

A Case of Right Loin Pain: Septic Ovarian Vein Thrombosis Due to *Campylobacter fetus* Bacteraemia

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Abstract

Introduction: Septic ovarian venous thrombosis is an uncommon condition. Diagnosis is often not immediately apparent clinically and there are many that mimic this condition. We described an unusual case of septic ovarian vein thrombosis associated with *Campylobacter fetus* (*C. fetus*) bacteraemia. **Clinical Picture:** A 46-year-old female presented with fever and acute right loin pain. Right ovarian venous thrombosis was demonstrated on sonography and confirmed with computed tomography and magnetic resonance imaging. *C. fetus* was isolated from the blood. **Treatment and Outcome:** The patient was given antibiotics and anticoagulation therapy with good response. **Conclusion:** Septic ovarian vein thrombosis should be considered as a differential diagnosis in female patients presenting with fever associated with lower abdominal pain. *C. fetus* bacteraemia also predisposes to thrombophlebitis, including septic ovarian vein thrombosis. When they are diagnosed in a timely manner and treated appropriately, the response is good and potential serious complications, including thromboembolism, and death could be averted. Radiological imaging is useful in the diagnostic work-up of this condition.

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Key words: Bacteraemia, *Campylobacter fetus*, Imaging, Septic ovarian vein thrombosis

Introduction

Septic ovarian venous thrombosis is an uncommon entity.^{1,2} Classically, it occurs as a postpartum complication with reported frequency of 1 in 600 to 2000 deliveries.² It is also encountered in patients with gynaecological disorders, such as endometritis and pelvic inflammatory disease,^{1,3} acute gastrointestinal inflammation, such as acute diverticulitis and ruptured appendicitis, and more recently, patients with malignant tumours, particularly those undergoing chemotherapy,³ as well as conditions associated with hypercoagulability, such as recent surgery and Crohn's disease.^{2,4}

Gonadal vein thrombosis is observed mainly in female patients. In about 90% of cases, it occurs in the right ovarian vein.² While 10% to 15% are bilateral, isolated left-sided involvement is rare. No known racial predilection has been reported.⁴ Cultures of gonadal vein thrombus have yielded various microorganisms.^{1,5} However, a review of the literature reveals no previous report of septic ovarian

vein thrombosis secondary to *Campylobacter fetus* (*C. fetus*) bacteraemia. We report a case of septic right ovarian vein thrombosis as a result of *C. fetus* bacteraemia presenting as fever and right loin pain.

Case Report

A 46-year-old Chinese female presented with fever associated with chills and rigours and acute right loin pain of a week's duration. The patient had no significant medical history of note. There was no history of recent childbirth, surgery or underlying malignant tumour. Clinical examination revealed a temperature of 38.4°C and right loin tenderness with a positive right renal punch. Heart sound was normal and there was no murmur detected. The prothrombin time, partial thromboplastin time and platelet count were normal. Urine microscopy and cultures were unremarkable.

Transabdominal sonography of the pelvis revealed a tubular structure with a central hypoechogenicity alongside

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the inferior vena cava (IVC) (Fig. 1). Colour Doppler sonography did not show any flow in this tubular structure. The ovaries and uterus were normal. There was no evidence of tubo-ovarian abscess. Further evaluation with helical computed tomography (CT) scan confirmed the presence of an enlarged tubular structure in the right hemipelvis draining superiorly into the IVC below the origin of the right renal vein. Low attenuation thrombus was demonstrated in all the CT sections along the entire length of the right ovarian vein. The vessel wall was thickened and showed enhancement with perivascular stranding. A delayed scan from the kidney to the bladder demonstrated a contrast-filled normal right ureter posterior to the thrombosed right ovarian vein (Fig. 2). The appendix was normal. CT scan also established the presence of a poorly defined and inhomogeneous enhancing inflammatory mass at the right adnexa adjacent to the distal end of the thrombosed right ovarian vein, which was thought to be due to pelvic vein thrombophlebitis. The uterus and both ovaries were normal

in size and configuration. On magnetic resonance (MR) imaging, the thrombus demonstrated low signal intensity on T1-weighted images and intermediate signal intensity on T2-weighted images, while the thickened wall revealed low T1 and high T2 signal intensity. Intravenous administration of gadopentetate dimeglumine showed enhancement of the thickened vessel wall and perivascular strandings. MR angiogram obtained with time-of-flight technique showed non-visualisation of the right ovarian vein.

C. fetus was identified from the blood cultures of the patient based on its growth characteristics, biochemical and susceptibility test results.⁶ It was susceptible to ampicillin and aminoglycosides. The patient was treated with intravenous ceftriaxone (for 1 week) and heparin, which were subsequently converted to oral clarithromycin for 2 weeks and warfarin. Her recovery was uneventful.

