

## Bacteraemia following orotracheal intubation and oesophageal balloon dilatation

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**ABSTRACT** Asymptomatic bacteraemia following balloon dilatation was assessed in 20 adults with oesophageal stricture. Asymptomatic bacteraemia occurred in 12 of 19 patients. The source of the bacteraemia appeared to be the patients' oropharyngeal flora. The bacteraemia was not of clinical importance in our patients, but might lead to endocarditis in predisposed individuals.

Many dental, gastroenterological, and urological procedures are associated with transient bacteraemia, which is often asymptomatic.<sup>1</sup> Endocarditis is predominantly caused by streptococci of the oral flora, so prophylaxis must focus on dental and surgical procedures affecting the mouth, nasal cavity, throat, and oesophagus. The incidence of bacteraemia associated with oesophageal dilatation with bougies has varied in reports from zero to 100%.<sup>2-4</sup> This study was undertaken to investigate whether bacteraemia occurred after oesophageal balloon dilatation.

### Methods

We studied 20 patients with a median age of 71 (range 47-86) years. None had received an antibiotic during the week before dilatation. Sixteen patients had a peptic stricture of their distal oesophagus and four patients stenosis of an oesophagogastrotomy following surgery for carcinoma of the oesophagus.

Dilatations were performed with a 6 cm long balloon at the end of a double lumen catheter (William Cook, Europe APS, Soeborg, Denmark). A guide wire is passed to facilitate introduction of the catheter through narrow strictures. Through the second lumen the balloon can be inflated to either 15 or 22 mm (two models). After general anaesthesia and orotracheal intubation the catheter was passed orally and under fluoroscopic control through the stricture. After partial inflation the balloon was withdrawn into the stricture and inflated to full diameter. After 10 minutes the balloon was deflated and withdrawn. The balloons were reused two to four times after disinfection and venting.

Blood samples were drawn from the antecubital vein after iodine disinfection before and after intubation and after oesophageal dilatation. Aliquots of 10 ml of each 20 ml sample of blood were inoculated into two Roche blood

culture bottles. They were cultured aerobically and anaerobically and observed over six days for growth. All bacteria were identified to the genus level and most to the species level. Streptococci were examined by the streptococcus department (Dr J Henrichsen) of the Statens Serum Institut, Copenhagen, Denmark.<sup>5</sup> Informed consent was obtained from all patients; the study received the approval of our regional ethics committee.

The statistical methods used were Fisher's exact test for fourfold tables and 95% "exact" confidence limits for values.

### Results

Patient 1 inadvertently had the dilatation while he had pyelonephritis (an infection with *Proteus mirabilis*). All the other patients had an uneventful dilatation. All blood cultures before dilatation were negative except for those of patient 1 (*P mirabilis* cultured on all occasions). A positive blood culture was obtained after orotracheal intubation in three of the 20 patients and after oesophageal dilatation in three (table). The positive blood cultures in patients 14 and 15 are considered to be due to skin flora contaminants because both grew *Propionibacterium acnes*.

Four disinfected balloons were tested for contaminants. In two cases there was no growth and in two there was less than

### Bacteriological findings in blood cultures from 20 patients having balloon dilatation of the oesophagus

Patient No	After orotracheal intubation	After oesophageal dilatation
1	<i>Proteus mirabilis</i>	<i>Proteus mirabilis</i>
2	<i>Staphylococcus haemolyticus</i>	<i>Micrococcus</i> sp
3	None	<i>Streptococcus milleri</i>
4	None	<i>Streptococcus mitior</i>
5	None	<i>Staphylococcus epidermidis</i> <i>Bacillus</i> sp <i>Lactobacillus</i> sp
6	None	<i>Streptococcus mitior</i>
7	None	<i>Streptococcus pneumoniae</i> type 9N
8	None	Non-haemolytic streptococcus*
9	None	<i>Streptococcus salivarius</i>
10	None	<i>Veillonella</i> sp
11	None	<i>Streptococcus mitior</i>
12	None	<i>Streptococcus salivarius</i>
13	None	<i>Corynebacterium</i> sp
14	None	<i>Propionibacterium acnes</i>
15	<i>Propionibacterium acnes</i>	None
16-20	None	None

\*This strain was lost during handling.

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0.5 colony forming unit/cm<sup>2</sup> balloon, representing four different coagulase negative staphylococci.

### Discussion

In this study 12 positive blood cultures out of 19 (excluding the patient with pyelonephritis) are presumed to be due to the oesophageal dilatation. The bacteria cultured are all thought to originate from the patients' oropharyngeal flora.

Blood was present on the balloon in 13 cases after dilatation; four patients had been operated on for cancer and three patients were receiving an H<sub>2</sub> blocker. None of these observations was related to the occurrence of bacteraemia.

Bacteraemia occurs less frequently after orotracheal than after nasotracheal intubation—in one study zero versus 16%.<sup>6</sup> This is in accordance with our finding of one in 18 cases. In studies of bacteraemia after oesophageal dilation with bougies the investigators have discussed whether their findings were due to oral flora or contaminated bougies.<sup>2-4</sup> The types of oral bacteria isolated from our patients do not support contamination of the utensils as the cause of the bacteraemia arising from oesophageal dilatation.<sup>2</sup> The isolation of coagulase negative staphylococci from two of the four balloons was probably due to inappropriate handling after disinfection and we no longer reuse our balloons.

The oesophagus will always be colonised with oropharyngeal flora, and the bougie or balloon cannot be positioned without surface contamination with these bacteria. Dilata-

tion will often produce mucosal injury and the possibility of bacteraemia. The bacteraemia will usually be of no importance, but the risk of endocarditis in predisposed individuals and of septicaemia in the immunocompromised patient must be born in mind. These patients should be given prophylactic antibiotics, preferably penicillin G intravenously, before oesophageal dilatation.

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