Methicillin-resistant *Staphylococcus aureus* at Tygerberg Hospital

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Summary

During 1985 *Staphylococcus aureus* was isolated from blood cultures of 74 patients at Tygerberg Hospital who were suffering from serious illness compatible with systemic spread of the organism. Twenty-six isolates (35%) were community-acquired and none were methicillin-resistant, while 48 were hospital-acquired of which 23 (48%) were methicillin-resistant. Methicillin resistance appears to be a problem confined to hospital isolates of *S. aureus*.

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Methicillin-resistant *Staphylococcus aureus* is known to occur in large tertiary care institutions and often gives rise to considerable clinical concern and extensive and expensive elimination efforts.[1] The appearance of methicillin-resistant *S. aureus* at Tygerberg Hospital in 1985 and attempts to establish whether any serious infections originated in the community are reported.

Patients and methods

The number of *S. aureus* isolates from several sources during 1985 was derived from the computerised records of the Department of Medical Microbiology. Methicillin sensitivity was evaluated by the method of Joan Stokes.[2] To determine whether any serious infections were associated with methicillin-resistant *S. aureus* and whether these could possibly have originated in the community the clinical records of all patients reported to have a blood culture positive for *S. aureus* were reviewed. For the purposes of this study all blood cultures obtained within 24 hours of admission to hospital were treated as community infections and the remainder as hospital infections.

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Results

S. aureus isolates were found to be methicillin-resistant in 18% of 2 681 pus swabs, 27% of 573 sites usually carrying normal flora and 25% of 100 blood cultures.

Twenty-six of the blood culture isolates were not associated with serious illness at the time of culture or subsequently. These cultures were obtained for mainly 'routine' reasons such as after an exchange transfusion or dialysis or were from patients thought to be particularly susceptible to serious infection. None of these patients received appropriate antibiotic therapy and, in view of their failure to develop any subsequent serious illness, these isolates may well have been contaminants. Only 1 of these isolates, from the hospital-infection group, was methicillin-resistant. The remaining 74 blood cultures were obtained from patients suffering a serious illness compatible with systemic spread of *S. aureus*. Table I summarises the spectrum of disease seen in these patients together with the methicillin sensitivity of the isolates and whether they appeared to be of hospital or community origin.

While no serious community infection could be ascribed to methicillin-resistant *S. aureus*, 48% of the hospital isolates were methicillin-resistant *S. aureus*. In 2 patients a positive blood culture for methicillin-resistant *S. aureus* was obtained within 24 hours of admission, but both had recently been hospitalised for a prolonged period at neighbouring institutions and were therefore classified as having hospital infections.

Penicillin resistance was found among 73% of the community isolates and 79% of the hospital isolates. Only 1 methicillin-resistant *S. aureus* isolate was also resistant to fucidic acid.

TABLE I. SERIOUS SYSTEMIC DISEASE ASSOCIATED WITH BLOOD CULTURE POSITIVE FOR *S. AUREUS* DURING 1985

	Community-acquired		Hospital-acquired	
	Methicillin-sensitive	Methicillin-resistant	Methicillin-sensitive	Methicillin-resistant
Septicaemia	3	—	6	9
Wound sepsis and postoperative infection	—	—	10	4
Osteitis/arthritis	12	—	—	1
Pneumonia/empyema	6	—	3	3
Neonatal septicaemia/pneumonia	2	—	1	5
Urinary tract infection	—	—	1	1
Incomplete abortion and complications	2	—	—	—
Meningitis	1	—	—	—
Renal failure/dialysis	—	—	3	—
Acute bacterial endocarditis	—	—	1	—
Total	26 (100%)	0	25 (52%)	23 (48%)

Discussion

A previous survey of blood culture results reported a low incidence of methicillin-resistant *S. aureus* at Tygerberg Hospital in comparison with centres in Transvaal.[3] Our results indicate that when cultures are separated into community- and hospital-acquired groups the incidence is in fact comparable to that reported from other South African centres. Despite the high incidence of methicillin resistance among *S. aureus* hospital isolates, the use of methicillin or cloxacillin still seems to remain appropriate for community-acquired infections.

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Dipstick screening for urinary tract infection

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Summary

In screening for urinary tract infection the leucocyte esterase test will detect almost all samples with significant pyuria and bacteriuria, but is relatively nonspecific. The nitrite test is more specific but less sensitive and about one-third of the urinary tract infections in a large group of children were missed. The combination of screening tests results in greater overall accuracy both in the diagnosis and exclusion of urinary tract infection. Almost all cases of urinary tract infection were detected when either the leucocyte esterase or the nitrite screening test or both were positive. If both tests are negative, urinary tract infection is virtually excluded and unless the child is symptomatic, further urinalysis is unnecessary. Laboratory urinalysis is, however, necessary if any one screening test for leucocyte esterase or nitrite (or protein or haemoglobin) is positive. Combined biochemical screening for urinary tract infection with dipstick test strips is reliable and allows early diagnosis and management. By avoiding unnecessary urinalysis it is cost-effective for the patient and will significantly reduce the laboratory workload.

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Urinary tract infection is common in infancy and childhood and may indicate underlying structural or functional uropathy requiring further management. The diagnosis of urinary tract infection is usually confirmed by microscopy and culture of a properly collected urine sample.

Reliable screening tests for urinary tract infection facilitate early diagnosis and treatment, and if negative may avoid unnecessary laboratory urinalysis.

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Neutrophil granulocytes contain several esterases which are not normally present in serum, urine or kidney tissue, while most urinary pathogens reduce nitrate present in urine to nitrite. The use of biochemical marker test strips for leucocyte esterase for pyuria, and for nitrite for bacteriuria, proteinuria and haematuria, is evaluated as a rapid screening method in the diagnosis or exclusion of urinary tract infection.

Materials and methods

Random urine samples from 1 137 children attending medical casualty and outpatient follow-up clinics were screened. The samples were obtained by clean-catch midstream or urine/ostomy bag collection, bladder catheterisation (at cystourethrography) or suprapubic aspiration. The presence or absence of signs and symptoms of urinary tract infection and antimicrobial therapy was recorded.

Screening urinalysis at the bedside was done with both the Combur 9 test (Boehringer Mannheim) and Multistix 9 (Ames Bayer-Miles) dipsticks. Quantitative microscopy of the unstained specimen was performed using the Fuchs-Rosenthal counting chamber. Ten or more pus cells/μl (unspun) was considered significant leucocyturia.

Routine laboratory urinalysis entailed microscopy of the spun sediment (5 ml at 1 500 rpm for 2 min) and semiquantitative culture using Bacteruritest (Mast Laboratories) filterstrip imprints on cystine-lactose-electrolyte-deficient agar (Oxoid CM 423). Isolates were determined by conventional methods, and antimicrobial sensitivity was determined by the Stokes disc diffusion method. The samples were stored at 4°C until they were batch-processed, usually within 1-4 hours of voiding.

Significant bacteriuria was defined as $>$ 100 000 colony-forming units of one predominant organism/ml urine. Secondary organisms were accepted only if they occurred in concentrations $<$ 10 000/ml; higher counts of three or more organisms were regarded as contaminants and reported as mixed growths. Lower counts were considered significant in samples obtained by bladder catheterisation or aspiration. Significant pyuria was considered present if $>$ 10 white blood cells/high-power field ($\times$ 400) were seen. Urinalysis in the laboratory was performed without knowledge of the test strip findings.