

# Infective Endocarditis of the Aortic Valve caused by *Pseudomonas aeruginosa* and Treated Medically in a Patient on Haemodialysis

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## معالجة التهاب الشغاف العدوائي للصمام الأبهري بالبكتيريا الزائفة الزنجارية بالأدوية عند مريض غسيل الكلية

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**المخلص:** التهاب الشغاف العدوائي عند مرضى غسيل الكلية عدوى خطيرة تحمل نسبة وفاة مرتفعة. عادة ما يسبب هذا الإلتهاب البكتيريا إيجابية الجرام ومن النادر أن تسببه البكتيريا سلبية الجرام. غالباً ما يتضمن العلاج الناجع استبدال الصمام المصاب جراحياً، بالإضافة إلى الاستخدام طويل الأجل للمضادات الحيوية، بينما يُعد نجاح العلاج بالمضادات الحيوية وحدها أمر نادر الحدوث. في هذا التقرير نصف حالة التهاب الشغاف العدوائي بالبكتيريا الزائفة الزنجارية في مريض على غسيل الكلية عولج بالمضادات الحيوية لوحدها.

مفتاح الكلمات: الزائفة الزنجارية، التهاب الشغاف العدوائي، غسيل الكلية، المعالجة بالمضادات الحيوية، تقرير حالة، عُمان.

**ABSTRACT:** Infective endocarditis (IE) in patients on dialysis is a serious infection with a high mortality rate. It is usually caused by Gram positive bacteria with Gram negative organisms being relatively rare as a cause. Recommended treatment usually involves surgical valve replacement and the extended use of antibiotics. Successful treatment with antibiotics alone is rare. We report a case of IE caused by *Pseudomonas aeruginosa* in a patient on dialysis treated solely with antibiotics.

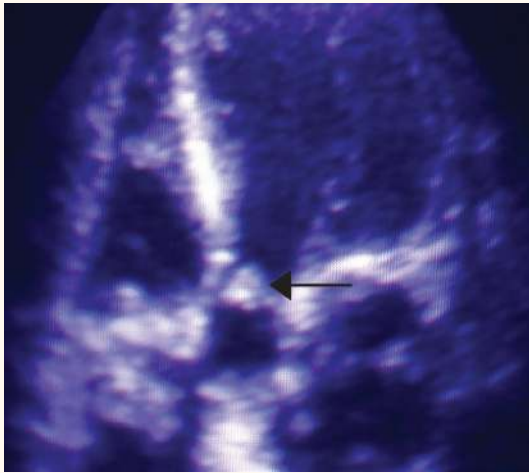
**Keywords:** *Pseudomonas aeruginosa*; Infective endocarditis; Dialysis; Treatment, antibiotic; Case report; Oman.

**I**NFECTIONE ENDOCARDITIS CAUSED BY *Pseudomonas aeruginosa* is rarely seen in clinical practice. It has been reported mainly in intravenous (IV) drug abusers.<sup>1,2</sup> *P. aeruginosa* is also an occasional cause of nosocomial endocarditis, accounting for 10% of cases in one small intensive care unit (ICU) series.<sup>3</sup> It carries a very high mortality rate of 80% necessitating, therefore, early diagnosis and intervention. The clinical outcome of right-sided endocarditis has improved with cure rates reaching 84% while that of the left side remains 33%.<sup>4</sup> This sub-optimal outcome is partly due to increasing resistance to beta-lactams and aminoglycosides.<sup>1,4,5</sup> Fluoroquinolones, on the other hand, seem to be more potent against *Pseudomonas*.<sup>6,7</sup> Numerous

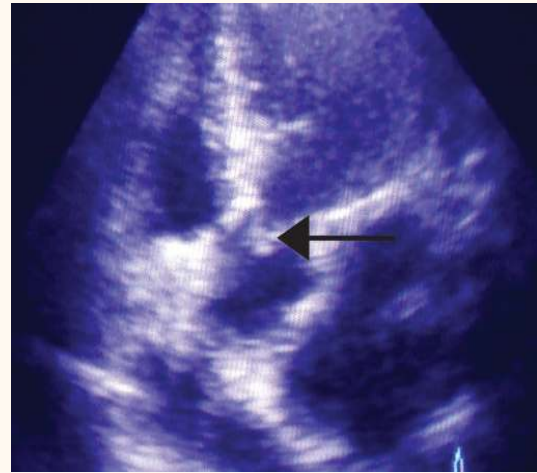
studies have shown significantly better outcomes with combined medical/surgical treatment.<sup>8-11</sup> We report a haemodialysis patient who developed aortic regurgitation following catheter related *P. aeruginosa* endocarditis and describe her medical management and the outcome.

## Case report

A 49 year-old Omani woman on dialysis with a past medical history of hypertension, diabetes, coronary artery disease, and end-stage renal disease presented to our hospital with uraemia. She was started on maintenance haemodialysis via a right internal jugular tunnelled cuffed catheter. A week later she had placement of an arteriovenous fistula (AVF).

