CASE REPORT

Multivalvular infective endocarditis in pregnancy presenting with septic pulmonary emboli

Nicola English,¹ Polly Weston²¹Department of Obstetrics & Gynaecology, King Edward Memorial Hospital, Subiaco, Western Australia, Australia²Department of Obstetrics & Gynaecology, Joondalup Health Campus, Joondalup, Western Australia, Australia

Correspondence to

Dr Nicola English,
nicola.english@hotmail.com

Accepted 17 April 2015

SUMMARY

A 33-year-old woman presented at 36 weeks gestation with worsening respiratory distress. A CT–pulmonary angiogram was performed to rule out a massive pulmonary embolism; instead, this identified extensive septic pulmonary emboli throughout both lung fields. Given the continuing maternal deterioration, a non-elective caesarean section was performed. A transoesophageal echocardiogram identified multiple large cardiac valve vegetations on both sides of her heart with an associated aortic root abscess. She responded well to a 6-week course of intravenous antibiotics.

BACKGROUND

Infective endocarditis is rare in pregnancy, however, with a mortality rate of up to 30%, obstetricians need to be aware of this serious condition. High-risk obstetric patients such as those with rheumatic and congenital heart disease are often identified as such early in pregnancy. As a result of changing patient demographics, however, infective endocarditis is becoming more common among patients without pre-existing cardiac disease. General obstetricians therefore are required to have a high clinical suspicion, and to be comfortable initially managing and appropriately referring these patients. We submit a case that highlights the presentation and management of infective endocarditis.

CASE PRESENTATION

A 33-year-old gravida 3 para 2 presented to the maternal fetal assessment unit at 36 weeks gestation. She had a previous diagnosis of hepatitis C and a history of intravenous drug use (IVDU), but denied drug use throughout the pregnancy. Her antenatal course to this point had been uneventful.

The patient presented by ambulance with 3 days of chest pain, abdominal pain and bilateral swelling of her lower limbs. She denied recent drug use. Her temperature was 35°C. She was tachycardic, tachypnoeic and oxygen saturation was 87% on room air. On examination, she had a tender left chest wall, diffuse coarse breath sounds, no crackles and no audible murmur. Her abdominal examination revealed a gravid uterus consistent with dates and she had marked pitting oedema bilaterally to mid-thigh level. Cardiotocography (CTG) was reactive.

INVESTIGATIONS

Laboratory tests demonstrated an infective picture with leucocytosis $16 \times 10^9/\text{L}$ and an elevated C reactive protein 242 mg/L. The patient was mildly

anaemic, 101 g/L, and had thrombocytopenia, noted for the first time this pregnancy, of $92 \times 10^9/\text{L}$. Liver and renal function was normal. Uric acid was elevated at 0.66 mmol/L and albumin was low at 27 g/L. The patient had proteinuria and a urine toxicology screen was positive for methamphetamines, opioids and cannabis.

While in our department, the patient became increasingly short of breath and adequate oxygen saturation became increasingly difficult to maintain.

An ECG demonstrated sinus tachycardia but no other abnormalities.

An urgent CT pulmonary arteriography (CTPA) demonstrated multiple cavitating lesions throughout all lung fields, suggestive of septic pulmonary emboli (figure 1).

In addition to maternal compromise, the CTG now displayed a fetal tachycardia and reduced variability, and the patient underwent an emergency caesarean section with general anaesthetic.

A transthoracic echocardiogram (TOE) identified a four-centimetre mobile vegetation on the tricuspid valve with severe tricuspid regurgitation. A subsequent TOE demonstrated additional right-sided vegetations associated with the subvalvular apparatus and right outflow tract. The aortic valve had a 3 cm vegetation and an associated root abscess, but preservation of function. Overall systolic function was normal.

DIFFERENTIAL DIAGNOSIS

The initial differential diagnosis was pulmonary embolism or severe pneumonia. This was because of the acute nature of the respiratory distress along

Figure 1 CT pulmonary arteriography showing extensive lesions, which are cavitating in appearance. This is highly suggestive of staphylococcus infection.