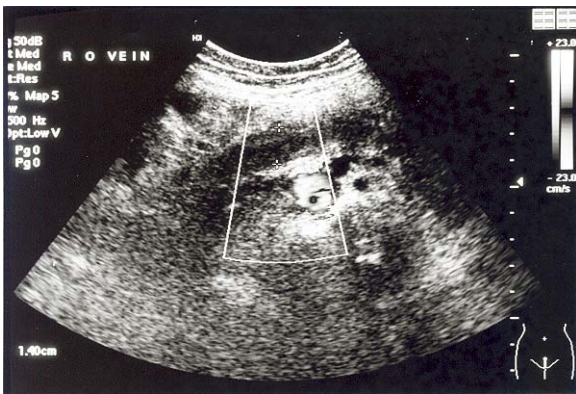


Fig. 1. A 46-year-old woman with right iliac fossa/flank pain. Colour Duplex sonography of pelvis shows an enlarged ovarian vein with hypochoic thrombus (arrow). No colour flow signal is demonstrated.

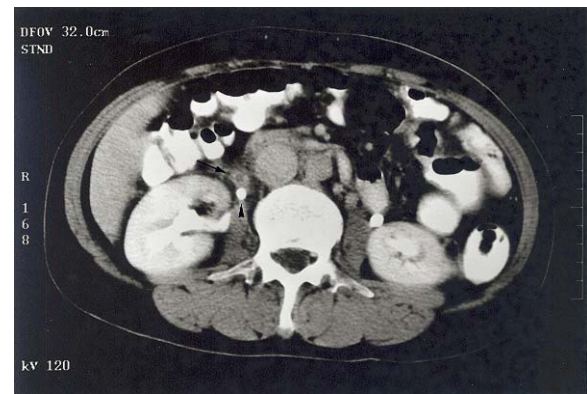


Fig. 2. Delayed computed tomography scan obtained during the excretory phase of kidneys in the same patient shows a contrast-filled normal-sized ureter posterior to the right thrombosed ovarian vein (arrowhead). The enlarged right ovarian vein shows a central low-attenuation thrombus and surrounding thickened enhancing wall (arrow).



Fig. 3a. Gadolinium-enhanced T1-weighted image shows enlarged right ovarian vein with low T1 signal intensity thrombus and enhancement of the thickened vessel wall as well as perivascular strandings.

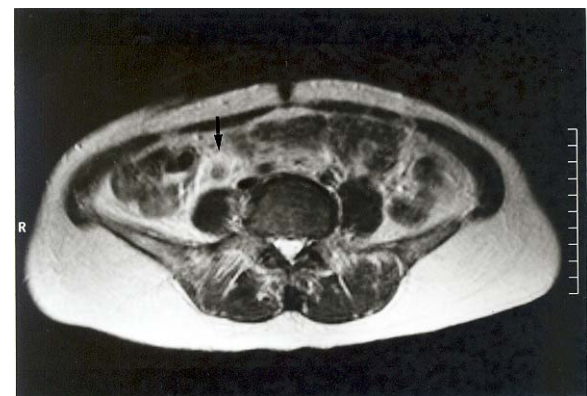


Fig. 3b. Axial T2-weighted image in the same patient shows intermediate-intensity thrombus within the lumen and a thickened wall of high signal intensity.

Discussion

The diagnosis of septic ovarian vein thrombosis is often not apparent clinically. In the past, the diagnosis was made in only 20% of cases prior to surgical exploration.³ Patients with septic ovarian vein thrombosis typically have lower abdominal pain or flank pain, with fever and leukocytosis. Physical examination is usually non-specific. Clinically, there are many mimics of this condition often indistinguishable from common urinary (such as pyelonephritis), gastrointestinal (such as appendicitis), hepatobiliary (such as cholecystitis) and gynaecological (such as endometritis) pathologies.

Septic ovarian vein thrombosis is potentially fatal as it may extend into the IVC and renal veins resulting in pulmonary embolism (25%) and death (5% of complicated cases or an estimated 18 deaths per million pregnancies).⁴ It can also track retrogradely into the iliofemoral veins, potentially mimicking lower extremity deep venous thrombosis.⁷ Another known complication of septic ovarian vein thrombosis is ureteric obstruction, as the perivenous inflammatory process extends to adjacent periureteral tissues.²

Imaging has proven to be helpful in the detection of septic ovarian vein thrombosis.^{3,4} Radiological modalities for making the diagnosis include sonography, CT and MR imaging.

On sonography, a thrombosed ovarian vein is dilated, non-compressible and filled with anechoic or hypoechoic thrombus extending toward the IVC.⁷ Doppler imaging revealed absence of blood flow. However, ultrasonography is often limited by technical factors, and negative or incomplete ultrasonographic study should prompt further investigation with CT or MR imaging, which are more sensitive and specific alternatives.

