

Introduction

Catheter-related *Staphylococcus aureus* bacteraemia (SAB) is associated with significant morbidity and mortality in hospitalised patients. We aimed to determine the incidence of this infection in our setting and to evaluate the incidence of complications (endocarditis, septic thrombophlebitis, secondary metastatic foci, and relapses) after an episode of catheter-related SAB.

Material and Methods

• Study design and setting: An observational cohort study of episodes of monomicrobial catheter-related SAB in adult patients (≥ 18 years) was conducted in a 1000-bed teaching hospital in Barcelona (Spain) from January 2012-September 2015. Data were recorded retrospectively in 2012, and prospectively from 2013 onwards. Given the observational nature of this research, patients were managed according to routine clinical care.

• Variables: Demographic, clinical data, risk factors for complicated bacteraemia, variables identified as quality-of-care-indicators (eg, follow-up blood cultures, echocardiography in patients with clinical indications), outcomes, and a 3-month follow-up period were recorded.

• Analysis: Peripheral venous catheter-related bloodstream infections (PVC-BSIs) were compared to central venous catheter-related bloodstream infections (CVC-BSIs). Long-term central venous catheters were excluded from the cohort.

Results

Ninety-one episodes-patients of catheter-related SAB were detected

- 54 PVC-BSIs (annual incidence 0.48 episodes/10 000 patient-days)
- 37 CVC-BSIs (annual incidence 0.33 episodes/10 000 patient-days).

One patient with PVC-BSI was lost to follow-up, leaving 90 episodes for further analysis

TABLE 1. Baseline demographic characteristics of patients with catheter-related SAB

Variable	Overall (n=90)	CVC-BSI (n=37)	PVC-BSI (n=53)	P-value
Age, median (IQR)	62.8 (47-76.3)	59.2 (42.2-73.2)	65.7 (48.8-83.5)	0.029
Gender, male	63 (70)	23 (62.2)	40 (75.5)	0.175
Charlson, median (IQR)	2 (1-4)	2 (0.5-4)	2 (1-4.5)	0.429
Diabetes mellitus	26 (28.9)	9 (24.3)	17 (32.1)	0.425
Chronic pulmonary disease	17 (18.9)	6 (16.2)	11 (20.8)	0.588
Malignancy	24 (26.7)	12 (32.4)	12 (22.6)	0.301
Liver cirrhosis	6 (6.7)	2 (5.4)	4 (7.5)	1.000
Immunosuppressive therapy ^a	20 (22.2)	13 (35.1)	7 (13.2)	0.014

^aIncludes corticoids, chemotherapy and other immunosuppressive drugs

TABLE 2. Clinical characteristics and outcomes of patients with catheter-related SAB

Variable	Overall (n=90)	CVC-BSI (n=37)	PVC-BSI (n=53)	P-value
MRSA strain	16 (17.8)	8 (21.6)	8 (15.1)	0.425
Vancomycin Etest MIC ≥ 1.5	59/88 (67)	26/36 (72.2)	33/52 (63.5)	0.390
Foreign body presence (other than catheter)	14 (15.6)	9 (17)	5 (13.5)	0.655
Endocarditis-predisposing condition ^a	21 (23.3)	7 (18.9)	14 (26.4)	0.408
Echocardiography (among patients surviving > 72h)	15/19 (78.9)	4/6 (66.2)	11/13 (84.6)	0.557
Septic shock	12 (13.3)	7 (18.9)	5 (9.4)	0.220
Appropriate iv antimicrobial therapy (≤ 48 h)	83 (92.2)	35 (94.6)	48 (90.6)	0.695
Follow-up blood cultures (2 -7 days after therapy in patients alive at day 3)	70/88 (79.5)	30/36 (83.3)	40/52 (76.9)	0.464
Persistent bacteraemia (>48h after therapy)	19/70 (27.1)	8/30 (26.7)	11/40 (27.5)	0.938
Visited by an infectious diseases specialist ^c	83 (92.2)	32 (86.5)	51 (96.2)	0.119
14-day mortality	11 (12.2)	4 (10.8)	7 (13.2)	1.000
30-day mortality	18 (20)	7 (18.9)	11 (20.8)	1.000
Complicated SAB ^b + relapses	19 (21.1)	4 (10.8)	5 (28.3)	0.045

^a Includes 5 prosthetic valves, 15 other predisposing valve condition, 4 endocavitary cardiac devices. Patients may have more than one predisposing risk factor.

^b Complicated SAB: endocarditis, septic thrombophlebitis, and secondary metastatic foci

^c Patients were visited at a median of 2 days (IQR 1-3) after blood sample collection in both groups

TABLE 3: Detailed description of relapses or new episodes of SAB during the 3-month follow-up period

Case	Patient data, catheter type	Endocarditis-predisposing condition	Performance of TTE/TEE ^a	Treatment of SAB (time)	Persistent bacteraemia (>48h after therapy)	Recurrence/new episode (Time in days)	Outcome
1	45-yr-old, PVC	No	No/No	7 days iv +5 days oral linezolid	No	+8	Native valve endocarditis/Alive
2	81-yr-old, PVC	No	No/No	13 days iv	No	+42	Death before explorations
3	90-yr-old, PVC	Aortic stenosis + mitral regurgitation	Yes/No	14 days iv	No	+3	Death before explorations
4	62-yr-old, CVC	Recent Bentall-Bono procedure	Yes/Yes	4 weeks iv	No	+8	Perivalvular collection around ascending aorta/Dead

^a TTE: transthoracic echocardiogram; TEE: transesophageal echocardiogram.

All echocardiograms ruled out endocarditis. In case 4, TEE showed postoperative circumferential hematoma around the graft of ascending aorta

Conclusions

Catheter-related *Staphylococcus aureus* bacteraemia is a serious preventable infection associated with a complication rate of 20% in our cohort. Special attention should be paid to peripheral venous catheters that are more frequently associated with complicated SAB or relapses than central venous catheters.

OUTCOMES of catheter-related SAB