CrossMark

To cite: English N, Weston P. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-209131

with tachycardia, low oxygen saturation and chest pain. The presence of lower limb swelling also raised suspicion for deep venous thrombosis. When it became clear from the urinary toxicology screen that the patient was actively using intravenous drugs, we deemed her a higher risk for deep venous thrombosis, especially of the iliac vessels. After discussing the patient's risk factors, clinical presentation and her increasingly unstable condition, with the radiology department, it was decided that a CTPA would provide us with the most answers in the least amount of time; the risk of radiation was deemed acceptable by the medical staff, and the patient consented. Infective endocarditis was not considered likely at that time until it was suggested by the presence of septic emboli on CTPA. The cavitating appearance of the septic emboli and history of IVDU made *Staphylococcus aureus* the most likely organism. The transoesophageal echocardiogram confirmed significant multivalvular infective endocarditis with an aortic root abscess.

TREATMENT

The patient remained in high dependency unit but was self ventilating on room air and otherwise haemodynamically stable. She was managed with input from the cardiology, cardiac surgery and infectious disease departments. Primary treatment was with empiric intravenous antibiotics. Blood cultures identified methicillin-sensitive *S. aureus* and the patient continued on a 6-week course of intravenous flucloxacillin and rifampicin.

Immediate recovery was complicated by severe withdrawal symptoms requiring methadone, diazepam and clonidine.

Thrombocytopenia continued postoperatively eventually reaching $56 \times 10^9/L$. In the absence of bleeding, no intervention was required, and the level returned to normal by day 5.

Electrolyte abnormalities were corrected and the patient received intravenous albumin correcting the hypoalbuminaemia and the peripheral oedema.

OUTCOME AND FOLLOW-UP

Bacteraemia persisted for 4 weeks but the patient demonstrated a good clinical response to antibiotic therapy. A repeat TOE showed no progression of the vegetations or abscess and no developing cardiac failure. Systemic emboli were ruled out with a bone scan and cerebral MRI. Surgery was not indicated in the acute setting due to the good clinical response and the preservation of systolic function.

The patient will have on-going cardiology and cardiothoracic follow-up with close monitoring of cardiac function and possible recurrences.

The patient's baby boy was delivered in good condition. He was admitted, for antibiotics, to special care nursery and discharged home well on day three of life.

DISCUSSION

Infective endocarditis (IE) in pregnancy is a rare and life-threatening condition with a reported incidence of 0.006% and a maternal mortality rate of 15–20%.^{1 2} Reports suggest that IVDU is becoming a more common risk factor for infective endocarditis in pregnancy,³ and now accounts for up to 14% of cases.

Infective endocarditis in the setting of IVDU tends to present characteristically with large vegetations on the right side of the heart; *S. aureus* is commonly the organism involved and septic pulmonary emboli the most frequently seen complication.⁴ *Streptococcus* is still the most common organism causing infective endocarditis in pregnant women, at 43%, but the incidence

of staphylococcal infection is rising primarily as a result of increasing IVDU among this population.

Morbidity from infective endocarditis is usually related to its extra-cardiac complications. Right-sided valvular vegetations are the origin for pulmonary emboli while systemic emboli arise from left-sided lesions. Perivalvular abscess formation is a relatively rare complication among pregnant patients. It is a marker of a more severe disease process, is associated with poorer outcomes and is often an indication for primary surgery.⁵

In addition to her clinical signs and symptoms, this patient displayed haematological and biochemical abnormalities on presentation. Thrombocytopenia has a recognised association with *S. aureus* bacteraemia,⁶ especially in the setting of infective endocarditis, and has been shown to correlate with a high level of bacteraemia. Thrombocytopenia is likely due to direct shearing force on platelets as they traverse abnormal valves, and also the adherence of *S. aureus* to platelets resulting in their activation and aggregation. The degree of thrombocytopenia in the setting of *S. aureus* IE has been shown to be an independent marker for the development of acute renal failure and poorer outcomes.⁷ Microscopic haematuria is sometimes seen in the presence of tricuspid vegetations, and forms part of a triad known as 'tricuspid syndrome'. This syndrome consists of pulmonary events, anaemia and microscopic haematuria. This should be considered in a patient with fever and haematuria in the absence of other infective sources.⁸