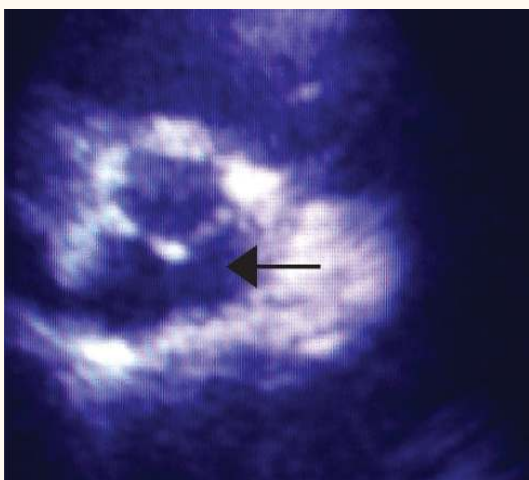


**Figure 1:** Apical view transthoracic echocardiography scan showing large vegetation seen on the aortic valve.



**Figure 2:** Apical view transesophageal echocardiography scan showing decrease in the size of previous vegetation.

Two weeks following the insertion of the catheter she developed fever and generalised weakness. Blood cultures taken from the central line grew *P. aeruginosa*. She was treated with ciprofloxacin and tazocin. She improved on this treatment and the tazocin was changed to amikacin after each dialysis. Subsequent surveillance blood cultures after 4 and 6 weeks of the first blood culture were negative. She was investigated with transthoracic echocardiography which reported no evidence of thrombi or vegetations. Given that her AVF was maturing and could be potentially used for dialysis only a month after the bacteraemia, the central line was kept for dialysis. However, one week later, before the line was removed, she presented with



**Figure 3:** Short axis, aortic view echocardiography scan showing total clearance of the vegetation.

fever, generalised weakness, sore throat and dry cough. Her examination revealed a temperature of 37.9°C, blood pressure of 180/70 mmHg, mild pedal oedema and no signs of inflammation on the skin overlying the tunnelled catheter, but mild crusting at the exit site. Her body weight was 65 kg. Her systemic examination was remarkable for a new diastolic murmur. Her investigations reported normal white blood cell (WBC) count and her chest X-ray reported no pneumonia. She continued to be sick and febrile despite initial management of presumed community-acquired pneumonia. At this stage, a catheter related infection was presumed and she was treated with vancomycin and amikacin. The tunnelled catheter was removed as her AVF was ready to be used for dialysis. Blood cultures grew *P. aeruginosa*. Transthoracic echocardiography (TTE) showed a well-circumscribed small mass attached to the non-coronary and right coronary cusp of the aortic valve suggestive of vegetation [Figure 1]. Transoesophageal echocardiography showed a huge vegetation of 2 cm on the left and non-coronary cusps of the aortic valve with no aortic root abscess. The cardiothoracic surgeon suggested valve replacement in addition to medical management with ceftazidime and amikacin. However, the patient strongly refused the surgery. On medical treatment alone she showed a remarkable improvement. TTE was done one month post antibiotics commencement. It showed evidence of severe aortic regurgitation (AR) and mobile vegetation attached mostly to the right coronary cusp. The large vegetation on the non-

coronary cusp was no longer seen and only small vegetation was seen on the left coronary cusp [Figure 2]. A repeat echocardiography 2 weeks later showed a mildly thickened aortic valve, but no vegetation [Figure 3]. In the last follow-up, one year later, the patient continued to do well clinically.

## Discussion

*Pseudomonas* bacteraemia is a nosocomial problem being the third most frequent cause of Gram negative bacteraemia.<sup>12</sup> Our patient had a central line which was the culprit for her bacteraemia and subsequent endocarditis. Endocarditis caused by this pathogen is very serious with a very high mortality rate.<sup>13</sup> Patients with left-sided valvular infections, often develop rapidly progressive symptoms that are due to either congestive heart failure or an embolism of large or medium-sized arteries. Ring and annular abscesses are also frequent complications.

*Pseudomonas* endocarditis is associated with high mortality. This is explained by the fact that beta-lactams have a slow bactericidal effect on the organism and resistance to the drugs develops rapidly. Thus, treatment of *P. aeruginosa* endocarditis usually necessitates the combination of antibiotics and surgery to achieve a cure.<sup>14</sup> Valve replacement was offered to our patient, but she persistently refused any surgical interventions. She was managed with a combination of ceftazidime (1 g three times a day) and amikacin (500 mg once/day, on three days of week with dialysis, to achieve trough levels below 5 mg/L and peak levels between 20–30 mg/L). After ten weeks the vegetation had completely disappeared. Medical treatment alone in left-sided infective endocarditis caused by *P. aeruginosa* was previously reported to be successful.<sup>15</sup>

## Conclusion

We reported the cure of a case of endocarditis caused by *P. aeruginosa* with ceftazidime and amikacin. In the case of catheter related bacteremia with *Pseudomonas*, the line should be removed as soon as possible.

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