Childhood discitis in a regional children's hospital

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Childhood discitis is rare, can be difficult to diagnose and it is unclear whether it is an infective or simply an inflammatory process. A departmental database search of 46 434 patients identified 12 cases from 1990–2008. The mean time to diagnosis from onset was 22 days. The children usually present with altered gait, a normal infection screen (temperature, white cell count, C-reactive protein, blood cultures) and radiographic loss of intervertebral disc height. Antibiotics were given in 11 cases and but no immobilization was used. Symptoms resolved by a mean of 6.5 weeks with no recurrence. This study highlights the unusual features of this rare condition which should be confirmed with MRI scanning. *J Pediatr Orthop B* **21:264–268 © 2012 Wolters Kluwer Health | Lippincott Williams & Wilkins.**

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Introduction

Discitis is rare in children. The exact aetiology is controversial; some regard it as an infective process affecting the intervertebral disc or endplates [1–6], whereas others view it as an inflammatory condition [7,8]. The diagnosis may initially be unclear particularly in the younger child and there is often a delay in diagnosis and initiation of appropriate treatment because the symptoms are variable, not necessarily localized to the spine and many of the usual investigations for an infective process such as inflammatory markers, blood cultures or elevation of temperature may be absent.

The aim of this study was to review all cases of discitis treated at a regional Children's Hospital since the introduction of a departmental database over the 19-year period. We aimed to identify the common features within this group that helped with diagnosis and review the results of management of this uncommon condition.

Methods

Since 1990 data on orthopaedic cases at our centre has been prospectively recorded in a departmental database. The hospital is the largest children's hospital in Scotland and provides tertiary paediatric services to the West of Scotland, a population of approximately three million. A database search of 46 434 patients, (520 with 'back pain') for the period 1990–2008 was performed and 12 cases of discitis were identified. The clinical notes and radiographs for all cases were reviewed. Inclusion criteria for this study were based on those of Fernandez *et al.* [9]: clinical findings compatible with the diagnosis together with plain radiographs demonstrating narrowing of intervertebral disc height; a technetium 99m bone scan with increase tracer uptake localized to a disc; or an MRI demonstrating intervertebral disc involvement with a normal appearance of the nonadjacent vertebrae. Only cases meeting these criteria were included.

Results

The 12 cases consisted of three boys and nine girls with a biphasic age distribution. There were eight 'toddlers' mean age 22 months (12–32) and four 'juveniles' mean age 12 years (11–13). The clinical features and initial investigations are shown in Table 1. The mean duration of symptoms before attending hospital was 16 days (5–32). Half of the children had been seen in the Emergency Department at least once earlier in the course of their illness with the same symptoms; accordingly the mean time to diagnosis was 22 days (5–49) from onset of symptoms. The presenting symptoms varied with age: all the younger children presented primarily with a gait abnormality, indeed no child under 28 months complained of back pain, whereas all older children to a varying degree had back pain. The positive clinical examination findings consisted of inability to bend forward (a positive 'coin test') in four; spinal tenderness in two; an abnormal spinal posture in two. Examination was often misdirected to the lower limbs, especially in the younger children, where no obvious abnormalities were identified.

The majority, 11 out of 12 were apyrexial on admission. All had routine blood tests performed on admission: the white blood cell count was raised to 15.2 and 17.5×10^9/l in only two and normal in 10; the mean erythrocyte sedimentation rate was 30 mm/h (10–65). The C-reactive protein was raised in only two and normal (< 7 mg/l) in 10. Blood cultures were performed in nine cases and were negative even on extended culture in eight. One grew a Gram-positive cocci. Plain spinal radiographs showed loss of disc height at a mean of 4.1 weeks following onset symptoms in 10 out of 11 cases together with irregular endplates in five. The earliest changes were seen 10 days after the onset symptoms (Fig. 1). One child had early radiographs performed five days after onset symptoms which were normal. Additional imaging consisted either

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of technetium 99m bone scanning in five cases, early in the series, and MRI in seven cases (Fig. 2) later in the series. All confirmed the diagnosis of discitis. In two children MRI demonstrated an 'abscess' and in one an epidural collection (Fig. 3). A single intervertebral level was involved in the lumbar spine in each child: six cases at L3/4, three cases at L1/2 and one case each at L2/3, L4/5 and L5/S1.

Treatment was guided by the consultant responsible at the time. Antibiotics were used in 11 children. Intravenous antibiotics were used initially in seven children for a mean duration of 9 days (2–28), with flucloxacillin alone being used in nine of those cases. All were continued on oral therapy subsequently. Four received oral antibiotics from the outset. Oral treatment was used for a mean duration of 6 weeks (1–12), with flucloxacillin alone used in eight out of 11. One child was treated with nonsteroidal anti-inflammatory drugs alone. No form of brace or other immobilization was used in the series. Resolution of symptoms to normal with a good range of motion occurred by a mean of 6.5 weeks (2–12). No cases of recurrence were found. The mean follow-up was 13.3 months (2–36).

