THE TOXIC STREPT SYNDROME: TWO CASE REPORTS

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ABSTRACT

We describe two patients with group A beta hemolytic streptococcal septicemia from minor foci in the skin. They developed extreme toxemia, mental obtundation and multi-system organ failure associated with diffuse erythema. They both survived after appropriate antibiotic and intense supportive therapy. These are examples of the "toxic strept syndrome" which is similar to staphylococcal toxic shock.

Keywords: group A streptococcus, toxic shock syndrome, erythema.

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INTRODUCTION

The classic toxic shock syndrome is associated with exotoxin-producing Staphylococcus aureus[1]. It is less well known that Group A beta-hemolytic Streptococcus pyogenes may also produce the same clinical picture[2-4]. This has been termed the "Toxic Strept syndrome" by some authors[3].

In this report we describe features of a catastrophic illness of rapid onset with multisystem organ involvement and dermatologic manifestations due to streptococcal infection in two patients.

CASE REPORTS

Case 1

A 57-year-old Chinese woman was admitted with complaints of fever, chills, rigors and multiple joint pains. Eighteen hours after admission she rapidly deteriorated, became restless, confused and toxic. Examination revealed a blood pressure of 100 mmHg systolic, heart rate of 120/min and cyanosis of the extremities. A small infected ulcer was noted on her right index finger. A diagnosis of septicemic shock was made with the infected right index finger as the likely source of infection. Intravenous cloxacillin, ceftazidime and amikacin was started along with fluid replacement and inotropic support. She became confused and disorientated with refractory hypotension. Her white cell count was 25,880/mm^3 with 90% neutrophils, toxic vacuolation and left shift. Both renal and liver functions were impaired. Group A beta-hemolytic streptococcus was isolated from three blood cultures. An erythematous rash with hemorrhagic bullae appeared on the extremities by the fourth day associated with disseminated intravascular coagulation. Her right middle and ring fingers became gangrenous and eventually required amputation. She was ventilated for respiratory distress and obtundation. The renal function progressively deteriorated and she needed dialysis for azotemia and fluid retention. Over four weeks in the intensive care she improved with resolution of septicemia and recovery of renal function. The skin rash subsided with desquamation. She was finally discharged at three months.

Comments

This woman had the fully evolved form of streptococcal toxic shock syndrome. She was in profound shock with severe multi-organ dysfunction. The dermatological features were multiform - local gangrene, generalized erythema, hemorrhagic bullae, and healing with desquamation - but consistent with that described by others[1,2,4]

Case 2

A previously healthy 47-year-old Chinese man was transferred to the National University Hospital from another hospital with a provisional diagnosis of acute peritonitis.

He presented with acute onset of fever, abdominal pain and distension followed by progressive shortness of breath. On admission, he was found to be toxic, febrile, tachypneic, dehydrated and jaundiced. His blood pressure was 110/80 mmHg and pulse rate 100/min. There were inspiratory crackles in both lungs. The abdomen was noted to be soft and distended with generalized tenderness. Bowel sounds were absent. An area of cellulitis was noted on the right abdominal flank which spread to the left flank and right antecubital regions over the next 12 hours. The total white count was 25,000/mm^3 with neutrophil count of 94.8%. Both renal and liver impairment was present. Intravenous benzyl penicillin, ceftazidime, erythromycin and amikacin were infused. A CT scan of his abdomen did not show any intra-abdominal septic foci. The patient was managed in the intensive care and mechanical ventilation was instituted for respiratory distress and mental obtundation. Over the next 48 hours, he responded dramatically with settling of temperature, improvement of conscious level and symptoms, subsidence of jaundice, increased urine output and improved arterial blood gases. Group A streptococcus was isolated in the initial blood cultures. He developed recurrent bleeding from a benign gastric ulcer which required surgical resection. His clinical recovery was otherwise rapid and unremarkable.

Comments

This man had a milder form of the toxic strept syndrome which responded promptly to appropriate antimicrobial and intensive supportive therapy. We note that he presented with abdominal pain and distention but did not show any foci of intra-abdominal sepsis.

