

Review of Maternity and Newborn Safety Investigation (MNSI) reports following maternal death from pulmonary embolism



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INTRODUCTION

METHODS

This is a retrospective case review of a selection of MNSI investigation reports from 2020 to 2023, which were coded as maternal deaths related to PE.

Inclusion criteria;

- ✓ confirmed diagnosis of PE at postmortem
- ✓ consent from the families for inclusion in thematic learning.

The 18 investigation reports were reviewed to assess the women's characteristics including the clinical scenarios, symptoms, VTE scoring as per RCOG guidance, investigations and management to analyse for common themes of potentially contributing factors.

DEMOGRAPHICS

Of the 18 investigations, most deaths occurred in the 1st trimester and the post-natal period, with 7 deaths occurring in each of these. 2 deaths occurred in both of the 2nd and 3rd trimesters. 7 of these deaths occurred in women who had few or no recognized risk factors for VTE, who in line with national guidance did not receive VTE prophylaxis.

The mean maternal age was 30 (range of 22-40) years, with 5 women over 35 contributing to their VTE risk. We did not have access to all women's body mass index (BMI), only 3 of the women had a known BMI of >30 kg/m². We did not have information on the women's ethnicities.

SAFETY PROMPTS AND CONCLUSIONS

- ✓ Does your trust have a robust pathway for non O&G doctors, such as in A&E or primary care, to have easy access to discuss a woman's care with obstetric or maternal medicine teams?
- ✓ In your unit are women with complex therapeutic anticoagulation discussed with local / regional maternal medicine networks?
- ✓ Are clinicians in your emergency department aware that both D Dimers and the modified Well's score are not validated for use in pregnancy?
- ✓ Do you have access to a FAST abdominal ultrasound to assess for intra-abdominal bleeding in a woman who presents with collapse in the 1st trimester prior to thrombolysis?
- ✓ When next updated, UK national guidance would benefit from a review of VTE scoring systems to ensure consistency between scoring with hyperemesis and BMI.
- ✓ This review highlights the importance of multi-disciplinary care, with the involvement of maternal medicine centres, for complex women with a diagnosis of VTE in pregnancy.

REFERENCES:

<https://www.mnsi.org.uk/>

<https://www.mnsi.org.uk/for-nhs/investigation-overview-for-nhs/>

MBRRACE: Saving Lives, Improving Mothers' Care Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2019-21 October 2023 Marian Knight, Kathryn Bunch, Allison Felker, Roshni Patel, Rohit Kotnis, Sara Kenyon, Jennifer J Kurinczuk (Eds.)

Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium Green-top Guideline No. 37a April 2015 Professor C Nelson-Piercy FRCP FRCOG, London; Dr P MacCallum MD FRCP FRCPath, Queen Mary University of London, London; Dr L Mackillop MA FRCP Edin, John Radcliffe Hospital, Oxford University Hospitals NHS Trust, Oxford

Kahlil A Chapter 31 Physiology of Pregnancy. In: RCOG MRCOG Part One Alison Flinder and Baskaran Thilaganathan

Thromboembolic Disease in Pregnancy and the Puerperium: Acute Management Green-top Guideline No. 37b April 2015 Dr AJ Thomson MRCOG, Paisley and Professor IA Greer FRCOG, Liverpool



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The Maternity and Newborn Safety Investigations (MNSI) programme is part of a national strategy to improve maternity safety across the NHS in England (1). MNSI has completed over 3500 independent safety investigations, using a standardised, system focused methodology, into maternity events, including 237 maternal deaths (2).

Pulmonary embolism (PE) remains one of the leading causes of direct maternal deaths in the UK, resulting in 1.5 deaths per 100,000 maternities from 2019-2020(3). Pregnant women have a four-to-six times in higher risks of risk of venous

thromboembolism (VTE) in comparison to non-pregnant women and even more so in the post-partum period (4). VTE are increased in pregnancy due to physiological changes; pregnancy is known to be a hypercoagulable state secondary to an increase in coagulation factors, specifically factors VII, VIII and X, and decreased in fibrinolytic activity (5). The diagnosis of VTE can be challenging in pregnancy, especially as recognised assessment tools for VTE for the non-pregnant population are not validated for use in pregnancy. Only 2-6% of pregnant women who are investigated for suspected PE will have a confirmed diagnosis (6).