Discussion

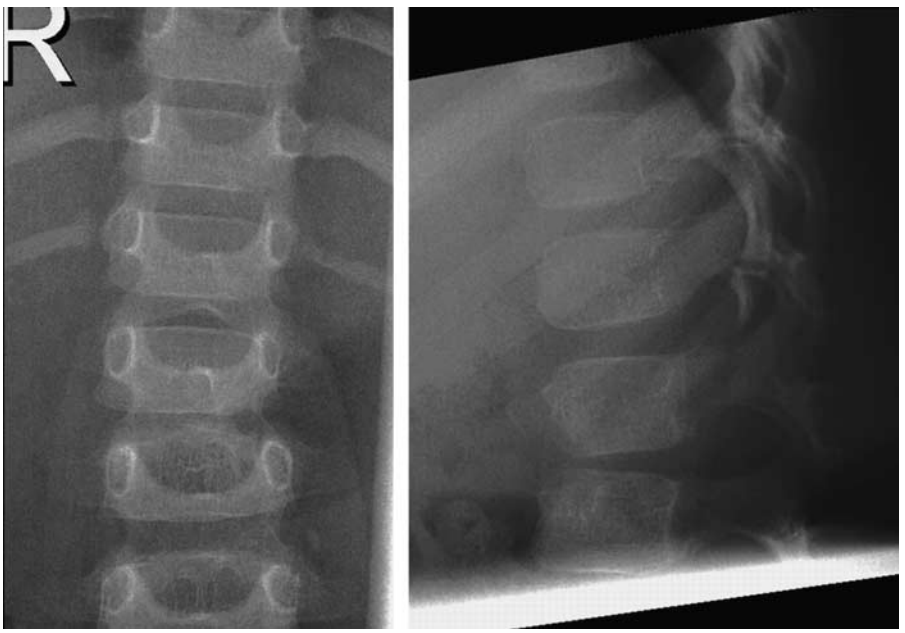
Childhood discitis is uncommon, our department in a regional children's hospital has treated 12 cases since

Table 1 Clinical features and initial investigations ordered by age

Case	Age (years)	Sex	Presentation	Duration (weeks)	Pyrexia	Raised WBC	Raised CRP	ESR	Cultures	Joint space narrowing	Level	Antibiotics
1	1	F	Altered gait 'Was walking, now not'	3	No	No	No	65	–	Yes	L1/2	Yes
2	1.2	F	Altered gait, limping	4	No	No	No	32	–	Yes	L4/5	Yes
3	1.4	M	Altered gait, tending to crawl	5	No	Yes	No	15	–	Yes	L3/4	Yes
4	1.4	F	Altered gait, 'can't bend to floor'	0.7	No	Yes	Yes	17	Neg	No (5 days)	L5/S1	Yes
5	1.8	M	Altered gait, not weight bearing	2.3	No	No	No	54	Neg	Yes	L3/4	Yes
6	2.3	F	Back pain, altered gait, abdominal pain	3	No	No	No	45	Neg	Yes + IE	L3/4	Yes
7	2.6	F	Back pain, altered gait, can't bend forward	4	No	No	No	28	Neg	Yes	L1/2	No (NSAID)
8	2.7	F	Back pain, avoiding bending, jumping & running	3	No	No	No	20	Neg	–	L2/3	Yes
9	11	M	Back pain radiating to hip, altered gait	1.4	No	No	No	16	–	Yes	L1/2	Yes
10	11	F	'Flu-like' illness, stiff hips, knees & back	3	No	No	No	15	Neg	Yes	L3/4	Yes
11	12	F	Back pain	4.5	No	No	No	10	Neg	Yes	L3/4	Yes
12	13	F	Back, abdominal & flank pain	0.9	Yes	No	Yes	46	Pos	Yes	L3/4	Yes

