Antibiotic prophylaxis, body piercing and infective endocarditis

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Infective endocarditis (IE) is associated with a high degree of morbidity and mortality and generally presents in patients with altered and abnormal heart architecture combined with exposure to bacteria through trauma and other potentially high-risk activities, including body piercing. Modern social behaviour has resulted in increased popularity of the practice of body piercing, particularly amongst the adolescent population and there has been a marked rise of cases of IE directly attributable to this practice. In this article we wish to examine the aetiology of such cases reported in the literature, with particular emphasis on causal organism, as well as to discuss the role of antibiotic prophylaxis and awareness in such at-risk patients within the primary care community.

Keywords: endocarditis, body piercing, tattoos, antibiotic prophylaxis, guidelines

Even with the introduction of molecular detection methods, infective endocarditis (IE) continues to be difficult to diagnose and is associated with a high rate of mortality (21–35%). Although there have been many developments with respect to antibiotic therapy in the treatment of the disease, its incidence is continuing to rise, affecting 3.3 cases per 100,000 population per year in the UK, with similar figures for the USA and 1.4–4.0 cases per 100,000 population per year in Europe as a whole. Reasons for this are (i) longer survival of patients with degenerative heart diseases, (ii) increased usage of antibiotics, (iii) increased incidence of prosthetic heart valves, (iv) younger children are suffering from congenital heart disease, (v) increase in bicuspid valve disease, (vi) advances in medical and surgical treatments, (vii) increase in the number of drug abusers and (viii) more sensitive and specific diagnosis. Generally there is a higher incidence in men than in women (2:1) suffering from the disease and the average age group affected is in the fifth decade. Over the past century, streptococci and staphylococci have remained the main causative organisms associated with IE, with an increase in cases as a result of staphylococci associated with intravenous drug abusers and HIV patients. With substantial advances made in the isolation and identification of microorganisms, it is now recognized that a wide spectrum of microbiological causative agents is associated with both culture-positive and culture-negative IE.

Body piercing has been defined as ‘a penetration of jewellery into openings made in such body areas as eyebrows, helix of the ears, lips, tongue, nose, navel, nipples and genitals’. Although this practice has its origins in ancient cultures and anthropology including the Egyptians and Romans, during the last decade, developed Western cultures, including the US and UK, have witnessed a dramatic rise in piercings. In a 2002 survey amongst college students in New York, 42% of men and 60% of women surveyed had body piercings. For a comprehensive review on body piercing including the medical consequences and psychological motivations, see Stirn. Although body piercing may give rise to several medical complications, e.g. fractures of the teeth, dysphagia, speech impediment and damage to structures beneath the skin, the most frequent complication is infection.

Although localized infective episodes are relatively common, cases of IE as a result of body piercing are rare in the general population, but are of more concern to those individuals with an underlying cardiac condition, which may predispose them to IE. To date, there have been relatively few reports published involving piercing and IE; however, of those reports published, there has been a dramatic rise in the last decade. Between 1991 and 1999, there were three published cases of IE associated with body piercing. However in the last 2 year period, five such cases have been published. Table 1 summarizes and reviews the clinical aspects of these cases. In most cases, the infected patients had an underlying cardiac condition, most notably a systolic murmur. Most cases involved the tongue, followed by ear, nose and nipple/navel in decreasing order of frequency. The mean age of patients with IE was 20 years (range 13–30 years) and there was an approximate equal distribution between the sexes. Generally, the presentation of symptoms of IE was approximately 1 month following the piercing procedure. The causal agents were mainly *Staphylococcus* spp. (*Staphylococcus aureus* and coagulase-negative staphylococci, i.e. *Staphylococcus epidermidis*) (62.5%), followed by a diversity of other genera, including *Neisseria, Haemophilus* and *Streptococcus* and following appropriate antibiotic intervention, as detailed, all patients recovered.

Awareness of the risk factors associated with the acquisition of IE, patient education and the appropriate use of antibiotic prophylaxis during high risk procedures, are all important strategies for the pre-
Table 1. A review of published case reports of infective endocarditis following body piercing

