

---

## CASE REPORT

---

# Puerperal Ovarian Vein Thrombosis

MMP Tong, AWH Ng, EHY Hung

*Department of Diagnostic Radiology and Organ Imaging,  
Prince of Wales Hospital, Hong Kong*

### ABSTRACT

*Puerperal ovarian vein thrombosis is an uncommon disease. This report describes a 37-year-old woman who presented with postpartum fever and right lower abdominal pain. Multidetector computed tomography scan showed extensive right ovarian vein thrombosis with propagation into the inferior vena cava, as well as secondary ureteritis. The pathogenesis and imaging features of this condition are discussed.*

*Key Words: Puerperal disorders; Tomography, X-ray computed; Ureter; Vena cava, inferior; Venous thrombosis*

### INTRODUCTION

Puerperal ovarian vein thrombosis (POVT) is an uncommon, but potentially serious clinical condition. However, the clinical diagnosis is often not obvious, and the condition may mimic other diseases associated with postpartum fever such as endometriosis, wound infection, or urinary tract infection. Awareness of POVT is important as the condition responds to prompt medical treatment with anticoagulation and broad-spectrum antibiotics. This report describes a patient with POVT and highlights the typical radiological features using multidetector computed tomography (MDCT). To the authors' knowledge, this is the first documented patient with associated secondary ureteritis.

### CASE REPORT

A 37-year-old woman presented in 2005 on postpartum day 5 with high fluctuating fever and right abdominal pain. She had a history of systemic lupus erythematosus, which had been in remission for the previous few years. This was her second pregnancy, for which she had an uneventful antepartum period. She underwent emergency caesarian section due to failed induction of labour. The caesarian section was uneventful.

Physical examination showed mild erythema and tenderness over the right side of the surgical wound. Abdominal examination was otherwise normal, with no pus or discharge suggestive of abscess formation. Her calves were soft with no signs of deep vein thrombosis. Her chest was clear.

Laboratory tests revealed markedly elevated white cell count of  $22.5 \times 10^9/L$  (normal range,  $4.5-11.0 \times 10^9/L$ ) and C-reactive protein of 750.5 nmol/L (normal range, 0.76-28.5 nmol/L). Urine multistix was negative for white cells. Urine and blood culture yielded no growth.

Targeted bedside ultrasound done by an obstetrician showed no evidence of wound haematoma or fluid collection.

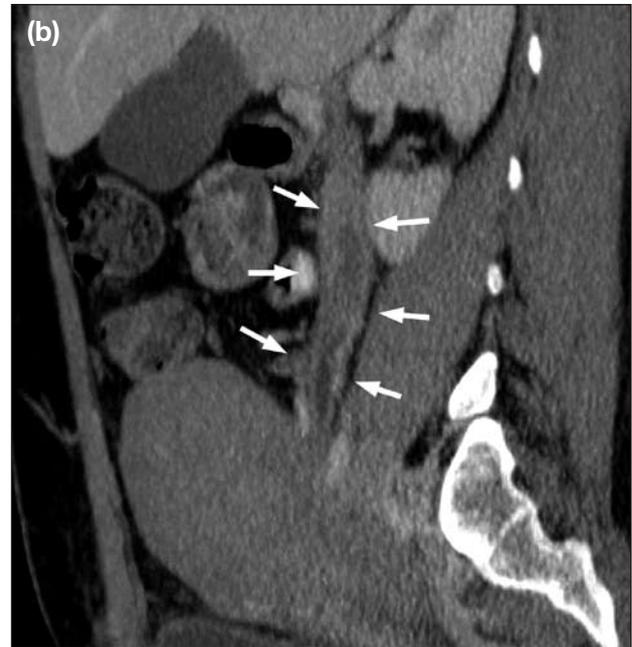
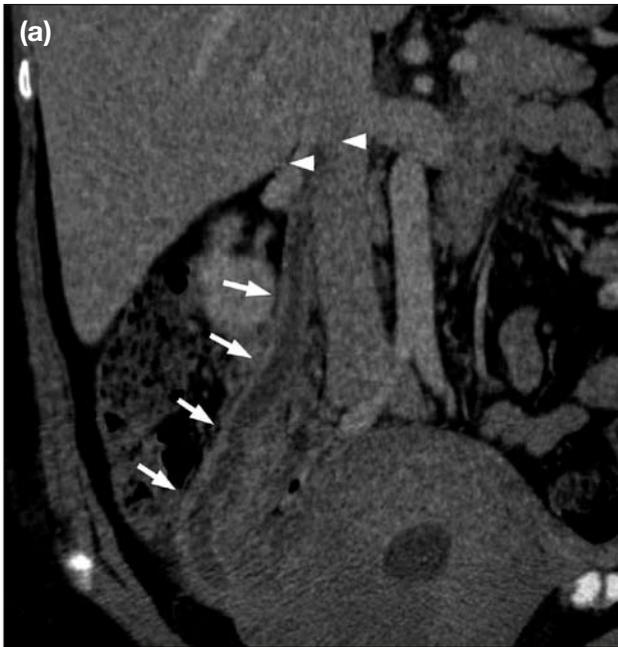
Owing to the persistent swinging fever despite empirical antibiotic treatment and with no obvious cause found, the patient subsequently underwent a contrast-enhanced MDCT study of the abdomen and pelvis on postpartum day 10. Contrast-enhanced CT scan of the abdomen and pelvis was performed using a 16-slice MDCT scanner. Iomeron 250 (100 mL) was given intravenously, followed by postcontrast scan at 75 seconds delay and showing the excretory phase of the urinary tract. The images were analysed using a reconstruction interval of 0.625 mm and multiplanar reconstruction.

