Case Report

Capnocytophaga sputigena primary iliopsoas abscess

Jasper F. W. Chan, Samson S. Y. Wong, Sally S. M. Leung, Iris W. S. Li, Kelvin K. W. To, Vincent C. C. Cheng and Kwok-Yung Yuen

Correspondence

Samson S. Y. Wong
samsonsy@hkucc.hku.hk

Department of Microbiology, Carol Yu Centre for Infection, University of Hong Kong, Queen Mary Hospital, 102 Pokfulam Road, Hong Kong SAR

Received 1 June 2010
Accepted 12 July 2010

Iliopsoas abscess is usually secondary to the spread of infection from a contiguous focus. Primary disease is uncommon, except in children where *Staphylococcus aureus* is the main pathogen. We report a 60-year-old woman who developed a primary iliopsoas abscess as a result of haematogenous spread of *Capnocytophaga sputigena* from a palatal fistula and chronic sinusitis due to previous treatment for nasopharyngeal carcinoma. Pyomyositis due to unusual and fastidious Gram-negative bacilli should be considered in patients with head and neck tumours who have previously received radiotherapy.

Introduction

Pyomyositis of the iliopsoas muscle used to be an uncommon condition until recently. The increasing number of cases reported in the past few years has been attributed to the greater availability of imaging techniques, an ageing population and the increasing number of immunocompromised hosts (Navarro López *et al.*, 2009). The classical clinical manifestations include fever, lower abdominal or back pain, and referred pain to the hip or knee. However, the symptoms and signs may be non-specific in the early phase of the disease. Iliopsoas abscess is usually secondary to contiguous spread from adjacent foci of infection, such as the spine, gastrointestinal and urinary tracts, intra-abdominal vessels, and decubitus ulcers. In these cases, *Mycobacterium tuberculosis* from spondylitis and gastrointestinal or urinary tract flora, such as *Enterobacteriaceae*, enterococci and anaerobes, are the usual pathogens. Primary iliopsoas abscess can occasionally result from haematogenous spread from a distant site and is usually found in children where *Staphylococcus aureus* is the predominant causative organism. With the exception of viridans streptococci (Navarro López *et al.*, 2009) and *Haemophilus aphrophilus* (Chien *et al.*, 2009), component organisms of the human oral flora have not been found in cases of primary iliopsoas abscess. We report what is believed to be the first case of primary iliopsoas abscess caused by *Capnocytophaga sputigena* in a patient with a history of nasopharyngeal carcinoma complicated by post-treatment palatal fistula.

Case report

A 60-year-old Chinese woman presented with fever and right groin pain for 5 days. She had a past history of left hip

tuberculosis 40 years ago, and nasopharyngeal carcinoma treated with surgery and radiotherapy 9 years ago, which was complicated by bilateral temporal radionecrosis, chronic sinusitis and palatal fistula. Physical examination showed she had a temperature of 38.0 °C and tenderness over the right groin. Computed tomography (CT) scans of the abdomen and pelvis revealed two rim-enhancing collections suggestive of intramuscular abscesses at the right iliopsoas and right rectus femoris muscles measuring 1.2 cm × 1.1 cm × 3.5 cm and 1.2 cm × 0.5 cm × 4.5 cm, respectively (Fig. 1). Magnetic resonance imaging of the lumbosacral spine did not reveal any evidence of primary bone or joint infection. Ultrasound-guided aspiration of the right iliopsoas abscess yielded a small amount of turbid fluid. Gram, Grocott and Ziehl–Neelsen stains of the aspirate were negative for micro-organisms, and routine culture under aerobic and anaerobic conditions on blood, chocolate and MacConkey agars revealed no growth after 7 days of incubation. The aspirate injected into the anaerobic blood culture bottle (BACTEC Aerobic/F and Anaerobic/F; Becton Dickinson) for enrichment became positive on day 3 of incubation. Tiny non-haemolytic colonies of Gram-negative bacilli appeared on 5% sheep blood agar after 2 days of incubation in 5% CO₂ at 37 °C. The bacterium was oxidase and catalase negative. Two Vitek identification systems (GNI and ANI; bioMérieux) gave conflicting results and identified the organism as *Acinetobacter lwoffii*/*Acinetobacter junii* and *Capnocytophaga* species with 64 and 99% confidence levels, respectively. 16S rRNA gene sequencing using the MicroSeq 500 identification system was performed on the isolate, which was shown to be 100% homologous with the *C. sputigena* sequence. The organism showed susceptibility to penicillin, ampicillin, cefuroxime, erythromycin, clindamycin, levofloxacin and tetracycline.

The patient's symptoms responded to percutaneous drainage and 1 g oral amoxicillin–clavulanate twice per

Abbreviation: CT, computed tomography.

Fig. 1. Intramuscular abscesses at the right iliopsoas muscle and the right rectus femoris muscle measuring 1.2 cm×1.1 cm×3.5 cm and 1.2 cm×0.5 cm×4.5 cm, respectively (indicated by arrows), in a CT scan of the abdomen and pelvis.

day, but developed drug-induced hepatic dysfunction after 7 days. The antibiotic regimen was thus changed to 500 mg oral levofloxacin once per day for a further 14 days. Reassessment by CT scan of the abdomen and pelvis performed 24 days after drainage confirmed complete resolution of the intramuscular abscesses. The patient remained well and blood tests, including complete blood analysis, liver and renal function tests, C-reactive protein and erythrocyte sedimentation rate, were normal at follow-up 6 months after discharge from hospital.

Discussion

Capnocytophaga species are fastidious, capnophilic, fusiform Gram-negative bacilli with gliding motility that are commonly found in the human oral cavity as part of the normal gingival flora (Ooshima *et al.*, 2003). The genus was first proposed by Leadbetter and colleagues in 1979 who classified strains of oral Gram-negative bacilli into 3 species, *Capnocytophaga ochracea*, *C. sputigena* and *Capnocytophaga gingivalis*, on the basis of variable carbohydrate fermentation, hydrolysis of polymers and reduction of nitrate (Leadbetter *et al.*, 1979). The genus now comprises seven species and has been postulated to play a causative role in gingivitis and periodontitis, although this association has been controversial. Among the different species, *C. sputigena* has been associated with opportunistic infections including bacteraemia, endocarditis, vertebral osteomyelitis, sinusitis, pleuropneumonitis, chorioamnionitis, septic abortion and keratitis. Intramuscular abscesses due to *Capnocytophaga* species is rare and has been reported in a single case of mixed infection with *S. aureus* as the result of haematogenous spread from the oral cavity after local trauma of the gluteal muscle (Ebinger *et al.*, 2000). The present case is believed to be the

first to describe *C. sputigena* as a sole cause of primary iliopsoas abscess, which has traditionally been associated with *S. aureus* in children.

The reason why *C. sputigena* caused a distant pyomyositis in this patient is uncertain. The prior radiotherapy to the head and neck region for the treatment of nasopharyngeal carcinoma was likely an important predisposing factor as local irradiation is associated with changes in the oral microbiota, which is sometimes related to xerostomia. In a study on nasopharyngeal carcinoma patients who had previously received radiotherapy for treatment, the prevalence of *Capnocytophaga* species in subgingival plaques ranged from 17 to 44 %, in contrast to 0 % in healthy subjects (Leung *et al.*, 1998). These patients may therefore be prone to metastatic Gram-negative infections when there is a breakdown of the mucosal barrier. An analogy is seen in the high prevalence of Gram-negative bacillary meningitis in patients with nasopharyngeal carcinoma (Huang *et al.*, 2003). Another important predisposing factor for metastatic capnocytophagal infection is concomitant oral pathology as described in a case of vertebral osteomyelitis (Duong *et al.*, 1996). Although bacteraemia is almost certainly a preceding event in these patients, the fact that it might have occurred transiently prior to the development of distant infections means that it may not be detectable on presentation. Also, the only set of blood cultures from our patient was taken after two doses of oral amoxicillin–clavulanate, which may also explain the negative culture results.

Most *Capnocytophaga* strains are susceptible to β -lactam/ β -lactamase inhibitor combinations, clindamycin, tetracycline, chloramphenicol, linezolid and imipenem, and resistant to polymyxin, fusidic acid, fosfomycin, colistin and trimethoprim. Susceptibility to other classes of antibiotics varies (Jolivet-Gougeon *et al.*, 2007). While β -lactams and quinolones are often used as the first-line treatment for such infections, resistant strains capable of causing serious infections have been reported elsewhere (Gomez-Garces *et al.*, 1994; Matsumoto *et al.*, 2008). We believe that in patients who have a history of head and neck tumours treated with radiotherapy, empirical therapy for musculoskeletal infections should include additional Gram-negative coverage whilst culture results are pending.

