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Pacemaker endocarditis due to Haemophilus parainfluenza: case report and literature review

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Abstract

We report a case of pacemaker infective endocarditis in a 14 month old girl, caused by Haemophilus parainfluenzae. There are no other cases in children reported in the literature. We discuss the issues surrounding the case and the evidence which influenced our management.

MeSH: Pacemaker, artificial, Endocarditis, Haemophilus parainfluenzae

Introduction

We report a 14 month old girl who developed early pacemaker infective endocarditis six weeks after insertion of the pacing device, and briefly discuss investigation and management. There are no other reported cases of paediatric pacemaker infective endocarditis from Haemophilus parainfluenazae in the literature.

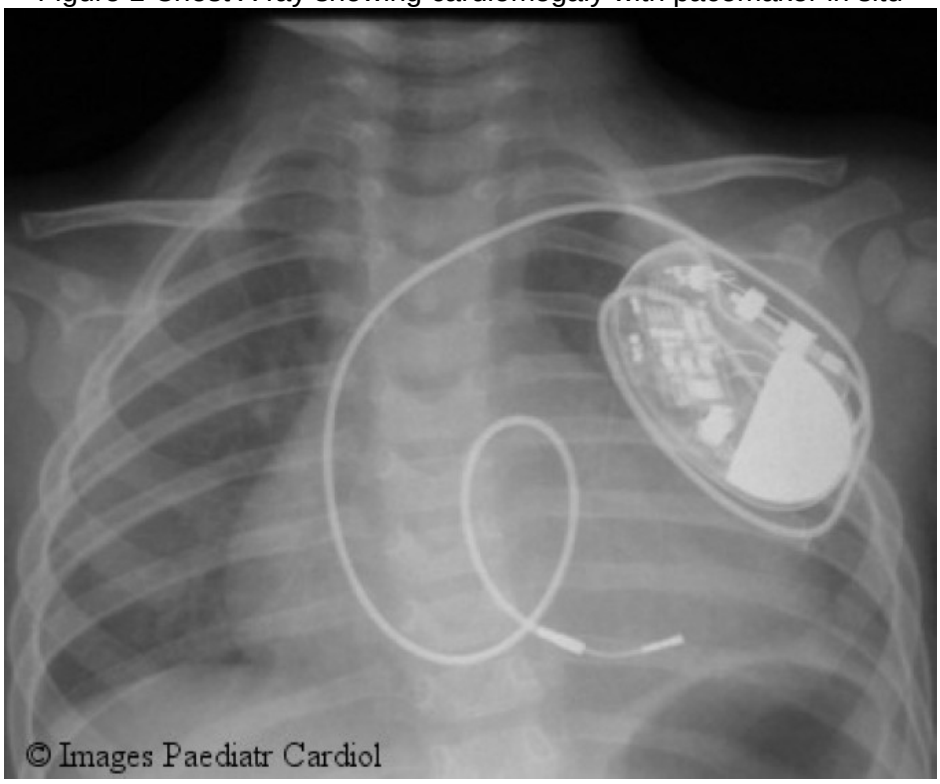
Case Report

In March 2007 a 14 month old girl with congenital complete heart block underwent implantation of an endocardial pacemaker into the right ventricle. She had remained asymptomatic throughout the first year of life.

Six weeks after her pacemaker insertion, she presented with pyrexia, lethargy, diarrhoea, vomiting and poor fluid intake. She was diagnosed with otitis media and sent home on amoxicillin/clavulanic acid. She was seen again two days later as she remained febrile. She was pale and lethargic with a liver edge extending to 1.5cm below the costal margin, and a grade 2/6 systolic murmur. She was sent home and advised to continue her oral antibiotics.

Two weeks after initial presentation she became acutely unwell, presenting in shock, with a grade 3/6 systolic murmur. She received a fluid bolus and commenced on intravenous ceftriaxone. CXR showed an enlarged heart with pacemaker and lead in situ (fig 1).