CT findings of venous thrombosis are enlargement of the thrombosed vein, presence of central low attenuation and a thickened enhancing vessel wall with perivascular inflammatory stranding. Confirming the ovarian vein drainage into the IVC is important to avoid mistaking the dilated vein for a dilated ureter, dilated fallopian tube or inflamed retrocaecal appendix. A delayed scan done during the excretory phase of the kidneys would be useful to differentiate a ureter from the ovarian vein (Fig. 3). During pregnancy, the ovarian vein may have a tortuous course and may be displaced laterally by the gravid uterus. This may mimic the appearance of thick-walled bowel loop.⁷

On MR imaging, thrombus within the enlarged ovarian vein demonstrates low signal intensity on T1-weighted images and intermediate signal intensity on T2-weighted images, while the thickened wall reveals low T1 and high T2 signal intensity. MR venography based on motion

sensitivity and contrast-enhanced MR angiogram based on the principle of T1 shortening provide better and more reliable visualisation of the vascular system. A flow void is demonstrated when thrombosis is present.

Bacterial insult to the endothelium of the vessel is postulated to be the pathogenesis of septic ovarian vein thrombosis. The coincident conditions of venous stasis and hypercoagulability also predispose patients to septic ovarian vein thrombosis.⁴ Cultures of ovarian vein thrombosis have previously yielded anaerobic streptococci, *Proteus* species, staphylococci, *Bacteroides* species and yeasts.⁵ In our patient, *C. fetus* species was isolated from the blood culture.

The term *Campylobacter* is derived from the Greek words “campylo” and “baktrom”, meaning “curved” and “rod”, respectively.⁸ *C. fetus* is a fastidious, motile, non-spore-forming and curved gram-negative bacillus. It is acquired through ingestion of food contaminated with organisms from animal faeces and intestinal colonisation serves as a reservoir, which leads to portal bacteraemia in susceptible hosts. Compromised hosts have an increased risk of sustained systemic bacteraemia.⁹ *C. fetus* infections appear to have a predilection for vascular sites resulting in thrombophlebitis in patients with bacteraemia. Laboratory isolation and diagnosis of *C. fetus* is usually delayed and difficult because of its slow growth and requirement for a microaerophilic atmosphere. Recovery from blood cultures may take 4 to 14 days after the specimen has been obtained. Clinicians should be notified early if *C. fetus* bacteraemia is suspected, in order that empirical treatment could be administered to minimise the risk of potential complications. Antibiotic treatment is indicated in all cases of *C. fetus* infections and empirical therapy is recommended in suspect patients, pending the results of blood cultures. The antibiotics of choice are gentamicin, imipenem, ampicillin, chlor-ampenicol and fluoroquinolones, such as ciprofloxacin.⁹ Relapse, however, has been documented.⁹ Patients with complications from septic ovarian vein thrombosis usually fail to improve with intravenous antibiotic therapy alone, and will require additional intravenous heparin therapy.¹⁰

Conclusion

The diagnosis of septic ovarian vein thrombophlebitis and *C. fetus* bacteraemia is difficult and often delayed. Clinicians must have a high index of suspicion for these pathological entities, as correct and timely diagnosis is important to avoid potential serious complications (sepsis, thrombosis of IVC and renal vein, pulmonary embolus or death). Radiological modalities, particularly CT and MR imaging, are currently the modalities of choice in the evaluation of patients suspected of septic ovarian vein thrombosis.

REFERENCES

1. Quane LK, Kidney DD, Cohen AJ. Unusual causes of ovarian vein thrombosis as revealed by CT and sonography. *AJR Am J Roentgenol* 1998;171:487-90.
 2. Savader SJ, Otero RR, Savader BL. Puerperal ovarian vein thrombosis: evaluation with CT, US, and MR imaging. *Radiology* 1988;167:637-9.
 3. Jacoby WT, Cohan RH, Baker ME, Leder RA, Nadel SN, Dunnick NR. Ovarian vein thrombosis in oncology patients: CT detection and clinical significance. *AJR Am J Roentgenol* 1990;155:291-4.
 4. Chellman MR. Ovarian vein thrombosis. Available at: <http://www.emedicine.com/radio/topic510.htm>. Accessed 12 February 2003.
 5. Munsick RA, Gillanders LA. A review of the syndrome of puerperal ovarian vein thrombophlebitis. *Obstet Gynecol Surv* 1981;36:57-66.
 6. Nachamkin I. *Campylobacter* and *Arcobacter*. In: Murray PR, Baron EJ, Jorgensen JH, Pfaller MA, Tenover FC, Tenover FC, editors. *Manual of Clinical Microbiology*. 8th ed. Washington DC: ASM Press, 2003:902-14.
 7. Kaakaji Y, Nghiem HV, Nodell C, Winter TC. Sonography of obstetric and gynecologic emergencies: Part I, Obstetric emergencies. *AJR Am J Roentgenol* 2000;174:641-9.
 8. Blaser MJ. *Campylobacter* and related species. In: Mandell GL, Bennett JE, Dolin R, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 5th ed. New York: Churchill-Livingstone, 2000:2276-85.
 9. Blaser MJ. *Campylobacter fetus* – emerging infection and model system for bacterial pathogenesis at mucosal surfaces. *Clin Infect Dis* 1998;27:256-8.
 10. Clarke CS, Harlin SA. Puerperal ovarian vein thrombosis with extension into the inferior vena cava. *Am Surg* 1999;65:147-50.
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