Late aortic homograft valve endocarditis caused by *Cardiobacterium hominis*: a case report and review of the literature

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Abstract

An unusual case of *Cardiobacterium hominis* endocarditis involving an aortic homograft valve is presented. Although the patient was young (a 17 year old man) and showed few of the characteristic features of the disease, the report does illustrate a number of the problems associated with this illness and highlights the need for the careful assessment of apparent culture negative endocarditis. The organism itself is susceptible to most antibiotics but further treatment, including surgery, may be necessary. Patients must therefore be examined repeatedly and assessed for haemodynamic deterioration, valve destruction or embolic phenomena. Homograft valve replacement may offer some benefits in the setting of aortic valve endocarditis and is therefore an attractive option in this situation.

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Keywords: *Cardiobacterium hominis*; endocarditis; valve replacement

*Cardiobacterium hominis* is a small, Gram negative coccobacillus, which is part of the normal human oropharyngeal flora. The organism is an unusual cause of human disease, but as its identification requires special media and prolonged incubation, it is notorious for causing apparently culture negative endocarditis. We report a case of infective endocarditis caused by *C hominis* in an adolescent male who had previously undergone aortic valve homograft replacement for congenital aortic stenosis and whose management was further complicated by the absence of traditional, inflammatory markers for the disease.

Case report

A 17 year old man was admitted with a three week history of lethargy and night sweats. He had previously undergone a balloon valvuloplasty at 7 years of age for congenital aortic stenosis, followed by a successful aortic valve replacement using a 20 mm homograft at the age of 15 years. He had remained well until his presenting illness, but had been treated with amoxycillin by his general practitioner for a bronchopulmonary infection immediately before admission, and had undergone dental treatment with appropriate antibiotic prophylaxis some months previously.

On examination he had no fever, with no stigmata of endocarditis, although a new, early diastolic murmur was easily audible at the lower left sternal edge in addition to a long standing ejection systolic murmur. At that time his erythrocyte sedimentation rate (ESR) was 4 mm in the first hour, C reactive protein (CRP) was undetectable, and full blood count, urine analysis and blood urea and electrolytes were all normal. The ECG showed normal sinus rhythm and left ventricular hypertrophy by voltage criteria.

An echocardiogram revealed a large, sessile vegetation on the non-coronary cusp of the homograft, which was clearly seen to prolapse into the left ventricular cavity during diastole. There was significant aortic incompetence with a broad jet of turbulent flow extending to the apex on colour Doppler with a forward velocity of 3.3 m/s across the valve. The left ventricular cavity was slightly dilated with an end diastolic diameter of 60 mm although the systolic function remained reasonable with a shortening fraction of 39% (fig 1).

A series of 12 blood cultures was taken before starting empirical treatment with intravenous ceftrioxone and gentamicin. After three days of incubation, a Gram negative bacillus was found in seven of these cultures, which was subsequently identified as *C hominis*. All subse-
Table 1  Previous reports of prosthetic valve cardiobacterium hominis endocarditis

<table>
<thead>
<tr>
<th>Author</th>
<th>Valve type</th>
<th>Valve position(s)</th>
<th>Antibiotic treatment</th>
<th>Outcome</th>
<th>Survival at follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wormser et al 1978</td>
<td>Autologous fascia lata</td>
<td>Aortic</td>
<td>Penicillin/gentamicin 10 days</td>
<td>Bjork-Shiley AVR (heart failure/embolic disease)</td>
<td>9 months</td>
</tr>
<tr>
<td>Geraci et al 1978</td>
<td>Bjork-Shiley</td>
<td>Aortic</td>
<td>Ampicillin 4 weeks</td>
<td>AVR (type)</td>
<td>6 months</td>
</tr>
<tr>
<td>Spernoga et al 1979</td>
<td>Porcine Xenograft</td>
<td>Mitral</td>
<td>Ampicillin 6 weeks</td>
<td>Bacteriological cure</td>
<td>nr</td>
</tr>
<tr>
<td>Prior et al 1979</td>
<td>Starr-Edward's</td>
<td>Mitral</td>
<td>Ampicillin 6 weeks</td>
<td>Bacteriological cure</td>
<td>6 months</td>
</tr>
<tr>
<td>Jolie et al 1986</td>
<td>Cooley-Bloodwell disc</td>
<td></td>
<td>Ampicillin 3 weeks</td>
<td>Bacteriological cure</td>
<td>1 month</td>
</tr>
<tr>
<td>Bellorini et al 1987</td>
<td>Bjork-Shiley</td>
<td>Aortic</td>
<td>Amoxicillin/ gentamicin 6 weeks</td>
<td>Bacteriological cure</td>
<td>nr</td>
</tr>
<tr>
<td>Prichard et al 1991</td>
<td>Carpenter-Edwards bioprosthesis</td>
<td>Aortic</td>
<td>Penicillin/gentamicin duration</td>
<td>18 months</td>
<td></td>
</tr>
<tr>
<td>Taveras et al 1993</td>
<td>Porcine Xenograft</td>
<td>Mitral and Aortic</td>
<td>Ampicillin/ gentamicin 1 week</td>
<td>St Jude AVR and MVR (heart failure)</td>
<td>5 months</td>
</tr>
<tr>
<td>Marques et al 1995</td>
<td>Starr-Edwards</td>
<td>Mitral and Aortic</td>
<td>Ampicillin/ gentamicin 6 weeks</td>
<td>Bacteriological cure</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Lin et al 1995</td>
<td>Bjork-Shiley</td>
<td>Aortic</td>
<td>Ceftriaxone 20 days</td>
<td>Bacteriological cure</td>
<td>nr</td>
</tr>
</tbody>
</table>

AVR, aortic valve replacement; nr, not reported; MVR, mitral valve replacement.

quent blood cultures were reported as negative. The intravenous treatment was continued for 18 days before changing to oral amoxicillin, to which the organism was sensitive. The patient’s symptoms improved quickly and he remained without fever throughout with repeatedly normal ESR, CRP, complement fractions, and white cell counts.

