Case Report

Disseminated Viridians Streptococcus *(Streptococcus mitis)* Infection Presenting with Toxic Shock-Like Syndrome

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The authors report a case of a 35-year-old man with no known underlying disease who presented with fever, cellulitis with hemorrhagic blebs on the left leg, monoarthricular left knee arthritis, multiple organ failure and septic shock. His clinical syndrome was compatible with toxic shock syndrome and his blood grew alpha hemolytic (viridians) Streptococcus mitis. To our knowledge, there are few reported cases of toxic shock syndrome cause by Streptococcus mitis in immune-competent adults.

Keywords: *Viridians streptococcus, Streptococcus mitis, Toxic shock syndrome*

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Viridans streptococci, which are nutritionally fastidious and mainly alpha-hemolytic, inhabit humans as normal flora, particularly of the oral cavity[1]. Despite their overall low virulence, they may cause infective endocarditis, and contribute to polymicrobic abscess and bacteremia. There are increasing numbers of reports of the pathogenic significance of viridians streptococci in children[2] and immune-compromised people such as cancer[3] or neutropenic[4-8] patients. Streptococcal toxic shock syndrome is an acute, multisystem, toxin-mediated illness, often resulting in multi-organ failure[9]. It is caused mainly by Group A beta-hemolytic streptococcus[10]. Here the authors report a case of alpha-hemolytic (viridians) *Streptococcus mitis* toxic shock-like syndrome in an immune-competent adult.

Case Report

A 35-year-old Thai man with no known underlying disease was hospitalized at Rajavithi Hospital, Thailand on November 3, 2011. The presenting symptoms were high-grade fever, nausea, vomiting, diarrhea, cellulitis with hemorrhagic blebs on the left leg, and septic arthritis in the left knee 2 days prior to admission day. Pertinent physical findings were: temperature 38.9°C; blood pressure 70/40 mmHg; pulse rate 100/min; and respiratory rate 24/min. His skin had scattered petechiae on the trunk, a well-circumscribed reddish patch (purpura) on the face (Fig. 1), forearm, hands (Fig. 2) and both legs. His left leg had a hemorrhagic bleb of 1 cm in diameter (Fig. 3). His left knee was swollen, with redness and warmth with positive ballottement signs.

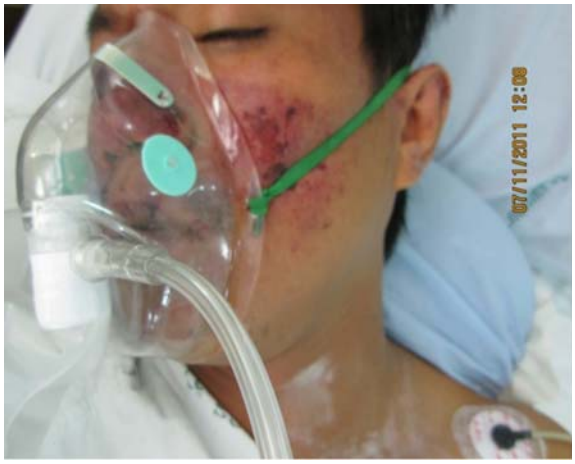

Fig. 1 Purpura on face

Laboratory investigations were performed as follows: complete blood count revealed hematocrit of

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32%, WBC 20,000 cell/mm^3, (N 61%, L 11%, M 8%, band 15%) and platelet count 10,000/mm^3; blood urea nitrogen and creatinine were 33 and 4 mg/dl, respectively; liver function test revealed albumin 3.3 g/dl, globulin 1.7 g/dl, aspartate aminotransferase 1,094 U/L, alanine tranaminase 197 U/L, Alkaline phosphatase 61 U/L, total bilirubin 8.41 g/dl, direct bilirubin 7.67 g/dl; coagulogram revealed prothrombin time 16.7 sec, partial thromboplastin time 43.6 sec, partial thromboplastin time ratio 1.67 and INR 1.39; coagulation test revealed fibrinogen assay 533 mg/dl, D-dimer 0.8 mg/dl; synovial fluid analysis of the left knee revealed fluid which was yellow in color, WBC 115,000/mm^3 (N 73%, L 27%); gram stain revealed numerous white blood cells, and no organism seen; and chest x-ray revealed minimal interstitial infiltration of both lungs.

