Unusual presentation of more common disease/injury

A 56-year-old woman with early acute pulmonary emboli following pelvic reconstructive surgery

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Summary

Venous thromboembolism (VTE) remains a significant cause of postoperative morbidity and mortality. There are few reports on acute symptomatic pulmonary embolism (PE) following urogynaecological surgery.

The authors report a case of an adult woman who developed a massive acute PE early on postoperative day 1 following a complex reconstructive surgery. Following anticoagulation treatment and placement of an inferior vena cava filter, the patient recovered and was discharged without discomfort on the ninth postoperative day.

While recognition of the early occurrence of VTE is important to ensure optimal patient care following major pelvic surgery, this case highlights the need to reconsider VTE prophylaxis protocols in moderate to high-risk populations undergoing elective surgery.

BACKGROUND

Venous thromboembolism (VTE), comprising deep vein thrombosis (DVT) and pulmonary embolism (PE), is a major complication after pelvic surgery and remains a significant cause of postoperative morbidity and mortality. Although most thrombi arise in the calf veins, it has also been suggested that a significant number of PEs originate in the pelvic veins after gynaecological and other pelvic surgical procedures.^{1 2}

While VTEs are potentially preventable complications, historically it is well recognised that clinicians are poor at diagnosing DVT and PE.³ The first manifestation of VTE may be fatal PE. Therefore, it is inappropriate to rely on early diagnosis and treatment of postoperative thromboembolism. For these reasons, routine and systematic prophylaxis in patients at risk is the strategy of choice to reduce the incidence of postoperative VTE.

CASE PRESENTATION

A 56-year-old postmenopausal woman presented to the urogynaecology outpatient clinic with a history of mixed (stress and urge) urinary incontinence and pelvic organ prolapse. After failed conservative management, including lifestyle modification, pelvic floor strengthening, anticholinergic medications and pessaries, the patient elected to undergo surgery.

Her medical history included obesity (body mass index (BMI) of 44 kg/m²), hypertension (controlled with amlipril), norvasc, altace and hydrochlorothiazide), type 2 diabetes (controlled with diet), osteoarthritis and a hiatal hernia.

Her past surgeries included laparoscopic bilateral tubal ligation, and a dilation and curettage procedure. She was a non-smoker. Her family history was negative for thrombophilia.

On examination, she was morbidly obese and had a grade 3 cystocele, a grade 1 rectocele and a grade 2 uterine

descent by the modified Baden and Walker classification.⁴ Her preoperative investigations, which included a chest x-ray (CXR), blood work and surface 12-lead ECG, were normal. She was deemed fit for general anaesthesia and surgery following preoperative anaesthesia and internal medicine consults.

On the day of surgery, the patient received a general anaesthetic and was placed in the dorsal lithotomy position with her legs in yellowfin stirrups. The patient underwent a total abdominal hysterectomy-bilateral salpingo-oophorectomy, combined abdominal-vaginal fascial sling, McCall culdoplasty, anterior and posterior repair with pelvisoft graft, cystoscopy and placement of a suprapubic catheter. The patient's size proved to be a challenge during the surgery. Blood loss was estimated at 500 cc. The operation was completed within 5 h upon which the patient was extubated uneventfully and returned to recovery in stable condition. Following admission to the general gynaecology ward, her vital signs remained stable overnight and she maintained a peripheral oxygen saturation (SpO₂) of greater than 95% on 3 litres of oxygen administered by a nasal cannula. She received 5000 units of unfractionated heparin (UFH) subcutaneously every 8 h.

On the morning of postoperative day 1, the patient began to complain of dizziness when she was assisted to sit upright in a chair and her SpO₂ dropped to 66%. She did not complain of any shortness of breath or chest pain; however, her breathing appeared laboured. To maintain an adequate SpO₂, she was administered 15 litres of oxygen by a non-rebreather mask.

On exam, the patient was afebrile, conscious and alert, normotensive, non-tachypnoeic, but was tachycardic (heart rate 105–130 bpm). Pulmonary auscultation revealed an expiratory wheeze and decreased bilateral air entry to the lung bases. The patient did not complain of any leg pain and no signs of a DVT were found on physical exam.

INVESTIGATIONS

The complete blood count with differential showed leukocytosis (white blood cell count $13.6 \times 10^9/l$). The arterial blood gas showed mixed respiratory and metabolic acidosis. Standard 12-lead ECG showed sinus tachycardia, borderline inferior Q waves and repolarisation abnormalities (ST depression and abnormal T waves) in leads I, II and III. The patient's CXR demonstrated low lung volumes and atelectasis in the left mid/lower zones and the right lung base. Her troponin I level was normal ($<0.10 \mu g/l$).

