

# Postpartum ovarian vein thrombosis

M. Hippach, R. Meyberg, C. Villena-Heinsen, D. Mink, A. K. Ertan, W. Schmidt, M. Friedrich

*Universitäts-Frauenklinik mit Poliklinik und Hebammenlehranstalt der Universität des Saarlandes, Homburg/Saar (Germany)*

## Summary

**Objective:** Ovarian vein thrombosis (OVT) is known as a rare but serious postpartum complication. The condition is often clinically not distinguishable from endometritis, appendicitis or pyelonephritis. OVT may cause sepsis, septic pulmonary thromboembolism, and thrombosis of the inferior vena cava and the renal veins, and is potentially fatal. The objective of this study was to report the clinical findings and outcome of two patients with diagnosed ovarian vein thrombosis after delivery managed at this institution.

**Method:** Two patients fit the study criteria of documented ovarian vein thrombosis after delivery. An imaging diagnosis (CT) of ovarian vein thrombosis was required for final study inclusion.

**Results:** We present two patients with ovarian vein thrombosis. The symptoms of one patient disappeared two days after beginning heparin and antibiotic therapy. The control-CT 93 days after the diagnosis of POVT showed unsuspect ovarian veins. The other patient suffered from POVT 13 days after spontaneous delivery. Because of lethal embolisms she died during the operation for embolectomy.

**Conclusion:** On the basis of our series and other recent series, OVT may likely be more common than previously thought and may become clinically apparent only when complicated by infection, expansion of the thrombus or pulmonary embolism. POVT is a potentially fatal condition most commonly seen as a complication of pelvic surgery or inflammatory disease.

**Key words:** Puerperal ovarian vein thrombosis; Symptoms; Diagnostic; Therapy.

## Introduction

Ovarian vein thrombosis (OVT) is known as a rare but serious postpartum complication. Patients typically complain in the early postpartum period of lower abdominal pain and tenderness, flank pain, tachycardia and spiking fever. The condition is often clinically not distinguishable from endometritis, appendicitis or pyelonephritis. OVT may cause sepsis, septic pulmonary thromboembolism, and thrombosis of the inferior vena cava and the renal veins, and is potentially fatal [1].

Austin [2] described the first case of postpartum ovarian vein thrombosis in 1956. At that time the diagnosis was made by palpating a characteristic mass on the involved side. Before 1981, the diagnosis was usually confirmed by exploratory surgery [1]. OVT has only rarely been described in association with other conditions, such as infections after pelvic surgery postabortal sepsis and pelvic inflammatory disease [3]. The modes of diagnosis have progressed over the last four decades from a presumptive diagnosis based on abdominal pelvic examination, to a confirmatory diagnosis by laparotomy, to diagnosis by imaging techniques including CT, duplex Doppler sonography, and MRI [4-7].

The objective of this study was to report the clinical findings and outcome of two patients with diagnosed ovarian vein thrombosis after delivery managed at this institution.

## Material and Methods

Between 1997 and 1999 two patients delivered at the University Hospital Homburg/Saar. Medical records were reviewed

in all patients who had a coded diagnosis of deep vein thrombophlebitis, pulmonary embolism and septic pelvic thrombophlebitis. The charts with either a presumptive diagnosis of septic pelvic thrombophlebitis or ovarian vein thrombosis or a confirmed diagnosis of ovarian vein thrombosis after either vaginal or cesarean delivery were reviewed in detail. We recorded the usual demographic data: summary of labor and delivery records; pertinent antepartum, intrapartum and postpartum complications; and mode of delivery, time of onset, clinical presentation, laboratory findings, imaging studies, and therapy of pelvic thrombophlebitis.

Two patients fit the study criteria of documented ovarian vein thrombosis after delivery. An imaging diagnosis (CT) of ovarian vein thrombosis was required for final study inclusion. The imaging studies were performed and interpreted by the Department of Radiology at our institution.