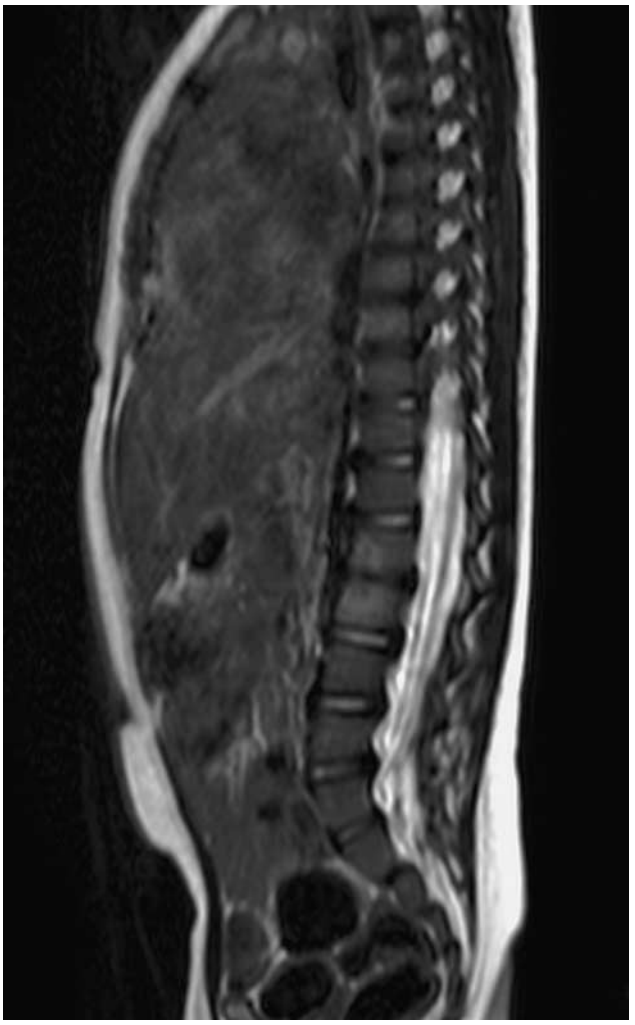
–, investigation not performed; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; F, female; IE, irregular endplates; M, male; Neg, negative; NSAID, nonsteroidal anti-inflammatory drugs; Pos, positive; WBC, white blood cell count.

Fig. 1



Anteroposterior and lateral radiographs of case 7, girl with 4-week symptoms, shows narrowing L1/L2.

Fig. 2



MRI scan of case 7, T2 sagittal confirming discits at L1/L2.

1990. Current knowledge is based on case series reports and a number of early papers built up a clinical picture of the condition [2,6,7,10–12], but little has changed since then regarding our understanding of the disease process.

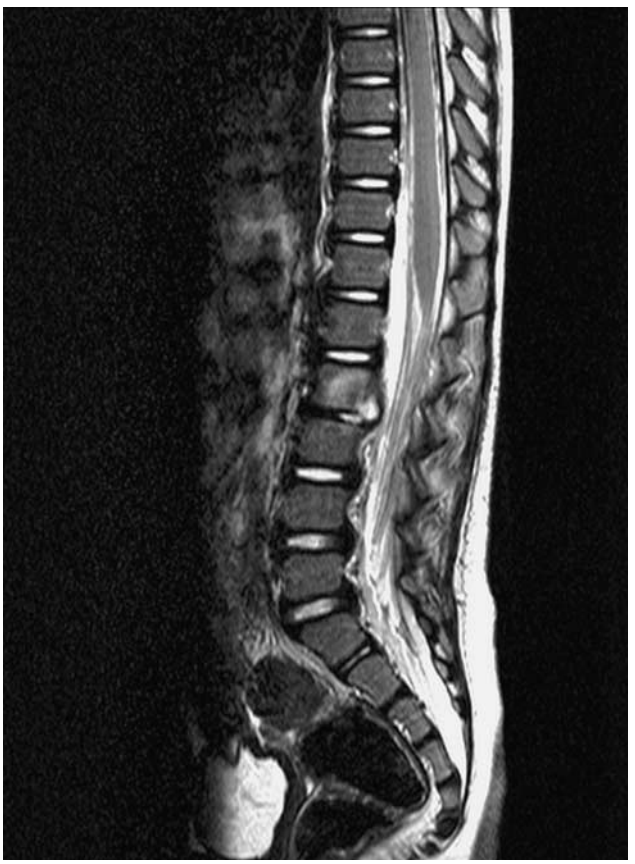
Symptoms and signs

This study highlights a biphasic age distribution with a higher incidence early in childhood (toddler) and a smaller later peak (juvenile). We observed two distinct groups, each with differing signs and symptoms. Of interest, and not described before, was a cutoff age (28 months) below which no child complained of back pain, whereas older children all had some degree of back pain as a part of their presentation. This may reflect the difficulty younger children can have communicating and localizing symptoms. Although the exact cutoff age may be variable, it highlights the differing symptoms between ages. Discitis should be considered in a young child presenting with an inability to weight-bear or with altered gait when no lower limb abnormalities can be identified. Our experience is that a toddler may present with an apparent regression in motor abilities: a child that could walk, stops and adopts crawling reflecting the altered gait associated with the condition, presumably as a result of pain. There may be little to find clinically on presentation. The child should be assessed for their ability to flex the lower back in bending – the 'coin test' evaluated by observing how the child tries to pick up an object, coin, toy etc. from the floor [8]. Poorly localized symptoms contribute to delay in reaching the diagnosis commonly found. In our series half the patients were seen in the Emergency Department, at least once, before the correct diagnosis was appreciated.

