

Yusra HABIB KHAN<sup>1</sup>, Azmi SARRIFF<sup>1</sup>, Amer HAYAT KHAN<sup>1</sup>, Azreen Syazril ADNAN<sup>2</sup>, Tauqeer Hussain MALLHI<sup>1</sup>

Submitted: 9 Jun 2014

Accepted: 26 Oct 2014

<sup>1</sup> School of Pharmaceutical Sciences, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia

<sup>2</sup> Chronic Kidney Disease Resource Centre, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

## Abstract

**Infective endocarditis (IE) is the one of the most important causes of increased mortality and morbidity among haemodialysis patients. The reason for this increasing prevalence of infection among these patients is the use of haemodialysis catheters during dialysis, as these patients are highly susceptible to infections that are easily transmitted via blood access points.**

**The present case was a geriatric end stage renal disease (ESRD) patient who was readmitted to the hospital two days after her scheduled haemodialysis session with symptoms of nosocomial endocarditis. Her concurrent medical complications were hypertension, non-insulin dependent diabetes mellitus, and ischemic heart disease. Based on her previous medical history and current examination, the patient was suspected to have IE due to catheter related infection.**

**The goal of therapy is to manage the comorbidities and infection by provision of appropriate treatment based on close monitoring of the patient condition.**

**Keywords:** chronic kidney diseases, endocarditis, infection

## Introduction

Infective endocarditis (IE) is one of the most important causes of increased mortality and morbidity among haemodialysis patients (1). The prevalence of chronic kidney disease is escalating every year and the number of patients undergoing dialysis is increasing proportionally. IE results in an increased number of complications and associated deaths in haemodialysis patients. Such patients are more susceptible to complications such as malnutrition, cardiovascular events, anaemia, and infections when compared to healthy individuals or non-haemodialysis patients (2).

The European Heart Journal states that more than two thirds of patients undergoing haemodialysis suffer from some sort of infection and that one third of these patients experience IE (3). The reason for this increased prevalence of infection among haemodialysis patients is the use of catheters during dialysis. These patients are highly susceptible to infections that are easily transmitted via the blood access point (1,4).

IE is an infection that involves the valves and surrounding tissues of the endocardium. Different types of IE are recognised: native-valve

IE, prosthetic-valve IE, IE in intravenous drug users, and nosocomial IE (3). We present case of a female geriatric patient with end stage renal disease (ESRD) on regular haemodialysis who suffered IE.

Due to concurrent underlying medical complications and existing infections, diagnosis of nosocomial endocarditis is extremely difficult at an early stage. The only way of preventing these infections is pre-screening of high risk patients, providing appropriate care (especially where invasive procedures are involved) and administering timely empirical therapy to these patients (5).

## Case Report

A 77-year-old female geriatric patient was admitted to hospital two days after her scheduled haemodialysis session. Patient presented with a high grade fever (39.2°C) associated with chills and rigor, severe recurrent non-productive cough and shortness of breath (SOB). During admission, her blood pressure was 171/78 mmHg with a pulse rate of 120 beats/min and a blood sugar level of 11 mmol/L.

Premorbidly, she had ESRD secondary to diabetic (DM) nephropathy, hypertension (HTN), non-insulin dependent diabetes mellitus (NIDDM) and ischemic heart disease (IHD). She had been on regular haemodialysis for the past ten years.

Physical examination revealed presence of bilateral lower limb swelling and abdominal ascites. A respiratory examination revealed bibasal fine crepitations. First (S1) and second (S2) heart sounds were heard with no additional murmurs.

Renal function profile was as follows: serum creatinine (Cr): 560 µmol/L, creatinine clearance (CrCl): 6.92 ml/min, and urea: 11.3 mmol/L. Her hemoglobin (Hb) was 9.0 g/dL, hematocrit (Hct): 27.6%, and white blood cell (WBC) count was 11.63 x 10<sup>9</sup>/L.

Medical history showed that due to excessive aneurysm of the native arteriovenous fistula (AVF), patient had been on a temporary internal jugular catheter for haemodialysis for the past one week. Cannulation of this AVF led to excessive bleeding therefore patient had to be haemodialysed via a temporary catheter. During this admission, patient was suspected to have catheter related infection (CRI), as she reported having intradialytic chills and rigors during her last haemodialysis. An echocardiography revealed two 1.25 cm<sup>2</sup> vegetations at the tricuspid valve and right coronary cusp. The catheter was removed immediately, as it was suspected to be the source of infection. A few hours post catheter removal, patient's fever was controlled and a new catheter was inserted.

Culture and sensitivity test was carried out to confirm the causative agent. In the mean time, empirical treatment for IE was initiated by administration of intravenous (I.V.) ceftazidime 1 g once daily (cephalosporin) and I.V. cloxacillin 2 g four times daily. For the management of comorbidities, other medications prescribed with empirical treatment were subcutaneous Mixtard 12 unit twice daily for control of blood sugar level, I.V furosemide 80 mg thrice daily as an anti-hypertensive agent, tablet bromhexin 8 mg thrice daily as an expectorant and mucolytic agent and tablet calcium carbonate 1.5 g TDS as phosphate binder.

On the second day of admission, patient still complained of persistent dry cough. Sputum production was induced by nebulising with saline. Further, due to low hemoglobin level, tablet folate 5 mg OD and tablet ferrous fumarate 200 mg OD were added to patients' medical chart for treatment of anaemia. Tablet felodipine 20 mg OD

was added to her current regime for hypertension and tablet cardipin 100 mg OD was added for prophylactic management of stroke. At the end of day 2, results of the culture and sensitivity test showed *Enterococcus faecalis* at the central catheter and coagulase negative staphylococcus at the peripheral line as the causative agents of infection. Empirical antibiotics were then switched to intravenous penicillin V potassium 2.4 megaunit 4 hourly and intravenous cloxacillin 2 g four times daily for the coverage of gram positive cocci that caused infection.

