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## CLINICAL VIGNETTE

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# Ovarian Vein Thrombosis: A Case Review

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### *Case Report*

A 28-year-old woman with a past medical history of congenital solitary left kidney presented to urgent care for evaluation of new onset right lower abdominal and hip pain associated with chills and nausea. She had presented to clinic 2 days prior with right back spasms, which were diagnosed as a muscle strain. She had been recommended supportive care, but she returned to clinic due to her new symptoms.

She was monogamous with one male partner and her last menstrual period was 2 weeks prior to her urgent care presentation. She reported no prior history of sexually transmitted diseases. She had been prescribed combined oral contraceptives (OCP) but stopped them several months prior to presentation for unspecified reasons.

Her initial vitals were temperature of 37.1° C, pulse of 108, respiratory rate of 18, blood pressure of 117/74, and oxygen saturation of 100% on room air. The rest of her exam was notable for an abdomen that was soft but significantly tender in the right lower quadrant. She also had significant tenderness in her right lumbar region.

Labs were significant for a WBC of 12.4 (neutrophil-predominant), normal comprehensive metabolic panel, elevated ESR/CRP to 50 and 17.7, respectively, and a urinalysis that showed 4+ leukocyte esterase and 2+ blood.

Given a concern for urinary tract infection, she was given ceftriaxone 1g intramuscularly. She then underwent a non-contrast CT abdomen/pelvis which confirmed absence of her right kidney and ipsilateral ureter, but also revealed a dilated tubular structure in the right retroperitoneum along the IVC. Due to the limited non-contrast evaluation CT with intravenous contrast confirmed right ovarian vein thrombosis (OVT). See **Figures 1-2** for representative images from her contrast CT.

With diagnosis of OVT, she was sent to the emergency room for further management. Additional history gathered in the ER was notable for prolonged use of tampons and a recent onset of vaginal discharge. Exam was significant for cervical motion tenderness. Ultrasound imaging was negative for tubo-ovarian abscess. She was admitted and started on enoxaparin for her ovarian vein thrombosis and cefoxitin plus doxycycline for her suspected pelvic inflammatory disease (PID). Her enoxaparin was later switched to apixaban. Her symptoms significantly improved and she was discharged on hospital day #3 with plans

to continue apixaban for 3 months, doxycycline and metronidazole for her PID, along with referral to hematology for follow-up on hypercoagulability labs sent during her hospitalization. She was advised to stop using tampons. Due to ongoing menorrhagia, her previously prescribed combined OCP was switched to medroxyprogesterone as well.

One month after initial presentation and hospitalization, she represented to urgent care with right-sided pelvic pain. Repeat CT abdomen/pelvis with contrast showed resolution of the thrombosis. Due to abnormal vaginal discharge noted on pelvic exam, she was treated again for presumed PID with ceftriaxone intramuscularly followed by a course of oral doxycycline. She followed up with hematology with unremarkable hypercoagulability labs.

### *Discussion*

Ovarian vein thrombosis (OVT) is a rare condition that typically occurs in postpartum patients<sup>1</sup>, estimated to have a 0.15-0.18% incidence in this population.<sup>2</sup> Similar to other venous thromboembolic (VTE) events, consideration of Virchow's triad helps to explain why pregnancy and the postpartum state are the biggest risk factors for developing OVT. The enlarging uterus causes pelvic venous compression leading to stasis, vascular injury occurs during delivery and finally, pregnancy is associated with increased concentrations of procoagulant factors and a decrease in protein S.<sup>3</sup>

Even though our patient was not pregnant, she had other risk factors for OVT: her suspected pelvic inflammatory disease (PID) from prolonged use of tampons and her recent intake of estrogen-containing contraceptives. Other risk factors for OVT reported in the literature include pelvic malignancy, inflammatory bowel disease and recent abdominal or pelvic surgeries.<sup>1,4</sup> There are also case reports of OVT occurring in the absence of any risk factors for thrombosis.<sup>5</sup> As with our patient, up to 90% of cases involve the right ovarian vein. This is thought to be from the right vein being longer, more tortuous, and having multiple incompetent valves.<sup>4</sup> Another reason for the right ovarian vein's propensity to thrombose compared to its left counterpart is that during pregnancy, the uterus more often dextrorotates, thereby compressing the inferior vena cava and right ovarian vein.<sup>6</sup>

