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## SHORT REPORTS

### Toxic shock syndrome and endocarditis

The toxic shock syndrome is known to be associated with a variety of staphylococcal infections unrelated to the use of tampons or to menstruation.<sup>1</sup> We report a case in a patient who had staphylococcal endocarditis.

#### Case report

The patient was a 21 year old woman who had been having psychiatric treatment for intravenous drug abuse for the past year. She had had amenorrhoea for three months but was not pregnant. The illness started with fever of 40.4°C, severe myalgia, and non-productive cough. On admission she was drowsy, pale, and dehydrated and her blood pressure was 90/50 mm Hg (supine). On clinical examination a soft systolic murmur was heard at the left sternal edge with widespread bilateral crepitations and a harsh pleural rub at the left base. Echocardiography showed vegetations and thickening of the tricuspid valve, and electrocardiography showed a sinus tachycardia of 110 beats/min with extensive T wave inversion in anterior and lateral leads. Patchy consolidation was present at both bases on a chest x ray film, and the left diaphragm was raised.

A provisional diagnosis of endocarditis of the tricuspid valve with pulmonary embolisation was confirmed by the isolation of *Staphylococcus aureus* from all of four blood cultures. Laboratory investigations showed renal dysfunction with raised blood urea and creatinine concentrations (26.4 mmol/l (159 mg/100 ml) and 220 µmol/l (2.5 mg/100 ml), respectively). There was moderate anaemia (haemoglobin concentration 8.9 g/dl), and platelets were low at  $85 \times 10^9/l$ . Results of liver function tests were normal.

Despite aggressive treatment to achieve volume expansion and correct shock, systolic blood pressures below 90 mm Hg were recorded several times in the 24 hours after admission. Thereafter the blood pressure stabilised. She was treated with intravenous cloxacillin (12 g daily) and gentamicin (240 mg daily) but remained feverish for nine days. Blood cultures collected during this period remained sterile. Rifampicin 900 mg daily was then substituted for gentamicin and she became afebrile two days later. Eleven days after the onset of illness an erythematous rash appeared over her fingers, and two days later the skin desquamated over the distal two phalanges of the fingers of both hands. She discharged herself on the 28th day but was believed to have remained well.

**Bacteriology**—The *S. aureus* isolated was phage group II (type 3A/3C/55/71) and produced enterotoxin F. It was resistant to penicillin but sensitive to methicillin, vancomycin, gentamicin, and rifampicin. Minimal inhibitory and bactericidal concentrations for the isolate (table) showed in vitro toler-

ance to cloxacillin. Bacterial synergy could not be shown in vitro for either of the combinations of antibiotic ultimately used. Carriage of *S. aureus* at other sites was not investigated until after treatment had started and proved negative.

#### Comment

We believe this to be the first recorded case of the toxic shock syndrome in association with staphylococcal endocarditis. Although the case was unusual as blood cultures yielded *S. aureus* the patient had the classic features of the disease with fever, hypotension, desquamation, and evidence of multisystem involvement (myalgia, renal impairment, thrombocytopenia, and cardiac abnormalities) as defined by Bergdoll *et al.*<sup>2</sup> The staphylococcus isolated was unusual since it belonged to phage group II, a group classically associated with production of epidermolytic toxins A and B and the scalded skin syndrome. It failed to produce these toxins but did elaborate enterotoxin F, which is characteristic of strains associated with the toxic shock syndrome.<sup>2,3</sup>

Tolerance to both nafcillin and vancomycin has been documented in staphylococci associated with the toxic shock syndrome but is rare.<sup>4</sup> The clinical importance of in vitro tolerance remains controversial, but this phenomenon is more important when the syndrome is associated with endocarditis than it is in most cases, in which a bactericidal antimicrobial regimen is not mandatory.

The toxic shock syndrome has emerged as a multifactorial staphylococcal disease and should be considered in all patients with appropriate signs and symptoms regardless of their sex or menstrual state.

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#### Sensitivity of *S. aureus* associated with the toxic shock syndrome

Antibiotic	Minimal inhibitory concentration (mg/l)	Minimal bactericidal concentration (mg/l)
Cloxacillin	0.25	> 32
Gentamicin	0.35	0.35
Vancomycin	0.25	0.25
Rifampicin	0.007	0.007