

Is antibiotic prophylaxis ever necessary before transoesophageal echocardiography?

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The British Cardiac Society (BCS) Clinical Practice Committee and Royal College of Physicians Clinical Effectiveness and Evaluation Unit recently published a guidance document (1) recommending antibiotic prophylaxis routinely before transoesophageal echocardiography (TOE), cardiac surgery and percutaneous coronary intervention in patients at moderate or high risk of endocarditis. This guidance is contrary to that of the European Society of Cardiology (2), and the American Heart Association (3). The purpose of this editorial is to re-examine the evidence for and against antibiotic prophylaxis in TOE.

Evidence for endocarditis after TOE

The evidence used for the BCS guidance was a single case report (4). A 55 year old man was referred for TOE to assess the need for surgery for bileaflet mitral prolapse. One week later he developed anorexia, nausea, light-headedness and malaise and subsequently fever and myalgia. At 17 days after TOE he sought medical help and *Streptococcus sanguis* was grown in both of two blood cultures. A repeat TOE showed no change other than increased nodularity of the flail portion of the posterior mitral leaflet. The appearance was thought to be consistent with infection or an increase in gain setting. The patient was treated with intravenous penicillin and gentamicin for two weeks followed by oral penicillin for a further two weeks and at the time of writing had remained well. The authors acknowledged that this case was not conclusively caused by the TOE, but thought that the temporal relationship was suggestive.

Systematic studies have failed to find endocarditis whether (5,6) or not (7,8) an apparent bacteremia was demonstrated at the time of TOE. Patients with replacement heart valves are at particularly high risk of endocarditis. In 85 patients with replacement heart valves followed for a mean of 82 days after TOE (9), no case of endocarditis was found.

Thus there is one case-report suggesting a possible link between endocarditis and TOE, compared against follow-up studies in a total of 432 patients showing no evidence of endocarditis. Similarly, a review of 41 studies of upper gastrointestinal endoscopy (10) found two cases of endocarditis, in both of which the connection was thought to be unconvincing.

Evidence for bacteraemia after TOE

There have been several studies investigating the induction of bacteraemia by TOE. Gorge et al (5) found that all cultures taken before TOE were sterile, but stopped their study early after 4 (17%) of the next 24 cultures taken 6-12 minutes after TOE were positive. However, in view of the small numbers, this does not represent a statistically significant rise (Fisher's exact test $p > 0.05$). Secondly, the organisms were mainly skin commensals and thus unlikely to represent true bacteraemia following TOE-related trauma. A study of 47 patients (11) found two positive cultures before, but 6 positive after TOE. Again the organisms were probably contaminants, diphtheroids in 3, micrococci in 2 and aerobic spore formers in one, all of which are skin commensals.

By contrast a study of 101 patients showed no positive cultures 6 minutes after the procedure compared to cultures positive for *Staphylococcus epidermidis* in two patients before the procedure (7). The rate of positive cultures before TOE or in control subjects not having TOE ranges between 0.07 and 6.3% (7,8,11-13). A number of studies show that bacteraemia is more common before than after TOE (8,12,14,15) and whether or not antibiotics are given (16). The presence of bacteraemia is not related to difficulty of intubation or the presence of an IV line (8). In nearly all studies, blood cultures have been positive only for skin commensals. This strongly suggests contamination. *Streptococcus viridans* is the most likely precursor of subsequent endocarditis and only one instance of viridans bacteraemia has been demonstrated (5).

Thus, significant bacteraemia appears to be a rare event after TOE. Considering that some sort of allergic reaction occurs in between 7 and 40 of every 1000 courses of penicillin (17,18) and that there is little evidence for its benefit in dental and other procedures leading to much higher rates of bacteraemia, its routine use for TOE is inappropriate.

Conclusion

Routine antibiotic prophylaxis before TOE has been recommended in only two original publications, one a suggestive but inconclusive case-report (4) and the other a small study reporting a statistically insignificant incidence of bacteraemia likely to be caused by contamination (5). By contrast, antibiotic prophylaxis has been thought not to be routinely necessary in 11 studies involving 1063 patients (6-9, 11-16,19). Of these, 8 studies considered that antibiotic prophylaxis was never routinely recommended, while 3 (6,11,13) suggested that prophylaxis could be considered in individual patients with prosthetic valves or after previous endocarditis.

The evidence points overwhelmingly in favour of the European Society of Cardiology guidance which is not to use antibiotic prophylaxis routinely for transoesophageal echocardiography for any indication. It may be reasonable to consider antibiotics in occasional cases, for example a patient with a replacement heart valve and evidence of poor oral hygiene in whom the study is being performed for an indication other than suspected endocarditis. In these individual cases, practice is governed by clinical common-sense rather than evidence.

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