DISCUSSION

The constellation of fever, hypotension, mental obtundation,

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skin rash, hepatic and renal impairment in the two patients described was clearly associated with streptococcal septicemia. In both patients the extreme toxemia and mental obtundation contrasted with the relatively minor skin lesions. In a previous study of bacteremic infections we have found Group A streptococci to be an infrequent pathogen[5]. It was isolated in less than 5% of 71 clinically significant blood cultures and no patient had the toxemia, skin manifestations and multisystem organ failure described in this report. The generalized skin involvement in both our patients appear to be toxin-mediated and not due to direct soft-tissue invasion by the streptococci. The clinical presentation in our patients was similar to that of the staphylococcal toxic shock syndrome, which is a well recognized toxin-mediated illness[1,6].

Streptococcus pyogenes produce toxins that show similar biologic properties with the toxin of staphylococcal toxic shock syndrome. Indeed, Streptococcus pyogenes is known to elaborate scarlet fever (pyrogenic) toxins of type A, B and C as well as hemolysins (cytolysins). All three pyrogenic toxins are proteins and vary in their physical and chemical properties. The molecular weight of toxin type A is 26,000, that of type B 21,900 and that of type C 13,200. These three toxins are immunologically distinct and they have biological properties similar to those of staphylococcal enterotoxins. These include pyrogenicity, lethal shock and tissue damage (involving liver and myocardium). In fact, there exists an amino acid homology of nearly 50 percent between streptococcal type A exotoxin and type B staphylococcal enterotoxin, which has been implicated as the mediator of toxic shock syndrome[3]. The similarity to enterotoxin might account for the prominent gastrointestinal symptoms in most of the case reports of the toxic strept syndrome and in our second patient who was admitted with abdominal pain and distention.

The pyrogenic streptococcal type A, B and C toxins are extracellular end products of group A hemolytic streptococcus. No other strains of streptococcus produce these toxins. In the 20th century there has been a dramatic decline in the prevalence and severity of rheumatic fever and infections caused by group A streptococcus. Some authors have attributed the decline to improved socioeconomic conditions, effective treatment of streptococcal pharyngitis with antibiotics, and secondary prophylaxis for rheumatic fever. However, Stollerman in 1988 argued that the decline is a function of the changing potential of the organism[7]. In some of the more recent outbreaks of streptococcal pharyngitis in the United States, the newly described streptococcal toxic shock-like syndrome and the severe streptococcal infections from Great Britain have been postulated to be due to changes in the expression of virulence factors of streptococcus pyogenes. The type of pyrogenic toxins elaborated by streptococcus could indeed be one of these factors. Most scarlet fever that occurred at the turn of this century were caused by type A toxins, but in recent years either type B or a combination of type B and C had invariably been detected. Perhaps the disappearance of the Streptococcus pyogenes strain producing type A toxin has resulted in the changing severity of scarlet fever.

A major difference between streptococcal and staphylococcal toxic shock syndrome is that the former often have extensive soft tissue infection and bacteremia. In contrast, the latter is usually not associated with bacteremia, and the site of infection may be difficult to identify. Recently we managed two young women with non-menstrual staphylococcal toxemia syndrome. One patient had a staphylococcal axillary abscess while the other had impetigo. The toxemia and hypotension in both patients subsided promptly after eradication of the skin infections. Nevertheless since it is also an exotoxin mediated illness the toxic strept syndrome may be diagnosed in the appropriate clinical presentation with isolation of the streptococcus in the skin alone without septicemia[8].

Host factors do not appear to play a significant role in the contraction of severe group A streptococcal infection. Stevens et al found that 80% of patients were less than 50 years of age and, as in our two patients, most had no significant underlying systemic disease[2].

Staphylcoccal and Streptococcal toxic shock syndromes require slightly different antibiotic therapies (oxacillin or methicillin versus penicillin respectively as first choice antibiotics) besides usual supportive measures. The streptococcus however has thankfully remained exquisitely sensitive to penicillin even in this era of bacterial multiresistance and therefore, a choice of an anti-staphylococcal agent in a patient with streptococcal sepsis would also be appropriate. The high mortality rate from systemic manifestations of group A streptococcus infection, which is about 30%, underscores the need for prompt diagnosis and specific treatment.

These two cases remind us that even classic gram positive cocci may cause acute fulminant illness. Careful physical examination with attention to skin manifestations may provide vital clues to guide anti microbial therapy.

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