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# SOURCES OF STREPTOCOCCAL BACTERAEMIA AND THEIR IMPLICATIONS FOR THE DIAGNOSIS OF INFECTIVE ENDOCARDITIS

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## Introduction

Robust confirmation of the microbiological cause of infective endocarditis (IE) requires demonstration of a sustained bacteraemia - multiple positive blood cultures being major criteria in the Duke nosology for IE. The interpretation of a single positive blood culture growing pathogens that could cause IE, but that do not fulfill major Duke criteria, is a common diagnostic difficulty in patients with a febrile illness. This study was designed to examine the clinical diagnosis in patients with streptococcal bacteraemias and the proportion with a final diagnosis of IE.

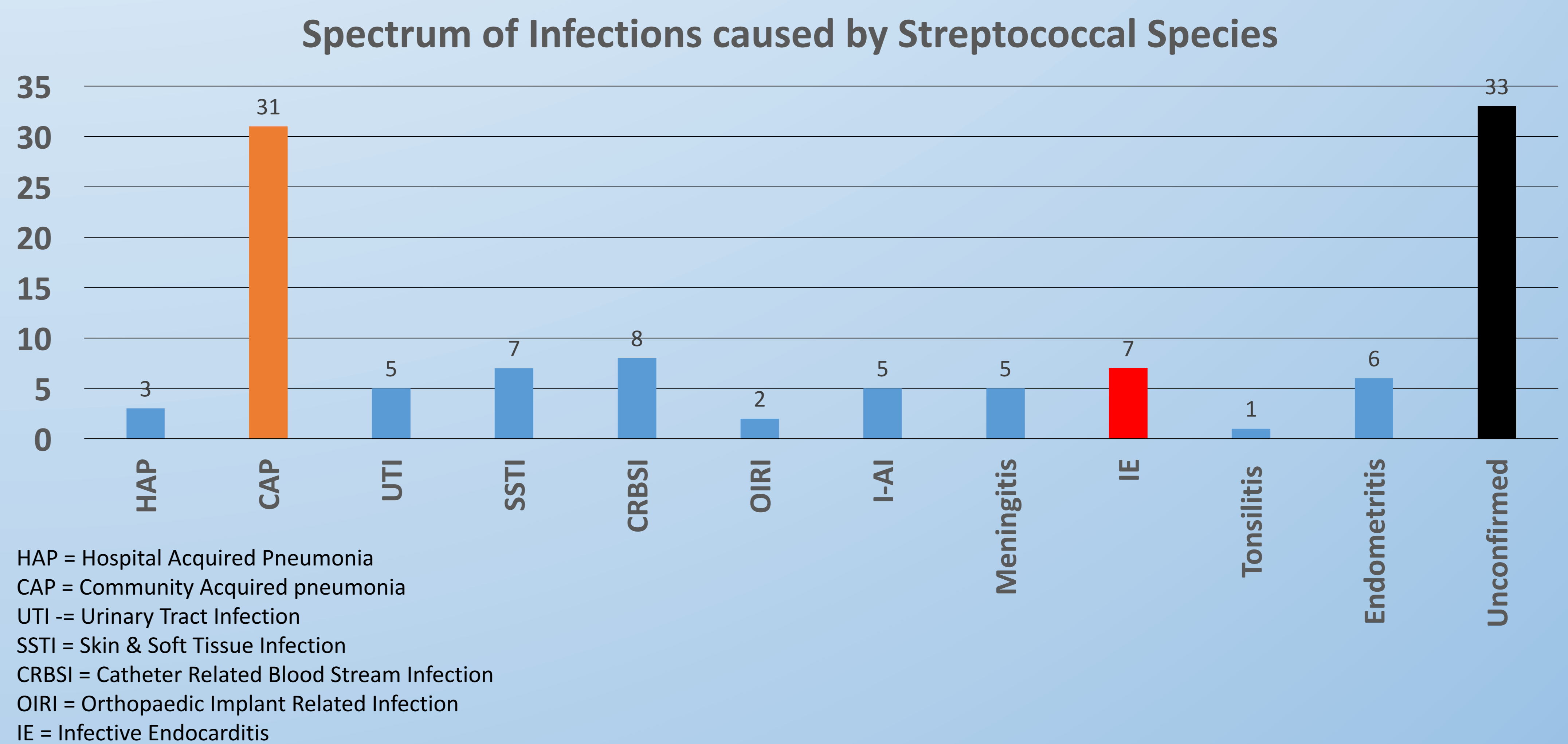
## Methods

This was a retrospective descriptive analysis of patients with streptococcal bacteraemia between September-December 2012. IE was confirmed by a Consultant Microbiologist (JS) using the modified Duke criteria. The variables recorded were age, gender, number of blood cultures taken and the final diagnosis stated in the discharge summary.

## Results

112 episodes were identified in 72 females and 40 males (mean age 40 years, range <1-97). The mean number of blood cultures was 2.57 (range 1-12) and 85 (76%) patients had only one blood culture taken. The infections recorded are shown in Figure 1. The cause of the bacteraemia was not stated in 33 (29.5%) cases. Community acquired pneumonia (n=31) was the commonest infection, followed by catheter-related bloodstream infection (n=8) and then IE and soft-tissue infection (both n=7). Details of the streptococcal species are shown in Table 1 and the results have been divided using age less than or greater than 18 years. 50% of bacteraemias were caused by oral streptococci. IE was confirmed in only 7 (1.2%).

	Age <18		Age ≥18		Total
	IE (%)	Not IE (%)	IE (%)	Not IE (%)	
<i>Streptococcus pneumoniae</i>	0 (0)	4 (100)	0 (0)	27 (100)	31
Oral streptococci	0 (0)	16 (100)	5 (12.5)	35 (87.5)	56
<i>Strep. bovis</i> group ( <i>gallolyticus</i> )	0 (0)	0 (0)	0 (0)	1 (100)	1
Beta-haemolytic streptococci	0 (0)	5 (100%)	2 (12.5)	14 (87.5)	21
<i>Strep. anginosus</i> group ( <i>anginosus/intermedius/constelatus</i> )	0 (0)	1 (100%)	0 (0)	2 (100)	3



## Conclusions

A significant proportion (12.5%) of oral streptococcal bacteraemias in adults are caused by IE – similar to the rate of IE in patients with *S. aureus* bacteraemia, where universal echocardiography is advocated. IE, and hence echocardiography, should be considered even if only one blood culture is taken and is positive with oral streptococci. Conversely, is uncommon in patients with *S. pneumoniae* in blood cultures. High rates of single blood culture sampling (76%) may be an unintended consequence of the Surviving Sepsis campaign and earlier initiation of empirical antibiotic therapy earlier. Under these circumstances the reliability of the Duke criteria will be reduced. Ideally, patients at increased risk of IE still require multiple blood cultures if they have a significant pyrexial illness in order to determine if a sustained bacteraemia is present.