naemia and the risk of *M. pneumoniae* infection, as these patients can suffer from more severe and prolonged illnesses and develop more complications[10].

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Infective endocarditis caused by *Streptococcus cristatus*

Endocarditis infecciosa causada por Streptococcus cristatus

A 76-year-old patient presented at our hospital with intermittent fever of up to 40 °C lasting three weeks, coinciding with stem cell inoculation in both hips. The patient had required aortic valve replacement six years earlier and, due to liver cirrhosis with hepatocarcinoma in segment 5, had also required partial hepatectomy and cholecystectomy five months earlier. Twenty days before, the patient had a dental filling for which he did not receive antibiotic prophylaxis. On examination, the patient had a fever of 39.1 °C with a pansystolic murmur, and a blood test showed 12,900 leukocytes, 90% of which were neutrophils. Suspecting endocarditis, a blood culture was obtained and the patient was admitted for study and antibiotic treatment with vancomycin and cefepime (1 g/12 h and 2 g/24 h intravenously [IV], respectively).

A transthoracic echocardiogram was performed, in which thickened aortic leaflets were observed, and also a transoesophageal echocardiogram, in which no clear images of endocarditis were observed. The blood culture was positive after 20 h of incubation, showing Gram-positive cocci in chains in the Gram stain. The blood culture was inoculated on CNA agars (Becton Dickinson, New Jersey, USA), TSA agars with 5% sheep blood (BD™) and chocolate agar. At 24 h, growth was observed, with its identification and antibiotic sensitivity provided by means of the SMIC-ID-11 (BD™) panel in the BD Phoenix™ AP system. The strain was identified as *Streptococcus cristatus* (*S. cristatus*), which was sensitive to penicillin (MIC ≤0.03 mg/l), vancomycin (MIC = 1 mg/l), teicoplanin (MIC ≤1 mg/l) and clindamycin (MIC ≤0.03 mg/l). In a subsequent blood culture, *S. cristatus* was identified again, changing the antibiotic treatment to ceftriaxone (2 g/24 h) while waiting to perform CT + PET-CT. After administration of IV contrast and 18-FDG, lesions compatible with small infarcts in the lower pole of the spleen and left kidney were found, as well as increased metabolic activity in the periprosthetic aortic valve, which did not prevent us from ruling out endocarditis (Fig. 1).

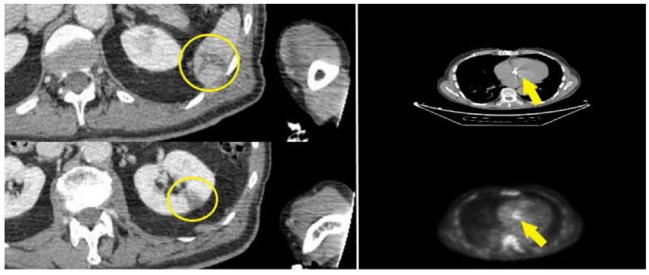

Figure 1. Joint CT and PET-CT study performed following endocarditis protocol after inconclusive result by transoesophageal echocardiogram by administration of intravenous contrast and 18-FDG, with imaging from the cervical region up to and including the pelvis. Hypodense lesions of triangular morphology and new appearance in the lower pole of the spleen and interpolar region of the left kidney, compatible with small infarcts (yellow circles). Focal increase in metabolic activity (yellow line) on the prosthetic aortic valve annulus's anterior region makes it impossible to rule out endocarditis without significant morphological findings.

The condition was considered as probable endocarditis (one major criterion and three minor criteria) and the patient completed six weeks of IV treatment. The patient was followed up through outpatient visits, confirming clinical improvement and normality in subsequent echocardiograms. To confirm the identification, the strain was reseeded to sequence the 16S ribosomal RNA gene. A 637 bp sequence was obtained that was entered into BLAST®, and was identified as *S. cristatus* with an identification percentage of 99.37% (see sequencing protocol and sequence in Appendix B: Supplementary material attached).

S. cristatus was isolated for the first time from the human oral cavity, belonging to the *mitis*group.[1] A 2014 study showed that *S. cristatus, Streptococcus oligofermentans* and *Streptococcus sinensis*

are closely related, and a new phylogenetic clade, the "*sinensis* group", was proposed to include these three microorganisms.[2] The relationship between infections such as endocarditis and dental interventions has been proven, and prophylaxis is recommended in patients with risk factors, such as valve carriers. In addition, poor dental hygiene also seems to be associated with a higher risk of infections by *S. cristatus*.[3] In the case presented here, and in another of those previously reported, the patients had minor dental interventions or a history of poor dental hygiene prior to the infection.[4]

Only nine clinical cases of infections caused by this microorganism have been described: six cases of infective endocarditis, one of septic arthritis and two of bacteraemia.[4-9] At our institution, we have identified another case of endocarditis by sequencing the 16S rRNA gene from a prosthetic valve sample.

Current treatment guidelines recommend, in patients with *viridans* group streptococcal prosthetic valve endocarditis, six weeks of penicillin (24 million U/24 h IV in continuous infusion or 4-6 doses) or ceftriaxone (2 g/24 h IV or IM), which can be combined with a 2-6 week regimen of gentamicin (3 mg/kg every 24 h IV or IM). In highly sensitive strains (MIC of penicillin $\leq$0.12 mg/l), as in our case, the combination with gentamicin has not shown higher cure rates compared to monotherapy.[10]

This case adds more scientific evidence about the ability of *S. cristatus* to cause serious infections such as bacteraemia or endocarditis, although more studies are needed to explore its virulence.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Annex. Additional material

Additional material for this article can be consulted in the electronic version available at doi:10.1016/j.eimc.2022.08.011

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Streptococcus canis as a causative agent of infection of osteosynthesis material and myositis

Streptococcus canis *como agente causal de infección de material de osteosíntesis y miositis*

A 51-year-old patient, a moderate alcohol consumer with a history of bimalleolar fracture of the right ankle nine years earlier, for which he required open reduction and osteosynthesis with a fibular plate and screw in the medial malleolus, was admitted due to ascitic decompensation in the context of Child C liver cirrhosis for control and study. At admission, the patient presented oedema and erythema in the right lower extremity, with a painful subcutaneous abscess on palpation. Surgical debridement was performed, with abundant purulent exudate discharge and osteosynthesis material was extracted, sending samples for cultures.

The osteosynthesis material sample was introduced into a container with thioglycolate enrichment medium, which was incubated at 37 °C in aerobic conditions for 24 h and subsequently Gram stained, and inoculated on chocolate and *Brucella* agars. Abscess samples were plated on chocolate, TSA with 5% sheep blood, McConkey, CNA and *Brucella* agars. In all the Gram