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CASE REPORT

Group A Streptococcus Toxic Shock Syndrome: An outbreak report and review of the literature

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Received 26 December 2010; received in revised form 10 July 2012; accepted 19 July 2012

KEYWORDS

GAS;
Outbreak;
Transmission

Summary Group A Streptococcal (GAS) Toxic Shock Syndrome (TSS) is an acute, rapidly progressive, and often fatal illness. Outbreaks can occur in hospitals. However, early infection control measures may interrupt transmissions and prevent morbidity and mortality.

Two cases of invasive GAS TSS were diagnosed within 48 h after two uncomplicated laparoscopic surgeries that were performed in the same operating room of a women's hospital.

Investigations conducted by the infection prevention and control department of the hospital identified 46 obstetrical staff members who were involved in the surgeries and/or had contact with either of the patients. All of the staff members were interviewed regarding any recent history of upper respiratory tract infections, the presence of skin lesions and vaginal or rectal symptoms. Throat, rectal, and vaginal cultures were obtained two times from all of the involved staff members. Throat colonization with GAS was detected in the cultures from one obstetrical intern who attended the 1st surgery and from one nurse who had formerly worked in the post-natal ward. These two strains were epidemiologically different from each other and from the outbreak strain. Both carriers were suspended from direct patient care and were treated with a ten-day course of oral clindamycin. The success of their decolonization status was assessed at the end of therapy and at three, six, nine and twelve months thereafter before reassigning them to routine work.

Unfortunately, in spite of the extensive investigation of all involved personnel and of the environment, the mode of transmission to the second patient could not be established. However, droplet or airborne transmission could not be ruled out.

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Early and meticulous implementation of infection control measures was crucial and instrumental in the successful management and control of this outbreak. Furthermore, there were no subsequent GAS cases detected during the 24 months following the outbreak.

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Introduction

GAS TSS is an uncommon form of septicemia caused by *Streptococcus pyogenes* (Lancefield group A), which is also the pathogen responsible for scarlet fever and other Streptococcal soft tissue infections. As with Staphylococcal TSS, invasive Streptococcal diseases are also caused by biologically potent exotoxins that mediate fever, shock, and tissue injury [1]. During the 20th century, there has been a significant reduction in the incidence and severity of Streptococcal infections that is partially attributable to the use of antibiotics and to improved socioeconomic conditions, especially in the industrialized world. Variations in the expression of virulence factors by the pathogen were found to be responsible for the reduction in the incidence and severity of streptococcal infections in the late 1980s [2–4]. However, *S. pyogenes* re-emerged with renewed virulence and has posed a global public health problem [5,6].

Sporadic outbreaks of *S. pyogenes* were predominantly characterized by a rapidly progressive disorder that was often associated with severe suppurative soft tissue infections [6].

In some studies involving women of childbearing age, the prevalence of vaginal colonization with GAS was less than 1%, suggesting that endogenous sources are uncommon and that clustering of cases or outbreaks associated with health care facilities can usually be traced to a single carrier. These carriers are usually health care workers colonized with the organism in a skin lesion or in the throat, vagina or rectum [7,8]. The causes of colonization with GAS and, in some cases, its subsequent transmission are unknown. There are a few published reports on attempts to eradicate the GAS carrier state; in most of these reports, the treatment modality, extent and duration of follow-up varied, offering little information to guide physicians in the management of these carriers [9–11].

We present two cases of post-laparoscopic invasive GAS TSS occurring in a busy tertiary care center (334 beds and over 22,830 admissions in 2009). Two cases of invasive GAS disease were diagnosed within 48 h of each other, activating intervention by the infection prevention and control program of the hospital. These cases and a review of the

literature are presented with respect to both the possible mode of transmission of GAS and the importance of an infection control role in preventing and/or controlling similar outbreaks.

Case presentation

Case 1 (index patient): A 39-year-old female, para 2+0, was brought to the Women's Hospital emergency room with a history of amenorrhea lasting 10 weeks, vaginal bleeding for 9 days and severe lower abdominal pain for 1 day. Her medical history was uneventful. On arrival at the emergency room, the physical examination was unremarkable, except for localized tenderness on the left iliac fossa.

Abdominal ultrasonography revealed a turbid fluid in the left para-ovarian space and a left adnexial mass, suggestive of ectopic pregnancy. Laboratory investigations revealed a positive urine pregnancy test, beta human chorionic gonadotrophin of 473.8 IU/l and an elevated white blood cell count of 15,500/ μ l. A diagnosis of ectopic pregnancy was made, and the patient underwent a laparoscopic left salpingectomy. The patient did not receive a prophylactic antibiotic, and she had an uneventful recovery and was transferred to the ward in stable condition.

However, 6 h postoperatively, she developed abdominal pain, with a temperature spike of 38 °C. Intravenous treatment with cefuroxime and metronidazole was started. Twenty-four hours post-surgery, her symptoms became more severe, and she became dyspneic and hypotensive. Additional laboratory testing showed a significant drop in hemoglobin (10.2 g/dl), and blood cultures taken upon admission revealed gram-positive cocci that were confirmed to be GAS.

The patient's condition continued to deteriorate, with progressive signs and symptoms of multiorgan impairment. Her condition necessitated an emergency diagnostic laparotomy, which was conducted in a different operating room. Diffuse ischemia of all intra-abdominal organs, with fluid throughout the abdominal cavity, was apparent. Peritoneal fluid samples that were taken intraoperatively also grew GAS. A diagnosis of TSS was

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