The mainstay treatment is with antibiotics and surgery. Three blood culture samples should be obtained prior to starting antibiotics. The empiric antibiotic choice is dependent on risk factors and local sensitivities. The recommended regime for infective endocarditis with a native valve in the presence of IVDU is a penicillinase-resistant penicillin, for example, flucloxacillin or vancomycin.⁹ Gentamicin is no longer recommended for *S. aureus* infective endocarditis in native valves as it has been shown to have no clinical benefit and carries a high risk of nephrotoxicity.¹⁰

While surgery was avoided in the acute setting in this case, it does have a role. The general opinion is that surgery is indicated in cases of acute heart failure related to left sided vegetations, where there is evidence of perivalvular extension of infection, presence of highly resistant bacteria or persistent bacteraemia and recurrent embolisation, despite antibiotic therapy.¹¹ The benefits of surgery in the acute setting should be balanced with

Learning points

- ▶ Intravenous drug use among pregnant patients is becoming a common risk factor for infective endocarditis.
- ▶ Presenting symptoms are dependent on the distribution of septic emboli so can be varied and require a high index of clinical suspicion.
- ▶ Valvular vegetations can be confirmed on transoesophageal echo but it is not required to make the diagnosis. Initiation of treatment should not be delayed to allow for imaging.
- ▶ Empiric antibiotics should be started early as per local guidelines after three sets of blood cultures have been taken.
- ▶ Once there is suspicion of infective endocarditis, a multidisciplinary approach should be implemented with early involvement of cardiologist, cardiac surgeons and microbiologists.

the risk of mortality and the high risk of recolonisation of the new valve in the presence of ongoing bacteraemia. In the setting of intravenous drug use, the role of surgery is even more contentious as the risk of recurrence is even higher.

Infective endocarditis will continue to be an important cause of maternal morbidity and mortality, and with rising use of intravenous drugs in pregnancy, obstetricians must remain vigilant.

Contributors The patient was initially managed on presentation by the authors NE and PW. NE wrote up the case after collecting all clinical information. PW was consulted throughout the writing process and performed some revisions resulting in the final piece.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Ward H, Hickman RC. Bacterial endocarditis in pregnancy. *Aust N Z J Obstet Gynaecol* 1971;11930:189–91.
- 2 Campuzano K, Roque H, Bolnick A, *et al*. Bacterial endocarditis complicating pregnancy: case report and systematic review of the literature. *Arch Gynecol Obstet* 2003;268:251–5.
- 3 Kebed KY, Bishu K, Al Adham RI, *et al*. Pregnancy and post partum endocarditis: a systematic review. *Mayo Clin Proc* 2014;89:1143–52.
- 4 Ruotsalainen E, Sammalkorpi K, Laine J, *et al*. Clinical manifestations and outcome in staphylococcus aureus endocarditis among injection drug users and non-addicts: a prospective study of 74 patients. *BMC Infect Dis* 2006;6:137.
- 5 Daniel WG, Mugge A, Martin RP, *et al*. Improvement in the diagnosis of abscesses associated with endocarditis by trans esophageal echocardiography. *N Engl J Med* 1991;324:795–800.
- 6 Grafton-Gvili A, Mansur N, Bivas A, *et al*. Thrombocytopenia in staphylococcus aureus bacteria: risk factors and prognostic importance. *Mayo Clinic Proc* 2011;86:389–96.
- 7 Conlon PJ, Jeffries F, Krigman HR, *et al*. Predictors of prognosis and risk of acute renal failure in bacterial endocarditis. *Clin Nephrol* 1998;49:96–101.
- 8 Nandakumar R, Raju G. Isolated tricuspid valve endocarditis in non-addicted patients: a diagnostic challenge. *AM J Med Sci* 1997;314:207–12.
- 9 Horstkotte D, Follath F, Gutschik E, *et al*. Guidelines on prevention, diagnosis and treatment of infective endocarditis. The task force on infective endocarditis of the European society of cardiology. *Eur Heart J* 2004;25:267–76.
- 10 Cosgrave SE, Vigliani GA, Fowler VG, *et al*. Initial low dose gentamicin for staphylococcus aureus bacteraemia and endocarditis is nephrotoxic. *Clin Infect Dis* 2009;48:713–21.
- 11 Hoen B, Duval X. Clinical practice. Infective endocarditis. *N Engl J Med* 2013;368:1425–33.

Copyright 2015 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