The patient was hospitalized and 2 sets of aerobic blood cultures were sent to the Microbiology Unit. The chosen antibiotic on the first day was meropenam, adjusted with the patients' history of penicillin drug allergy, and septic shock was managed with early-goal directed therapy[11]. On the first day of hospitalization, he had more hemorrhagic blebs on the right leg and increased cyanosis of both hands. His bloods grew gram-positive cocci in chains in both sets, with colonies revealing alpha-hemolysis on sheep blood agar plates, and his antibiotic was changed to ceftriaxone and clindamycin to cover streptococcus toxic shock syndrome. He had no rash or other allergic reaction to ceftriaxone. On the second day of hospitalization, he was hemodynamically stable, with no inotropic drugs. Further microorganisms identified by biochemistry (negative pyrrolidonylarylamidase (PYR), optochin resistant, negative bile solubility and bile esculin test), were viridians group streptococcus, susceptible to penicillin with MIC 0.023 ug/ml and after further identification to species level[12], it was found to be compatible with *Streptococcus mitis*. With regard to his hands, there was progression to dry gangrene of the index and middle fingers of his left hand, the index finger of his right hand, and the first, second, and third toes of his left foot (Fig. 4). Treatment was initiated with an intravenous heparin drip to keep partial thromboplastin time ratio 1.5 times for 7 days and subcutaneous injection of enoxaparin was continued for the following 10 days with clinical improvement. Echocardiogram was performed and showed no vegetation, EF 62%, and trivial mitral and tricuspid regurgitation. Eventually, his clinical condition improved and his skin lesions resolved after 26 days of intravenous ceftriaxone. The patient was discharged from hospital 6 weeks after admission.

