, and today’s mortality rate is less than 10%. Mortality and morbidity are directly linked to delay in diagnosis. An absence of paralysis, or presence for less than 36 hours, improves the clinical outcome. An estimated 50% to 75% of pediatric patients experience a significant delay in diagnosis, which could lead to catastrophic neurological outcomes. The problem with spinal epidural abscess is not treatment, but early diagnosis, with complete resolution of his symptomatology. His normal gait has returned, he has remained afebrile, reports no further pain, and 2 months after presentation he has resumed his normal life. An estimated 50% to 75% of pediatric patients experience a significant delay in diagnosis, which could lead to catastrophic neurological outcomes. The problem with spinal epidural abscess is not treatment, but early diagnosis, with complete resolution of his symptomatology. His normal gait has returned, he has remained afebrile, reports no further pain, and 2 months after presentation he has resumed his normal life.

**REFERENCES**