Pyogenic discitis in adolescence: a case report and review of the literature

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Back pain in adolescents can have many underlying reasons. Even though discitis is an uncommon condition, health care professionals should suspect discitis in children and adolescents with back pain with or without a history of trauma. With early diagnosis and treatment, favorable results can be achieved in these patients. Our report concerns a successfully treated discitis with osteomyelitis in a 16 year old patient with subsequent three year follow up.

Key words: Pyogenic discitis, Adolescence.

Introduction

Common causes of low back pain in children, such as muscle strain, herniated disk, spondylolysis, spondylolisthesis and Scheuermann's kyphosis, are frequently diagnosed and given proper treatment. Due to the low incidence, a delay in diagnosis of less common causes of low back pain such as systemic disease (storage disease), neoplastic disease or infection (discitis) may result in long term disability (restriction of mobility and local kyphosis) (1) of the involved spine. In this case report, we describe the outcome and long term follow up of a 16 year old boy who presented with low back pain, was diagnosed with discitis and treated successfully.

Case report

A 16-year-old male presented to his pediatrician's office with complaints of intermittent low back pain for the previous four weeks. He recalled falling backwards while playing volleyball 1-2 months before presentation. He had no recollection of fever, chills or other physical ailments. His pain was isolated to the lumbar region without any radicular symptoms or weakness. Physical

exam demonstrated tenderness to palpation at the lumbar spine and surrounding paraspinal musculature. He did not have any signs of myelopathy or spinal cord impingement such as muscle weakness, altered reflexes or sensation. Radiographs (Figure 1) demonstrated a slight, if any, decrease in the disk space height of L2-3 but no other significant findings that would correlate with low back pain in a young adult. After completing a course of physical therapy without any pain alleviation, MRI of the lumbar spine was obtained (Figure 2). The results demonstrated mild superior endplate compression of L3 with mild diffuse bone marrow edema of the L3 body and pedicle consistent with spondylodiscitis.

Figure 1 LS spine radiographs at initial presentation

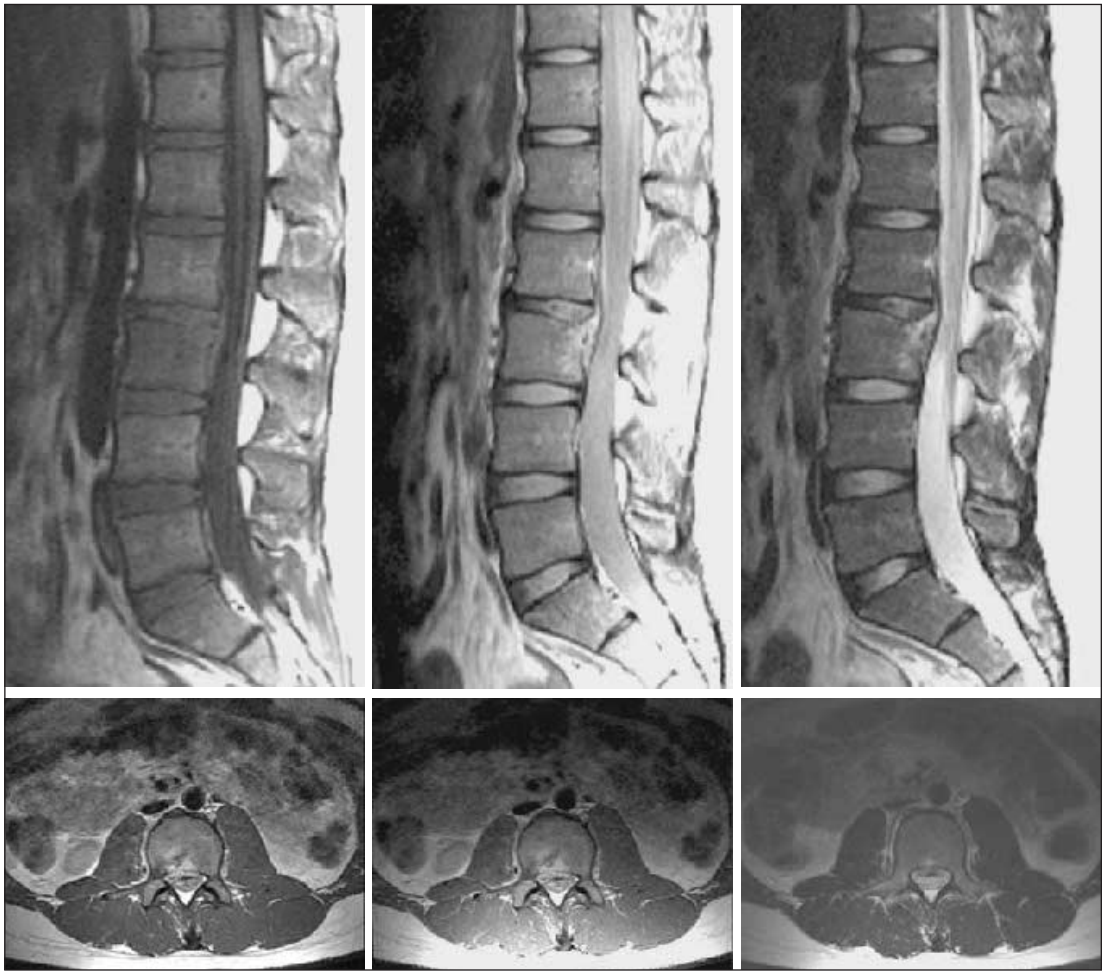

Figure 2 MRI of the LS spine with and without gadolinium showing the inflammatory changes in the intervertebral disc at the onset of treatment. No signs of the spinal canal compromise are seen

