

## Ovarian vein thrombosis – a rare but important complication of hysterectomy and oophorectomy

S O'Hagan,<sup>1</sup> MB ChB; S Andronikou,<sup>2</sup> MB ChB, FCRad, FRCR (Lond), PhD; R Truter,<sup>3</sup> MB ChB, MMed Rad (Diagnostic); C J van Rensburg,<sup>4</sup> MB ChB, MMed (Int), PhD

<sup>1</sup> Kimberley Hospital Complex, Kimberley, Northern Cape, South Africa

<sup>2</sup> Department of Radiology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

<sup>3</sup> Schnetler Corbett and Partners, Cape Town, South Africa

<sup>4</sup> Louis Leipoldt Medical Centre, Broadway Street, Bellville, Cape Town, South Africa

Corresponding author: S O'Hagan (suzanneohagan@gmail.com)

This case study highlights the clinical importance of ovarian vein thrombosis in the context of pelvic surgery for benign gynaecological conditions and the role of imaging, particularly computed tomography with reformatting, in confirming the diagnosis.

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Ovarian vein thrombosis is a rare but important complication of surgical procedures such as hysterectomy and oophorectomy. The clinical importance relates to the possible complications and requirement for lifelong anticoagulation.

Radiological investigation is integral in making the diagnosis; in particular, computed tomography (CT) with reformatting demonstrates the thrombosed vessels directly. The decision to treat should be based on the severity of presenting symptoms and the thrombogenic risk factor profile of the patient.

### Case report

A 34-year-old woman who had undergone hysterectomy and left oophorectomy for dysfunctional vaginal bleeding due to endometriosis 10 months previously presented with intractable pain in the right loin and right iliac fossa. A full blood count, the erythrocyte sedimentation rate and the results of coagulation studies were normal. Urinalysis was non-contributory, colonoscopy was negative, and ultrasound examination was also reported as negative. CT revealed that the remaining (right) ovary was engorged and contained a cyst (Figs 1 and 2). In addition, a thrombus was identified in the right ovarian vein and the iliac vein was distended. A diagnosis of ovarian vein thrombosis as a complication of previous gynaecological surgery was made. Anticoagulation therapy was commenced and resolved the patient's symptoms within 3 days.

### Discussion

Ovarian vein thrombosis is a well-known complication of the postpartum period.<sup>[1]</sup> The pathophysiology of ovarian vein thrombosis is ascribed to Virchow's triad of vessel wall injury, venous stasis and hypercoagulability.<sup>[1]</sup> Risk factors that are not related to the pregnancy state include recent surgery, Crohn's disease and malignant tumours.<sup>[2]</sup> Hypercoagulation disorders such as systemic lupus erythematosus, antiphospholipid syn-

drome, the presence of factor V Leiden, paroxysmal nocturnal haemoglobinuria, hyperhomocysteinaemia, protein C and S deficiency, and heparin-induced thrombocytopenia are also all reported as risk factors for ovarian vein thrombosis.<sup>[2,3]</sup>

When associated with parturition, ovarian vein thrombosis usually becomes apparent within the first week after delivery,<sup>[4]</sup> with significant clinical symptoms often mimicking appendicitis.<sup>[5]</sup> The morbidity of ovarian vein thrombosis arises from complications such as sepsis, extension of the thrombus to the inferior vena cava and renal veins, and pulmonary embolism.<sup>[6]</sup>

Extensive gynaecological surgery for malignant disease constitutes another recognised cause of ovarian vein thrombosis.<sup>[3]</sup> This association is not surprising, given the known thrombogenic effects of malignancy and chemotherapy and the decreased blood flow in the vein after hysterectomy and oophorectomy.<sup>[7]</sup> In this setting, ovarian vein thrombosis seems to be an incidental finding in most cases. In contrast to puerperal ovarian vein thrombosis, clinical signs and symptoms related to ovarian vein thrombosis or pulmonary embolism are rare, with studies suggesting that ovarian vein thrombosis in this context is of limited clinical significance.<sup>[8]</sup>

It is worth noting that reported cases of ovarian vein thrombosis in association with hysterectomy for benign disease, as in our case, are rare and the literature does not give clear recommendations on whether ovarian vein thrombosis in association with benign disease should be treated.<sup>[9]</sup>

The diagnosis of ovarian vein thrombosis can be established by ultrasound, magnetic resonance imaging (MRI) or CT with sensitivities of 52%, 92% and 100%, respectively.<sup>[10]</sup> The limitations of ultrasound include obscuring of the gonadic vein by overlying bowel gas.<sup>[11]</sup> Magnetic resonance angiography has the best combined sensitivity and specificity. Since MRI is capable of imaging in multiple planes, does not require intravenous contrast material and is sensitive to alterations in blood flow, it is of potential

