First Report of a Hip Prosthetic and Joint Infection Caused by \textit{Lactococcus garvieae} in a Woman Fishmonger\textsuperscript{V}

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We describe the first case of hip prosthetic infection due to \textit{Lactococcus garvieae}. The patient, a 71-year-old woman fishmonger, developed a hip infection 7 years after total hip arthroplasty. The origin of infection was possibly due to the manipulation or intake of seafood or fish contaminated with \textit{Lactococcus garvieae}.

**CASE REPORT**

A 71-year-old woman was admitted for orthopedic consultation at Nantes University Hospital because of pain in the left hip she had suffered for about 1 year. Her medical history included obesity (body mass index [BMI] of 41), arterial hypertension, type 2 diabetes mellitus, hemochromatosis, ischemic cardiopathy, and chronic alcoholism. Osteonecrosis of the femoral head had been treated with total hip arthroplasty 7 years before. Infection of the hip prosthesis was suspected on clinical examination. Radiographs of the left hip revealed signs of unsealing of the prosthesis, with serious modifications to the cortical bones. The patient was admitted for aspiration of the hip, using fluoroscopic guidance, 1 month later. Laboratory data included a blood leukocyte count (6.34 $\times$ 10\textsuperscript{9} cells liter\textsuperscript{-1}), with 74% polymorphonuclear leukocytes and a C-reactive protein level of 50 mg liter\textsuperscript{-1} (normal range is <5 mg liter\textsuperscript{-1}). Serial blood cultures remained negative despite the absence of antibiotic treatment. A purulent fluid was aspirated from the hip. Direct examination showed Gram-positive cocci arranged in pairs, short chains, and clusters. Antibiotics were not prescribed until the final microbiological result from the joint fluid aspiration was completed.

A two-stage exchange arthroplasty was planned. The first stage involved removal of the infected prosthesis and insertion of a gentamicin spacer (Biomet Orthopaedics Switzerland GmbH, Dietikon, Switzerland) for six weeks. Seven out of eight perioperative samples (five tissue specimens from around the prosthesis, one bone specimen, and two joint fluids) were positive in culture. An antibiotic therapy was started, including a combination of ceftriaxone (2 g per day) and levofloxacin (750 mg per day) for 3 months. Intravenous administration of drugs was preferred to improve patient compliance and tissue diffusion of antibiotics. Ceftriaxone was chosen as an alternative to high-dose amoxicillin, which is more efficacious when patients have a high BMI.

Cultures from three samples (two tissue specimens and one from joint fluid) performed during the second stage of arthroplasty (6 weeks after the removal of the infected prosthesis) remained sterile after 14 days of incubation. Treatment was well tolerated, and the clinical outcome was favorable at 1 year after the hip replacement. The patient could walk again without any difficulty.

Culture of the joint fluid was positive on blood agar after 1 day of aerobic incubation (bioMérieux, Marcy l’Etoile, France). The bacterium was catalase and oxidase negative. An accurate identification (probability, 99%; typicity, 100%), using an IDGP N052 card (bioMérieux, Marcy-l’Etoile, France), led to \textit{Lactococcus garvieae}. Sequencing of the partial 16S rRNA gene was performed, as previously described (7, 16, 21), to confirm identification of this rarely encountered bacterium in clinical specimens. The 500-bp fragment obtained was compared with NCBI GenBank entries using the BLAST algorithm (http://www.ncbi.nlm.nih.gov/BLAST) and the BIBI database (http://umr5558-sud-str1.univ-lyon1.fr/lebibi/lebibi.cgi). The sequence of the bacterium showed 100% identity with the sequence of the \textit{L. garvieae} type strain (16S rRNA gene, GenBank accession number no. AB362690).

After 24 or 48 h of incubation at 37°C in aerobic conditions, the seven positive perioperative specimen cultures yielded Gram-positive cocci identified as \textit{L. garvieae}, which allowed us to identify this bacterium as the origin of infection (1). In this case, the prosthetic and bone infections seem to have been acquired by hematogenous spread from a distant source.

Testing for \textit{in vitro} susceptibility was performed using the disk diffusion and the Etest diffusion methods on Mueller-Hinton medium with 5% sheep blood (bioMérieux). The breakpoints described for general bacteria allowed us to consider this bacterium susceptible to amoxicillin (MIC, 1 μg/ml), ceftriaxone (MIC, 0.38 μg/ml), levofloxacin (MIC, 0.50 μg/ml), moxifloxacin (MIC, 0.25 μg/ml), and tetracycline but resistant to lincomycin, fosfomycin, cotrimoxazole, and rifampin, according to the French committee guidelines (3).

\textit{Lactococcus garvieae} is a Gram-positive bacterium with nonmotile and nonsporulating cocci. Colonies on blood agar or nutrient agar are circular, smooth, and entire (Fig. 1). The...
small nonhemolytic gray colonies were able to grow in aerobic as well as anaerobic atmospheres. Ovoid cells were elongated in the direction of the chain and were mostly in pairs or short chains. The _L. garvieae_ isolate showed the following phenotypic characteristics: PYR (pyrrolidonylarylamidase) positive, LAP (leucine aminopeptidase) positive, 6.5% salt positive growth on PYR (pyrrolidonylarylamidase) positive, LAP (leucine aminopeptidase) positive, 6.5% salt positive growth on media, 6.5% salt positive growth on mannitol, trehalose, ribose, and saccharose broths but not in sorbitol, arabinose, or diacetylecitc. The _Lactococcus_ genus was separated from the _Streptococcus_ genus on the basis of genetic analysis, including DNA-DNA relatedness and 16S rRNA sequencing data (16). The _Lactococcus_ genus comprises seven species and subspecies (_L. lactis_ subsp. _lactis_, _L. lactis_ subsp. _cremoris_, _L. lactis_ subsp. _hordniae_, _L. garvieae_, _L. piscium_, _L. plantarum_, and _L. raffinolactis_) identified by phenotypic analysis (5, 14, 15). These species are facultative anaerobic, catalase-negative, Gram-positive cocci that primarily produce lactic acid from the fermentation of carbohydrates. _Lactococcus garvieae_, originally described as _Streptococcus garvieae_ in 1981 by Garvie et al., was one of the new species of this genus, and the identification was confirmed by Collins et al. in 1983 and Elliott et al. in 1991 (2, 4, 9). _L. garvieae_ is not a fastidious-grown microorganism, but its diagnosis is difficult when bacteriologists are not aware of its possible links with animal contact or food contamination. Indeed, this species is rarely found in clinical routine samples, and its Gram morphology leads to suspicion of _Streptococcus_. To the best of our knowledge, this is the first report of prosthetic infection caused by _L. garvieae_. Despite several investigations, the source of contamination in this case was not found. However, fish consumption and its manipulation are the most probable sources of bacteremia, as has been reported in the literature (20). In fact, as was found from our patient’s medical story, this former fishmonger and immunosuppressed woman lived near the sea and prepared and ate fish and shellfish frequently. A skin wound could be the gateway for asymptomatic bacteremia with secondary localization at the prosthesis. This case illustrates the ability of _L. garvieae_ to cause a late prosthetic joint infection in a patient with multiple comorbidities. The propensity for a commensal bacterium to cause unapparent bloodstream infections with septic metastasis and joint infections is of special concern for patients with a severely suppressed immune system.

REFERENCES