## Case Report 1

A 31-year-old white woman, gravida 1 para 0, underwent cesarean section six weeks before full term pregnancy. The immediate postpartum period was uncomplicated. Six days after delivery she had a temperature of 39 °C with slight right costovertebral tenderness. No abdominal mass could be palpated. Clinically there was no focus. The blood culture was negative. Because of an ongoing temperature of 40 °C a CT-scan was performed both with and without intravenous contrast. On contrast-enhanced scans, a rounded area of low density with ring enhancement was seen in both ovarian veins with extension to the inferior vena cava on the right side and to the renal vein on the left side. Both antibiotic therapy with rocephine (1x2g), metronidazole (2x500mg) and gernebcin (2x40mg), and heparin therapy with PTT-values 1.5-2 times of the control were started. Two days after beginning heparin and antibiotic therapy the patient's symptoms disappeared. Antibiotic therapy was finished after ten days and heparin therapy was changed to low molecular heparin for another 73 days. Ninety-three days after diagnosis of OVT (POVT) the control CT scan showed unsuspect ovarian veins postpartum on both sides.

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### Case Report 2

A 22-year-old white woman, 2 gravida, 1 para, underwent spontaneous vaginal delivery of a full-term infant. The immediate postpartum period was complicated by a partially retained placenta and hemorrhaging. Manual extraction of the remaining placenta was required and following this the patient did well. She was discharged six days later.

Eight days after delivery she had a temperature of 40.7 °C with nausea, vomiting and pain in both flanks. Thirteen days after delivery she was admitted to hospital. Physical examination revealed slight right costovertebral tenderness. No abdominal mass could be palpated. The uterus was well contracted and not tender. An intravenous urogram revealed enlargement of the left kidney with hydronephrosis and partial obstruction of the middle ureter. Ultrasonography confirmed the diagnosis. Angiography of the kidney showed thrombosis of the left renal veins. Fifteen days postpartum, a CT revealed complete thrombosis of both ovarian veins with a thrombus extending to the inferior vena cava on the right side and with thrombosis of the left renal vein including the veins in the left kidney. Anticoagulant therapy in the form of intravenous heparin was started immediately. Antibiotic therapy with zienam (3x500mg) and certymycin (2x150mg) was started. Twenty-three days postpartum, a chest-CT revealed a pulmonary embolism in the left lung. Blood culture was negative several times. Twenty-seven days postpartum, the patient revealed severe dyspnea. The CT showed the left kidney without contrast enhancement corresponding to infarctions. The left renal vein was completely full of thrombosis. Her temperature was still high with 39.8 °C. The antibiotic therapy was enlarged with vancomycin (4x500mg) and metronidazole (3x500mg). Thirty-four days after delivery a pulmonary angiography revealed severe pulmonary embolisms on both sides with a large thrombus in the vena cava near the right renal vein. The decision for embolectomy was made, but the patient died during surgery because of lethal embolisms.

### Discussion

Puerperal ovarian vein thrombosis is an uncommon condition that results in inflammation and thrombosis of one or both ovarian veins [1, 3]. In 80%-90% of cases, POVT occurs in the right ovarian vein. The reported incidence of POVT varies from one in 600 - 2000 deliveries to 0.15% - 0.18% of puerperia [7, 8].

Brown and Munsick [9] showed that this condition usually manifests as lower abdominal or flank pain associated with fever, with a mean time of onset of symptoms of two days postpartum. Frequently there seems to be a history of a minor complication at delivery requiring instrumentation or manipulation of the uterus [1, 3]. In 56% of the cases a mass is palpated, usually a tender linear mass originating near the uterine cornu and extending superiorly in upto 50%-67% of patients [3]. Other clinical symptoms are chills, tachycardia, nausea, vomiting and abdominal distension. The differential diagnosis includes acute appendicitis, broad ligament hematoma, adnexal torsion, abscess, and pyelonephritis [1, 3].

