

A young girl unable to sit

SELF-ASSESSMENT QUIZ

Mohamed Zaki¹, Hassan Al Said², Ghalia Al-Mutaril, Medhat Othman³

An eleven-month old girl was referred to the hospital with three-week history of irritability, refusal to sit or to bear weight on her legs. There was no history of trauma, raw milk intake or preceding viral or bacterial infections. She was afebrile all throughout her illness. Examination of her back showed decreased lordosis and stiffness of the paravertebral muscles. Any attempt at flexing her spine caused marked discomfort. The rest of physical examination was unrevealing.

Laboratory investigation at presentation showed hemoglobin concentration of 10 gm/dl, total WBC of $14.4 \times 10^9/l$, neutrophils 64%, platelet count of $483 \times 10^9/l$. Erythrocyte sedimentation rate was 45 mm/h. Three blood cultures were sterile. Tests for brucellosis, tuberculosis, Widal and sickling were negative. The MRI images of the spine are shown in Figures 1 and 2. After 4 days of bed rest she was able to resume her normal activity. She remained well during follow up visits.

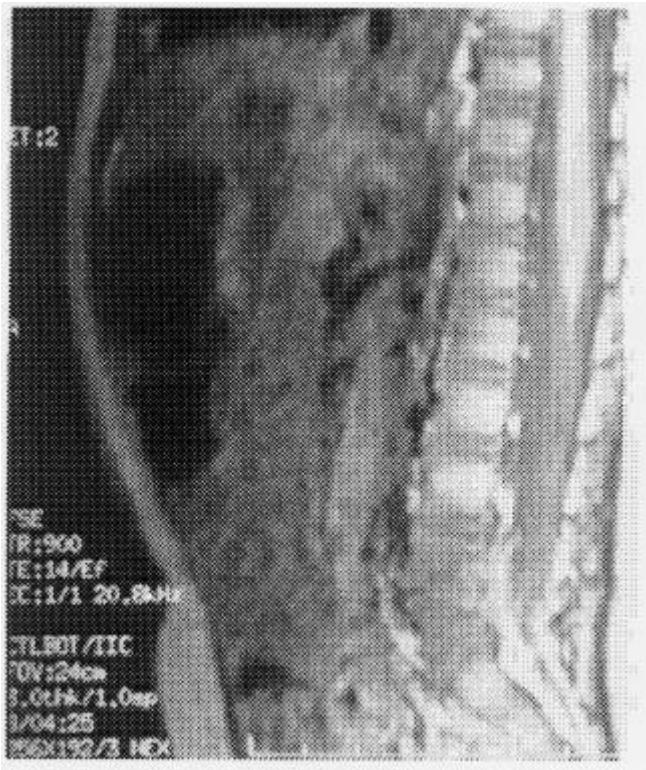


Figure 1

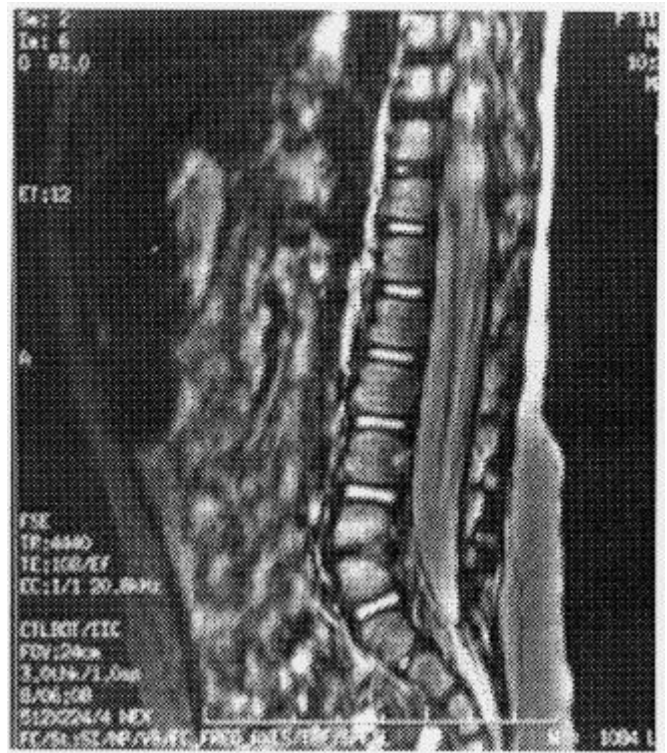


Figure 2

Questions

1. What are the findings on the MRI?
2. What is the diagnosis?

(Please turn to next page for answers.)

¹Department of Pediatrics, Farwania Hospital, ²Al-Razi Orthopaedic Hospital, and ³Formerly of Department of Radiology, Farwania Hospital, Kuwait.

Correspondence: Dr. Mohamed Zaki, P.O. Box 25850, Safat, Postal code 13119, Kuwait.

Tel./Fax: 488 5251, Email: mzaki@kma.org.kw

Answers

1.

Figure 1 - MRI of the spine (sagittal view):

T1-weighted image of L3-L4 demonstrating disruption of the normal architecture of the disc, with loss of distinction between the disc and vertebral bodies, low signal intensity in adjacent vertebrae.

Figure 2 - MRI of the spine (sagittal view):

T2 weighted image of L3 and L4 revealing decreased disc space height, loss of normal disc signal, poor definition of the cortical end plates and increased signal intensity in the adjacent vertebral bodies.

2.

Intervertebral discitis.

