CASE REPORT

Silent destruction of aortic and mitral valve by *Klebsiella pneumoniae* endocarditis

K H Srinivas, Rajni Sharma, Navin Agrawal, C N Manjunath

Department of Cardiology,
Sri Jayadeva Institute of
Cardiovascular Sciences and
Research, Bangalore, India

Correspondence to

Dr Navin Agrawal,
drnavinagrwal@gmail.com

SUMMARY

Klebsiella endocarditis rarely affects the native valve especially in the immunocompromised and the elderly. We report a case of *Klebsiella* endocarditis in a 60-year-old man who had a nidus of infection on the aortic valve which led to severe aortic regurgitation. This possibly spread to the anterior mitral leaflet (AML) leading to AML perforation therefore causing moderate mitral regurgitation. The reason for this suspicion was that there was perforation of the AML in the absence of vegetation. Noteworthy is that he was asymptomatic apart from generalised fatigue. This case draws our attention to the nature of *Klebsiella* valvular affection due to the fact that it had bitten the aortic and mitral valve silently and compelled the patient to undergo double valve replacement without having a prolonged duration of symptomatic illness thereby calling for high suspicion especially in individuals in the extremes of ages where the symptoms are less-guiding than the signs.

BACKGROUND

Gram-negative bacteria causing endocarditis is a rare entity, although the incidence might be increasing.¹ *Klebsiella* species among Gram-negative bacteria are an especially rare cause of bacterial endocarditis. Cohen *et al*² reviewed reports of endocarditis caused by Gram-negative bacteria (348 cases) among which only two cases caused by *Klebsiella* species had been published in the English language literature between 1945 and 1977. We presented a case of *Klebsiella pneumoniae* endocarditis which illustrates the silent nature of the infection whereby it destroyed the native aortic and mitral valve and how it compelled the patient to undergo dual valve replacement. We also emphasise here the importance of early suspicion and thorough evaluation when the signs are more than the symptoms especially in extremes of age as in our case.

CASE PRESENTATION

A 60-year-old man who had been previously asymptomatic without any obvious predisposing factor for endocarditis and without a history of having being previously diagnosed of a cardiac illness presented with symptoms of fatigue (NYHA class II) for the last 4 weeks. Chest pain occurred at night for the last 1 week. On physical examination the patient was afebrile (98.8°). Pulse was collapsing in nature. Blood pressure was 130/70 mm Hg. Grade 3/6 pansystolic murmur at apex radiating to axilla and grade 3/4 early diastolic murmur at the

aortic area were presented. The patient had splenomegaly and clubbing whereas other cutaneous stigmata of endocarditis were not present. The patient had a borderline increased jugular venous pulse but there was no pain or tenderness in the right upper quadrant of her abdomen, nausea, vomiting, anorexia or any abdominal distension or pedal oedema. The patient had dyspnoea and orthopnoea owing to the acute onset of mitral regurgitation in the presence of a non-compliant left atrium.

INVESTIGATIONS

Transthoracic echocardiography showed the presence of severe aortic regurgitation with thickened cusps and a vegetation attached to it (figure 1, videos 1–3). There was moderate mitral regurgitation through the fenestrated anterior mitral leaflet (drop lesion from aortic vegetation) with an eccentric jet (figure 2, video 4). The left atrium and left ventricle were dilated. The left ventricular function was normal. The findings were confirmed using a transoesophageal echocardiography. The X-ray showed signs of pulmonary venous congestion and the ECG showed signs of left atrial and ventricular enlargement. The biochemical profile showed 13 700/μL white cell count, polymorphs 78%. The haemoglobin was 6.4 g%, platelet count was 2 40 000/μ, serum creatine level was 1.2 mg/dL. The modification of diet in renal disease glomerular filtration rate MDRD GFR was 59 mL/min. Urine analysis showed 2+ bacteria, white cell count was 12–15/hpf. Blood culture (3 samples) and urine culture showed *K pneumoniae* species that was susceptible to amikacin (minimum inhibitory concentration (MIC) ≤ 2 g/mL), cephaperazone/sulbactam (MIC ≤ 4 μg/mL), gentamycin (MIC ≤ 1 μg/mL) and meropenem (MIC ≤ 0.25 μg/mL). A routine pre-operative coronary angiogram was normal. The USG of his abdomen revealed borderline prostatomegaly which may explain the presence of a urinary tract infection in the absence of an alternative predisposition besides age.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis in this case could have been a rheumatic heart disease or a valvular prolapse or a connective tissue disorder but in the presence of the Duke's major criteria there was no reason to doubt the diagnosis although there was no obvious cardiac predisposing factor for endocarditis which was evident after her clinical evaluation or investigations.

To cite: Srinivas KH, Sharma R, Agrawal N, *et al*. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-200704

Figure 1 Apical four-chamber view with colour Doppler imaging. Two coloured jets of mitral regurgitation, one valvular and other through anterior mitral leaflet perforation. Left atrium and left ventricular cavity dilated.

Figure 2 Colour M mode taken at the descending aorta. Holodiastolic reversal in descending aorta because of severe aortic regurgitation (red coloured).