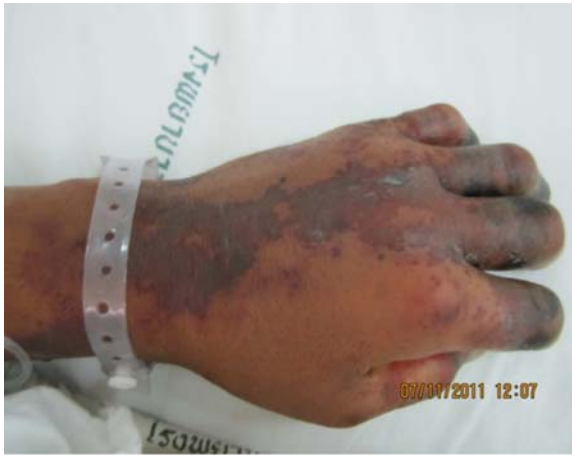

Fig. 2 Purpura on left hand

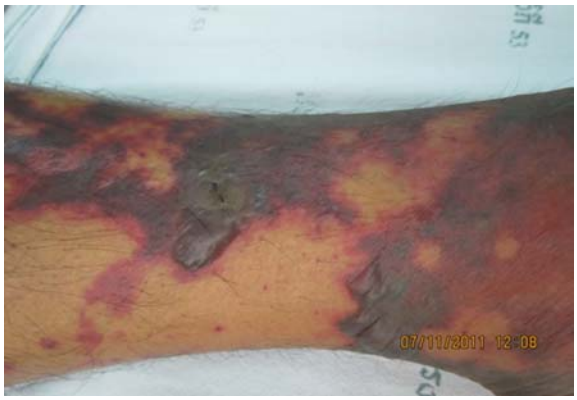

Fig. 3 Left leg with hemorrhagic blebs

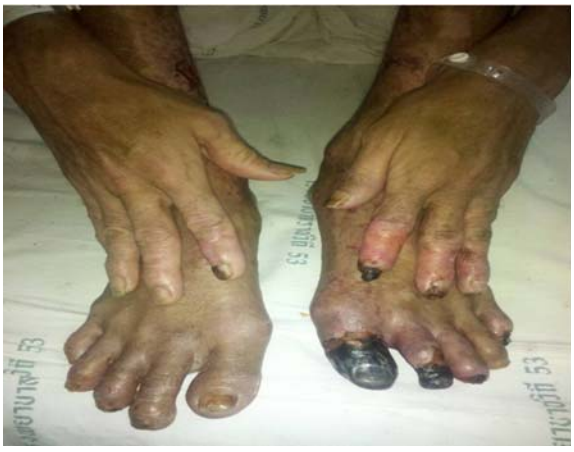

Fig. 4 Dry gangrene at his hands and feet

Discussion

The patient had septic shock from *Streptococcus mitis*, with a clinical syndrome which was compatible with toxic shock syndromes (according to the clinical criteria, including high-grade fever, diffuse rash, erythroderma, subsequent desquamation of palm and sole, hypotension, DIC, renal & hepatic involvement and isolation of streptococci from blood specimens). *Streptococcus mitis* is an alpha-hemolytic streptococcus of the viridans groups, normally a commensal in the oral cavity. It can cause a range of invasive diseases in humans, and it is emerging as a cause of bloodstream infection in neutropenic and immune-compromised patients. In studies by the Health Protection Agency (HPA, 2009)[13] in the United Kingdom, the incidence of *S. mitis* bacteremia exceeds that of group A or group B streptococci, and its incidence increased from 1.9 cases per 100,000 in the period 2002-2004 to 2.4 cases per 100,000 in 2008. These isolate strains were routinely resistant to commonly-used antibiotics. These results are similar to previous observations in the USA, which demonstrated high rates of antimicrobial resistance in *S. mitis* isolates[14].

There are few reports of *S. mitis* toxic shock-like syndrome in immuno-competent patients. One, from Lu et al[15], found that *S. mitis* produces 34-kda exoprotein that may possess superantigen-like activity. Another report from Madhusudhan T et al[16] reported the case of a previously healthy 33-year-old woman who presented with severe continuous pain in her right upper limb with progressive erythematous rash diagnosed as necrotizing fasciitis, drowsiness, respiratory failure, DIC with acute kidney injury and hemoculture positive for *S. mitis*, which can be treated successfully with antibiotics and intensive care support. The patient in the present study is one of the few reported cases in immuno-competent patients of *S. mitis* toxic shock-like syndrome followed by disseminated infection such as cellulitis, fasciitis, arthritis, and septicemia. This suggests that *S. mitis* may be an emerging microorganism in normal healthy hosts which requires early detection and optimal use of supportive and aggressive treatments to reduce morbidity and mortality.

Potential conflicts of interest

None.

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การติดเชื้อ viridians streptococcus (Streptococcus mitis) ชนิดแพร่กระจายที่มาด้วยอาการคล้ายภาวะช็อคจากทอกซิน

พจน์ อินทลาภาพร, สุนีย์ วงศ์เจริญ, อนงนาฏ ชินะผา, ธวิชชัย จริยะเศรษฐพงศ์

เชื้อ Streptococcus viridans เป็นเชื้อประจำถิ่นในช่องปาก ซึ่งก่อโรคในมนุษย์ได้หลายแบบ แต่ไม่ค่อยพบว่าก่อโรครุนแรง ที่เริ่มต้นด้วยกลุ่มอาการคล้ายภาวะช็อคจากทอกซิน ดังเช่นในรายงานผู้ป่วยรายนี้ อายุ 35 ปี สุขภาพแข็งแรงดี มีไข้ ขาซ้ายบวมอักเสบ ร่วมกับมีตุ่มน้ำใสชนิดที่มีเลือดออก ร่วมกับข้ออักเสบ และเพาะเชื้อขึ้น Streptococcus mitis มีภาวะแทรกซ้อนเรื่องตับอักเสบ และตอบสนองต่อการรักษาด้วยการให้ยาปฏิชีวนะกลุ่มเพนนิซิลลิน นาน 6 สัปดาห์