

## *Pasteurella* spp in Knee Mega Prosthesis Infection: A Case Report

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### Abstract

*Pasteurella* spp is the most frequently pathogen isolated from infected wound inflicted by domestic animal bites. Here we present a case of isolation of *Pasteurella pneumotropica* like organism from knee mega prosthesis infection occurred in 63 years old female.

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### Case Report

63-year-old woman presented herself at our Infectious disease department 15 months following a right total knee replacement for pseudoarthrosis with mega prosthesis. There was no history of trauma or any local invasive therapeutic procedure in the interim period. The postoperative course had been uneventful until ten days prior to her arrival at our department when she reported sudden onset of pain at her right knee with functional impairment, without fever or local other signs or symptoms. About five days later, given the persistent pain and the appearance of a swollen, edematous and warm right knee, she arrived at our emergency room, where an x-ray was performed showing prosthesis in place, with large bone defects in the patella, clearly lateralized and associated with massive swelling. Laboratory investigations revealed neutrophilic leucocytosis (WBC = 10660 cells/mm<sup>3</sup>), increased c reactive protein (CRP = 457 mg/l), and an initial acute renal failure (creatinine = 1.39 mg/dl). The patient was discharged with an antibiotic therapy with amoxicillin/clavulanic acid, replaced after two days with teicoplanin 600mg and ceftriaxone 2g IV (due the persistence of fever and inflammation signs on the knee). After an initial clinical improvement, she came back to our emergency room for the appearance of a fistula secreting abundant amount of pus. A new right knee x-ray was performed which, compared to the previous one, showed a further increase of patellar space. Laboratory investigations revealed a decrease of inflammation signs and creatinine value (WBC = 8160 cells/mm<sup>3</sup>, CRP 246 mg/l, creatinine 1,15 mg/dl). Emoculture and urinoculture were negative. She was hospitalized and urgently underwent an articular washing to collected material for microbiological culture. The postoperative period was complicated by congestive heart failure and renal impairment, corrected with diuretic therapy. Waiting for the surgery microbiological results we continued the antibiotic therapy with teicoplanin and ceftriaxone with improved CRP (from 246 to 70 mg/l), later changed to oxacillin 12g due to the detection of MSSA by intraoperative swab culture. After four days since the beginning of the oxacillin treatment, an itchy rash associated with fever and increase of CRP (104 mg/l) appeared. We consequently modified anticoagulation therapy with fondaparinux instead of enoxaparin and the antibiotic therapy with daptomycin plus levofloxacin for suspect allergic reaction to oxacillin and clinical worsening with the only anti MSSA antibiotic

therapy. The rash was treated with success with a single dose of the steroid associated with antihistamine. During the hospitalization for persistent anemia treated with a lot of emotransfusions, we decided to perform an esophagogastroduodenoscopy that was negative for active bleeding, and a colonoscopy that was positive for an anal polyp characterized by signs of recent bleeding. The polyp was removed and histology was negative for neoplasia. Although daptomycin and levofloxacin 7 days therapy the persistence of high CRP associated with pain and edema at right knee, we decided to perform a soft tissue echography that reported the presence of an abscessual lesion that probably prevented the clinical recovery to first surgeon revision and specific antibiotic therapy. As a consequence, the patient underwent a second surgery revision with abscessual evacuation and replacement of the prosthesis. The diagnosis of infection is often complicated by the inability to isolate the pathogen responsible for infection with traditional sampling techniques. This is mainly due to the fact that the bacteria responsible for the infection are organized into complex structures, known as biofilm. Suspecting a prosthetic biofilm producing bacteria infection, at the operating bed, the prosthesis was portioned for its sample processing and treated in the operating room with a MicroDTTect device (4i for infection srl, Monza, Italy), which, thanks to the use of a dithiothreitol solution, enhances retrieval of bacteria embedded in biofilm. A traditional microbiological culture with Castaneda flask (Hemoline, Biomeriux, Marcy l'Etoile, France) and a joint fluid cultured into blood culture device (Biomeriux, Marcy l'Etoile, France) were performed.

Given the persistence of anemia and the oozing of blood from the surgical wound, an angiography and an arteriography were performed, resulting negative for hemorrhagic lesions. The hematoma

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was finally considered by orthopedic surgeons as a probable result of oozing bleeding and treated with compressive medication and local ice, in addition to a reduction of prophylaxis fondaparinux, with resolution of anemia.

*Pasteurella pneumotropica* like organism was identified after 10 days of culture with an automatic (Vitek, Biomeriux, Marcy l'Etoile, France) and semi automatic instrument (Api, Biomeriux, Marcy l'Etoile, France) from screws and prosthesis inoculated into a Castaneda flask (Hemoline, Biomeriux, Marcy l'Etoile, France).

Antibiotic susceptibility testing performed for *Pasteurella pneumotropica* like organism was as followed: ampicillin (MIC  $\leq 2$ ), cephalosporines (cefepim  $\leq 1$ , cefotaxime  $\leq 1$ , ceftazidime 4), aminoglycosides (gentamicin  $\leq 1$ ), quinolones (ciprofloxacin  $\leq 0,25$ ) were sensible. Considering previous and recent isolation (MSSA, *E. coli* ESBL negative and *P. pneumotropica* from intraoperative material), the therapy was changed to levofloxacin plus gentamicin.

The *Pasteurella spp* identification was confirmed by a broad range PCR targeted on the 16S rRNA gene. The 291 bp PCR product was sequenced directly and the 16S rDNA sequences obtained were compared with those in the GenBank database by using the BLAST search tool: sequence shared 100% identity with *Pasteurella spp.*, in particular with *P. multocida* and *P. canis*.

Given the particularity of the bacterium isolated, the patient was interviewed about possible biting by domestic animal. She confirmed a dog scratching 20 days before the onset of pain at her right knee and fever. Currently the conditions of the patient are good: while persisting a pain comparable to that before the infection, laboratory tests are normal.

Although in literature the *Pasteurella spp* is the most frequently reported bacteria from wounds inflicted by animals bites [1-9] it is a rare pathogen responsible for prosthetic infection and our clinical experience suggest that detailed anamnesis should help for the correct diagnosis of this particular infection [4].

In order to provide valuable support to the Orthopedic clinical microbiologist and infectious disease specialist, must have multiple samples to be subjected to microbiological survey, taken from areas defined with appropriate techniques prevent cross-contamination and without treatment/antibiotic prophylaxis for an adequate period of time. Our case showed a high sensitivity of the prosthetic material compared to culture of joint fluid or tissue swab in the diagnosis of infections.

In our experience we ensured *Pasteurella spp* identification with Castaneda culture after 10 days of culture; MicroDTT device led to the identification of any bacteria and then we excluded the presence of biofilm producing bacteria.

Finally our case showed as, especially in this particular infection, the deep collaboration between infectivologist, orthopedic and microbiologists should be targeted often on the basis of a proper medical history.

## Conflict of Interest

None of the authors has conflict of interest with the submission.

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