Nosocomial Neisseria meningitidis Sepsis as a Complication of Plasmapheresis

Neisseria meningitidis is a rare cause of nosocomial infection in adults. We report a case of meningococcal bacteremia in an immunosuppressed patient who was undergoing plasmapheresis. A 52-year-old man presented with worsening dyspnea on exertion and orthopnea. He had received a cardiac allograft 6 months earlier and had been receiving treatment with oral cyclosporine (100 mg b.i.d) and azathioprine since transplantation. Findings on an echocardiogram suggested graft rejection. An antibody-mediated process was suspected as the cause of the episode of rejection. Daily plasmapheresis was initiated.

The first two sessions of plasmapheresis were uneventful. Levels of circulating IgG decreased to 15% of pretreatment levels. Twelve hours later, the patient reported back pain and chilly but remained afebrile. Blood was drawn for culture, and treatment with intravenous vancomycin (1 g q12h) was started. During the next session of plasmapheresis, the patient reported that his symptoms were worsening. Plasmapheresis was stopped, and intravenous ciprofloxacin (400 mg q12h) therapy was started.

The patient developed respiratory distress requiring mechanical ventilation, hypotension, and fever (temperature to 39.2°C). Metabolic acidosis developed. A chest radiograph showed diffuse interstitial markings. Paracentesis was performed. Gram staining of ascitic fluid showed gram-negative diplococci. N. meningitidis was isolated from blood, sputum, and ascitic fluid. Treatment with vancomycin and ciprofloxacin was stopped, and that with intravenous ceftriaxone (1 g q12h) was started. The patient rapidly responded and completed a 10-day course of ceftriaxone.

Cohen et al. [1] reported two cases of meningococcal bacteremia in an oncology unit, with colonization of three more patients. Wing [2] reported a case of pneumonia in a patient undergoing plasmapheresis for glomerulonephritis. Two other cases of nosocomial meningococcal pneumonia have been reported: in one case the patient was receiving steroid therapy [3], and in the other, inadequate infection control measures were implicated as the cause of infection [4].

Among the adult population of the United States, 5%–10% are colonized with N. meningitidis [5]. Clinical infection in adults is rare. The highest rates of infection occur immediately after colonization with a new strain. The carrier state is an immunizing process [6]. A deficiency of circulating bactericidal antibodies is associated with disease [7]. Complement plays a role in host defenses against meningococccemia. Deficiencies in early and late components of complement are associated with recurrent meningococcal infection.

Plasmapheresis decreases the level of circulating immunoglobulin and complement [8]. Complement and it are found predominantly in the intravascular compartment, and the time in which the levels of both return to preplasmapheresis levels depends on the rate at which they can be synthesized. Pretreatment levels of complement are reached within 48 hours, whereas it may take up to 28 days for IgM to return to these levels. Levels of IgG may return to 50% of pretreatment levels within 24 hours of initiating plasmapheresis, as extravascular stores are mobilized. Repeated plasmapheresis depletes these stores. Rate of synthesis then becomes the limiting factor in restoring levels of IgG, which take 2 weeks to return to pretreatment levels after plasmapheresis ceases.

In patients undergoing plasmapheresis, it is often difficult to determine if an untoward event is caused by underlying disease, immunosuppression, or plasmapheresis itself. Previous studies have differed in their assessment of the risk of infection associated with plasmapheresis. Some reports show an increase in the rates of infection [2], while others do not [9]. No specific infectious agent has been shown to occur with increased frequency in patients undergoing plasmapheresis.

In conclusion, we describe the second case of nosocomial meningococcal infection associated with plasmapheresis and the first case in which meningococcemia has been documented. Although levels of antibody to N. meningitidis were not determined, it is possible that transient hypocomplementemia and the removal of protective circulating antibodies by plasmapheresis rendered our patient vulnerable to meningococcemia. Physicians should be aware of the potential for this organism to cause nosocomial disease in patients undergoing plasmapheresis.

Patrick J. Haugh, Charles S. Levy, Margo A. Smith, and Donal K. Walshe
Section of Infectious Diseases, Washington Hospital Center, Washington, D.C.

References
Severe Acute Cytomegalovirus Sialadenitis in an Immunocompetent Adult: Case Report

In the majority of immunocompetent adults, cytomegalovirus (CMV) causes a latent, asymptomatic infection. Occasionally, a mild, febrile, self-limiting mononucleosis-like illness is observed. However, CMV is an important human pathogen in utero and in immunocompromised hosts; in such settings, CMV infection may result in severe diseases including pneumonia, hepatitis, chorioretinitis, hematologic abnormalities, and involvement of the gastrointestinal tract and the CNS [1]. CMV has a well-established tropism for the salivary glands, but even among patients with AIDS, CMV sialadenitis is rare and usually presents as painful salivary gland swelling [2]. We describe an immunocompetent adult with severe acute sialadenitis of all head salivary glands. The patient recovered after receiving symptomatic therapy for 1 month.

A 57-year-old man presented with a 4-day history of sore throat, fever, chills, fatigue, arthralgia, and painful preauricular and submandibular swelling. Despite administration of antibiotics and anti-inflammatory agents, the infection progressed, and he complained of increasing anorexia, exertional dyspnea, and aphagia because of severe xerostomia. Physical examination on admission revealed painful, pasty, and diffuse enlargement of both parotid glands and submandibular glands (figure 1). The oral cavity was extremely dry and erythematous. No saliva was expelled from the salivary duct orifices when the salivary glands were massaged. The tonsils were mildly hyperplastic, without purulent exudate. The patient was sweaty and in mild respiratory distress, and he had cervical lymphadenopathy. Findings on general physical examination were unremarkable. His temperature, pulse, and blood pressure were normal.

The patient's medical history was remarkable only for a gastric ulcer that was treated with a Billroth II procedure 20 years previously. During the previous 2 years, he had not left Germany. Laboratory tests showed elevated levels of aspartate aminotransferase (81 U/L) and alanine aminotransferase (49 U/L). The amylase level was 177 U/L, and the WBC count was 22.6 × 10^9/L with 81% neutrophils and 8% lymphocytes. The erythrocyte sedimentation rate was elevated at 110 mm/h. Levels of extractable nuclear antigens, cytoplasmic anti-neutrophil cytoplasmic antibodies, perinuclear anti-neutrophil cytoplasmic antibodies, double-stranded DNA antibodies, and rheumatoid factor were normal. Only the level of antinuclear antibodies was slightly elevated. The serum angiotensin converting enzyme level was normal, and an anteroposterior radiograph of the chest did not show any signs of sarcoidosis or other diseases.

An ultrasonogram of the salivary glands confirmed diffuse enlargement of both the parotid and submandibular glands. Echogenicity was decreased, and there was no sign of sialolithiasis, neoplasms, cystic lesions, or abscesses. Examination of the abdomen showed only a slightly increased echographic texture of the liver. Examination of biopsy specimens from the left submandibular gland and the minor salivary glands in the lower lip demonstrated hyperplastic epithelium with predominantly lymphocytic infiltrate CD8^+, UCHL1^+, and focal L26^+ and some neutrophilic granulo-

Figure 1. Swelling of the submandibular and parotid glands of a patient with CMV sialadenitis; the patient was noted to be pale and sweaty on admission.