<table>
<thead>
<tr>
<th>Age/sex</th>
<th>Site of piercing</th>
<th>Lag time</th>
<th>Presentation</th>
<th>Underlying cardiac condition</th>
<th>Clinical findings</th>
<th>Causal organism</th>
<th>Antibiotic treatment</th>
<th>Surgery</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 years/F</td>
<td>nose</td>
<td>3 weeks</td>
<td>flu-like symptoms, fever, myalgia, headache, nausea, vomiting</td>
<td>none</td>
<td>elevated C-reactive protein and ESR, neutrophil leucocytosis; echocardiography: large vegetation on anterior leaflet of mitral valve with no evidence of valvular incompetence</td>
<td>Staphylococcus aureus</td>
<td>flucloxacillin and vancomycin (3 weeks); vancomycin alone (3 weeks) owing to allergy</td>
<td>none</td>
<td>6</td>
</tr>
<tr>
<td>30 years/F</td>
<td>ear lobe</td>
<td>few weeks</td>
<td>fever, malaise, systolic ejection type murmur</td>
<td>ESR 111 mm/h; C-reactive protein 52 mg/dL; TTE &amp; TOE: vegetation 1.36 × 1.13 cm on the anterior tricuspid leaflet</td>
<td>Staphylococcus epidermidis</td>
<td>dicloxacinil (2 g, six times daily)—6 weeks</td>
<td>recommended reconstruction of valve but patient did not return for further treatment</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>24 years/M</td>
<td>nipple</td>
<td>1 month</td>
<td>nausea, fever, diarrhoea, dyspnoea, productive cough, with blood stained sputum, systolic murmur in the aortic area; congenital bicuspid aortic valve; aortic coarctation (9 years previously)</td>
<td>elevated ESR; moderate leucocytosis; TTE &amp; TOE: severe insufficiency of aortic valve without vegetations but with thickening of the cusps</td>
<td>Staphylococcus epidermidis</td>
<td>initial treatment following blood culture results: amoxicillin and gentamicin (1 month); treatment after surgery: gentamicin, vancomycin and ofloxacin (2 weeks); further treatment: flucloxacillin (10 days)—discharged</td>
<td>removal of aortic valve</td>
<td>8</td>
<td></td>
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<tr>
<td>20 years/F</td>
<td>tongue</td>
<td>1 month</td>
<td>fatigue, myalgia, arthralgia, intermittent fever, systolic ejection murmur of mitral regurgitation</td>
<td>ESR 88 mm/h; C-reactive protein 85 mg/dL; TOE: vegetation on anterior leaflet of the mitral valve</td>
<td>Neisseria mucosa</td>
<td>initial treatment following blood culture results: ceftriaxone iv (1 g twice a day) and ciprofloxacin iv (200 mg twice a day)—28 days</td>
<td>none</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>25 years/M</td>
<td>tongue</td>
<td>2 months</td>
<td>fever, chills, rigors, shortness of breath, aortic valvuloplasty (17 years previously); Grade 3/6 ejection systolic murmur; Grade 2/6 diastolic blowing murmur</td>
<td>ESR 41 mm/h; C-reactive protein 5.1 mg/dL; TTE: inconclusive; TOE: remnants of a bicuspid and deformed aortic valve with multiple vegetative lesions</td>
<td>Haemophilus aphrophilus</td>
<td>initial treatment following blood culture results: ampicillin, nafcillin and gentamicin; secondary treatment: ceftriaxone and gentamicin; discharge treatment: ceftriaxone and gentamicin</td>
<td>recommended aortic valve replacement—patient did not return for further treatment</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
vention of IE in susceptible patients. The increased prevalence of congenital heart disease (CHD) in children coupled with the increased frequency of body piercing in children and young adults could potentially result in a greater number of cases of IE. Poor awareness of the disease and risk factors of IE have been recently highlighted by Bulat & Kantoch,14 who describe that a minority (47%) of parents of children with CHD were themselves unaware of IE and only 29% were aware of situations where antibiotic prophylaxis was required. Coupled with this, there is relative confusion over the legal onus on body piercing practitioners carrying out piercings on minors.15

Antibiotic prophylaxis is recommended by several national guidelines for the prevention of IE,16-18 however there have been no guidelines to date that have specifically described the need for antibiotic prophylaxis associated with body piercing procedures for susceptible individuals. The rationale for antibiotic prophylaxis to help prevent IE is itself surrounded in controversy, as there is no definitive evidence for its efficacy.19 Regardless, it is not unreasonable to apply the same scientific rationale to support the use of antibiotics to help prevent IE following body piercing procedures, namely that such procedures may be carried out under conditions which do not adhere to adequate hygiene standards and where well-established causal agents of IE may cause bacteraemia following such invasive procedures. Body piercing should be considered a high risk procedure in relation to the possible acquisition of IE, for several reasons, including: (i) the physical invasiveness of the procedure, (ii) the microbial ecology of the piercing site may be a reservoir for IE-causing organisms, e.g. S. aureus on mucosal surfaces and viridans streptococci in the oral cavity, (iii) the prolonged healing times associated with mucosal trauma around the piercing site, e.g. up to 6 weeks required for healing of the tongue and up to 12 months for healing of the navel,3 (iv) procedures may not be carried out by medically qualified personnel under adequate hygiene conditions, (v) microbial biofilm formation on indwelling jewellery and (vi) difficulty with the hygiene management of the trauma site, e.g. tongue, sweat associated with body piercing.

Considerable evidence and opinion is mounting in the literature echoing the precautionary approach, that there is a role for antibiotic prophylaxis associated with body piercing. In a recent 2003 survey,18 the Japanese Circulation Society Joint Working Groups for Guidelines for Management of Infective Endocarditis demonstrated that 28.4% (n = 67/236) of cardiologists gave antibiotic prophylaxis relating to piercing, whereas a US survey19 of physician members of the International Society of Adult Congenital Cardiac Disease showed that 61% (n = 72/118) of physicians recommended antibiotic prophylaxis in piercing. Most recently, Weinburg & Blackwood11 suggested that because of the severity of IE, the relative ease of low cost single dose antibiotic prophylaxis should be recommended until such times as reliable data are obtained to determine its efficacy.

At present, the growing social trend of body piercing amongst children and young adults is concerning, particularly for those children and youths with CHD and an associated susceptibility for the acquisition of IE. Primary intervention by physicians and allied health care workers with such individuals should attempt to educate the patient in terms of the advantages of abstinence of piercing procedures to minimize potential acquisition of IE. In cases, where the patient wishes to proceed with the piercing, advice should be given and precautionary use of antibiotic prophylaxis should be encouraged, in line with current opinion. Prospective randomized studies examining the association between body piercing and IE are urgently required to help substantiate or refute the role of antibiotic prophylaxis in such circumstances, as well as examining the effect on acqui-
sition of bacterial antibiotic resistance as a result of this practice. A meta-analysis of such studies would thus serve to either amend or allow the established recommendations on antibiotic prophylaxis of IE to remain unaltered.

References