KEY FINDINGS

Communication issues were identified in 16 of the deaths

HEALTHCARE SYSTEM RELATIONSHIPS

Different hospital departments in the same trust;

- For 2 women there was a breakdown in communication between members of the same team;
- 4 women who presented to non obstetric & gynaecology (O&G) departments and their care was not discussed with the on call O&G team.

Different trusts;

- 4 women received care across multiple trusts where a breakdown in communication was noted.
- This was multifactorial with trusts using multiple different computer systems
- Within a trust maternity and medical teams often used different systems for clinical documentation, not always with universal access to both.

Primary and secondary healthcare;

- For 6 of the women there were challenges with communication between primary and secondary care providers

Woman with a known CVST on treatment dose LMWH was sent for an anti-Xa level; she felt lightheaded and the blood sample was not taken; the requesting clinician was not informed; the next level checked was sub-therapeutic.

Woman had her pregnancy booked in Trust A and presented to the emergency department in another trust (Trust B) where she was diagnosed with a DVT. This was not communicated back to Trust A, and the team there did not have access to notes from Trust B.

Woman with a history of multiple PEs was informed that if she became pregnant, she would need VTE prophylaxis; she contacted her GP to request this following a positive pregnancy test. Despite multiple attempts the GP was unable to get through to the on-call O&G team and when guidance was given it was incorrect (to only start prophylaxis once viable pregnancy confirmed); the woman did not get prophylaxis prior to her death from PE.

WOMEN AND FAMILIES

- 4 of the women would have benefited from pre-pregnancy counselling given their history of previous VTE, some of whom were on life-long anti-coagulation with minimal discussion around contraception and safe planning of pregnancy prior to the woman becoming pregnant.
- For 4 of the women there was an opportunity for patient education regarding the risks and symptoms of VTE in women who were known to be high risk, and this was not provided.
- 4 of the reports highlighted that the woman had difficulty with communication such as learning difficulties or a language barrier.
- 6 of the women and their partners received minimal education around the indication for, how to take, correct dosage and medication safety for the prophylactic or treatment dose low molecular weight heparin (LMWH) as indicated by their medical history, as well as having difficulty accessing repeat prescriptions leading to missed or incorrect doses.

Woman presented multiple times to healthcare professionals with hyperemesis gravidarum, she did not receive information regarding risks of VTE or the signs and symptoms to be aware of.

Woman was diagnosed with a IVC clot in pregnancy in the context of malignancy. Her and her partner were unaware of this confirmed diagnosis and were told there 'might be a blood clot'. The treatment with LMWH was not discussed with them, it was not mentioned in the discharge summary and the woman did not take it.

CLINICAL AREAS HIGHLIGHTED

- For 6 women there was incorrect VTE score calculation: mainly with hyperemesis gravidarum and prolonged postnatal admission meaning that women who should have been recommended VTE prophylaxis were not.
- This review notes there is inconsistency in the national guidance for VTE scoring in pregnancy for women with hyperemesis and BMI over 40.
- 3 of the women were given incorrect LMWH dosing for their weight.
- For 2 of the women anti-Xa level monitoring was planned; this was then not actioned or doses were not changed accordingly
- 1 woman was commenced on intravenous heparin and the monitoring was challenging, leading to missed doses.
- 3 women had difficulty accessing prophylactic LMWH in the first trimester, when it was recommended to be used.
- 4 of the women had incorrect use of D Dimer and modified Well's score in pregnancy
- 3 of the 7 women, where the death occurred in the 1st trimester, were thrombolysed with out a FAST abdominal ultrasound being performed to assess for intra-abdominal bleeding.



Woman with a diagnosis of CVST in pregnancy, was having her anti-Xa level checked regularly, she never had a level in the therapeutic range and her dose of LMWH was not changed.

Woman with a previous history of DVT, who was on life-long anticoagulation with a direct oral anticoagulant (DOAC), stopped this when she had a positive pregnancy test. The GP was only able to issue prescriptions for LMWH for 5 days at a time, making it difficult for the woman to comply with her treatment.