CT showed a markedly engorged entire right ovarian vein (Figure 1). Extensive thrombus was present along the course of the ovarian vein with uppermost extension

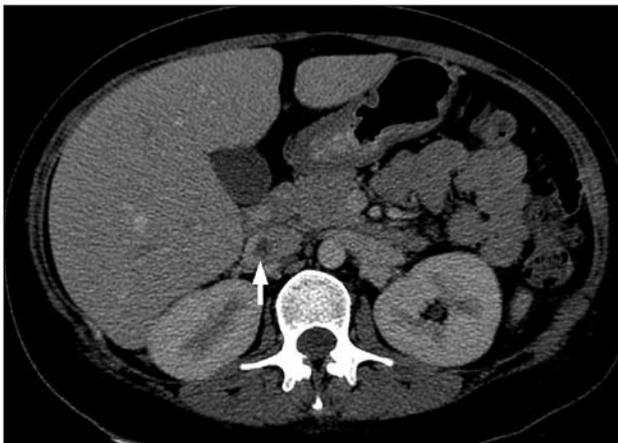
---

*Correspondence: Dr MMP Tong, Department of Diagnostic Radiology and Organ Imaging, Prince of Wales Hospital, 30-32 Ngan Shing Street, Shatin, Hong Kong.  
Tel: (852) 2632 2287; Fax: (852) 2648 4122;  
E-mail: drmmptong@yahoo.com.hk*

Submitted: 23 September 2008; Accepted: 6 October 2008.



**Figure 1.** Postcontrast multidetector computed tomography scan with image reformation. Oblique (a) coronal and (b) sagittal views showing a markedly engorged right ovarian vein with filling defects compatible with thrombus throughout the vein. Thrombus is extended into the inferior vena cava at the renal hilum level (arrowheads). The thrombosed right ovarian vein shows a thickened enhancing wall (white arrows).



**Figure 2.** Axial postcontrast multidetector computed tomography scan of the renal hilum showing a filling defect in the inferior vena cava (arrow), compatible with propagation of thrombus into the inferior vena cava.

into the confluence of the right renal vein and inferior vena cava (Figure 2). There was moderate venous wall thickening and enhancement as well as surrounding inflammatory fat strands suggestive of thrombophlebitis (Figure 3).

The adjacent right ureter also showed wall thickening and a prominent lumen due to secondary inflammation (Figure 3). There was no evidence of extrinsic compression onto the distal ureter by the engorged ovarian vein or the distended parauterine pelvic veins. Contrast excretion was also comparable on both sides with no drainage

obstruction. No abdominal wall haematoma or fluid collection was identified at the caesarian section wound site. The rest of the abdomen and pelvis was unremarkable.

