Pneumococcal Sepsis, Peritonitis, and Cellulitis at the First Episode of Nephrotic Syndrome

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INTRODUCTION

Infectious complications are common in nephrotic syndrome (NS), especially primary peritonitis which has been reported in 1.5% to 16% of patients.1-6 Spontaneous bacterial peritonitis usually occurs within the first 2 years of a diagnosis of NS.7 Urinary loss of small molecular proteins such as immunoglobulin G fractions, factor I, and factor B may alter opsonization, phagocytosis, and killing of bacteria and result in defective humoral and nonspecific immunity. Steroid use may aggravate infectious complications.8-10 More severe hypoalbuminemia and low serum total protein levels are known to predispose the patient to serious infections.7

The majority of peritonitis cases are caused by encapsulated gram-positive organisms, particularly Streptococcus pneumoniae, but may also be caused by gram-negative organisms.11 Although chemoprophylaxis with penicillin is shown to reduce the incidence of pneumococcal infection, there are no controlled trials on the use of penicillin prophylaxis in NS.12 Advisory Committee on Immunization Practices recommended pneumococcal vaccination for all children 2 to 5 years of age with particular comorbidities, including nephrotic syndrome.13

Pneumococcal peritonitis has been reported following immunization against S pneumoniae.14,15 It seems that although administration of polyvalent pneumococcal vaccine might reduce the incidence and severity of pneumococcal infections, it cannot be relied upon to provide absolute protection.15 We report a case of pneumococcal sepsis, peritonitis, and cellulitis at the first episode of nephrotic syndrome.

CASE REPORT

An 8-year old boy was admitted to hospital with colicky abdominal pain and vomiting. He had been admitted to a Department of Pediatric Nephrology 1 week earlier with generalized edema, proteinuria, hypoalbuminemia (serum albumin level < 2.5 g/dL) and nephrotic-range proteinuria (urinary protein excretion rate > 1g/m²/d). The final diagnosis was NS and the patient had been discharged with prednisolone, 60 mg/d, in divided doses.

On admission, physical examination revealed normal blood pressure (90/60 mm Hg), the temperature was 36.5°C, and there was mild generalized edema and ascites, generalized tenderness in abdominal palpation, a circular erythematous lesion around the umbilicus (Figure 1), and an ill-defined swollen painful erythematous lesion in the anterior surface of the left thigh (Figure 2).

Urine analysis showed 3+ proteinura and mild...
pyuria (leukocyte, 6 to 8 per high-power field). Urine culture was negative for microorganisms. Serum albumin, blood urea nitrogen, and serum creatinine levels were 2.3 mg/dL, 55 mg/dL, and 1.2 mg/dL, respectively. Abdominal ultrasonography showed fluid accumulation in the pelvic cavity. Peritoneal fluid aspiration was performed under ultrasonography guide and the specimen was sent for biochemical analysis and culture. Blood culture was obtained and empirical antibiotic therapy was started. As the patient had evidence of peritonitis and infectious skin lesions (cellulitis), a combination of 3rd-generation cephalosporin (ceftriaxone, 1 g, twice per day) and clindamycin (40 mg/kg/d) was started to cover \( S \) pneumoniae, \( S \) pyrogenous, and gram-negative organisms. In addition, furosemide was used to reduce the edema and the dosage of prednisolone was changed to stress dose (15 mg/m\(^2\)/d).

The Table shows results of peritoneal fluid analysis and culture, blood culture, and antibiograms. Peritoneal fluid and blood cultures confirmed pneumococcal sepsis with different foci of seeding of microorganism in the peritoneal cavity (primary spontaneous peritonitis) and cutaneous tissue (cellulitis lesions around the umbilicus and in lower extremity). Forty-eight hours after starting treatment, abdominal pain resolved, but the patient complained about nausea and vomiting. Therefore, antibiotics were changed into vancomycin, 10 mg/kg every 6 hours. The patient received the drug for 10 days and was discharged from hospital with a low dose of prednisolone (15 mg/m\(^2\)/d) and prophylactic antibiotic (oral penicillin, 250 mg/d).

**DISCUSSION**

Uncu and coworkers reported 8 episodes of primary peritonitis in 7 patients with NS during 5 years.\(^1\) All attacks of peritonitis occurred in the relapse period. The causing microorganisms were identified in 3 patients (\( S \) hemolyticus, \( S \) pneumoniae, and \( \alpha \)-hemolytic Streptococcus). Tain and colleagues reported 10 episodes of sepsis.
and 8 episodes of peritonitis during the follow-up of 231 nephrotic children; S pneumoniae was isolated in 4 patients. Gorensek and colleagues found a definite microbiologic agent in 31 of 62 peritonitis episodes; pneumococcal disease was present in 24 patients (38%), while Tapaneya-Olarn and Tapaneya-Olarn isolated microorganisms in half of the 35 bacterial peritonitis episodes in a 20-year study. Both gram-negative and gram-positive bacterial infections were found equally in the early years of the study, whereas during the past 4 years of the study, the preponderant microorganisms were found to be gram negative.

Sepsis, meningitis, urinary tract infection, and cellulitis are other infections that can occur in children with NS. This case report presents a combination of pneumococcal sepsis, peritonitis, and cellulitis in a nephrotic child at the first episode of the disease. Association of sepsis, peritonitis, and cellulitis has rarely been reported in nephrotic syndrome.

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CONFLICT OF INTEREST
None declared.

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