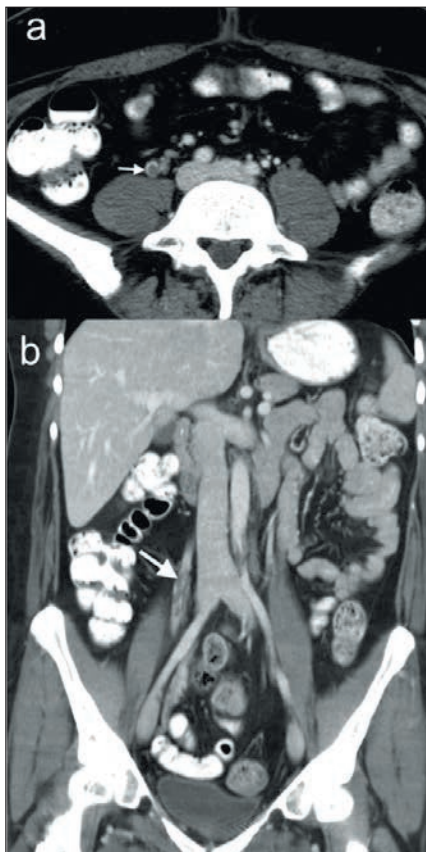


Fig. 1. (a) Axial and (b) coronal contrast-enhanced computed tomography scans of the abdomen, demonstrating right ovarian vein thrombosis (arrows).

value in the diagnosis and follow-up of ovarian vein thrombosis.<sup>[11]</sup> Because sensitivity of MRI to blood flow and to the paramagnetic effects of iron (in the form of methaemoglobin) is superior to that of CT, differentiation between flowing blood, acute thrombus (<1 week old) and subacute thrombus (between 1 week and 1 month) is possible.<sup>[12]</sup> However, MRI is reserved for doubtful situations because of cost and speed considerations.<sup>[13]</sup> Helical CT angiography with bolus injection of iodinated contrast material provides an accurate way of diagnosing ovarian vein thrombosis, and this is considered the standard method for diagnosis of this condition. Dilated, thick-walled ovarian veins with rim enhancement and central hypodensity are considered to be the main CT imaging findings.<sup>[14,15]</sup> Recent advances in helical CT and the development of

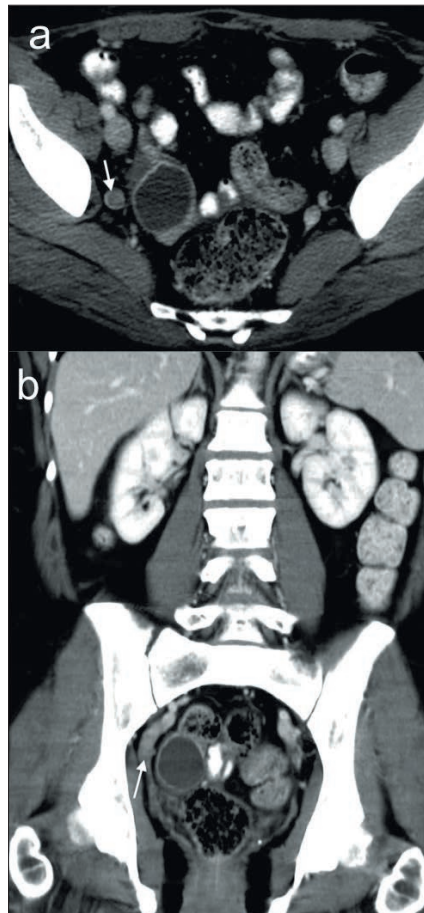


Fig. 2. (a) Axial and (b) coronal computed tomography scans of the abdomen. The axial image (a) demonstrates continuity of thrombus in the pelvic portion of the ovarian vein adjacent to the right ovary, which is recognisable by the ovarian cyst. The coronal image (b) demonstrates the distended iliac vein adjacent to the ovarian cyst.

multiplanar reconstructions and maximum intensity projections have allowed a global and immediate approach to a large number of pathologies of the vascular system, including ovarian vein thrombosis.<sup>[16]</sup>

## Conclusion

Although uncommon, ovarian vein thrombosis should be considered for some months as a cause of pelvic pain in patients who have undergone surgery for benign gynaecological conditions.

The literature on the management of both symptomatic and asymptomatic patients who develop ovarian vein thrombosis after

pelvic surgery for benign conditions is sparse, and studies with long-term follow-up and randomisation are lacking.

Taking sensitivity, specificity, time considerations and cost-effectiveness into account, CT with bolus injection of iodinated contrast is the investigation of choice in making the diagnosis. However, the importance of making a radiological diagnosis rests on the need to treat. This presents an opportunity for further study to ascertain the clinical significance of ovarian vein thrombosis that results from gynaecological surgery for benign conditions.

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