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Case Report

Pediatric spinal epidural abscess in an immunocompetent host without risk factors: Case report and review of the literature

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ABSTRACT

Spinal epidural abscesses (SEAs) are unusual bacterial infections, with possible devastating neurologic sequelae. Despite abundance of case series in adults, reports in children are scanty.

We describe a spontaneous SEA due to methicillin susceptible *Staphylococcus aureus* (MSSA) in a previously healthy 15-year old male, and we perform a literature review regarding management of pediatric SEAs without risk factors, from 2001 to 2014.

We found a total of 12 cases (8 males, average age 9.6 years). Clinical presentation was mainly fever, back pain and elevation of inflammation markers. All cases were initially misdiagnosed. Lumbar puncture was performed in 36% of patients. Etiological diagnosis was obtained in 8 cases. MSSA was isolated in 4 patients, methicillin-resistant *S. aureus* in 1 patient, and *S. aureus* with unknown susceptibility patterns in 2 cases. The average of therapy duration was 6 weeks. Patients' spine was always evaluated by gadolinium-enhanced magnetic resonance imaging; most abscesses were localized at thoracic and lumbar area, without osteomyelitis. In 8 cases, laminectomy and/or abscess drainage were performed in association with medical therapy; 3 cases were successfully treated with antimicrobial therapy only; no data were available in one case. A good outcome was obtained in all patients, except a reported residual headache and paraspinal pain lasting for 3 years.

The rarity and the possible differential diagnosis can lead to underestimate SEA occurrence in children without risk factors. It seems therefore essential to maintain a high attention to pediatric SEAs. A prompt diagnosis and adequate therapy are essential prognostic factors for remission.

Introduction

Spinal epidural abscesses (SEAs) are unusual bacterial infections requiring prompt diagnosis and management to prevent devastating neurologic sequelae.

They represent about 7% of vertebral infections and usually occur in subjects with predisposing underlying diseases or conditions such as diabetes mellitus, chronic renal failure, cancer, advanced age, immunodeficiency, alcoholism, intravenous drug abuse, cauda equina, holocord syndrome, neurosurgery, spinal anesthesia and acupuncture, mucocutaneous trauma, or by spreading of a known infection localized at other sites.

Bacteria gain access to the epidural space through contiguous spread (primary SEA) or by hematogenous dissemination (secondary SEA); the source of infection is not identified in 20–40% of cases [1–4].

The most common causative agent is *Staphylococcus aureus*, both methicillin-susceptible (MSSA) or methicillin resistant (MRSA), accounting for 50–90% of cases, followed by streptococci (8–17%) and Gram negative bacteria (10–17%) [1,4,5].

SEAs have an insidious onset of pain and a progressively worsening clinical picture characterized by fever and elevation of the indices of inflammation.

Four clinical stages have been described: stage 1 – lumbar pain, fever and local tenderness; stage 2 – radicular pain, nuchal rigidity and changes in the reflexes; stage 3 – sensory and motor

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abnormalities, with motor weakness and bowel and bladder dysfunction; stage 4 – paralysis with permanent sequelae. Alterations are reversible up to stage 4. It is therefore essential to achieve an early diagnosis, start effective antimicrobial therapy and, if required, proceed with a prompt neurosurgical intervention [2,3].

Several case series of spinal epidural abscesses in adults have been reported in the scientific literature, whereas reports in children are scanty. We describe a spontaneous SEA due to MSSA in a 15-year-old boy without risk factors, and have performed a review of publications in the scientific literature regarding management of pediatric SEAs published in the last 14 years. Two previous reviews, including reports on patients with risk factors, reported cases up to calendar year 2000 [6,7]. In the present work, we analyzed reports and reviews from pediatric patients published from 2001 to 2014 which, as in our case, did not present risk factors.

A review of the English literature was performed by an exhaustive Pubmed search for case reports and reviews, with publication date January 2001–December 2014, using the following terms: "spinal subdural abscess", "spinal epidural abscess", "spontaneous subdural abscess", "spontaneous epidural abscess", "spontaneous spinal epidural empyema". The exclusion criteria were: (i) adult population (age ≥18 years), (ii) incomplete clinical or age information or undistinguishable data between pediatric and adult patients, (iii) tubercular spinal epidural abscesses, and (iv) any underlying disease in the medical or surgical history. A manual review of the papers found by the above search method was performed to verify inclusion and exclusion criteria and to exclude cases with risk factors for hematogenous spreading (e.g. impetigo in chickenpox, cat scratch, mucocutaneous trauma) and/or underling predisposing diseases (e.g. cauda equina, holocord syndrome, neurosurgery).

