Journal of Infection (2005) **51**, e5–e9

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CASE REPORT

Vertebral osteomyelitis due to *Fusobacterium* species: report of three cases and review of the literature

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Accepted 21 June 2004
Available online 4 August 2004

KEYWORDS
Spondyoldiskitis;
Fusobacterium;
Anaerobic bacteria

Abstract We describe three cases of *Fusobacterium* spp. diskitis and review with attention to risk factors, clinical features, diagnosis, treatment and outcome. In most of the reported cases, a ear–nose–throat infection was found. Clinical manifestations were similar to those of classic bacterial vertebral osteomyelitis. Clindamycin is the most appropriate antibiotic. The outcome seems to be very good without relapse with appropriate treatment compared to pyogenic vertebral osteomyelitis.

Introduction

Fusobacterium spp. are Gram-negative, non-motile, non-sporeforming, obligate anaerobic rods belonging to the family *Bacteroidacecae*. They are commonly found as normal oral flora once the teeth have erupted, gastrointestinal tract and genito-urinary tract of women. They have been frequently isolated from a wide variety of clinically significantly anaerobic infections that include oral and dental infections, brain abscess, empyema, hepatic and intra-abdominal abscess, bacteraemia, endocarditis and soft tissue infections but occasionally bone and joint infections.[1] Among different species, *Fusobacterium necrophorum* accounts for the majority of osteomyelitis cases, and *Fusobacterium nucleatum* is occasionally implicated. Vertebral osteomyelitis due to *Fusobacterium* spp. is uncommon. A search of the literature with use of MEDLINE revealed only nine cases of *Fusobacteria* diskitis.[2–10] We describe three additional cases of vertebral osteomyelitis due to *Fusobacterium* spp. and we review the cases with regard to risk factors, clinical features, diagnosis, treatment and outcome in order to contribute to the description and understanding of this condition.

Case 1

A previously healthy 78-year-old female was admitted for febrile (40 °C) low back pain of 4-day

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doi:10.1016/j.jinf.2004.06.012

duration. Three months before admission, she has been treated for a periodontal disease around a right inferior molar, which was extracted.

Initial physical examination showed paravertebral muscular tenderness with pain upon percussion over the spine from the fifth lumbar vertebrae and the first sacral vertebrae. Finding on neurological examination were normal. A CT-scan showed marked narrowing of the L5-S1 disk space, irregularity of the inferior endplate of L-5 and superior endplate of S-1, and intra-osseous gas. Magnetic resonance imaging (MRI) confirmed vertebral osteomyelitis. Two blood cultures and the disk punction yielded *F. necrophorum*, which was susceptible to penicillin, clindamycin and metronidazole. A dental radiograph was normal. The patient was treated with an 1800-mg daily dose of clindamycin for 4 weeks intravenously followed by 8 weeks orally. The back pain completely disappeared after the first month. Two years later, the patient was healthy and had no symptom.

Case 2

A 62-year-old man was admitted to the hospital because of backache. His medical history consisted of arterial hypertension. He presented with intermittent fever and sweats since 2 months. Despite treatment with non-steroid anti-inflammatory drugs, his back pain worsened, leading to complete immobilization. Antibiotic by amoxicilline and clavulanate (3 gm per day) was introduced by his general practitioner. At admission, physical examination revealed pain and lumbar stiffness. His temperature was 38 °C. Two blood cultures yielded *F. necrophorum* betalactamase negative, which was susceptible to penicillin, clindamycin and metronidazole. MRI confirmed vertebral osteomyelitis involving the four and fifth lumbar vertebrae. Vertebral biopsy yielded negative result. The patient was treated with clindamycin 1800 mg daily for 4 weeks intravenously then 8 weeks orally. Fever resolved completely within 1 week after the beginning of antimicrobial therapy. At 2-year follow-up, the patient did not report any symptom.

Case 3

A 61-year-old man presented with 2 weeks of low back pain and fever. His medical history consisted of diabetes mellitus and arteritis. The patient had a temperature of 40 °C, and physical examination was normal except for tenderness to percussion over the spine between the sixth and eight dorsal vertebrae. MRI with gadolinium contrast revealed vertebral osteomyelitis involving both the sixth/seven and seven/eight dorsal vertebral disks. A CT-guided vertebral biopsy was performed. Findings on microscopic examination of the bone biopsy specimen were consistent with acute osteomyelitis. Cultures of the biopsy specimen and blood yielded *F. nucleatum* betalactamase negative, which was susceptible to penicillin, clindamycin and metronidazole. Dental radiographs revealed evidence of periodontal disease around multiple teeth, which were extracted. The patient was treated with intravenous penicillin for 4 weeks, and then orally clindamycin 600 mg every 8 h for 8 weeks. The back pain resolved within 2 weeks. A 3-year follow-up showed complete resolution and no relapse of infection.

Discussion

Anaerobic vertebral osteomyelitis is very unusual. In a large recent retrospective study, only two of 253 (0.8%) episodes of vertebral osteomyelitis were due to an anaerobic bacteria.[11] Moreover anaerobes are found particularly in postoperative spondylodiskitis.[12] *Propionibacterium acnes* is the major anaerobic bacteria found.[13] Some cases of vertebral osteomyelitis are reported in the literature with another anaerobes like *Bacteroides fragilis*, or *Prevotella* spp.[14,15]

Osteomyelitis involving the bones of the skull is the commonest site for bone involvement with *Fusobacterium*. *F. necrophorum* is the most commonly isolated specie. This specie also accounts for the majority of cases of anaerobic purulent arthritis among which it accounts for more than 33% of the total anaerobes recovered.[1] These infections generally followed human bites, fractures or oral infections or occurred in association with vascular insufficiency or neuropathic diseases. But vertebral osteomyelitis due to *Fusobacterium* species is very rare.

Since the first description by Fain,[2] only 12 cases of *Fusobacterium* species vertebral osteomyelitis have been reported in the medical literature,[2–10] including the three present cases. One case was excluded from the analyse for absence of description in the published series.[10] Table 1 summarises the main features of the 11 remaining cases.[2–9]

A previous ear–nose–throat (ENT) infection or maxillofacial problem was found in the majority of the patients ($n=8$, 73%) without any other identified portal of entry. This data highlight the