Infective Endocarditis, Heart and Beyond

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\textbf{Abstract}

Infective endocarditis has been a constant menace in human history with its debilitating consequences. The predisposing factors such as dental plaques/procedures and compromised valvular heart lesions contribute greatly in disease occurrence. Human commensals have been a source of infection. It manifests as combination of clinical sign and symptoms and mainly relies on echocardiographic findings and blood culture results. Trans-oesophageal echocardiography is superior in depicting vegetations on cardiac structures. We present three cases in two Manchester hospitals over a short span of time caused by Streptococci gordonii, agalactiae and Staphylococci aureus.

\textbf{Keywords:} Infective endocarditis; Blood cultures; Echocardiography

\textbf{Introduction}

Infective endocarditis is a rare disease caused by normal body flora; particularly oral, gastrointestinal and genito-urinary commensals. Leaking or abnormal heart valves, previous valve surgery, metallic valves, uncorrected congenital cardiac anomalies, dental plaques, dental procedures, repeated gum and dental bleeding, and drug addiction are some of the predisposing factors for infective endocarditis. Infective endocarditis responds well to prolonged course of intravenous antibiotics in majority of cases; however, a few resistant/advanced cases may need surgical debridement of the plaques and replacement of affected valves. In about 20\% cases the outcome proves to be fatal even after aggressive treatment.

\textbf{Case Report}

Our first patient was a middle aged British white lady who presented with headache, fever, neck stiffness and sensation of being generally unwell. She developed intermittent fever associated with rigors and chills during her holidays in Europe. She also had nausea, malaise and joint pains without any rash. She was a known case of mitral regurgitation with leaky posterior leaflet. She underwent dental procedure for mild dental plaques and caries. On examination she had splinter haemorrhages, raised temperature and pan-systolic murmur at mitral area radiating to the axilla. C-reactive protein (CRP) and white cell count (WCC) were raised with mildly deranged liver function tests (LFTs). Three consecutive blood cultures revealed Streptococcus gordonii. Electrocardiogram was unremarkable. Trans-thoracic echocardiogram failed to demonstrate the vegetations; however, trans-oesophageal echocardiogram (TOE) demonstrated vegetations on aortic and pulmonary valves.

Second patient was a 33-year-old African drug-addict male with aortic and mitral valve prosthesis and history of tooth extraction 2 months ago. He came with high grade fever and chest pain and was found to have infective endocarditis. Culture was positive for Streptococcus agalactiae and viridans on three different occasions. TOE showed two dangling vegetations on prosthetic mitral valve (Fig. 1a).

Third case was a 28-year-old English intravenous drug user lady with mixed valvular heart disease. She presented with high grade fever, chest pain and cough. She was found to have vegetations on tricuspid valve on TOE ultrasound (Fig. 1b). Blood culture was positive for Staphylococcus aureus. CT thorax showed multiple small cavitory lesions in both lungs, suggesting infective pulmonary emboli (Fig. 2).
Discussion

Infective endocarditis is a rare entity. Annual incidence in UK is reported to be 1.4 - 4 per 100,000 [1]. Male to female ratio is about 2.3:1 [2]. Drug addiction, valvular heart disease, prosthetic valves and pacemakers are predisposing factors. Dental plaques, dental procedures, bad oral hygiene and day to day trivial trauma are responsible for removal of oral flora and subsequent bacteremia. Bacteremia is considered to be the pathogenesis of infective endocarditis which leads to vegetation and abscess formation. It can result into valve leakage and aortic root weakening. The most commonly found bacteria are Streptococcus species including sanguis, gordonii, agalactiae, pneumoniae, oralis, mitis, beta-hemolytic group G, Staphylococcus aureus/epidermidis and diphtheroids [3]. Hemophilus, Actinobacillus, Cardiobacterium, Eikenella, Kingella (HACEK) [4], Coxiella burnetti, Chlamydia, Propionibacterium acnes, Mycobacteria, Bartonella henselae, Ehrlichia chaffeensis, Tropheryma whippelii [5] along with fungi Candida, Aspergillus and Histoplasma are the rarely isolated organisms.

The Streptococcus viridans is followed by gordonii which is structurally related to sanguis species but environmentally is related to mutans/mitis sp. Streptococcus agalactiae is related to gastrointestinal tract and was previously known as Strep bovis. These bacteria form fibrin containing vegetations over the failing or metallic valves and devices like pacemakers and implantable defibrillators. Staphylococcus aureus is increasingly found in intravenous drug users and resides on right sided heart valves causing infective embolization [6].

Fever, headache, joint pains, backache, haematuria, loss of appetite, unexplained weight loss, new rashes, confusion, breathlessness and features suggestive of stroke are common clinical presentations. Clinical examination may reveal new onset murmur, new fingernail, skin and eye changes.

Diagnosis of the infective endocarditis is based upon Duke’s criteria. According to this diagnostic tool we look for two major, one major and three minor or five minor criteria [7] which are as follows. Major criteria: 1) Positive blood culture detecting typical organism in two separate cultures or persistently positive blood cultures, e.g. 3, > 12 h apart (or majority if ≥ 4); 2) Positive echocardiogram vegetation, abscess, dehiscence of prosthetic valve or new valvular regurgitation. Minor criteria: 1) Predisposition (cardiac lesion; IV drug user); 2) Fever > 38 °C; 3) Vascular/immunological signs; 4) Positive blood culture, not fulfilling major criteria; 5) Positive echocardiogram, not fulfilling major criteria.

ECG findings may be normal or may depict long PR interval. TOE is superior to trans-thoracic echocardiography in demonstration of dangling intra-cavitary vegetations or

![Figure 1](image1.png)

**Figure 1.** (a) Thick sessile vegetation on mitral valve. (b) Large dangling vegetation on tricuspid valve.

![Figure 2](image2.png)

**Figure 2.** CT chest depicting cavitary lesions representing septic emboli.
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References

