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 developing infective endocarditis

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

- acquired valvar heart disease with stenosis or regurgitation
- valve replacement
- structural congenital heart disease, including surgically corrected or palliated structural conditions, but excluding isolated atrial septal defect, fully repaired ventricular septal defect or fully repaired congenital aortico-pulmonary fistula
- and, where appropriate, expert advice

If a person at risk of infective endocarditis is receiving antimicrobial therapy because they are undergoing a gastrointestinal or genitourinary procedure at a site where there is a suspected infection, the person should receive an antibiotic that covers organisms that cause infective endocarditis.

Overview

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

Interventions with endocarditis (IE) is an inflammation of the endocardium, particularly affecting the heart valves, caused mainly by bacteria that are introduced to the heart 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 diagnosis and treatment, IE remains a life-threatening disease with significant mortality (approximately 20%) and morbidity.

The predisposing factors for 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 intravenous 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 prevented by an interventional procedure, most frequently dentistry. IE can be caused by several different organisms, many of which could be transferred into the blood during an interventional procedure. Strepococci, Staphylococcus aureus and enterococci are important causative organisms.

It is accepted that many cases of IE are not caused by interventional procedures (Brucato 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 mainly on extrapolation from animal models of the disease (Pallach 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 leading to convincingly superior designs. Consequently, the evidence available in this area is limited, being drawn chiefly from observational (case–control) studies.

For prophylaxis to be effective, certain requirements must be fulfilled: identification of patients at risk, identification of the procedure that is liable to provoke bacteraemia, and choice of a suitable regimen. There should also be a favourable balance between the risks of side-effects from prophylaxis and the development of the disease (Moreillon et al. 2004). Understanding these principles is the assumption that antibiotic prophylaxis is effective for the prevention of IE in dental and non-dental procedures. However, many researchers consider this assumption to be not proven (Prendergast 2006), which has led to calls to significantly reduce the use of antibiotic 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 patients with a wide range of cardiac conditions, for 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.

The rationale for prophylaxis against IE in endocarditis usually follows bacteraemia, certain interventional procedures cause bacteraemia with organisms that can cause endocarditis, these bacteria are usually sensitive to antibiotics; therefore, antibiotics should be given to patients with predisposing heart disease before interventional procedures that may cause bacteraemia (Durack 1995).

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The national guideline aims to provide clear guidance to the NHS in England, Wales and Northern Ireland regarding which dental and non-dental interventional procedures require, or do not require, antimicrobial prophylaxis against IE. In contrast to other recently published national and international guidelines, it explicitly considers the likely cost effectiveness as well as the clinical effectiveness of antibiotic prophylaxis.

In summary, this guideline recommends that antibiotic prophylaxis solely to prevent IE should not be offered 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 interventional procedure and the development of IE.
- regular toothbrushing almost certainly presents a greater risk of IE than a single dental procedure because of repetitive exposure to bacteraemia with oral flora.
- the clinical effectiveness of antibiotic prophylaxis is not proven.
- antibiotic prophylaxis against IE for dental procedures may lead to a greater number of deaths through fatal anaphylaxis than a strategy of no antibiotic prophylaxis, and is not cost effective.

Given the difficulties in relative risk definition, a simple classification of conditions into either groups at risk and not at risk was undertaken.

The full report (CG64 Prophylaxis against infective endocarditis: NICE guidance) and guidance for patients can be seen at: www.nice.org.uk