Thrombosis of the right ovarian vein occurs at least five times as often as thrombosis of the left ovarian vein [1]. Unilateral right-sided involvement is described in 80% of cases, unilateral left-sided involvement in 6% of

cases and bilateral involvement in 14%. This preponderance is believed to be due in part to the commonly occurring dextrotorsion of the enlarged uterus, which causes compression of the right ovarian vein. Significant retrograde drainage of the left ovarian vein and the uterine veins into the right system is known. This may protect the left ovarian vein from uterine organisms. The right ovarian vein is also longer than the left and contains multiple incompetent valves acting as a site for stasis or a nidus for thrombosis. Thus, the marked right-sided preponderance may be explained [1].

The pathogenesis of POVT is related to the Virchows triad. Changes in circulating coagulation factor levels with a hypercoagulable state exist during pregnancy and the puerperium due to increased circulating levels of clotting factors I, II, VII, IX and X [3]. Additionally, the high thromboplastin concentration in the placenta may gain access to the mother's circulation during parturition. Alterations in the venous wall secondarily to the effects of high levels of circulating estrogens, surgical trauma, and bacterial insult to the endothelium are another part of the Virchow triad [3]. Cultures of ovarian vein thrombus have yielded anaerobic streptococci, proteus species, staphylococci, bacteroides species, and yeast organisms [1]. Stasis of blood flow is seen in the immediate postpartum state as the venous velocity drops sharply in the ovarian veins, leading to partial venous collapse and significant stasis. It has been found that at term the ovarian vein has a diameter three times its normal size with a volume of 60 times normal [3].

Brown *et al.* [9] indicate the importance of nonsurgical diagnosis of POVT. In most cases it responds to conservative therapy with antibiotics and anticoagulation without surgical intervention. Broad-spectrum antibiotic therapy should last at least one week and anticoagulation three weeks [3]. Surgical treatment like interruption of the inferior vena cava or ovarian vein, or inferior vena cava ligation is associated with significant mortality but is indicated in some cases after failure of conservative therapy, particularly to prevent pulmonary embolic episodes [3, 5]. The death rate associated with POVT has been estimated to be 18 per 1 million pregnancies [10].

Before the advent of cross-sectional imaging methods, POVT was difficult to diagnose. Most cases were diagnosed at surgery. Diagnosis of POVT using CT was first reported in 1981 [4]. Since then the CT, sonographic and MRI imaging findings of the entity have been well described and these methods have been shown to be reliable in detecting POVT [5-7]. Characteristic findings on contrast enhanced CT scans include dilatation of the

Table 1. — Summary of postpartum ovarian vein thrombosis-patient clinical data.

Pt. no.	Parity	Gestat. age at delivery	Age	Site	Day of presentation	No. of days to heparin response	Mode of diagnosis	Extension
1	1	35 weeks	31	both	6 <sup>th</sup> d. postp.	3	CT	v. cava
2	2	40 weeks	22	both	8 <sup>th</sup> d. postp.	0	CT	v. cava v. renalis

ovarian vein, a low-attenuation center in the vein representing the thrombus and contrast enhancement of the walls of the veins. The thrombosed vein is seen as a tubular structure originating in the region of the adnexa and extending cephalad in the retroperitoneal region to the level of the renal veins [7]. On sonography the thrombosed vein appears as an anechoic to hypoechoic mass extending superiorly from the adnexa with absence of flow on Doppler examination [6]. MR imaging findings are generally those of a subacute clot, with high signal intensity within the thrombosed vein [5].

### Conclusion

On the basis of our series and other recent series, OVT may likely be more common than previously thought and may become clinically apparent only when complicated by infection, expansion of the thrombus or pulmonary embolism. POVT is a potentially fatal condition most commonly seen as a complication of pelvic surgery or inflammatory disease. CT provides a quick, and in our experience, reliable method for the examination and follow-up of patients with suspected POVT. POVT should be included in the differential diagnosis of occult pulmonary embolism or in cases of unexplained fever or abdominal pain.

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Address reprint requests to:  
**MICHAEL FRIEDRICH, M.D.**  
 Universitäts-Frauenklinik mit Poliklinik  
 und Hebammenlehranstalt  
 Universitätskliniken des Saarlandes  
 D-66421-Homburg/Saar (Germany)

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