

Abstract

Background: Current practice guidelines for the treatment of SAB advocate echocardiogram (ECHO), preferably trans-esophageal (TEE), in all patients with SAB. The benefit of ECHOs in uncomplicated SAB has not been validated.

Methods: Retrospective analysis of trans-thoracic ECHO (TTE) and TEE results in hospitalized adults with SAB between 7/2008-12/2009. ECHOs were ordered by the managing physicians. SAB cases were stratified into persistent (PER; ≥ 3 d), relapse (REL), the presence of intracardiac prosthetic devices (DEV), clinical findings of endocarditis (CLIN) and uncomplicated (UC; ≤ 2 d, no devices and without distant seeding).

Results: We encountered 296 SAB cases, 54 were excluded: death/transfer/discharge within 48 h of SAB (n=24), suspected contamination (n=11) and mixed bacteremia (n=9). Among the remainder, TTE was performed within 0-19 d (median=2) in 103 (42.6%) cases and TEE was performed within 0-22 d (median=6) in 60 (24.8%) instances. TTE was performed in 59 (59.1%) PER/REL, 13 (43.3%) DEV, 5 (55.6%) CLIN, and 30 (27.3%) UC-SAB. TEE was performed in 36 (38.7%) PER/REL, 8 (26.7%) DEV, 7 (77.8%) CLIN, and 9 (8.2%) UC-SAB. ECHO results were stratified according to SAB type (table). ALL TTE TEE performed in UC-SAB were negative. TEE was positive in 10/44 (22.7%) cases with negative TTE.

Conclusions: TEE is rarely positive in UC-SAB and is probably not cost-effective. These findings do not validate current practice guidelines for TEE in all cases with SAB.

It should be limited to subsets with persistent SAB, relapse, cardiac devices and clinical findings suggestive of endocarditis.

Introduction

Staphylococcus aureus bacteremia remains a common and serious infection. It is associated with high risk for distant foci of infection and endocarditis. The risk for these complications, including endocarditis, is higher in patients with bacteremia for ≥ 3 days and delayed removal of a removable source. Whether these complications lead to persistent bacteremia or develop because of continuous bacteremia is uncertain. Although patients who clear the bacteremia within a short time (1-2 days) may still develop endocarditis, the risk is much smaller.

Because of these concerns, trans-esophageal echocardiogram is often suggested in patients with SAB. Recent IDSA guidelines advocate TEE in all patients with SAB. The benefit of this approach in all SAB has not been clearly documented. Kaasch et al recently suggested the use of risk stratification criteria in nosocomial SAB (CID 2011). We evaluated all our community- and healthcare-associated SAB, reviewed echocardiographic findings and stratified the results according to the risk of complications.

Patients and Methods

- Adult (≥ 18 y) inpatients with positive blood culture (BC) for *S. aureus* (7/16/2008-12/1/2009) were screened. All patients with SAB (positive BC and clinical signs of bacteremia) were evaluated.
- The following information was gathered prospectively: demographics, underlying conditions, comorbidity score (according to a recently modified Charlson weighted index), the presence of cardiac devices (prosthetic valve, pacemakers/defibrillators), source of infection, duration of bacteremia, and metastatic foci. Echocardiograms were ordered according to the managing physician preference.
- Cases were then stratified according to SAB and host characteristics: persistent bacteremia (≥ 3 d), relapse, the presence of cardiac devices, clinical findings consistent with endocarditis and uncomplicated SAB (≤ 2 d, no devices and without distant seeding). Echocardiogram results were then evaluated.

Statistical methods: Chi square test was used to assess the significance of differences. All statistical tests were performed using SPSS 12. P value < 0.05 was considered to indicate statistical significance. Study approved by the St. John Hospital IRB.

Figure 1: Study outline

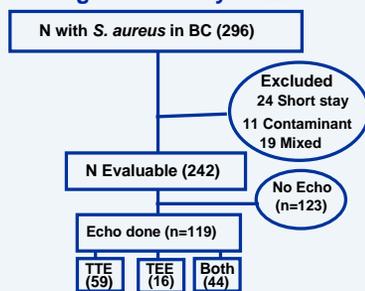


Figure 2: Echocardiogram results

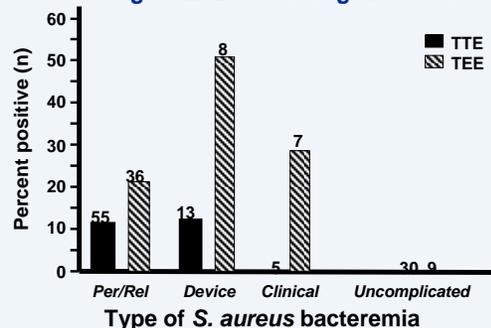


Table: Type of *S. aureus* bacteremia with Echocardiograms done and % positive

	PER/REL ^a		Device		CLINICAL IE		Uncomplicated ^b	
	Com-Ass ^c	HCA ^d	Com-Ass	HCA	Com-Ass	HCA	Com-Ass	HCA
TTE: n	6	49	1	10	3	2	6	72
% IE	16.7	10.2	0	10	0	100	0	0
TEE n	6	30	1	7	3	4	3	6
% IE	0	26.7	100	42.9	33.3	25.0	0	0

a: persistent/relapse; b: ≤ 2 days without distant seeding); c: Community-associated; d: healthcare-associated

Results

- We encountered 296 SAB cases, 54 were excluded because of death/transfer/discharge within 48 h of SAB (n=24), suspected contamination (n=11) and mixed bacteremia (n=19).
- Among the remainder, TTE was performed within 0-19 d (median=2) in 103/242 (42.6%) cases and TEE was performed within 0-22 d (median=6) in 60/242 (24.8%) instances.
- TTE was performed for cardiac assessment in 34 cases and for endocarditis 69 instances. TTE was performed for: persistent bacteremia or relapse in 55/89 (61.8%), device-associated in 13/30 (43.3%), the presence of murmurs or emboli 59/106 (55.6%), and uncomplicated bacteremia 30/110 (27.3%).
- TEE was performed for cardiac assessment in two cases and endocarditis in 58 cases. TEE was performed for: persistent bacteremia/relapse in 36/93 (38.7%), device-associated in 8/30 (26.7%), the presence of murmurs/emboli in 7/9 (77.8%), and uncomplicated bacteremia in 9/110 (8.2%).
- ECHO results were stratified according to SAB type (Table). ALL TTE and TEE performed in uncomplicated bacteremia were negative. TEE was positive in 10/44 (22.7%) cases with negative TTE.

Conclusions

- IE is rare in uncomplicated healthcare- and/or community-associated SAB.
- TEE should be limited to subsets with persistent SAB, relapse, cardiac devices and/or clinically suspected IE.
- TTE is rarely helpful.
- These findings do not validate IDSA practice guidelines for TEE in all cases with SAB.