Case

In June 2013, a 15-year-old male was referred to the Emergency Department of Siena University Hospital, Tuscany, Italy, from another regional hospital with a provisional diagnosis of meningitis. He reported a history of fever, headache and back pain, mainly in the lumbar-sacral region, during the previous 3 days. No previous trauma, nor minor or major surgery was reported by the boy or his parents.

His past medical history was unremarkable, but he received a anti group C meningococcal conjugate vaccine dose together with a anti diphtheria-tetanus booster dose 2 weeks before admission; seven days of myalgias and low grade fever (maximum 37.5 °C) with spontaneous resolution were reported to after those immunizations.

On admission the patient was conscious complaining of headache and lumbar pain with bilateral leg weakness; on physical examination his BMI was 17.3 blood pressure 110/70 mmHg, heart rate 92/min, respiratory rate 20/min, body temperature 36.3 °C (he had received 1000 mg of acetaminophen one hour before admission); he had a stiff neck with a lumbar pain arising while attempting to flex his neck, and presence of a bilateral

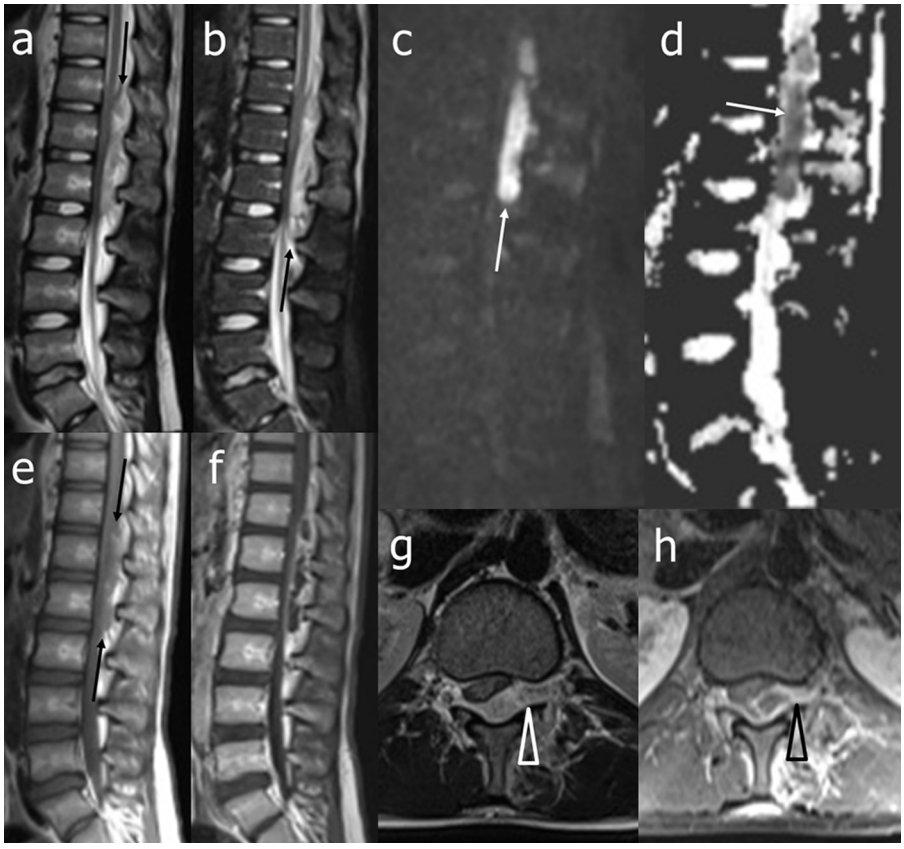

Fig. 1. Magnetic resonance imaging of the thoraco-lumbar spine at diagnosis: unenhanced T2-weighted (a), short tau inversion recovery (STIR) (b), diffusion-weighted (DW) (c), apparent diffusion coefficient (ADC) map (d), and T1-weighted (e) sagittal and T2-weighted axial (g) images, and gadolinium-enhanced T1-weighted sagittal (f) and axial (h) images. At the thoracolumbar junction, a posterior median-left paramedian epidural collection compressing the caudal spinal cord, conus medullaris, and upper cauda equina is clearly evident. The lesion shows irregular signal intensity on unenhanced conventional sequences (a, b, and e, *black arrows*), restricted diffusion on DW images and ADC map (c, d, *white arrows*), and peripheral gadolinium-enhancement (f, h). Note also that the lesion shows extent toward the left intervertebral foramen (g, h, *arrow head*). STIR image does not show associated abnormal signal intensity of the bone marrow.