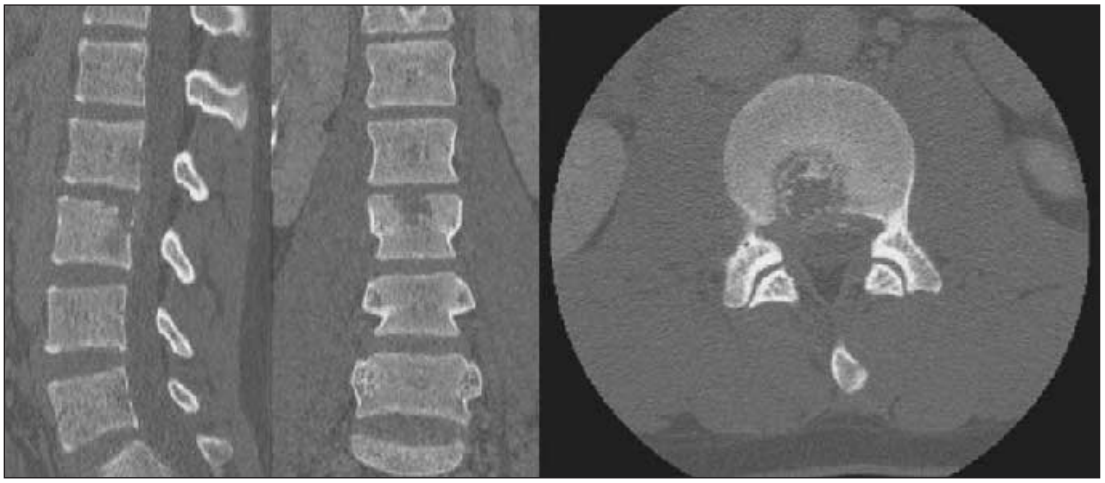

Figure 3 CT scan show extensive bone resorption of the involved level

This patient was admitted to hospital for further work up. Admission lab testing revealed an erythrocyte sedimentation rate (ESR) of 80 and C-reactive protein of 2.8 (0-0.8 mg/dl) but a normal white blood cell of 10.8 without a left shift. Due to the unusual findings within the L 3 vertebral body and lumbar disc, a CT guided biopsy (Figure 3) of both the L3 body and L2-3 disc was obtained.

We obtained peripheral blood cultures which were subsequently negative. Initially the patient was treated empirically with intravenous Vancomycin until the cultures were finalized. Vancomycin was discontinue promptly because the patient developed a "Red Man Syndrome".

The cultures of the biopsy specimens demonstrated Methacillin sensitive Staphylococcus aureus within both the L3 body and L2-3 disc which were consistent with the blood culture results and confirmed acute and chronic inflammation consistent with osteomyelitis. The treatment intravenous Nafcillin was started at that time. At the end, the patient was treated with an eight-week course of intravenous Nafcillin, a low profile bed rest for 4 weeks and thoracolumbar orthosis for a total of three months.

Follow up radiographs (Figure 4) and MRI (Figure 5) demonstrated resolution of

Figure 4 Follow up radiograph 4 months after initial treatment showed disc space narrowing

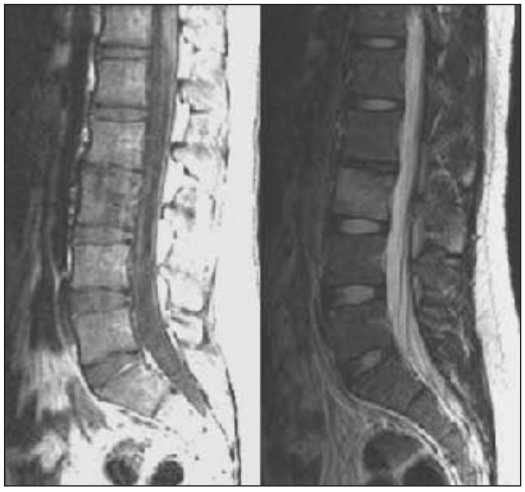

Figure 5 Follow up MRI 1 month after treatment showed slow revolution of disc and bone edema

