

Life-threatening Pulmonary Embolism in the Immediate Postpartum Period: to thrombolyse or not to thrombolyse?

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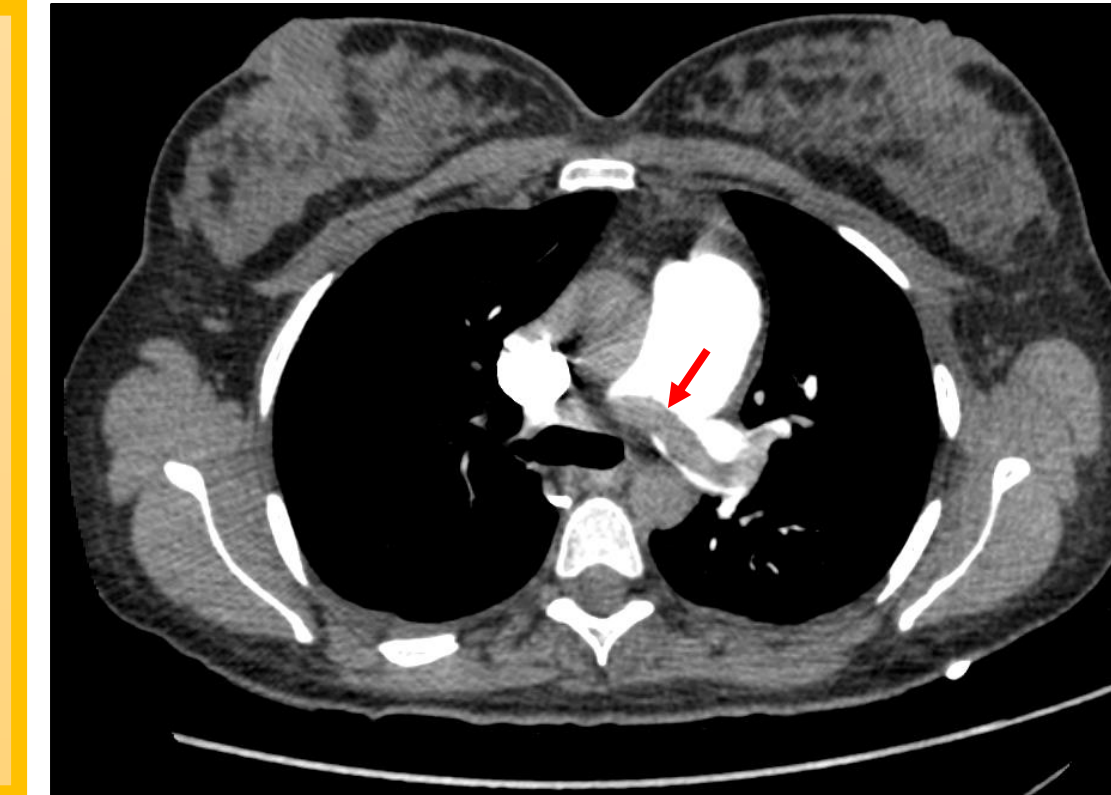
BACKGROUND



- Venous thromboembolism (VTE) continues to be the commonest direct cause of maternal death in the UK
- Recent studies report a **mortality rate of up to 37%** in patients with VTE-related haemodynamic compromise⁽¹⁾
- Management of peripartum pulmonary embolism (PE) requires a multidisciplinary approach

INVESTIGATIONS

- **Bloods:** Hb120, WCC13.8, Plt161, Na 130 ↓, Cr 90↑, Mg 0.63↓, Troponin 196↑
- **ECG:** Sinus tachycardia
- **Bedside echo:** Evidence of right heart strain
- **CTPA:** Extensive bilateral pulmonary emboli including a large saddle embolus



DISCUSSION

Our case highlighted the fact that PEs do not always present with the expected symptoms of dyspnoea, chest pain or calf swelling. In this patient, though oxygen saturations remained above 94%, there were signs of cerebral hypoperfusion evidenced by syncopal episodes. It is therefore essential to consider the diagnosis of massive PE in the context of maternal collapse even if the oxygen saturations are normal.

Though most international guidelines support its use in life-threatening VTE, there is often reluctance to administer thrombolysis in obstetric patients due to concerns surrounding the safety of thrombolytic agents and risks of massive haemorrhage. The evidence for the use of thrombolysis in pregnancy and the puerperium is based on case reports and case series only – no randomised controlled trials exist.

Gartman (2013) reviewed 56 articles describing thrombolysis in pregnancy dating back to 1970, and concluded that of the 231 patients reported, only 3 died. The cause of their deaths was likely their critically unwell admission status rather than thrombolysis alone, and none of the patients died of bleeding. Given the low complication rate, Gartman went on to support the use of thrombolysis in life-threatening situations irrespective of pregnancy status.⁽²⁾

In our patient, the added complexity was her postoperative status. Condliffe *et al.*⁽³⁾ analysed case reports to explore dilemmas clinicians faced when considering thrombolysis in postsurgical patients. They concluded that >50% of patients thrombolysed within 1 week of surgery developed massive haemorrhage, and so recommended the use of surgical embolectomy, low-dose catheter-directed thrombolysis or mechanical disruption in the peripartum period when the bleeding risk was especially high.