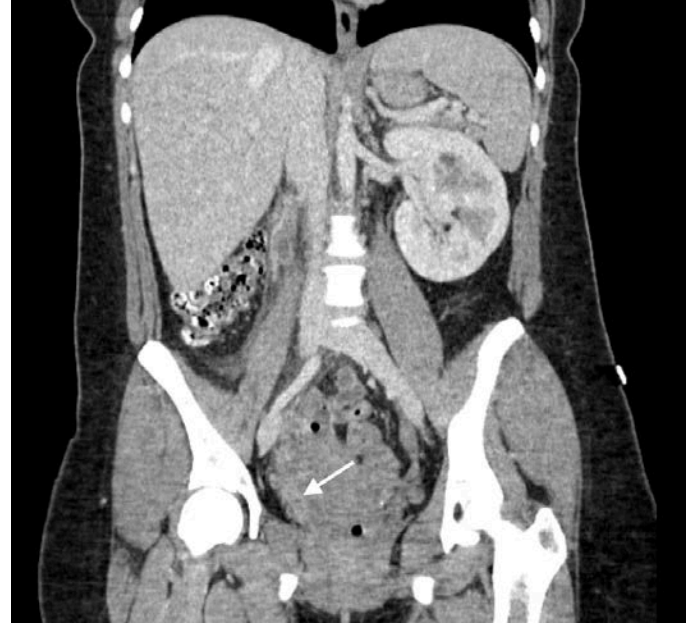
Patients with OVT present with non-specific symptoms such as abdominal pain, flank pain, nausea, vomiting, fevers, and chills.<sup>2</sup> This raises the importance of maintaining a high index of clinical suspicion in order to diagnose OVT. Other diagnoses to consider include acute appendicitis, endometritis, pyelonephritis, tubo-ovarian abscess and ovarian torsion.<sup>2</sup> OVT has serious potential complications such as septic thrombophlebitis and pulmonary embolism.<sup>1</sup> Thus, early diagnosis and treatment of OVT are crucial in order to minimize morbidity and mortality.

Diagnosing OVT previously often relied on laparotomy, while currently it can be diagnosed using advanced imaging modalities.<sup>2</sup> A prospective study of 26 patients suspected to have septic postpartum OVT reported magnetic resonance (MR) angiography performed better than computed tomography (CT) and duplex ultrasound in both sensitivity and specificity (100%/100% vs. 77.8%/62.5% vs. 55.6%/41.2%, respectively).<sup>7</sup> Other recent literature suggests that CT and MR imaging both achieve greater than 90% sensitivity and specificity.<sup>5</sup> Given CT's lower cost and wider availability, clinicians who suspect OVT should start with a contrast-enhanced CT unless there are contraindications.

The treatment of OVT involves on two aspects: anticoagulation and if appropriate, antibiotics. There are no clearly delineated guidelines that recommend a particular anticoagulant over another or that recommend a duration of anticoagulation for OVT. Wysokinska et al<sup>4</sup>, who published a retrospective review of clinical outcomes for 114 patients with OVT over a 16-year period, argued that a reasonable approach would be to treat patients with OVT using established guidelines for lower extremity deep venous thromboses (DVT). They found similar rates of recurrent VTE between OVT and lower extremity DVT patients. Our patient was transitioned from low-molecular weight heparin to apixaban, a direct factor Xa inhibitor. Direct oral anticoagulants (DOACs) are playing an increasing role in treating thrombotic disorders due to their ease of use in the outpatient setting and lack of required lab monitoring. Future prospective studies evaluating the safety and efficacy of DOACs in the management of OVT are needed. Antibiotics should be considered if an infection predisposing to OVT is suspected (such as PID in our patient or endometritis) or if OVT becomes complicated by septic thrombophlebitis. Enteric gram-negative and anerobic organisms are unsurprisingly the most common culprits, although *Staphylococcus* has also been implicated.<sup>8</sup>

Our case highlights the difficulty in diagnosing OVT due to its vague and non-specific symptoms. Though it more often affects postpartum women, the presence of any risk factor(s) for VTE should heighten one's clinical suspicion for OVT in the female patient presenting with abdominal and/or flank pain. Once diagnosed, treatment with anticoagulation and if indicated, antibiotics, should begin promptly in order to prevent life-threatening complications.

**Figure 1.** Coronal image from CT Abdomen/Pelvis with contrast, showing enlarged and thrombosed right ovarian vein (white arrow); congenital absence of right kidney noted as well.



**Figure 2.** Axial image from CT Abdomen/Pelvis with contrast, showing enlarged and thrombosed right ovarian vein (white arrow).



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