

Meningitis Due to *Streptococcus salivarius*

Streptococcus salivarius is a common inhabitant of the oral mucosa that has been associated with infection in different sites (4). Meningeal infection by this species, generally related to neoplasias or iatrogenia, has been described on few occasions (1, 2, 6). We describe two cases recently diagnosed in our hospital.

Case 1. An 84-year-old male was admitted for intestinal subocclusion due to an adenocarcinoma of the rectum. Ten days after admission the patient's general condition began to deteriorate and developed fever and nuchal rigidity. The cerebrospinal fluid (CSF) yielded 7,680 leukocytes/ml (95% were polymorphonuclears), 726 mg of protein per dl, and undetectable glucose. Empiric treatment was initiated with ceftazidime (2 g every 6 h), ampicillin (2 g every 4 h), and vancomycin (1 g every 12 h). Streptococci were isolated from the CSF and by culture from one blood sample. Therapy was changed to ampicillin (2 g every 4 h) and gentamicin (80 mg every 8 h). The patient was discharged 22 days later in satisfactory condition.

Case 2. A 65-year-old woman who underwent surgery for meniscectomy with epidural anesthesia returned to the hospital 4 days after surgery due to headache, general discomfort, chills, and vomiting that had continued since the day after the meniscectomy. CSF analysis revealed 580 leukocytes/ml (95% were polymorphonuclears), 108 mg of protein per dl, and 26 mg of glucose per dl. The patient, who was allergic to penicillin, was treated empirically with vancomycin (1 g every 12 h) and tobramycin (300 mg every 24 h). A streptococcus was isolated from the CSF. Tobramycin therapy was discontinued, and clindamycin therapy (600 mg every 12 h), was initiated. The patient recovered in 7 days without sequelae.

The first case appeared to be an example of an invasive streptococcal infection originating from the large intestine in a patient with intestinal neoplasia and is similar to the other cases described in the literature (1). In the second case, the microorganism was probably introduced at the time the puncture was made for the epidural anesthesia, a risk which has also been reported previously (6). Gram's staining of the CSF was negative in both patients.

Both isolates were identified by phenotypic methods and genetic analysis. In phenotypic analyses, both strains hydrolyzed esculin in the presence of 4% bile and yielded a positive reaction with Lancefield group D antiserum. It was not possible to identify these streptococci to the species level by using the API 20 Strep system (bio-Mérieux, Marcy l'Etoile, France). With the rapid ID 32 Strep system (bio-Mérieux), which has demonstrated greater reliability in the identification of viridans group streptococci (3), both strains were erroneously identified

as *Streptococcus vestibularis*. These streptococci were correctly identified to the species level as *S. salivarius* by genetic methods using *sodA_{int}* gene sequencing (5). Sequence analysis of the two strains yielded 98.6% identity with the sequence of the type strain *S. salivarius* ATCC 19645 (EMBL gene bank accession no. Z95916). The difficulty in phenotypic identification of these strains confirms the need to use genetic methods for identification of certain viridans group streptococci determined to be of clinical relevance.

In summary, we report two cases of meningitis due to *S. salivarius* infection related, respectively, to intestinal neoplasia and epidural anesthesia, each with good clinical response. The use of genetic methods was determinative for species-level identification.

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Pedro Idigoras*
Adoración Valiente
Luis Iglesias
Servicio de Microbiología
Hospital Donostia
San Sebastian, Gipuzkoa, Spain

*Phone: 34-4-3007046
Fax: 34-43-007063
E-mail: idigoras@chdo.osakidetza.net

Patrick Trieu-Cuot
Claire Poyart
Laboratoire Mixte Pasteur-Necker de Recherche sur les
Streptocoques et Streptococies
Paris, France