Imaging

Plain radiographs of the spine are useful in suspected cases, especially if symptoms have persisted for more than 10 days as it is likely that radiographic changes will then be present; loss of intervertebral disc height and possibly endplate irregularities. These changes appear to

Fig. 3



MRI scan of case 8, 3 weeks symptoms, shows L2/L3 discitis and early 'abscess' formation.

persist on follow-up. Kayser *et al.* [4] followed 20 cases of childhood discitis for 10–23 years and found 16 were completely asymptomatic, whereas four had some degree of restricted spinal movement. All had persisting radiograph changes; with intervertebral narrowing observed in all radiographs, with the additional finding of ankylosis in 12 and fusion in eight [4]. MRI scanning is recommended to confirm the diagnosis. In our cases both technetium 99m bone scan and MRI had excellent sensitivity for the disease. MRI may provide additional information such as the presence of an epidural collection or 'abscess' which could influence the duration of antibiotic therapy.

Infective versus inflammatory process

Whether childhood discitis represents an inflammatory or self-limiting infective process remains unclear. The usual investigations associated with an infection are often normal. Most have normal inflammatory markers and are apyrexial. Peripheral venous blood cultures are usually negative [4,6,8–10,13,14]. Although no formal biopsy was performed in any of our cases, biopsy of possible infected material has been tried to confirm the diagnosis. Some report no positive biopsy results [8,9,13]; whereas others had mixed positive and negative results [5,6,12,14].

These aspects have contributed doubt that the condition is an infection. However the lack of a significant systemic response may reflect an adequate local host response to a pathogen of low virulence, in an otherwise well patient. Furthermore changes in the vertebral blood supply with age may explain the differing pathogenesis observed between a rapidly resolving childhood discitis and the vertebral osteomyelitis more often seen in adults. In the young, the vertebral blood supply is a rich anastomosis of intraosseous arteries communicating with the disc. This copious blood supply makes haematogenous spread of infection a likely route, with preceding infections; ear, urinary or respiratory described [15]. The anastomosis has also been shown to have a protective effect, limiting the extent of bony infarction from septic emboli. As a result osteomyelitis is unlikely to develop and the clinical picture is mild [16]. With maturity the blood supply changes to become a system of end arteries and when microorganisms lodge in the low-flow, end-organ vasculature infarction of a wedge-shaped subdiscal area of bone results in vertebral osteomyelitis [16].

Treatment

Management includes variable usage of anti-inflammatory agents, antibiotics and immobilization. The majority of early literature recommends antibiotic use in selected cases [3,6,7,9,11–14,17], such as when pyrexia was a feature [7], or with persisting symptoms [3] or signs of systemic sepsis [13]. Therefore in a number of these studies a percentage of patients treated did not receive antibiotic therapy and yet successful resolution occurred. More recently antibiotics have been more widely used [4,5,8]. In our series, antibiotics were used in all except one child and associated with a fairly rapid response and no recurrence. Given the rarity of the disease and the good results we had observed with antibiotic therapy it would seem acceptable to use them despite the lack of clear evidence of an infective cause. Intravenous flucloxacillin for 1 week or once a response was evident then conversion to oral until resolution of the child's symptoms and signs seems reasonable. Menelaus [7] recommended immobilization as the key to successful resolution and that the natural course was for pain to persist until prolonged rest was enforced. All the studies we reviewed had used some form of immobilization to a greater or lesser degree as part of their treatment regime, for those not receiving antibiotics it formed the mainstay of their treatment, either in the form of cast or spinal brace [5,8,9,13], bed rest [7,11,17] or a combination of both. In contrast, our series did not have immobilization by brace or specific bed rest and resolution of symptoms with good range of motion occurred without these measures. We would therefore not recommend immobilization for the treatment of childhood discitis as a routine.

Conclusion

When reviewing a young child with reduced mobility or altered gait, it is important to keep in mind that this may be the only presenting features of an undiagnosed childhood discitis. As inflammatory markers are likely to be normal in a systemically well child, a high degree of suspicion is required. Although radiographs should show intervertebral disc height narrowing if symptoms have exceeded 10 days, further imaging with MRI is likely to confirm the diagnosis. We would consider intravenous flucloxacillin followed by up to 6 weeks of oral therapy without the use of bracing or immobilization. This should be effective in most cases with rapid resolution and no recurrence.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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