The patient continued to demonstrate unstable SpO_2 levels and required high concentrations of oxygen (12–15 litres) administered by either a non-rebreather mask or an oxymiser disposable oxygen-conserving device. Thus, she was placed on continuous cardiac and SpO_2 monitoring, was moved to an observation bed and the intensive care unit (ICU) was consulted.

The ICU consultant believed a PE was unlikely given the acute time course of the patient's symptoms and suggested that atelectasis and fluid overload were more likely responsible for her symptoms.

Ventolin and atrovent were administered to relieve the patient's expiratory wheeze, intravenous Lasix (40 mg) was administered, the patient's intravenous rate was decreased, incentive spirometry was encouraged and intermittent pneumatic compression (IPC) devices were used.

The patient continued to remain hypoxic and dyspnoeic throughout the evening.

Her troponin I level increased on subsequent blood draws ($0.12 \mu g/l$ at 19:00 and $0.25 \mu g/l$ at 04:15 on postoperative day 2); likely secondary to increased cardiac activity. On the morning of postoperative day 2, a repeat CXR demonstrated substernal atelectasis in both lung bases and a repeat ECG showed sinus tachycardia, borderline Q waves in the inferior leads, non-specific T-wave abnormalities in diffuse leads and left atrial hypertrophy.

A spiral CT scan was performed, revealing multiple occlusive pulmonary emboli involving the segmental arteries of the left upper and lower lobes, and the right upper, middle and lower lobes.

TREATMENT

As the patient's risk of bleeding from her recent major surgery was high, a retrievable Cook Celect filter was placed in the inferior vena cava under fluoroscopic guidance. The patient remained in an observational bed for intensive monitoring and management.

Anticoagulation treatment with continuous intravenous UFH was administered beginning on postoperative day 4. Under the advice of our haematology colleagues, the patient was switched to subcutaneous injections of low molecular weight heparin (tinazaparin 20 000 units daily) on postoperative day 6.

A duplex ultrasound examination of her lower extremities on postoperative day 7 revealed no evidence of a DVT. A two-dimensional echocardiography on the same day showed no direct evidence for pulmonary hypertension, but the patient's right ventricle was dilated and there was mild global right ventricle dysfunction.

OUTCOME AND FOLLOW-UP

The patient recovered and was discharged without discomfort on the ninth postoperative day. Her inferior vena

cava filter could not be removed on the day of discharge because an inferior venacavogram demonstrated a moderate-sized thrombus within the filter struts. A repeat inferior venacavogram on postoperative day 21 confirmed no residual thrombus within the filter and it was successfully removed.

DISCUSSION

Urinary incontinence and pelvic organ prolapse are increasingly common conditions; at least 11% of women ultimately elect to undergo surgery.⁵ Often these surgeries involve multiple procedures and can be quite complex with associated postoperative morbidities, including VTE. The overall risk of VTE with gynaecologic surgery has been reported as 7–45%.⁶ The incidence of VTE following complex reconstructive urogynaecologic surgery specifically is not documented in the literature.

The risk of VTE is stratified according to the patient's pre-existing individual risk factors (eg, obesity, advanced age, prior VTE history, malignancy) and the risk of the procedure itself (the nature of the surgery—eg, the site, technique and duration of the procedure, the type of anaesthetic, the presence of infection, the degree of postoperative immobilisation).^{7–9} In many patients, multiple risk factors may be present and the risks are cumulative.¹⁰ For our patient, her individual risk factors for VTE included age greater than 40 years, morbid obesity (a personal BMI of 44) and a history of immobility (due to her increased BMI and severe osteoarthritis in both knees). There was no personal or family history of VTE. In follow-up, with the thrombosis clinic, no evidence of a congenital or acquired hypercoagulable state has been found in our patient. The procedural risks included undergoing major pelvic reconstructive surgery close to 5 h in duration in the Trendelenberg position, which involved both abdominal and vaginal incisions and a general anaesthetic. According to The Working Party of the Royal College of Obstetricians and Gynaecologists' risk assessment profile for thromboembolism in gynaecological surgery,¹¹ preoperatively, our patient was at high risk for VTE.

