

Six-year-old boy with a slow-onset persistent back pain

Giulia Caddeo,¹ Paola Paganin,² Giulia Gortani,³ Marco Carbone,³ Massimo Gregori,³ Egidio Barbi³

A 6-year-old boy was evaluated for a 6-week history of low back pain. Initially, the pain was exacerbated by movements, eventually showing a milder and fluctuating trend. History was unremarkable for previous traumatic events, fever or nocturnal pain. Physical examination revealed localised pain at palpation of the spinous processes at the lumbosacral level. Blood tests showed a normal blood count, negative C reactive protein (CRP) and erythrocyte sedimentation rate, normal lactic acid dehydrogenase (LDH) and creatine phosphokinase.

A posterior–anterior radiograph of the lumbar spine resulted normal. An MRI scan revealed a lumbosacral transitional vertebra with bone oedema of the posterior arch until the spinous process.

For better bone definition, a CT scan was performed (figure 1).

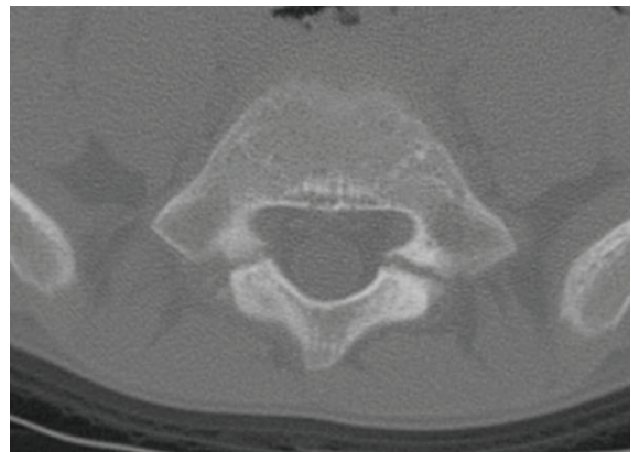


Figure 1 CT scan of the transitional lumbosacral (L5) vertebra.

QUESTIONS

1. Which causes of persistent low back pain should be ruled out in children under 10 years of age?
 - A. Osteochondrosis
 - B. Neoplasm

- C. Functional pain
 - D. Infections
2. What is the diagnosis in this patient?
 3. How is the diagnosis performed?
 4. How is this condition managed?

Answers can be found on page 287.

ANSWERS TO THE QUESTIONS ON PAGE 286

ANSWERS

- Both answers B and D are correct. In children under 10 years, low back pain is an infrequent occurrence and, when persistent, it should always evoke concerns of a serious illness. The most severe causes of back pain in this age group are infections and neoplasms. Other possible aetiologies are listed in table 1.¹ Among infectious diseases, both primary spine infections (spondylodiscitis) and visceral causes (pneumonia, urinary tract or abdominal infections) should be considered. In spondylodiscitis, symptoms are frequently non-specific including low-grade fever, back stiffness, difficulty in sitting, recent onset of constipation and, rarely, neurological signs.² A localisation of tubercular infection should be considered in populations at risk. Malignancy (eg, leukaemia, Ewing sarcoma, neuroblastoma) should be ruled out in children with night-time low back pain, fever and weight loss. Blood tests (eg, blood count, CRP, LDH) may aid the diagnosis, identifying signs of systemic inflammation. Table 2 shows the main red flags for serious underlying pathology.
- The CT scan showed bilateral lysis in the pars interarticularis of a transitional lumbosacral vertebra (figure 2) suggestive of bilateral spondylolysis without spondylolisthesis. Spondylolysis is a congenital or acquired fracture of the pars interarticularis between the zygapophyseal (facet) joints, usually occurring at the L5 (85%–95% of cases) or L4 (5%–15% of cases) vertebrae. The congenital form is the result of a dysplasia of the pars interarticularis. The acquired form is due to a stress fracture, usually as a consequence of repetitive hyperextension traumatic events, or to other pathological causes of increased fragility of the bone.³ Spondylolisthesis, a complication of spondylolysis, is defined by the sliding of one vertebra with respect to the underlying one.⁴
- In one 45-year prospective study, spondylolysis was found in 4.4% of all children at the age of 6 years.⁵ Despite this prevalence, spondylolysis is usually asymptomatic, especially in children under 10 years. Diagnosis is often made accidentally with imaging performed for other reasons. When clinically expressed, spondylolysis is defined by persistent low back pain with an insidious onset. It is associated

Non-organic low back pain	41.7%
Trauma	31.6%
Kidney urinary disease	8.6%
Spine infection	3.4%
Pneumonia	3.4%
Tumours	2.6%
Spondylolysis and spondylolisthesis	2.6%
Sickle cell crisis	1.1%
Rheumatological disease	1.1%
Discopathy	1.1%
Neurological disease	0.8%
Abdominal pathology	0.8%
Scoliosis	0.8%
Psychogenic disease	0.4%

Table 2 Evaluation of the child with low back pain: red flags for serious underlying pathology