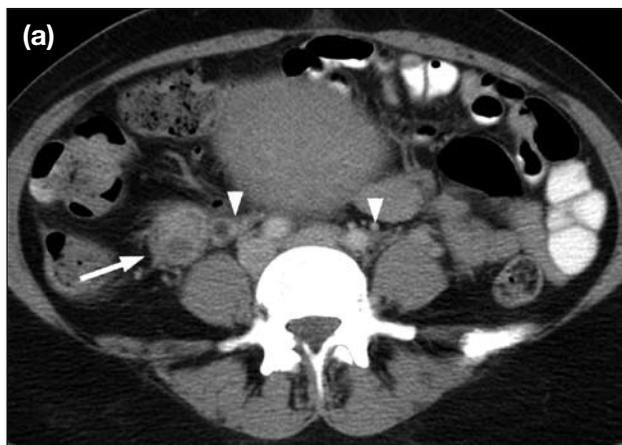
The CT findings were compatible with acute right ovarian vein thrombophlebitis and secondary ureteritis. The patient was subsequently treated with anticoagulation (low molecular weight heparin, later switched to warfarin) and intravenous antibiotics. Her clinical condition gradually improved, and she attained an afebrile state with return of normal white blood cell count.

Follow-up CT scan done after 7 weeks showed a less distended right ovarian vein and evidence of early recanalisation. There was no thrombosis in the inferior vena cava (Figure 4). The ureteritis had also subsided.

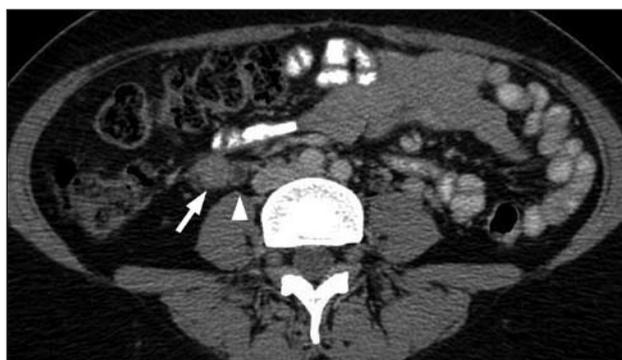
## DISCUSSION

POVT is an uncommon clinical condition, with a reported incidence in the range of 0.002% to 0.05%.<sup>1-4</sup> POVT usually occurs in the first 2 weeks after delivery. POVT can result in serious fatal complications of pulmonary embolism (3% to 33%),<sup>3,5</sup> inferior vena cava thrombosis, or septicaemia.

It is believed that POVT is caused by a hypercoagulable state during pregnancy and the puerperium, alterations in the vein wall, stasis of blood flow, and/or endometritis.<sup>3,4</sup> There is a predilection for right-sided ovarian vein



**Figure 3.** Postcontrast multidetector computed tomography scan. (a) Axial scan showing the thrombosed right ovarian vein (arrow) lying immediately adjacent to the ureter (arrowheads) — the lower third of the ureter is secondarily inflamed with mild luminal distention and wall thickening and there is inflammatory fat streakiness around the right ovarian vein and ureter; and (b) coronal reformatted image taken in the excretory phase showing the close relationship of the thrombosed right ovarian vein (arrows) and the right ureter (arrowheads).



**Figure 4.** Follow-up computed tomography scan after 2 months showing reduced distension and inflammation of the right ovarian vein (arrow). There is evidence of recanalisation. The ureteric wall (arrowhead) is also less thickened and inflamed compared with Figure 3a. The mesenteric fat adjacent to the ovarian vein and ureter show fewer inflammatory strands.

involvement (80% to 90% compared with 6% for the left side and 14% bilaterally),<sup>4,6,7</sup> which can be explained by the longer course and multiple incompetent valves of the right ovarian vein.<sup>4</sup> The retrograde drainage of the left ovarian vein and uterine veins into the right system might result in increased bacterial inoculation to the right ovarian vein.<sup>4</sup> Some authors postulate that the dextrorotation of a gravida uterus might precipitate right side involvement.<sup>1</sup> In this patient, the presentation time and affected side are compatible with that described in the literature.<sup>1</sup>

Ovarian veins are paired retroperitoneal structures. They form a plexus near the ovaries within the broad ligament and communicate with the uterine plexus. The veins ascend adjacent to the psoas muscles and ureters. The right ovarian vein terminates in the inferior vena cava, while the left drains directly into the left renal

vein.<sup>3</sup> The vicinity of the ureter may cause confusion of ovarian vein thrombosis with hydronephrosis, but careful anatomical consideration will clarify the diagnosis.