There is a movement towards the standardisation of VTE prevention regimens to promote quality of care and patient quality of life.¹² Data from a large number of randomised clinical trials over the past 30 years provide overwhelming evidence that prophylaxis reduces VTE and studies have also shown that fatal PE is prevented by thromboprophylaxis.¹³ However, there is variability among sites in the type of pharmacological prophylaxis used. Currently, at our centre, it is common practice to administer two to three times daily subcutaneous low-dose UFH following pelvic surgery. The risk of VTE is reduced by 70% with the administration of UFH, and that of PE is reduced by 50%, according to a review of randomised trials of patients undergoing surgery.¹⁴

In addition, mechanical prophylaxis, including IPC devices or graduated compression stockings (GCS), is also used in our centre while surgical patients are in hospital and early mobilisation is encouraged. UFH plus IPC devices or GCS are recommended for VTE prophylaxis following major gynaecological surgery until discharge from hospital.¹³ As our patient's BMI was elevated, she was receiving subcutaneous injections of UFH three times daily. While GCS were used perioperatively, IPC devices were only

Learning points

- Perioperative prophylactic treatment for patients at high risk for VTE includes pharmacological and mechanical interventions. Patients at our centre undergoing pelvic reconstructive surgery routinely receive heparin and GCS perioperatively. As a result of this experience, we have modified our practice to include the routine perioperative use IPC devices for all patients at moderate and high risk for VTE.
- Altogether, 50% of VTE complications develop during the first 24 postoperative hours.¹⁶ Thus, it is especially important during this time period to monitor for signs and symptoms of VTE and to ensure the patient is receiving proper VTE prophylaxis.
- VTE, including PE, must always be included in the differential diagnosis when a patient experiences a sudden change in oxygen demands to maintain normal SpO₂. In our case, it was initially assumed that the patient's increasing oxygen demands were due to postoperative atelectasis. Recognition of the early occurrence of VTE is important to ensure optimal patient care following major pelvic surgery.
- In Canada, the life expectancy of women is increasing, we are in the midst of an obesity epidemic and an increasing amount of women are electing to undergo urogynaecological surgery. It is likely that we will need to reconsider institutional VTE prophylaxis protocols in moderate to high risk populations.

used once she began to demonstrate respiratory difficulties. These methods of prophylaxis are consistent with current guidelines.^{8–15} The patient continues to be followed by the thrombosis clinic. Currently, no thrombophilias have been identified in the patient. She will remain on anticoagulation treatment for 6 months.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Clarke-Pearson DL**, Synan IS, Coleman RE, *et al*. The natural history of postoperative venous thromboemboli in gynecologic oncology: a prospective study of 382 patients. *Am J Obstet Gynecol* 1984;**148**:1051–4.
2. **Clarke-Pearson DL**, Jelovsek FR, Creasman WT. Thromboembolism complicating surgery for cervical and uterine malignancy: incidence, risk factors, and prophylaxis. *Obstet Gynecol* 1983;**61**:87–94.
3. **Brennan JE**, Greer IA. Thromboembolism in gynaecological surgery. *Curr Obstet Gynaecol* 1998;**8**:44–8.
4. **Baden WF**, Walker TA, Lindsey JH. The vaginal profile. *Tex Med* 1968;**64**:56–8.
5. **Culligan PJ**, Goldberg RP. *Urogynecology in Primary Care*. London: Springer, 2006.
6. National Institute of Health Consensus Development Conference. Prevention of venous thrombosis and pulmonary embolism. *JAMA* 1986;**256**:744–9.
7. **Baglin T**. Venous thromboembolism in hospitalised patients: a public health crisis? *Br J Haematol* 2008;**141**:764–70.
8. NICE. Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery, 2007. <http://www.nice.org.uk/CG92> (accessed 27 Jan 2011).
9. Thromboembolic Risk Factors (THRIFT) Consensus Group. Risk of and prophylaxis for venous thromboembolism in hospital patients. *Br Med J* 1992;**305**:567–74.
10. **Flordal PA**, Bergqvist D, Burmark US, *et al*. Risk factors for major thromboembolism and bleeding tendency after elective general surgical operations. The Fragmin Multicentre Study Group. *Eur J Surg* 1996;**162**:783–9.
11. Royal College of Obstetricians and Gynaecologists. Report of the RCOG on Prophylaxis against Thromboembolism in Gynaecology and Obstetrics. 1995. London: The College.
12. **Shojania KG**, Duncan BW, McDonald KM, *et al*. Making health care safer: a critical analysis of patient safety practices. *Evid Rep Technol Assess (Summ)* 2001;**43**:i–x, 1–668.
13. **Jaffer AK**, Brotman DJ. Prevention of venous thromboembolism after surgery. *Clin Geriatr Med* 2008;**24**:625–39, viii.
14. **Collins R**, Scrimgeour A, Yusuf S, *et al*. Reduction in fatal pulmonary embolism and venous thrombosis by perioperative administration of subcutaneous heparin. Overview of results of randomized trials in general, orthopedic, and urologic surgery. *N Engl J Med* 1988;**318**:1162–73.
15. **Geerts WH**, Pineo GF, Heit JA, *et al*. Prevention of venous thromboembolism: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest* 2004;**126**(Suppl 3):338S–400S.
16. **Kakkar VV**, Howe CT, Flanc C, *et al*. Natural history of postoperative deep-vein thrombosis. *Lancet* 1969;**2**:230–2.

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