It was decided that further elective aortic valve replacement was required both on the grounds of continuing left ventricular volume load and the appearance of the vegetation on ultrasound. At surgery, after six weeks of antibiotic treatment, the homograft was found to be friable with multiple perforations although no vegetations were identified. The aortic root was replaced using a 22 mm homograft with reimplantation of the coronary arteries, and the patient made an uneventful recovery without embolic phenomena. The excised graft underwent prolonged culture but subsequent bacteriological examination showed no growth. The patient was discharged from hospital on amoxycillin for a further four weeks and was well 18 months after the procedure.

Discussion

C hominis is a fastidious, Gram negative bacillus, which is present as normal flora of the oropharynx in most individuals.1 The organism is facultatively anaerobic and is difficult to isolate from standard media without optimum growth conditions that include CO₂ enrichment and 100% humidity.2 It may be distinguished from other, closely related HACEK bacilli (Haemophilus species, Actinobacillus actinomycetemcomitans, Eikenella corrodens, and Kingella kingii) by a positive oxidase reaction and the production of indole. However, blood cultures may take up to 14 days’ incubation before becoming positive, and the determination of minimal inhibitory antibiotic concentrations using standard techniques remains problematic.3

The organism is rarely the cause of human infection but was named when it was first isolated from four patients with infective endocarditis in 1962.4 Since then, fewer than 50 cases of C hominis endocarditis have been reported in the literature. Although most of these cases have had some form of pre-existing cardiac disease, only 10 cases involving prosthetic valves have been described to date, including four patients with tissue prostheses although C hominis homograft endocarditis has not been described previously (table).

The illness has a characteristically insidious onset, occasionally with symptoms lasting as long as nine months before diagnosis.5 A history of dental manipulation may be elicited, although for most cases no portal for entry can be identified.6 Patients are often middle aged and may be feverish, but the fever is often low grade.7 Stigmata of endocarditis such as splenomegaly, anaemia, and haematuria are usually present particularly in those with prolonged illnesses, and the ESR is, typically, moderately raised.8 Other positive serological investigations such as rheumatoid factor or non-treponemal tests for syphilis may be misleading in the context of apparently sterile blood cultures.5 15-18

C hominis tends to form large, friable vegetations which are associated with a significant risk of cerebral embolisation (around 30% of cases)9 or mycotic aneurysm formation (around 10%),10 both of which appear to be more common than with other Gram negative endocarditides.11 Right sided endocarditis is rare, but was associated with a fatal pulmonary embolism in a single reported case.12 Symptomatic heart failure has required valve replacement in up to a quarter of patients with the disease13 and this may also be required to prevent embolic sequelae.14

The organism is almost always susceptible to penicillin, and most cases of C hominis endocarditis may be successfully treated with a three week course of antibiotics using either amoxycillin alone or in combination with an aminoglycoside.15 However, resistance to erythromycin and vancomycin has been reported16 and these agents should not be considered appropriate empirical treatment for patients who are allergic to penicillin unless there is good evidence of sensitivity in vitro.17 Definitive differentiation from other members of the HACEK group is also essential, particularly as
Actinobacillus actinomycetemcomitans and Hae-
mophilus aphrophilus may be penicillin resistant.

Our patient received oral amoxicillin for a
presumed bronchopulmonary infection just
before admission and as prophylaxis for dental
therapy three months earlier. Despite this,
we were able to isolate C hominis in blood cul-
tures within three days. His presentation was
unusual in that he was young and had none of
the usual clinical features or serological mark-
erers of infective endocarditis. Although subse-
quent blood cultures were sterile, it was
difficult to monitor his progress other than by
symptoms and with repeated echocardiogram-
phy.

Four of the 10 previously reported cases of C
hominis prosthetic valve endocarditis have
required valve re-replacement on account of
haemodynamic compromise or to prevent
embolic complications.6 11 12 As such, without
other markers and despite an apparent bacte-
riological cure, it was felt appropriate, in this
case, to proceed to urgent surgery given the
ehocardiographic findings, which indicated a
high risk of embolisation. However, the use of
“early” surgery during the active phase of
dentive endocarditis has to be balanced with
the added risk of prosthetic valve infection and,
therefore, intervention took place at the end of
the six week course of antibiotics when it was
considered that the valve was most likely to be
sterile.

Homograft valves can be inserted either in
a subcoronary position or as a complete aortic
root replacement. In the presence of recent
bacterial endocarditis, it is often necessary to
remove the native aortic root completely and
unroof all apparently “healed” left ventricular
outflow tissue.20 This is best achieved by
performing aortic root replacement which,
albeit a more demanding procedure than
simple subcoronary valve implantation, may be
to the patient’s long term benefit.21 22

The greatest risk of recurrent endocarditis
following valve replacement for ongoing native
or prosthetic valve infection appears to occur
within the first three months of operation23 and
eyearly mechanical valve dehiscence has been
reported to be a complication of C hominis
endocarditis.24 At the same time, a number of
reports14-23 suggested that this early peaking
hazard phase is greater for mechanical and
xenograft valves than for homografts used in
the aortic position.21 25 27 This may be caused by
an intrinsic biological resistance to infection,
although homografts do have a constant and
low risk for endocarditis.27 28 For these reasons,
and partly at the specific request of the patient,
a further homograft was used successfully in
this case.

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