Factors associated with 12-week case-fatality in *Staphylococcus aureus* bacteraemia, a large observational study.

Pierre Braquet[1], Laetitia Minary[2], Catherine Cornu[3], Lionel Piroth[4], Elodie Curlier[5], Matthieu Revest[6], Catherine Lechiche[7], Xavier Duval[8], Vincent Le Moing[1]
[1]CHU Montpellier, [2]CHU Nancy, [3]CHU Lyon, [4]CHU Dijon, [5]CHU Besançon, [6]CHU Rennes, [7]CHU Nîmes, [8]CHU Hôpital Bichat-Claude Bernard Paris

Introduction

Staphylococcus aureus bacteraemia (SAB) is frequent and associated with poor outcomes in industrialised countries. This study's aim was to update factors associated with case-fatality.

Patients and Methods

We conducted an observational prospective multicentre cohort study (VIRSTA) in 8 tertiary care centres in France. All consecutive incident adults with positive blood culture specimen seen between April 2009 and October 2011 were included. Their data were collected using a standardised online form. Patients with positive cultures from vascular devices only were excluded. Multivariate logistic regression was used to identify independent factors associated with death 12 weeks after the first positive blood culture. The impact of first line antibiotic treatment was further assessed in the subgroup of patients who survived the first day and received at least one antibiotic dose.

Results

We enrolled 2091 patients with SAB, among whom follow-up was complete for 1972 patients (median age: 67.8 years, inter-quartile range: 55.5-78.9, male gender 64.9%). Most frequent comorbidities were cancer history (29.3%), diabetes (27.9%) and chronic renal insufficiency (27.8%). SAB was nosocomial or health-care related in 69.6% and MRSA accounted for 18.6% of the cases. Primary focus was vascular access in 27.9%, skin in 19.1% and unknown in 21.0%. Case fatality at week 12 was 34.0%.

We identified 12 independent prognostic factors (Table). Other factors were not associated with case-fatality: diabetes, peripheral arteriopathy, chronic obstructive pulmonary disease and immunosuppressive therapy.

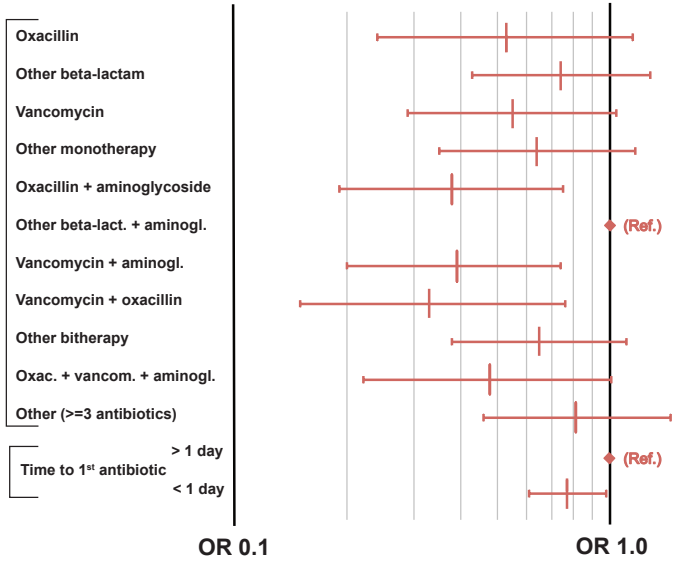
Endocarditis was associated with case-fatality in bivariate analysis but not after adjustment for other factors.

We adjusted first line antibiotic data on previously identified prognostic factors among the 1896 patients who survived the first day and received at least one antibiotic dose (Figure).

Table: Multivariate logistic regression on case fatality (n=1972)

Prognostic factors	Frequencies Dead/	Exposed	= %	Multivariate regression OR	CI	p
Age						
(by 10-year increment)				1.56	1.44-1.69	<0.001
Gender						
Male	408	1280	31.9	1.00		
Female	263	692	38.0	1.34	1.06-1.68	0.013
Chronic renal insufficiency						
No	435	1423	30.6	1.00		
Yes	236	549	43.0	1.46	1.15-1.86	0.002
Chronic liver disease						
No	569	1693	33.6	1.00		
Yes	102	279	36.6	1.43	1.04-1.97	0.028
Cancer history						
None	434	1395	31.1	1.00		
Localized Cancer	154	429	35.9	1.17	0.90-1.52	0.246
Metastatic Cancer	83	148	56.1	4.28	2.88-6.38	<0.001
In vitro susceptibility						
MSSA	510	1598	31.9	1.00		
MRSA	161	374	43.0	1.33	1.02-1.75	0.039
Primary focus						
Other known focus	397	1441	27.6	1.00		
Pulmonary focus	58	117	49.6	2.27	1.45-3.55	<0.001
Unknown focus	216	414	52.2	2.62	2.02-3.41	<0.001
Complication: Stroke						
No	620	1872	33.1	1.00		
Yes	51	100	51.0	1.73	1.05-2.86	0.031
Complication: Heart Failure						
No	570	1786	31.9	1.00		
Yes	101	186	54.3	1.76	1.23-2.53	0.002
Pulmonary 2ndary focus						
No	583	1800	32.4	1.00		
Yes	88	172	51.2	2.14	1.46-3.14	<0.001
Osteo-articular 2ndary focus						
No	615	1706	36.0	1.00		
Yes	56	266	21.1	0.55	0.39-0.79	0.001
Complication: Sepsis						
None	296	1266	23.4	1.00		
Severe sepsis	137	303	45.2	2.45	1.83-3.30	<0.001
Septic shock	230	376	61.2	5.11	3.84-6.80	<0.001
Missing	8	27	29.6	1.71	0.68-4.31	0.252

Figure: First line antibiotics and case-fatality Multivariate logistic regression after adjusting on prognostic factors (n=1896)



Conclusion

SAB is a deadly disease and modifiable prognostic factors are scarce. Sepsis, underlying comorbidities and unknown primary focus have a major impact. Early combination prescription of specific anti-staphylococcal antibiotics i.e. oxacillin or vancomycin, associated with each other or with aminoglycosides, may be associated with better outcome.