This was supported by Martillotti *et al.* (2017) whose systematic review identified that while thrombolysis and surgical embolectomy were equally effective (92% vs. 94% respectively), thrombolysis was associated with a higher risk of massive haemorrhage (28% vs. 20%). In fact, in postnatal patients, the risk was as high as 58%, and so they recommended the use of surgical embolectomy where available.⁽⁴⁾

It is therefore essential to risk stratify patients. Blondon *et al.* (2021) developed a flowchart which provided a visual representation for the risk stratification and treatment of patients with PE in pregnancy. They suggested – in line with most national and international guidelines^(5,6,7) – that in the absence of haemodynamic instability, the mainstay of treatment is subcutaneous high dose LMWH. In the presence of circulatory shock, thrombolysis or surgical embolectomy should be considered depending on the patient's likelihood of massive haemorrhage and the local availability of specialist services.⁽⁸⁾ As these decisions are complex and multifactorial, a MDT approach is essential.

Our case adds to the case reports that support the use of thrombolysis as a lifesaving agent in the context of massive PE in postpartum patients where surgical embolectomy is unavailable. It also highlights the importance of careful counselling regarding the high risk of PPH especially in postoperative patients. In patients that are immediately postoperative and do not have refractory cardiovascular compromise, it is preferable to consider IV UFH due to its rapidly reversible nature.⁽⁹⁾

SUMMARY OF ANTENATAL CASE NOTES

- 35-year-old, G1P0, BMI 21
- Booked at a South London District General Hospital
- No concerns at antenatal visits.
- Normal nuchal, anatomy and 36 week growth scans.
- Past medical history: None
- Family history: None of note
- Social history: Non-smoker

INTRAPARTUM EVENTS

- Admitted for induction of labour at 41⁺⁵ weeks gestation for prolonged pregnancy.
- Developed transient episodes of maternal loss of consciousness, and concurrent fetal distress at 7cm dilatation
- Underwent surgically uncomplicated Category 1 Caesarean Section, estimated blood loss (EBL) 400mL
- Perioperatively, noted to be profoundly hypotensive and tachycardic with multiple syncopal episodes
- Ongoing episodes in immediate postpartum setting requiring high doses of vasopressors

BEDSIDE ASSESSMENT

- **Symptoms:** syncopal episodes, feeling anxious; no chest pain or shortness of breath.
- **Examination:** chest clear, normal heart sounds, no calf swelling; no evidence of ongoing internal bleeding
- **Observations:** Tachycardia, hypotension, respiratory rate 20, normal oxygen saturations, afebrile

MULTIDISCIPLINARY TEAM DECISIONS

- Multidisciplinary team (MDT) at our District General Hospital: obstetricians, anaesthetists, midwives, acute medics, cardiologists, haematologists, intensivists and critical care outreach
- Wider MDT members from tertiary centres: obstetricians, respiratory physicians, haematologists, cardiothoracic surgeons

Heparin therapy

Too haemodynamically unstable

Thrombolysis

Significantly high risk of postpartum haemorrhage

Surgical embolectomy

Unavailable in DGH and patient too haemodynamically unstable to transfer to tertiary centre

PRE-THROMBOLYSIS COUNSELLING

- **Unanimous decision to thrombolyse with tissue plasminogen activator (tPA) on Intensive Treatment Unit (ITU)** given the patient was too acutely unwell to transfer to tertiary centre for surgical embolectomy, thoracotomy or extracorporeal membrane oxygenation (ECMO)
- Patient counselled regarding risk of postpartum haemorrhage (PPH) and subsequent need for return to theatre for examination under anaesthesia (EUA), insertion of intrauterine balloon, uterine compression sutures and/or hysterectomy.
- Blood bank alerted and 6 units of packed red cells crossmatched.

MASSIVE POSTPARTUM HAEMORRHAGE

- After receiving 70% of the dose, the patient developed heavy vaginal bleeding and went to theatre for management of PPH.
- Bedside transabdominal ultrasound scan: no free fluid → **bleeding from placental bed and atony**
- Underwent transvaginal evacuation of clots, insertion of intrauterine balloon and vaginal packs. Uterotonics administered.
- Blood products transfused: 4 units packed red cells, 2 pools fresh frozen plasma, 2 pools cryoprecipitate
- **Final EBL 2.4 litres**

POST-THROMBOLYSIS CARE

- Day 0: Transferred to ITU for observation and carefully titrated intravenous unfractionated heparin (IV UFH).
- Day 1: Extubated. Patient and family debriefed.
- Day 2: Stepped down to subcutaneous high-dose low molecular weight heparin (LMWH). Intrauterine balloon and vaginal packs removed.
- Day 3: Stepped down to labour ward.
- Day 6: Discharged home with haematology outpatient follow-up. Further debrief with obstetric consultant organised.

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