TREATMENT

The patient was put on cephaperazone sulbactam combination with gentamycin as per culture sensitivity report along with medication for the management of heart failure. The patient responded and the blood culture was negative after 10 days of intravenous antibiotics. Meanwhile we prepared the patient for elective dual valve replacement by correcting the anaemia with a blood transfusion. After completion of 4 weeks of intravenous antibiotics the patient was taken for surgery after a routine pre-operative coronary angiogram to rule out a co-existent coronary

Video 2 Parasternal long axis view. Soft mobile vegetation attached to right coronary cusp. Rent at base of anterior mitral leaflet (drop lesion from aortic vegetation causing anterior mitral leaflet perforation).

disease, successful aortic and mitral bio-prosthetic valve replacement was carried out which was indicated as a result of the presence of acute severe valvular regurgitation involving both the left-sided valves (Class I indication). Excised valve was sent for culture and no growth was noted at 7 days of culture.

OUTCOME AND FOLLOW-UP

Cephaperazone and sulbactam was continued for further 4 weeks postoperatively and blood cultures on completion of therapy were sterile. The patient had returned to work and was asymptomatic 3 months after his operation. The patient had been put on anticoagulation for the next 3 months with a target INR 2.5–3.5.

The rarity of the *Klebsiella* species endocarditis itself limits its recognition and awareness of the malignant course it follows. The available literature and 22 case series published between 1966 and 1997 gives a data of 50 cases, 41 cases from various series on endocarditis and 9 cases from isolated case reports.³ In 22 case series of 2472 cases of endocarditis included after excluding selective studies on children⁴ and pacemaker patients,⁵ 215 (8.7%) of the cases were caused by Gram-negative bacteria, and 37 (1.5%) of these were caused by *Klebsiella* species. Gram-negative organisms were responsible for 7.4% of the cases of native valve endocarditis and 19.3% cases of prosthetic valve endocarditis, in the 22 series reviewed, *Klebsiella* species caused 1.2% of the cases of native valve endocarditis and 4.1% of the cases of prosthetic valve endocarditis. Men were mostly affected after the age of 45 years.⁶ The most common source of bacteraemia was urinary tract infection followed by infection of the pacemaker. The most common valve to be affected was aortic (17 cases; 74%), followed by mitral

Video 1 Parasternal short axis view. Aortic valve is tricuspid. A mobile vegetation seen on right coronary cusp.

Video 3 Parasternal long axis view. Colour Doppler imaging at aortic valve showing severe aortic regurgitation.

Video 4 Apical four chamber view. Colour Doppler image showing moderate mitral regurgitation with two colour jets of valvular regurgitation and regurgitation through perforation of anterior mitral valve

(8 cases; 35%), the tricuspid valve (1 case; 4%); three patients (13%) had aortic as well as mitral valve involvement.⁶ However, a wide variety of antibiotics were used, and a combination therapy was typically administered. The mortality reported in *Klebsiella* endocarditis was 49%. But in recent times the mortality associated with *Klebsiella* endocarditis appears decreased because of expanded armamentarium of antibiotics. Surgical valve replacement along with antibiotics provided better results as compared to conservative management with antibiotics alone.

Klebsiella species is a rare but dreadful cause of bacterial endocarditis and are responsible for high mortality rate and higher complication rate. The previous studies have shown common trend of complications in *Klebsiella* species endocarditis. Large vegetations, valve perforation and root abscesses are common in *Klebsiella* endocarditis and usually needs combined medical and surgical treatment for eradication. Prolonged antibiotic therapy with a combination of an aminoglycoside and a third generation cephalosporin in conjunction with valve replacement probably provides the best outcome.⁷ Close watch with serial echocardiograms are indicated to secure the management. Many patients fail to respond to medical treatment alone or develop mechanical complications even on medical therapy requiring early surgeon intervention.

Learning points

- ▶ This case is an eye opener to the clinician and the cardiologist in terms of having a wider approach in evaluating the population in the extremes of age where they present with vague symptoms and lack the signs of endocarditis.
- ▶ Simple pointers like severe anaemia, pus cells and red blood cells on urine examination and the presence of murmurs on a cardiovascular examination may point towards diagnosis of infective endocarditis.
- ▶ Blood culture and two-dimensional echocardiogram can provide a definitive diagnosis.
- ▶ Aggressive treatment and surgical intervention if necessary can help to obtain a successful outcome.
- ▶ Timely diagnosis and high index of suspicion is the key to success in management of such cases.

Contributors All the authors were involved in patient care and the drafting of manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Hessen MT, Abrutyn E. Gram-negative bacterial endocarditis. In: Kaye D, eds. *Infective endocarditis*. 2nd edn. New York: Raven Press, 1992:251.
- 2 Cohen PS, Maguire JH, Weinstein L. Infective endocarditis caused by Gram negative bacteria: a review of the literature, 1945–1977. *Prog Cardiovasc Dis* 1980;22:205–423.
- 3 Anderson JM, Janoff EN. *Klebsiella* endocarditis: report of two cases and review. *Clin Infect Dis* 1998;26:468–74.
- 4 Martin JM, Neches WH, Wald ER. Infective endocarditis: 35 years of experience at a children's hospital. *Clin Infect Dis* 1997;24:669–75.
- 5 Arber N, Pras E, Copperman Y, et al. Pacemaker endocarditis. *Medicine (Baltimore)* 1994;73:299–305.
- 6 Thomas MG, Rowland-Jones S, Smyth E. *Klebsiella pneumoniae* endocarditis. *J R Soc Med* 1989;82:114–5.
- 7 Healy DP, Wong-Beringer A. Endocarditis. In: Koda-Kimble MA, Young LY, eds. *Applied therapeutics: the clinical use of drugs*. 6th edn. Washington: Vancouver, 1995:51–2.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit

<http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow