Case Report

Post-operative mediastinitis, pleuritis and pericarditis due to *Mycoplasma hominis* and *Ureaplasma urealyticum* with a fatal outcome

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Post-sternotomy mediastinitis, although infrequent, is a potentially life-threatening complication of cardiac surgery. We report an unusual case of *Mycoplasma hominis* and *Ureaplasma urealyticum* post-surgical mediastinitis with persistent pleural and pericardial effusion. Clinical manifestations and response to therapy are described, and the difficulties of establishing the diagnosis are discussed.

**Case report**

A 77-year-old man with a medical history of hypertension and chronic obstructive pulmonary disease was admitted to the intensive care unit following cardiovascular surgery, in which the aortic valve was replaced with a prosthetic valve and the superior third ascending aorta was replaced. Following the operation, in the first few hours, the patient required inotropic medication and ventilator support to maintain haemodynamic stability. Four days after the operation, he developed septic symptoms, disorientation and cardio-respiratory dysfunction. A computerized tomography scan of the thorax showed the appearance of a mediastinal and pericardial haematoma with signs of a cardiac tamponade. The patient was operated on again to remove the haematoma. Over the following days, the patient’s temperature was 37.5 °C and he showed permanent leukocytosis.

Treatment was started with cefotaxime (2 g every 6 h) and metronidazole (500 mg every 8 h). Blood cultures were requested and the previous antibiotic treatment was substituted with piperacillin/tazobactam (4 g every 8 h) and teicoplanin (400 mg every 12 h). Blood cultures were negative, but the surgical wound presented signs of sternal dehiscence and a grey, purulent and serosanguinous fluid was secreted from the mediastinal area. No organisms were observed in Gram stains of this material. Culture was negative after 48 h of incubation for conventional aerobic and facultative bacteria. On day 12, after the second operation, surgical debridement and drainage of the mediastinum was performed. Despite this treatment, the wound evolution was torpid with constant exudation which turned into pus. Microbiological results were again negative. In the haemogram, an increase in leukocytosis with a left shift was noted. Five days later, it became necessary to perform a third operation due to sternal wound dehiscence. At that time, samples from the wound, mediastinal exudate and pleural and pericardial fluids were plated onto sheep blood agar, chocolate agar, MacConkey agar, Columbia CNA blood agar and vitamin K agar (Biomedics). Incubation was performed at 37 °C in air, 5 % CO₂ and anaerobically in a sealed container with a GasPak catalyst (BBL Microbiology Systems). After 5 days of incubation, growth of translucent and very tiny colonies of different size and morphology was observed under a stereomicroscope on all plates except MacConkey agar. The presence of mycoplasma was suspected and preliminary identification was obtained by subculture into UMMlyo broth with Mh supplement (Mycofast EvolutioN 2; International Microbio). Treatment was changed to doxycycline (500 mg every 24 h) and clindamycin (600 mg every 6 h). Over the following days, symptoms improved slightly. However, the patient developed septic shock and multiorgan failure and died on day 51 after the first surgical procedure because of a digestive haemorrhage due to a bulbar ulcer which could not be controlled despite endoscopic treatment. An autopsy showed bilateral pneumonia and necrotizing pericatrificial inflammation in the subcutaneous tissue, muscle and synthetic material from the ascending aorta, following the collection of samples. *Mycoplasma hominis* and *Ureaplasma urealyticum* were cultured from all of these samples. Definitive identification of the organisms was determined by automated DNA sequencing of the 16S RNA gene and sequence comparison with sequences available from the GenBank Nucleotide Sequence Database.
Discussion

Suppurative mediastinitis remains one of the most serious complications of median sternotomy after open heart surgery. Fortunately, the number of reported cases indicates that the incidence of this condition is low (Fariñas et al., 1995; Fernández-Ayala et al., 2003; Muñoz et al., 1997; Sielaff et al., 1996). Classic post-cardiac surgery sternal wound infections are mostly caused by staphylococci and members of the Enterobacteriaceae and management generally consists of operating on again for debridement, drainage and antibiotic therapy (Fariñas et al., 1995; Muñoz et al., 1997). Signs of infection usually appear early after the operation. The onset and clinical course of infection are rapid, and sepsis is a major presenting complication. However, in our patient, the infection was characterized by a chronic, indolent and recurrent course, which is consistent with other published reports (Mattila et al., 1999). In spite of initial negative cultures, the diagnosis of mediastinal infection was made when intraoperative observations (necrotic tissue, mediastinal pus and sternal disjunction) were unequivocal. Confirmation was obtained on the basis of positive results of culture of sterile fluids on conventional bacteriological agar plates incubated for 5 days. The aetiological diagnosis was delayed, and in spite of a slight improvement after the specific treatment for both micro-organisms and surgical debridement, the infection evolved to septic shock and multiorgan failure.

Atypical growth characteristics in routine bacterial culture, and the inability to demonstrate the organisms by Gram staining, led to delayed diagnosis of the Mycoplasma and Ureaplasma infections. The inability to detect growth of these organisms using automated blood cultures has been attributed to a great extent to the mycoplasmaspecific effects of sodium polyanethol sulfonate, the anticoagulant widely used in liquid blood culture media (Waites & Canupp, 2001).

It is difficult to know the source of the bacterial infection. A possible origin could be colonization of the gnotobiotic tract after a procedure such as insertion of a urinary catheter and the eventual systemic spread through the bloodstream. In fact, the patient had presented with aseptic leukocyturia several days before surgery, but no specific studies were performed.

Although rare, M. hominis and/or U. urealyticum infections must be considered in the differential diagnosis of slowly progressive but destructive wound infections (Smyth & Weinbren, 1993), pneumonia and culture-negative pleural effusion (García et al., 2007; Saez et al., 2003) and culture-negative mediastinitis that occurs after cardiac surgery (Mossad et al., 1996). Treatment requires a combined surgical and antimicrobial approach.

Tetracycline, clindamycin and fluoroquinolones are considered effective. Subsequent to the death of the patient, the results of susceptibility testing revealed that the two strains were susceptible to doxycycline, tetracycline, minocycline, levofloxacin, ofloxacin, ciprofloxacin and moxifloxacin.

To date, only one other case of mixed deep sternal wound infection due to M. hominis and U. urealyticum has been reported (Boyle et al., 1993). As U. urealyticum is more difficult to identify than M. hominis, it could be possible that mixed infections by these two bacteria are actually more common than currently appreciated. An increased awareness by clinical microbiologists will likely lead to a better understanding of the epidemiology and clinical presentation of these organisms.

References


