Culture-Negative Pericarditis Caused by *Neisseria meningitidis* Serogroup C

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We describe a case of primary purulent culture-negative pericarditis caused by *Neisseria meningitidis* serogroup C occurring in an 8-month-old previously healthy boy, which was detected in pericardial fluid by broad-spectrum PCR amplification.

CASE REPORT

A previously healthy infant aged 8 months was admitted to the Emergency Department of Louis Mourier Hospital (Paris, France) with a 10-day history of several daily feverish peaks of between 39 and 40°C. On examination, the patient had normal hemodynamic parameters, and his temperature was 36.6°C. He was pale, with neither spots nor purpura. The examination of the ears and nose was unremarkable. There was no hepatosplenomegaly or local pain. Neurologic and pulmonary clinical examinations revealed no abnormalities. Heart sounds were diminished in intensity. A chest radiograph showed considerable cardiomegaly, with a cardiothoracic index of 0.6. The cardiac echography revealed a pericardial effusion and thickened pericardium. There was no sign of cardiac tamponade. Blood and urine samples were taken for culture. Laboratory studies showed a white blood cell (WBC) count of 21.10^9/mm^3, with 45% polymorphonuclear neutrophils, 11% monocytes, and 44% lymphocytes. The C-reactive protein level was 167 mg/liter, and the erythrocyte sedimentation rate was 92 mm/h. The creatine kinase level was 126 UI/liter (range, 30 to 180 UI/liter). Despite the absence of neurologic signs, cerebrospinal fluid was collected. It was clear, with no WBCs, 2 red blood cells/mm^3, and normal glucose and protein levels. The patient remained sterile. A PCR for detection of *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* from bronchoalveolar liquid (BAL) was negative. Immunofluorescence microscopy of BAL was negative for respiratory syncitial virus, adenovirus, and herpes simplex virus. No cytomegalovirus was detected by PCR from BAL. Serological investigations for human immunodeficiency virus, cytomegalovirus, and Epstein-Barr virus were negative.

In the absence of microbial cultures, we performed a universal 16S rRNA PCR amplification from the pericardial fluid. DNA was extracted with the QIAamp DNA Mini kit (QIA-GEN, Courtaboeuf, France). The PCR mixture (final volume, 50 μl) contained 10 μl of DNA, 1 μM (each) primer, 200 μM (each) deoxynucleoside triphosphate, and 1 unit of Taq Gold DNA polymerase (Perkin Elmer, Foster City, Calif.) in 1× amplification buffer (10 mM Tris-HCl [pH 8.3], 50 mM KCl, 3 mM MgCl₂). To amplify a 400-bp chromosomal DNA fragment, we used two pairs of universal primers complementary to highly conserved nucleotide sequences from a part of the gene encoding 16S rRNA (7): 27F (5'-AAG AGT TTG ATC CCG CAA CGA CGT AG) and 1492R (5'-GGT TAA GTC CCG CAA CGA GCG C) and 244 (5'-GGT TAC CTT GTT ACG ACT T). PCR was performed as follows: an initial step of 7 min at 95°C, followed by 40 cycles of 20 s at 94°C, 30 s at 55°C, and 45 s at 72°C, and a final extension step of 10 min at 72°C. Direct sequencing of the PCR products was performed with the ABI Prism 310 sequencer (Perkin Elmer) by using the Big Dye Terminator Cycle Sequencing kit (Perkin Elmer). The sequences were compared to those in the GenBank database and yielded a 100% identity with the 16S rRNA sequence of the type strain of *Neisseria meningitidis* (accession number AL162758). In addition, a sample of DNA extract was sent to the Centre National de Référence des Meningocoques (Pasteur Institute, Paris), who confirmed the serogroup of the *N. meningitidis* isolate as being serogroup C by using a multiplex PCR method (9).

After 2 days of antibiotic therapy, the patient was afebrile. Treatment with intramuscular ceftriaxone was continued for 15 days, and then oral amoxicillin was given for 8 days. The pa-
tient did not receive corticosteroids. Ten months later, the child presented a normal clinical examination, electrocardiography, and cardiac echography, with just a minor echoic pericardium showing no signs of pericardial constriction.

Discussion. *Neisseria meningitidis*, a gram-negative diplococcus that colonizes the nasopharynx, can spread to the bloodstream and cause invasive disease. The most common clinical presentations of invasive meningococcal disease are meningo-coccal septicemia and meningitis (11). Pericarditis is a rare presentation of invasive meningococcal disease. The most common clinical criterion that colonizes the nasopharynx, can spread to the bloodstream and cause invasive disease. The most common clinical localization of *N. meningitidis*, representing 0 to 14% of cases of purulent pericarditis (2-4, 10), according to the published series. These infections occur primarily in adults. Only three cases of *N. meningitidis* pericarditis in children under 3 years of age have previously been reported (1, 6, 8).

The patient had an atypical medical history without clinical signs of meningitis or other foci of meningococcal infection. Three types of meningococcal pericarditis have been classified by Finkelstein et al. (5) on the basis of clinical and biological criteria: primary, disseminated, and immunoreactive meningococcal pericarditis. Our patient probably presented primary meningococcal pericarditis. In fact, he presented no clinical manifestations of meningitis or other meningococcal localizations, and he recovered quickly after aspiration of pericardial fluid and appropriate antibiotic therapy without corticosteroids (4, 10).

Considering the discordance between the intensity of the inflammatory syndrome and the negativity of Gram stains and cultures of the pericardial fluid and blood samples, we could not exclude a possible antibiotic treatment preceding the hospitalization (even though this was not mentioned in the patient’s clinical history) or the presence of another uncultivable organism. However, the fact that the only sequences amplified by PCR were of *N. meningitidis* makes it highly improbable that inflammation was due to coinfection with an uncultivable bacteria.

To our knowledge, this is the first case of culture-negative pericarditis due to *N. meningitidis* serogroup C that has been diagnosed only by universal 16S rRNA PCR amplification. We think that it may be helpful to perform this technique for patients with clinical evidence of purulent pericarditis with culture-negative septic samples.

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REFERENCES