History	<ul style="list-style-type: none"> ▶ Pre-pubertal children (especially <5 years) ▶ Duration >4 weeks ▶ Systemic symptoms (fever, malaise, loss of appetite) ▶ Unexplained weight loss ▶ Night-time pain or pain at rest ▶ Recent onset of constipation or bladder dysfunction ▶ History of trauma, recent infection, immunosuppression, malignancy
Examination	<ul style="list-style-type: none"> ▶ Local tenderness ▶ Back stiffness ▶ Difficult in sitting ▶ Association with neurological signs (especially in the lower extremities) ▶ Lymphadenopathy or abdominal mass

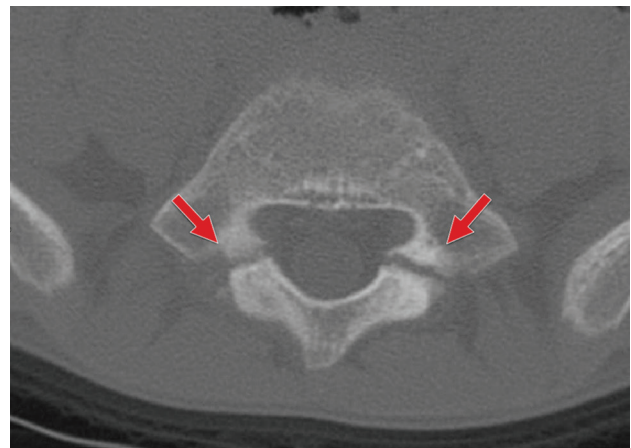


Figure 2 Bilateral lysis in the pars interarticularis of the transitional lumbosacral (L5) vertebra (red arrows).

with nerve root compression only when complicated by spondylolisthesis.⁶ Vertebral X-rays with standard views or additional 45-lateral oblique projection represent the first-line imaging for diagnosis. In case of negative X-ray findings, when clinical suspicion remains strong, CT scan represents the gold standard, although MRI is also becoming a possible important tool for diagnosis.⁷

- Asymptomatic spondylolysis does not require any treatment or activity restriction. An annual follow-up is recommended until skeletal maturity is reached. Treatment of symptomatic forms is usually conservative consisting in rest, anti-inflammatory drugs and spinal bracing for several months. For cases refractory to conservative treatment, surgery is indicated.⁸

Giulia Caddeo,¹ Paola Paganin,² Giulia Gortani,³ Marco Carbone,³ Massimo Gregori,³ Egidio Barbi³

¹University of Trieste, Trieste, Friuli Venezia Giulia, Italy

²Dipartimento di Scienze Mediche e Chirurgiche e della Salute, Università degli Studi di Trieste, Trieste, Italy

³Institute for Maternal and Child Health—IRCCS ‘Burlo Garofolo’, University of Trieste, Trieste, Italy

Correspondence to Dr Paola Paganin, Università degli Studi di Trieste Dipartimento di Scienze Mediche e Chirurgiche e della Salute, Trieste 34127, Italy; paganin1988@gmail.com

Contributors All the authors contributed equally to the design and to the writing of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Parental/guardian consent obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© Author(s) (or their employer(s)) 2021. No commercial re-use. See rights and permissions. Published by BMJ.

To cite Caddeo G, Paganin P, Gortani G, *et al.* *Arch Dis Child Educ Pract Ed* 2021;**106**:286–288.

Received 8 December 2018

Accepted 7 November 2019

Published Online First 19 November 2019

Arch Dis Child Educ Pract Ed 2021;**106**:286–288. doi:10.1136/archdischild-2018-316648

REFERENCES

- 1 Biagirelli FS, Piga S, Am R, *et al.* Management of children presenting with low back pain to emergency department. A 7-year retrospective study. *Am J Emerg Med* 2018;pii :S0735-6757:30569–2.
- 2 Principi N, Esposito S. Infectious discitis and spondylodiscitis in children. *Int J Mol Sci* 2016;17:539.
- 3 Shah SA, Saller J. Evaluation and diagnosis of back pain in children and adolescents. *J Am Acad Orthop Surg* 2016;24:37–45.
- 4 Davis PJC, Williams HJ. The investigation and management of back pain in children. *Arch Dis Child Educ Pract Ed* 2008;93:73–83.
- 5 Beutler WJ, Fredrickson BE, Murtland A, *et al.* The natural history of spondylolysis and spondylolisthesis: 45-year follow-up evaluation. *Spine* 2003;28:1027–35. discussion 1035.
- 6 Gagnet P, Kern K, Andrews K, *et al.* Spondylolysis and spondylolisthesis: a review of the literature. *J Orthop* 2018;15:404–7.
- 7 Tofte JN, CarlLee TL, Holte AJ, *et al.* Imaging pediatric Spondylolysis: a systematic review. *Spine* 2017;42:777–82.
- 8 Lim MR, Yoon SC, Green DW. Symptomatic spondylolysis: diagnosis and treatment. *Curr Opin Pediatr* 2004;16:37–46.