Risk factors for mortality amongst hospitalised patients with *Staphylococcus aureus* bacteraemia – a prospective cohort study

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INTRODUCTION

- *Staphylococcus aureus* bacteraemia (SAB) remains a common infection with significant mortality, ranging from 20 to 40%

- Risk factors for development of bacteraemia include presence of indwelling vascular catheters, end-stage kidney disease as well as intravenous drug use.

- In contrast, the risk factors for mortality remain poorly understood

- Understanding predictors for adverse outcomes in this infection will better prognosticate and guide patient management and disposition

METHOD

Patient recruitment
- Consecutive patients (n=634) with laboratory-proven blood culture positive for *Staphylococcus aureus* were prospectively examined
- All patients were hospitalized from a single tertiary centre

Data collection
- Examined the overall population and divided cohort based on inpatient mortality (n=37) and those who survived
- Clinical and demographic background data collected, as well as clinical outcomes
- Adverse composite clinical outcomes were defined as either mortality, and presence of metastatic infection

Statistical analysis
- Independent samples Student's t-tests and chi-squared tests were employed to compare between groups
- Multivariable analyses to identify independent risk factors for mortality
- P-value of <0.05 was considered significant

RESULTS

Table 1: Characteristics of hospitalised patients with *Staphylococcus aureus* bacteraemia

Parameter	Overall population (n=634)	Mortality (n=37)	No mortality (n=597)	p-value
Patient profile				
Age (years)	58.7 (±18.2)	69.6 (±14.9)	58.1 (±18.2)	<0.001
Gender (Male)	403 (64.1%)	21 (60.0%)	382 (64.3%)	0.606
Community-acquired SAB	122 (19.2%)	7 (18.9%)	115 (19.3%)	0.959
History of intravenous drug use	27 (4.3%)	0 (0.0%)	27 (4.5%)	0.068
History of structural heart disease	20 (3.2%)	1 (2.7%)	19 (3.2%)	0.672
Presence of long intravenous catheter	118 (18.6%)	6 (16.2%)	112 (18.8%)	0.830
Human immunodeficiency virus infection	5 (0.8%)	0 (0.0%)	5 (0.8%)	0.740
Diabetes mellitus	255 (40.2%)	15 (40.5%)	240 (40.2%)	0.967
Haemodialysis	145 (22.9%)	11 (29.7%)	134 (22.4%)	0.306
History of cancer	49 (7.7%)	5 (13.5%)	44 (7.4%)	0.195
Presence of prosthesis/implant	43 (6.8%)	2 (5.4%)	41 (6.9%)	0.533
Immunosuppressant use	105 (16.6%)	9 (24.3%)	96 (16.1%)	0.191
Recent surgery within 6 months	138 (21.8%)	7 (18.9%)	131 (21.9%)	0.838
Temperature (°C)	37.9 (±1.1)	37.7 (±1.2)	37.9 (±1.1)	0.224
Duration of fever (days)	2.6 (±2.6)	1.6 (±1.9)	2.7 (±2.6)	0.079
Investigations				
Methicillin-resistant SAB	165 (26.0%)	17 (45.9%)	148 (24.8%)	0.004
Total white cell count (x10⁹/L)	14.3 (±7.4)	14.1 (±6.1)	14.3 (±7.5)	0.887
C-reactive protein (mg/dL)	144.3 (±106.4)	106.3 (±90.2)	146.9 (±107.1)	0.140
Serum creatinine (umol/L)	268.1 (±309.6)	253.3 (±156.2)	269.2 (±317.9)	0.844
Clinical outcomes				
Persistent bacteraemia at 72 hours	43 (6.8%)	1 (2.7%)	42 (7.0%)	0.309
Persistent fever at 72h	40 (6.3%)	1 (2.7%)	39 (6.5%)	0.722
Presence of metastatic infection identified	33 (5.2%)	1 (2.7%)	32 (5.4%)	0.713
Infective endocarditis	36 (5.7%)	3 (8.1%)	33 (5.5%0	0.459
Bone infection	19 (3.0%)	1 (2.7%)	18 (3.0%)	0.694

Table 2: Multivariable analyses identifying risk factors independently associated with mortality in hospitalised patients with *Staphylococcus aureus* bacteraemia

Parameter	Adjusted odds ratio (95% confidence interval)	p-value
Older age (per year)	1.05 (1.02 – 1.07)	<0.001
Methicillin-resistant *Staphylococcus aureus* (MRSA) infection	2.04 (1.01 – 4.09)	0.046
Haemodialysis	1.45 (0.66 – 3.19)	0.352

DISCUSSION AND CONCLUSION

- Amongst hospitalised patients with SAB, the mortality was low (5.8%, n=37)

- Older age and MRSA infection (compared with MSSA) remained independently associated with mortality on multivariable analysis

- We did not demonstrated an association with prolonged fever or bacteraemia and in-hospital mortality

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