National Institute for Health and Clinical Excellence: prophylaxis against infective endocarditis

Summary and list of all recommendations on antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures – issued March 2008

Adults and children with structural cardiac defects at risk of develop-
ing infective endocarditis

Healthcare professionals should regard people with the following cardiac conditions as being at risk of developing infective endocarditis:

- acquired valvular heart disease with stenosis or regurgitation
- ventricular septal defect
- atrial septal defect
- congenital heart disease
- previous infective endocarditis
- hypertrophic cardiomyopathy

Infective endocarditis is an inflammatory disease of the endocardium, particularly affecting the heart valves, caused mainly by bacteria but occasionally by other infectious agents. It is a rare condition, with an annual incidence of fewer than 10 per 100,000 cases in the normal popu-
lation. Despite advances in diagnostic and treatment, IE remains a life-threatening disease with significant mortality (ap-
approximately 20%) and morbidity.

Published medical literature contains many case reports of IE being provoked by an interventional procedure, most frequently dental. IE can be caused by se-
veral different organisms, many of which could be transferred into the blood during an interventional procedure. Streptococcus, Staphy-
lococcus aureus and enterococci are important causative organisms.

Its accepted that many cases of IE are not caused by interventional procedures (Bruncik et al. 2006), but with such a serious condition it is reasonable to consider that any cases of IE that can be prevented should be prevented. Conse-
quently, since 1995, antibiotic prophylaxis that aims to prevent endocarditis has been used in at-risk pa-
tients. However, the evidence base for the use of antibiotic prophylaxis has relied heavily on extrapolation from animal models of the disease (Pollack 2005) and the applicabil-
ity of these models to people has been questioned. With a rare but serious condition such as IE it is dif-
cult to plan and execute research that is appropriate to the clinical setting.

As a result, the evidence available in this area is limited, being drawn chiefly from observational (case-control) studies.

Overview

Antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures

Interventions of endocarditis (IE) are an inflammatory disease of the endocardium, particularly affecting the heart valves, caused by bacteria but occasionally by other infectious agents. It is a rare condition, with an annual incidence of fewer than 10 per 100,000 cases in the normal population. Despite advances in diagnostic and treatment, IE remains a life-threatening disease with significant mortality (approximately 20%) and morbidity.

The predisposing factors for the development of IE have changed in the past 50 years, mainly with the decreasing incidence of rheumatic heart disease and the increasing impact of prosthetic heart valves, nosocomial infection and in-
travenous drug misuse. However, the potentially serious impact of IE on the individual has not changed (Prendergast 2006).

Published medical literature contains many case reports of IE being provoked by an interventional procedure, most frequently dental. IE can be caused by several different organisms, many of which could be transferred into the blood during an interventional procedure. Streptococcus, Staphylococcus aureus and enterococci are important causative organisms.

Its accepted that many cases of IE are not caused by interventional procedures (Bruncik et al. 2006), but with such a serious condition it is reasonable to consider that any cases of IE that can be prevented should be prevented. Consequently, since 1995, antibiotic prophylaxis that aims to prevent endocarditis has been used in at-risk patients. However, the evidence base for the use of antibiotic prophylaxis has relied heavily on extrapolation from animal models of the disease (Pollack 2005) and the applicability of these models to people has been questioned. With a rare but serious condition such as IE it is difficult to plan and execute research that is appropriate to the clinical setting.

As a result, the evidence available in this area is limited, being drawn chiefly from observational (case-control) studies.

The rationale for prophylaxis against IE is to reduce the risk of infective endocarditis developing. The guideline Development Group (GDG) used the decision making and conclusions of relevant national and international guidelines to help inform its own decision making. This decision-making process has been important because, for many of the key clinical questions covered in this guide-
line, there is no evidence base that would make it possible to recommend differ-
tially, and the development of clinical guidelines requires, or does not re-
quire, antibiotic prophylaxis against IE. The Guideline Development Group (GDG) made the decision to separate sections: American Heart Association (AHA) (2007), British Society for Antimicrobial Chemotherapy (BSAC) 2006 (Gould et al. 2006), European Society of Cardiology (ESC) 2004 (Hurstz etc. 2004), Under-
ly ing these principles is the as-
sumption that antibiotic prophylaxis is effective for the prevention of IE in dental and non-dental pro-
cedures. However, many re-
searchers consider this assump-
tion to be not proven (Prendergast 2006), which has led to calls for sig-
ificantly reduce the use of an-
tibiotic prophylaxis in this setting. This shift in opinion is reflected in national and international clinical guidelines for prophylaxis against IE. Guidelines used to recommend antibiotic prophylaxis for IE for pa-
tients with a wide range of cardiac conditions are based on a range of interventional procedures, both dental and non-dental. They now tend to recommend that only those with one of a small number of high-risk cardiac conditions should receive antibiotic prophylaxis when they undergo a limited number of specified dental procedures.

In summary, this guideline rec-
ommends that antibiotic prophylaxis against IE should not be given to people at risk of IE undergoing dental and non-dental procedures. The basis to support this recommendation is:

- there is no consistent association between having an ir-

gendeath disease and the develop-
ment of IE
- regular toothbrushing almost certainly presents a greater risk of IE than a single dental proce-
dure because of repetitive ex-
position to bacteria in oral flora
- the clinical effectiveness of anti-

motic prophylaxis is not proven
- antibiotic prophylaxis against IE for dental procedures may lead to a greater number of deaths through fatal anaphylaxis as a strategy of no antibiotic prophylaxis, and is not cost effective.

Given the difficulties in rela-
tive risk definition, a simple clas-
sification of conditions into ei-
ther groups at risk and not at risk was undertaken.

The full report (CG64 Pro-
phylaxis against infective en-
docarditis: NICE guidance) and guidance for patients can be seen at: www.nice.org.uk