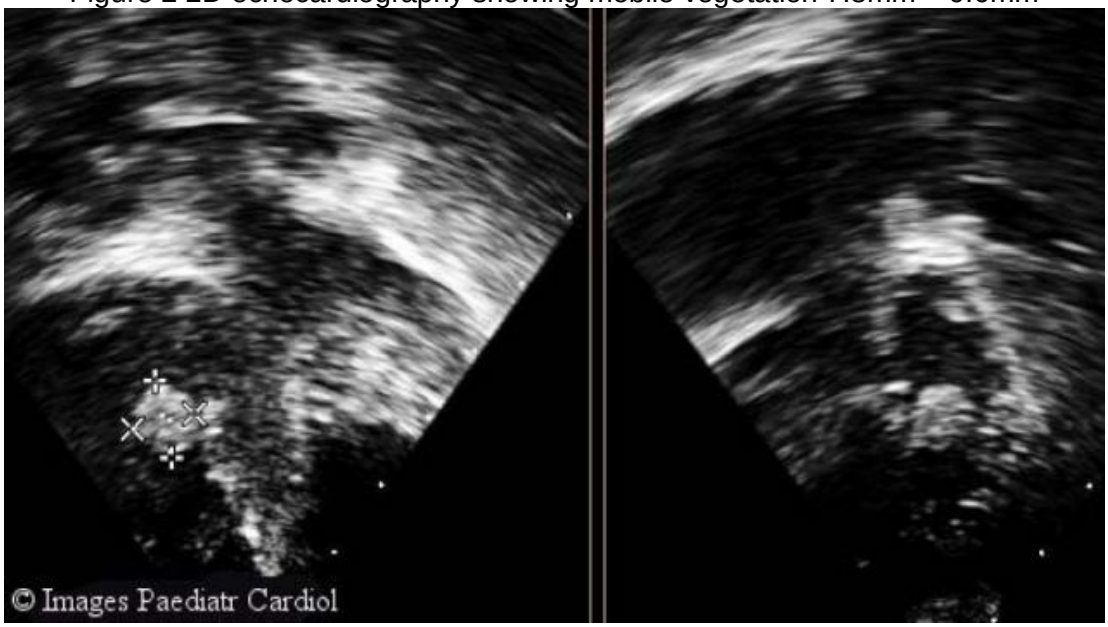
Figure 1 Chest X ray showing cardiomegaly with pacemaker in situ



Investigations showed a C-reactive protein of 275 mg/L, white cell count of 35.7×10^9/L, neutrophils 17.2×10^9/L, platelets 111×10^9/L, and haemoglobin of 7.6g/dl. Infectious endocarditis was suspected. There were no external signs of pacemaker pocket infection. An echocardiogram showed “a mobile mass attached to the pacing

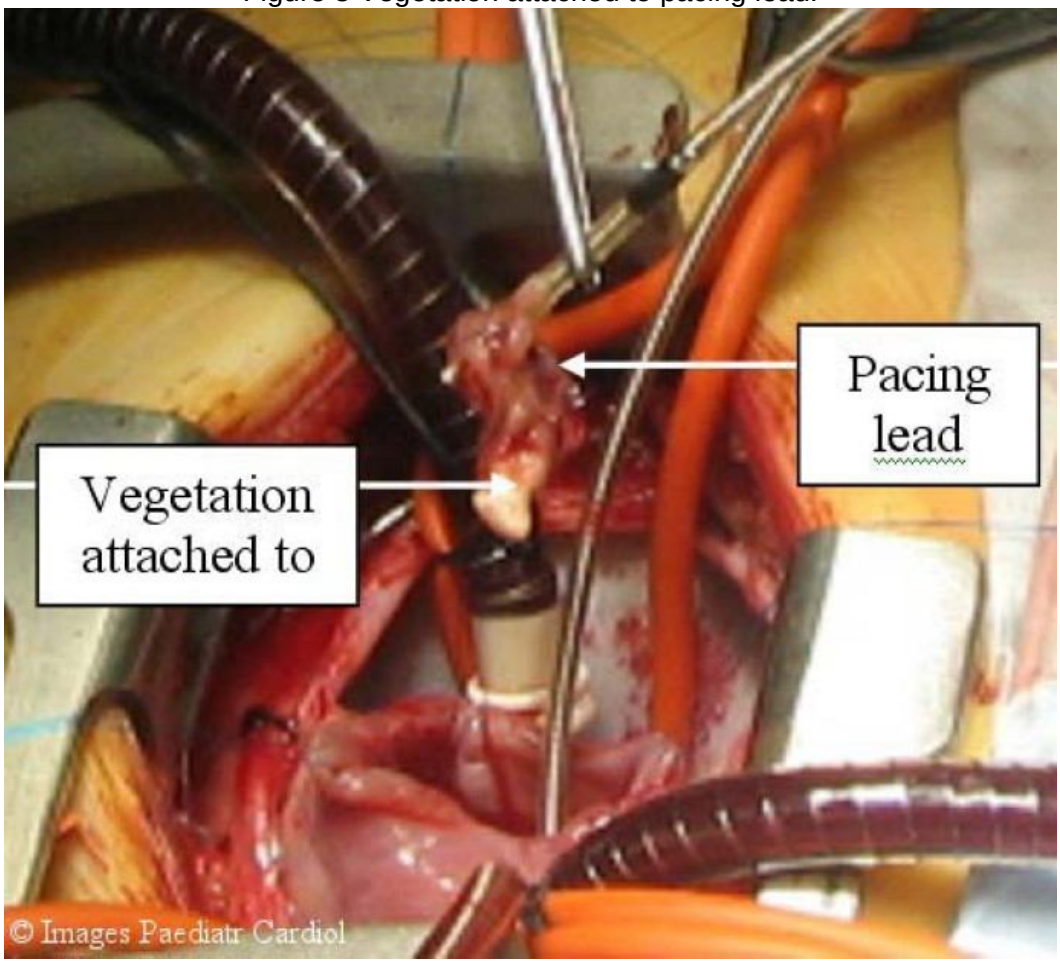
wire and tricuspid valve, moderate tricuspid regurgitation and a patent foramen ovale" (fig 2).

