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Editorial Open Access

Staphylococcus aureus Toxic Shock Syndrome

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Editorial

Toxic shock syndrome (TSS), caused by toxic shock syndrome toxin-1 (TSST-1) and type B enterotoxins produced by *Staphylococcus aureus* [1,2]. The disease (TSS) was initially described in 1978 and came to public attention in 1980 with the occurrence of a series of menstrual-associated cases and at least 50% of non-menstrual cases. TSST-1 is a pyrogenic toxin superantigen produced by *Staphylococcus aureus* [3,4]. TSST-1 super antigen activate avast number of T cells in a T cell receptor B chain Vβ-selective manner in direct association with major histocompatibility complex class II molecules on antigen-presenting cells especially Vβ2+ T cells [5-7].

TSS symptoms will be manifested within 8-12 hours after infection, the symptoms include fever, low blood pressure, rash, malaise and confusion, diarrhea and inability to maintain proper hemostasis. Severe cases often progress to multiple-organ involvement and desquamation of the skin over the entire body, some cases end in death [8].

Menstrual TSS is usually related to tampon use which increases the vaginal concentration of oxygen that stimulates TSST-1 production by *S. aureus* normally present in the vagina. High-absorbency tampons also sequester magnesium ions, which causes nutrient depletion in the vagina and may simulate late log-phase conditions for resident *S. aureus*, inducing TSST-1 secretion [9]. Menstrual toxic shock syndrome can be prevented by avoiding the use of highly absorbent tampons, changing tampons more frequently and using tampons during menstruation only (not regularly). Non-menstrual TSS was reported in postoperative patients [10], postpartum women [11], patients with skin and bone infections [12], patients with respiratory infections [13], and patients with small burns [14,15].

Treatments of TSS include cleaning of wounds and remove any foreign bodies, beta-lactamase-resistant antistaphylococcal antibiotics should be administered intravenously to patients with staphylococcal infections and IV fluids administration [15]. The usually prescribed antibiotics are nafcillin, oxacillin, and first generation cephalosporin. Recently, researches are directed to development of either monoclonal antibodies against TSST-1 or other peptides to block the ability of bacterial toxins to activate T cells, therefore blocking the toxicity cascade [16]. Diagnosis of toxic shock syndrome can be made by detection of toxin -1 by high performance liquid chromatography [17], flow cytometry [18], reversed passive latex agglutination, enzyme linked immunosorbent assay (ELISA) and immunoblot [19]. Davis and Fuller [20] reported that *S. aureus*, *S. pneumonia*, enterococci, and groups A and B streptococci can be identified in about 2.5 h using a commercially available DNA probe kit that utilizes hybridization protection assay technology [20]. Feng et al., [21] reported that vaccination with plasmid DNA encoding a mutant toxic shock syndrome toxin-1 ameliorates toxin-induced lethal shock in mice. The mice were intranasally immunized with the plasmid DNA (named pcDNA-mTSST-1) plus a mucosal adjuvant, a non-toxic mutant labile toxin (mLT).

References

1. Reingold AL, Hargrett NT, Shands KN, Dan BB, Schmid GP, et al. (1982) Toxic shock syndrome surveillance in the United States, 1980 to 1981. Ann Intern Med 96: 875-880.
2. (1997) Case definitions for infectious conditions under public health surveillance. Centers for Disease Control and Prevention. MMWR Recomm Rep 46: 1-55.
3. Todd J, Fishaut M, Kapral F, Welch T (1978) Toxic-shock syndrome associated with phage-group-I Staphylococci. Lancet 2: 1116-1118.
4. Davis JP, Chesney PJ, Wand PJ, LaVenture M (1980) Toxic-shock syndrome: epidemiologic features, recurrence, risk factors, and prevention. N Engl J Med 303: 1429-1435.
5. Alouf JE, Müller-Alouf H (2003) Staphylococcal and streptococcal superantigens: molecular, biological and clinical aspects. Int J Med Microbiol 292: 429-440.
6. Uchiyama T, Kamagata Y, Wakai M, Yoshioka M, Fujikawa H et al. (1986). Study of the biological activities of toxic shock syndrome toxin-1: I. Proliferative response and interleukin 2 production by T cells stimulated with the toxin. Microbiol Immunol 130: 469-83.
7. Uchiyama T, Imanishi K, Miyoshi-Akiyama T, Kato H (2005) Staphylococcal superantigens and the diseases they cause. In:Alouf J.E., M.R. eds. The comprehensive source book of bacterial protein toxins, 3rd Edition. London, United Kingdom: Elsevier 830-43.
8. Schlievert PM (1993) Role of superantigens in human disease. J Infect Dis 167: 997-1002.
9. Bosley AR, Bluett NH, Sowden G (1993) Toxic shock syndrome after elective minor dermatological surgery. BMJ 306: 386-387.
10. Bracero L, Bowe E (1982) Postpartum toxic shock syndrome. Am J Obstet Gynecol 143: 478-479.
11. Keller JL, Evan KE, Wetmore RF (1999) Toxic shock syndrome after closed reduction of a nasal fracture. Otolaryngol Head Neck Surg 120: 569-570.
12. Ferguson MA, Todd JK (1990) Toxic shock syndrome associated with Staphylococcus aureus sinusitis in children. J Infect Dis 161: 953-955.
13. Cole RP, Shakespeare PG (1990) Toxic shock syndrome in scalded children. Burns 16: 221-224.
14. McAllister RM, Mercer NS, Morgan BD, Sanders R (1993) Early diagnosis of staphylococcal toxaemia in burned children. Burns 19: 22-25.
15. Chesney PJ (1989) Clinical aspects and spectrum of illness of toxic shock syndrome: overview. Rev Infect Dis 11 Suppl 1: S1-7.
16. Karauzum H, Chen G, Abaandou L (2012) Synthetic human monoclonal antibodies toward staphylococcal enterotoxin B (SEB) protective against toxic shock syndrome. J Biol Chem 287: 25203-15.
17. Kawano Y, Ito Y, Yamakawa Y, Yamashino T, Horii T, et al. (2000) Rapid isolation and identification of staphylococcal exoproteins by reverse phase capillary high performance liquid chromatography-electrospray ionization mass spectrometry. FEMS Microbiol Lett 189: 103-8.
18. Zorgani A, Essery SD, Madani OA, Bentley AJ, James VS, et al. (1999) Detection of pyrogenic toxins of Staphylococcus aureus in sudden infant death syndrome. FEMS Immunol Med Microbiol 25: 103-8.

19. Zhu H, Willcox MD (1999) Detection of staphylococcal superantigens from contact-lens-induced inflammatory diseases. Aust N Z J Ophthalmol 27: 237-240.

20. Davis TE, Fuller DD (1991) Direct identification of bacterial isolates in blood cultures by using a DNA probe. J Clin Microbiol 29: 2193-2196.

21. Feng MH, Cui JC, Nakane A, Hu DL (2013) Vaccination with plasmid DNA encoding a mutant toxic shock syndrome toxin-1 ameliorates toxin-induced lethal shock in mice. Tohoku J Exp Med 231: 1-8.