Despite being on felodipine (a calcium channel blocker), patient was still hypertensive, therefore another antihypertensive agent, tablet metoprolol (a beta blocker) 75 mg BD, was added to her treatment regime.

## Discussion

We described case of an elderly woman with end stage renal failure who was admitted to hospital for endocarditis, with symptoms appearing immediately after her scheduled dialysis session. Endocarditis is an infection that involves the inner lining of the heart (i.e., the endocardium). The causative agent of infection—either bacterial (more common) or fungal (less common) adheres to heart valves and results in persistent growth and damage of the surrounding tissues (3). The symptoms of IE progresses with growth of bacteria within endocardium and becomes more visible with the passage of time. Initial symptoms are vague and include flu, fever, and fatigue. With passage of time, severe cough and shortness of breath are experienced (6).

IE is predominantly more prevalent among haemodialysis patients and leads to higher mortality and morbidity in these patients when compared to the general public. Basically, IE is categorized into 5 main categories: native valve IE, prosthetic valve endocarditis, nosocomial IE, IE in drug users, haemodialysis associated IE.

In the current case, patient was at a high risk of developing endocarditis since she had been on a temporary haemodialysis catheter via internal jugular catheters (IJC). Patient's previous medical history showed sensitivity to ampicillin and resistance against high levels of gentamicin. Therefore, for empirical treatment of infection, ceftazidime along with cloxacillin was prescribed by her physician. As soon the causative agent of infection was known (i.e., *E. faecalis*), ceftazidime was withheld as it does not provide maximum coverage against the causative gram positive bacteria (7). *E. faecalis* is responsible for

only 5–15% cases of IE. The reason for infection by this causative agent involves poor hygiene. Upon inquiry by physician, patient recalled touching her catheter several times as she was feeling uncomfortable. The possible reason for staphylococcal infection at peripheral line might be inadequate or lack of use of a swab before taking blood from the peripheral line. Staphylococcus constitutes the normal flora of the skin therefore, it can be detected in blood if skin is not swabbed before taking blood.

Upon admission, patient was suffering from fluid overload that was visible with pitting edema and constantly high blood pressure. A combination of various medications was prescribed to control her blood pressure and furosemide was added to her treatment regimen. Furosemide was chosen over other diuretics as it shows synergistic effects with captopril that would result in better control of hypertension as well as fluid overload. Furosemide is also known to cause severe hypokalemia, so potassium supplements are normally given concomitantly with furosemide; however, in the case of ESRD patients, hypokalemia caused by furosemide is not managed as kidneys are unable to excrete any excess potassium.

Due to timely management of all mentioned complications, on 4th day of admission, patient's blood pressure and blood sugar level were controlled while infection eradicated slowly after 5 days of complete treatment.

## Conclusion

End stage renal patients are prone to various types of infections. Presence of co-morbidities and issues related to dose adjustment based on creatinine clearance creates difficulties for the physician for designing an appropriate therapeutic regimen for the patient. IE is one such infection in ESRD patients that is associated with high mortality. Goal of therapy is to manage comorbidities and infection by provision of appropriate treatment based on close monitoring of renal function and electrolytes.

## Ethical Approval

Ethical approval and prior written consent was taken from patient before submission of case report to journal.

## Acknowledgement

None.

## Conflict of Interest

None.

## Funds

None.

## Authors' Contributions

Conception and design: AHK

Drafting of the article: YHK, THM

Critical revision of the article for important intellectual content: AS, ASA

Final approval of the article: AS

Provision of study materials or patients: ASA

## Correspondence

Dr Yusra Habib Khan  
PhD (Universiti Sains Malaysia)  
School of Pharmaceutical Sciences  
Universiti Sains Malaysia  
11800 Pulau Pinang  
Malaysia  
Tel: +6016-453 0979  
Fax: +609-764 2543  
Email: yusrahajib@gmail.com

## References

1. Doulton T, Sabharwal N, Cairns HS, Schelenz S, Eykyn S, O'Donnell P, et al. Infective endocarditis in dialysis patients: New challenges and old. *Kidney Int.* 2003;**64**(2):720–727. doi: 10.1046/j.1523-1755.2003.00136.x).
2. Khan YB, Sharriff A, Adnan AS, Khan AH, Malhi TH, Jummaat F. Management of emergent complications with end stage renal disease. *J Coll Physician Surg Pak.* 2015;**25**(5):392.
3. Hoen, B. Infective endocarditis: A frequent disease in dialysis patients. *Nephrol Dial Transplant.* 2004;**19**(6):1360–1362. doi: 10.1093/ndt/gfh149.
4. Nishizaki Y, Watanabe T, Tokuda Y, Futatsuyama M, Furukawa K, Mori N, et al. Renal function and mortality in patients with infective endocarditis. *Gen Med.* 2012;**13**(1):19–24. doi: 10.14442/general.13.19.
5. Lukes AS, Bright, DK, Durack, DT. Diagnosis of infective endocarditis. *Infect Dis Clin N Am.* 1993;**7**(1):1.
6. Mylonakis E Calderwood SB. Infective endocarditis in adults. *N Engl J Med.* 2001;**345**(18):1318–1330. doi: 10.1056/NEJMra010082.
7. Horstkotte D, Follath F, Gutschik E, Lengyel M, Oto A, Pavie A, et al. Guidelines on prevention, diagnosis and treatment of infective endocarditis executive summary the task force on infective endocarditis of the European Society of Cardiology. *Eur Heart J.* 2004;**25**(3):267–276. doi: 10.1016/j.ehj.2003.11.008.