As host factors significantly affect the aetiology of primary iliopsoas abscess, accurate identification of the causative organism is crucial. CT-guided aspiration of the abscesses must be considered in all patients to assist in the choice of antimicrobial therapy. The importance of obtaining cultures prior to the commencement of antibiotics – except in patients with fulminant sepsis – cannot be overemphasized. Routine laboratory cultures may miss infections caused by fastidious and slow-growing pathogens such as *Capnocytophaga* spp., especially in patients who have been put on antibiotics. The increasing availability of molecular methods such as 16S rRNA sequencing facilitates the rapid identification of these unusual pathogens, which may

otherwise be misidentified by traditional laboratory techniques and commercially available identification systems.

References

- Chien, J. T., Lin, C. H., Chen, Y. C., Lay, C. J., Wang, C. L. & Tsai, C. C. (2009). Epidural abscess caused by *Haemophilus aphrophilus* misidentified as *Pasteurella* species. *Intern Med* **48**, 853–858.
- Duong, M., Besancenot, J. F., Neuwirth, C., Buisson, M., Chavanet, P. & Portier, H. (1996). Vertebral osteomyelitis due to *Capnocytophaga* species in immunocompetent patients: report of two cases and review. *Clin Infect Dis* **22**, 1099–1101.
- Ebinger, M., Nichterlein, T., Schumacher, U. K., Manncke, B., Schmidt, D. & Böhn, I. (2000). Isolation of *Capnocytophaga granulosa* from an abscess in an immunocompetent adolescent. *Clin Infect Dis* **30**, 606–607.
- Gomez-Garcés, J. L., Alos, J. I., Sanchez, J. & Cogollos, R. (1994). Bacteremia by multidrug-resistant *Capnocytophaga sputigena*. *J Clin Microbiol* **32**, 1067–1069.
- Huang, C. R., Lu, C. H., Chien, C. C., Lee, P. Y. & Chang, W. N. (2003). High incidence of gram-negative bacillary infection and high mortality in adult patients with bacterial meningitis and nasopharyngeal carcinoma. *Eur J Clin Microbiol Infect Dis* **22**, 509–511.
- Jolivet-Gougeon, A., Sixou, J. L., Tamanai-Shacoori, Z. & Bonnaure-Mallet, M. (2007). Antimicrobial treatment of *Capnocytophaga* infections. *Int J Antimicrob Agents* **29**, 367–373.
- Leadbetter, E. R., Holt, S. C. & Socransky, S. S. (1979). *Capnocytophaga*: new genus of gram-negative gliding bacteria. I. General characteristics, taxonomic considerations and significance. *Arch Microbiol* **122**, 9–16.
- Leung, W. K., Jin, L. J., Samaranayake, L. P. & Chiu, G. K. (1998). Subgingival microbiota of shallow periodontal pockets in individuals after head and neck irradiation. *Oral Microbiol Immunol* **13**, 1–10.
- Matsumoto, T., Matsubara, M., Oana, K., Kasuga, E., Suzuki, T., Hidaka, E., Shigemura, T., Yamauchi, K., Honda, T. & other authors (2008). First case of bacteremia due to chromosome-encoded CfxA3- β -lactamase-producing *Capnocytophaga sputigena* in a pediatric patient with acute erythroblastic leukemia. *Eur J Med Res* **13**, 133–135.
- Navarro López, V., Ramos, J. M., Meseguer, V., Pérez Arellano, J. L., Serrano, R., García Ordóñez, M. A., Peralta, G., Boix, V., Pardo, J. & other authors (2009). Microbiology and outcome of iliopsoas abscess in 124 patients. *Medicine (Baltimore)* **88**, 120–130.
- Ooshima, T., Nishiyama, N., Hou, B., Tamura, K., Amano, A., Kusumoto, A. & Kimura, S. (2003). Occurrence of periodontal bacteria in healthy children: a 2-year longitudinal study. *Community Dent Oral Epidemiol* **31**, 417–425.