Figure 2 2D echocardiography showing mobile vegetation 7.8mm × 9.6mm



Gentamycin was added to the antibiotic regime. Blood cultures showed a pure growth of gram negative rods later confirmed to be Haemophilus parainfluenzae, sensitive to 3rd generation cephalosporins and gentamycin. One week later she underwent open heart surgery under bypass for the complete removal of the infected cardiac pacemaker system (fig. 3).
Culture of the vegetation failed to isolate any organisms. A week later she had a permanent epicardial pacemaker system inserted (requiring sternotomy). She was discharged from the cardiothoracic unit two weeks after admission. A follow-up 2D echocardiogram showed moderate tricuspid regurgitation and a small vegetation that was still present near the apical ventricular septum. Clinically she has remained well and haemodynamically stable.

Figure 3 Vegetation attached to pacing lead.



Discussion

If untreated pacemaker infective endocarditis is fatal. We discuss some management issues surrounding pacemaker endocarditis in children with emphasis on H parainfluenzae.

There are few published studies on the epidemiology of pacemaker endocarditis in children. One study by Cohen et al, in a 20 year paediatric cohort, reports an overall incidence of 2.3% of implanted pacemakers.[1] Case reports of pacemaker endocarditis from H. parainfluenzae are rare. We conducted a literature search using MEDLINE (1950 to date) and EMBASE (1974 to date) using the key words *pacemaker, endocarditis, infection, Haemophilus parainfluenzae*. We found only two other case reports of pacemaker endocarditis caused by Haemophilus parainflunzae, and both were in adults (table 1).[2,3]

Haemophilus parainfluenzae is a commensal of the oral cavity and the upper respiratory tract, and belongs to a group of fastidious gram negative bacilli collectively known as HACEK **(Haemophilus spp, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikinella corrodens and Kingella kingae)**. It is an unusual cause of device related bacterial endocarditis, the majority of which are caused by Staphylococcus aureus and epidermidis.

Infective endocarditis in general can present insidiously and time to diagnosis is often prolonged. The commonest presenting feature is fever which is present in 80% of

cases.[4] Septic shock is the presentation in only 9% of cases.[5] When suspected, transthoracic echocardiography (TTE) is an excellent tool for the detection of vegetations in children, with a reported sensitivity of 81%. Transoesophageal echocardiography (TOE) has been shown to have a superior detection rate in adults, but its role in children has yet to be established.

Table 1 Case reports of pacemaker endocarditis caused by Haemophilus parainfluenzae

Report	Age	Sex	Onset of symptoms to diagnosis	Time from last pacemaker insertion to onset of symptoms	Underlying Pathology	Management	Complications	Outcome
Sammut et al	14 months	F	3 weeks	6 weeks	Congenital heart block	Antibiotics, open heart surgery under bypass for removal of device, re-implantation after 1 week	None	Good
Pai et al[2]	38 years	M	2 weeks	3 months	Sinus node dysfunction	Antibiotics, open heart surgery	None	Good, no need for pacemaker
Rosenbaum et al[3]	18 years	F	10 days	6 months	Sick sinus syndrome, repair of ASD	Antibiotics only	None	Good

Strategies to prevent pacemaker endocarditis include primary antibiotic prophylaxis given perioperatively. A meta analysis by De Costa et al was shown to significantly reduce the incidence of serious infective complications following pacemaker insertion.[6] Secondary prophylaxis is not routinely recommended, and the American Heart Academy still classifies this group as a negligible risk category. We could not define a clear source of infection in our patient, and can only postulate haematogenous spread from her middle ear infection.

Third generation cephalosporins are an excellent choice of antibiotic for HACEK organisms which are often resistant to penicillins. Fluoroquinolones can also be used. However removal of the infected intracardiac device offers the best chance of complete eradication of the infection, with lower morbidity and mortality.[7,8] Device re-implantation should be at a new site when the patient is no longer bacteraemic.

Conclusion

Pacemaker endocarditis should always be suspected in a child with an implanted pacemaker presenting with fever. Echocardiography is the earliest investigation most likely to confirm the diagnosis. The best treatment is surgical device removal under appropriate antibiotic cover.

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