The findings on MRI of the spine point to intervertebral disc affection. The different causes of this condition (see discussion section) were ruled out by doing the appropriate tests. Rapid clinical improvement solely with bed rest is a further support for the diagnosis.

Discussion

Intervertebral discitis of childhood is a rare disorder with a peak incidence between one and three years of age. The presenting features are usually non-specific and age-related. They mimic many surgical and medical conditions and because of this the diagnosis is commonly delayed, particularly in young children, for weeks in most cases.

The presenting symptoms in discitis of childhood include irritability, and inability to sit, bear weight on lower limbs or walk, as well as pain in the lower limbs, back or abdomen. Fever is not present in all patients. The differential diagnosis of this condition includes septic arthritis, osteomyelitis of the spine, meningitis, and appendicitis, among others.

The etiology of childhood discitis is still a matter of debate. Some authors believe this condition to be of an infective origin and the causative organism is hematologically spread through the vascular channels that cross the end-plates in young children.¹ Culturing of aspirated disc material and blood cultures from children with this condition grew

bacterial pathogens in 25-50% of cases.² Another support for the infective theory is the rapid clinical improvement, within 48-72 hours, after the administration of antibacterial therapy in those patients.¹ In contrast others have suggested a non-microbial cause for this disease in children.³ The rapid clinical improvement in our case favoured the last theory.

The most consistent laboratory abnormality is a modest rise in erythrocyte sedimentation rate. In cases with positive blood and/or disc material culture, the most common pathogen was *Staphylococcus aureus*.² Other bacterial pathogens include *Kingella kingae*, *Streptococcus pneumoniae*, and more recently anaerobic bacteria have been isolated from children with discitis.⁴ In Kuwait, the search for locally present infections such as brucellosis, typhoid fever and tuberculosis should also be looked for. In addition sickle cell anemia, another prevalent disease in the country, can cause signs and symptoms similar to those of discitis and every case should be tested for this disorder.