POVT usually presents as fever (80%), lower quadrant abdominal pain, and nausea.<sup>1,5</sup> Sometimes a mass may be palpable in the right iliac fossa. Since the clinical presentation is non-specific, imaging is helpful to differentiate POVT from other causes of postpartum fever such as urinary tract infection or wound infection, and other surgical diseases such as acute appendicitis or peritonitis.

The treatment for POVT is usually medical, with anticoagulation and broad-spectrum antibiotics.<sup>1,3</sup> Surgery is usually avoided except for complicated cases.<sup>3</sup>

CT is a useful imaging modality for diagnosis of POVT, with excellent sensitivity and specificity. In one prospective study, the sensitivity and specificity was 100% and 99%, respectively.<sup>8</sup>

Typical radiological findings of acute POVT on MDCT include engorged ovarian vein and hypoattenuated thrombus formation.<sup>1</sup> In patients with thrombophlebitis, there is associated wall thickening/enhancement and perivenous inflammatory fat strands. Right ovarian vein thrombosis can propagate into the inferior vena cava as illustrated by this patient.

Due to the proximity to the ureter, there can be secondary inflammation of the ureter, which is also shown by this patient, who had mild secondary inflammatory changes to the right ureter adjacent to the ovarian vein

thrombophlebitis. To the authors' knowledge, this is the first report to document this unusual finding. There was no associated obstruction of the urinary tract.

The diagnosis of POVT can also be established by ultrasound or magnetic resonance imaging (MRI). Since the ovarian veins are deep and retroperitoneal in location, the sensitivity of ultrasound to detect POVT can be confounded by patient factors of body build, amount of overlying bowel gas, or caesarian section wound. With MRI, high signal intensity indicating loss of signal void characteristic and/or thrombus can be seen within the engorged ovarian vein on both T1- and T2-weighted sequences.<sup>4</sup> However, the sensitivity and specificity at 92% and 100%, respectively, are not as good as with CT.<sup>8</sup> Gallium scan can give clues to POVT, but it is an indirect imaging modality, and non-specific in nature.<sup>4</sup>

POVT, although not common, should be considered in the differential diagnosis of postpartum fever. The clinical presentation is often non-specific, but the diagnosis is straightforward with MDCT scan. Early diagnosis is important, as this can allow prompt medical treatment

to be started, and prevent unnecessary surgical exploration or potentially serious complications of inferior vena cava thrombosis and pulmonary embolism.

## REFERENCES

1. Royo P, Alonso-Burgos A, García-Manero M, Lecumberri R, Alcázar JL. Postpartum ovarian vein thrombosis after cesarian delivery: a case report. *J Med Case Reports*. 2008;2:105.
2. Govaerts I, Braude P, De Paepe J, Kirkpatrick C. Postpartum ovarian veins thrombophlebitis. *Eur J Obstet Gynecol Reprod Biol*. 1994;57:56-8.
3. Takach TJ, Cervera RD, Gregoric ID. Ovarian vein and caval thrombosis. *Tex Heart Inst J*. 2005;32:579-82.
4. Savader SJ, Otero RR, Savader BL. Puerperal ovarian vein thrombosis: evaluation with CT, US and MR imaging. *Radiology*. 1988;167:637-9.
5. Clarke CS, Harlin SA. Puerperal ovarian vein thrombosis with extension into the inferior vena cava. *Am Surg*. 1999;65:147-50.
6. Dahnert W. *Radiology review manual*. 5th ed. Philadelphia: Lippincott Williams and Wilkins; 2005. p 1050-1.
7. Dessole S, Capobianco G, Arru A, Demurtas P, Ambrosini G. Ovarian vein thrombosis: an unpredictable event: two case reports and review of the literature. *Arch Gynecol Obstet*. 2003;267:242-6.
8. Twickler DM, Setiawan AT, Evans WA, Stettler RW, Brown CE, Cunningham FG. Imaging of puerperal septic thrombophlebitis: prospective comparison of MR imaging, CT and sonography. *AJR Am J Roentgenol*. 1997;169:1039-43.