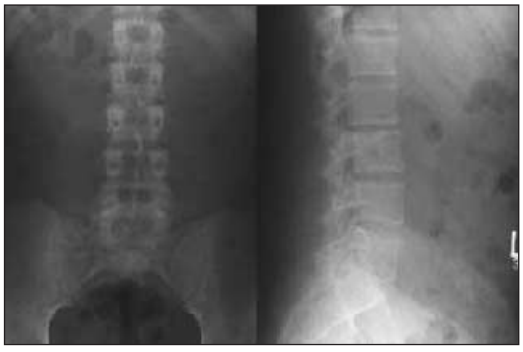

Figure 6 L-S spine radiographs after 1year and 6 months follow up still showed L 2-3 disc space narrowing

the bone edema with the only residual finding being a decreased disc space between L2 and L3. After 8 weeks from the initiation of treatment the ESR and white blood cell count were normal. Symptomatically, the patient's back pain resolved.

At the one year and two year follow up visits, radiograph show only mildly decreased disc space height (Figure 6). The patient was asymptomatic at those visits.

Discussion

Discitis in childhood and adolescence is a relatively rare condition. Average age of diagnosis is between 5-7.5 years old and it most frequently occurs in the age groups of 0-2, 10-12, 12-14 years respectively; L2-3 and L3-4 discs are the most common involved vertebral levels (2, 3). Adolescent discitis can be explained by seeding of microorganisms in the existing vascular channels that penetrate from the vascular loop into the disc proper. These channels usually persist until the third decade of life (4). However, the vascular theory can not be the only explanation of the entire phenomenon since benign bacteremia exists daily and is mostly transient and totally asymptomatic.

Morrissy and Haynes postulated that local trauma and hematoma were predisposing factors which can lead to bone infection (5). Infarction of a bone segment must occur in the vertebral body before osteomyelitis develops. Bacteria penetration in the vertebral body by lodging in the area with poor blood supply, is followed by its subsequent multiplication leading into symptoms of infection. Scoles and Quinn (6) believes that discitis is probably a common clinical manifestation of trauma, viral inflammation or bacterial infection. In our case, the history of trauma while playing volleyball may be a precipitating cause of discitis.

Plain spinal x-rays are an initial part of back pain investigation. The typical finding on the radiographs is narrowing of the intervertebral disc space which occurs 2-3 weeks after the onset of the symptom. This is followed by erosion of the subchondral bone plate and osseous eburnation (3, 7). MRI is a useful diagnostic tool in adolescents. Ring et al. (9) showed that the appearance on MRI was similar to that in an adult patient. A typical finding in the vertebral body on the T1-weighted image is a low intensity signal which may be less obvious than in the adult since the bone marrow is predominately hematopoietic in nature. A T2-weighted image of the infected disc usually shows increased signal intensity but these changes may not be observed in children (8, 10, 11).

The mainstream treatment of discitis is antibiotics (12), although there are reports of its self-limited course in some patients with prolonged recumbency (7, 10). Crawford used antibiotics only in 41% of his patients and reported similar outcomes (4). Since the most common causative organism is *Staphylococcus aureus*, some authors recommended starting antibiotics empirically even if the biopsy was negative (3, 4, 8, 13, 14). The route of administration should initially be intravenous. Intravenous antibiotics lead to a predictable and rapid resolution of the symptoms (8). The acute symptoms usually resolve in 2-3 days. After 4-6

weeks of treatment, intravenous antibiotics can be changed to an oral form only if acute back symptoms resolve (6). Other forms of non-operative treatment consist of bed rest, bracing and traction; however, these methods should not be used as the sole treatment because of the high complication rate (8).

Blood cultures should be obtained prior to antibiotic administration. A needle biopsy may be necessary in cases when systemic symptoms persist for 3-4 days in spite of broad-spectrum antibiotics. A needle biopsy under a CT-scan guidance or fluoroscopy is the method of choice. An open biopsy may be performed only if the close method fails. Needle biopsy yields positive results in only 60% of cases (4, 6, 12, 14, 15).

The indication for a surgical treatment is limited to cases where failed antibiotic treatment. Debridement, decompression or correction and stabilization of a deformity are necessary due to abscess formation, spinal cord compression and/or development of a spinal deformity (14). On follow up radiographs, most disc spaces had persistent endplate sclerosis with narrowing of the intervertebral disc space. In cases where disc height loss was more than 50%, there was usually progression to bony fusion of the adjacent levels.

Conclusion

Healthcare professional should have a high suspicion for discitis in children with back pain since early diagnosis has very good prognoses for recovery. If symptoms are not responding to NSAIDs, pain medication or physical therapy, discitis should be included in the differential diagnosis. Our diagnostic method of choice after plain x-rays is MRI with contrast medium. Laboratory diagnostic tests such as blood cultures, ESR, complete blood count and tissue culture from needle guided biopsy are obtained routinely. The treatment choices include intravenous antibiotics, bed rest and bracing. Surgical intervention is rarely indicated.

Conflict of interest: The authors declare that they have no conflict of interest. This study was not sponsored by any external organisation.

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