Plain radiographs of the spine should be the first radiographic study in any suspected case of discitis. The first observed abnormality is disc space narrowing with or without involvement of the adjacent vertebrae. However, such changes may take days to weeks to be observed, and can lead to delay in diagnosis. In addition plain X-ray of the spine will not allow full visualization of the extent of soft tissue involvement.⁵

Radionuclide bone scan allows early diagnosis of disc space affection. Technetium 99 is the most common agent used. It showed areas of inflammation as increased accumulation of the isotope relative to the surrounding normal tissues. Diagnosis can be reached within 2 to 7 days from presentation.⁶ The use of computed tomography and more recently magnetic resonance imaging (MRI) have revolutionized the diagnosis of spinal column infection. Many authors consider magnetic resonance as the study of choice as not only will it show the disc and vertebral abnormalities very early in the disease but also demonstrates the extension to the surrounding soft tissue.^{1,2,5} Documentation of the latter is particularly essential in cases

complicated with neurological manifestations. Sagittal images best display changes within the endplates and vertebral bodies, while axial images are needed to demonstrate paraspinous or lateral paradural extension. T1 and T2 weight sequences are required for the diagnosis of discitis. Narrow disc spaces, vertebral end plate erosion, loss of distinction between vertebral endplates and disc, may be diagnosed from sagittal T1 weighted images (as in Figure 1) accompanied by increased signals in the same anatomical distribution in T2 sequences (Figure 2). MRI changes are caused by replacement of normal fatty marrow element with inflammatory cells. In earliest stages of discitis, these changes may occur prior to disc space narrowing or erosion of endplates.

Bed rest and spinal support are essential in the treatment of children with discitis. The role of antibiotic therapy remains controversial. Some authors recommend early administration of antibiotic in all children with this disorder, and this should continue for several weeks. They report rapid recovery and fewer complications.^{1,2} Others advise the use of antibiotics only in children with systemic signs, positive blood or aspirate cultures, or for those whose symptoms do not improve with immobilization alone.

Patients should maintain bed rest until the abnormal laboratory parameters become normal and spinal mobility unrestricted. Follow up reports of children with discitis have documented the favourable outcome of most cases regardless of the method of treatment.² However, prolonged follow up (12 to 35 years) in a group of children have shown that more patients complain of backache as they grow older, with narrowing of vertebral canal at the site of the original discitis.⁶ Of interest was that mode of treatment did not affect the outcome in this group of patients.

A high index of suspicion is needed for early diagnosis of this condition to avoid unnecessary investigations and treatment procedures and to provide the appropriate care.

SUMMARY POINTS

Intervertebral discitis can mimic many surgical and medical conditions, in young children hence high index of suspicion is needed to reach diagnosis.

Apart from mildly raised ESR, there are no specific tests for diagnosis.

The cause of this disorder remains controversial. Bacterial infection may be responsible for some cases of discitis. *Staphylococcus aureus* is the most common pathogen isolated. Non-infectious origin has also been proposed.

MRI scanning is the best imaging modality for diagnosis. MRI detects the vertebral changes very early in the course of the disease. It can also reveal extra-vertebral extension of the infection particularly in cases with neurological complications.

Bed rest is required in all cases. The use of antibacterial agents is controversial but it is indicated in cases with positive blood and/or disc aspirate cultures and in those with delayed recovery. The majority of patients will recover completely irrespective of the treatment modality, yet some of them may be left with residual damage and disability.

References

1. Ring D, Johnston II CE, Wenger DR. Pyogenic infectious spondylitis in children: the convergence of discitis and vertebral osteomyelitis. *J Pediatr Orthop* 1995;15:652-60.
2. Ventura N, Gonzalez E, Terricabras L, Salvador A, Cabrera M. Intervertebral discitis in children: A review of 12 cases. *Int Orthop* 1996;20:32-4.
3. Ryppy S, Jaaskelainen J, Rapola J, Alberty A. Non specific diskitis in children. A nonmicrobial disease? *Clin Orthop and Related Research* 1993;297:95-9.
4. Brook I. Two cases of diskitis attributable to anaerobic bacteria in children. *Pediatrics* 2001;107:E26.
5. Glazer PA, Hu SS. Pediatric spinal infections. *Orthop Clin North Am* 1996;27:111-23.
6. Jassen Br, Hart W, Schreuder O. Discitis in childhood, 12-35 year follow-up of 35 patients. *Acta Orthop Scand* 1993;64:33-6.