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JOHOR MATERNAL MORTALITY

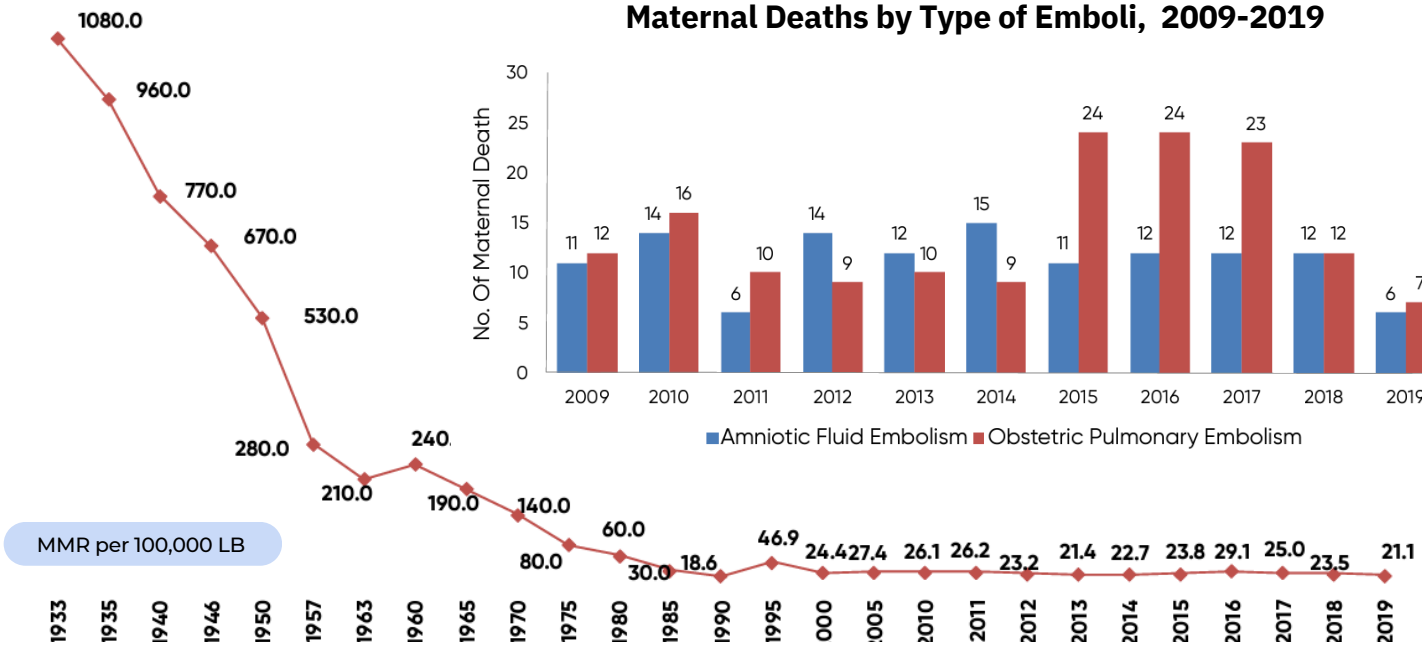
DEFINITION OF MATERNAL DEATH

The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

MATERNAL DEATHS JOHOR JANUARY – JUNE 2024

As of 30th June 2024, Johor's maternal mortality ratio (MMR) is at 18.6 per 100,000 live births with the estimated live birth (LB) 48,254 for 2024. The MMR is the 3rd highest in Malaysia, after Selangor and Sabah.
Johor's MMR for the year 2023 was at 38 per 100,000 LB, showing a steep rise since the peak attributed to COVID-19 in 2021 .

MATERNAL MORTALITY RATIO MALAYSIA 1933-2019



Maternal Deaths by Type of Emboli, 2009-2019

Source of data: Family Health Development Division, Ministry of Health

MATERNAL MORTALITY INVESTIGATION REPORT

Madam Y is 29 years old primigravida with no known co-morbidity except for family history of Diabetes and Hypertension. She presented to the antenatal clinic before 12 weeks of gestation and had recorded 13 visits. At booking, her weight was 59 kg and BMI 23.6.Her venous thrombo-embolism (VTE) score at the first visit was 0.

At 24 weeks she was noted to have excessive weight gain of 5.8 kg within a month, however she did not have symptoms or signs of impending eclampsia, blood pressure was normotensive, no pedal oedema and no albuminuria. Her total weight gain for the entire pregnancy was 17.6 kg. OGTT done at 18 and 25 weeks gestation were normal.

It was also noted that she was always tachycardic, her pulse ranged between 90 to 109 throughout her pregnancy despite hemoglobin level maintaining above 11 gm/dl. She was not investigated further for tachycardia eg ECG or thyroid function test.

At 39 weeks of gestation, she had labour symptoms and was admitted to the hospital. She delivered 4 days later via LSCS due to fetal distress. The baby was healthy, birthweight was 3.78 kg. Patient was given S/C Heparin 5000 iu at 14 hours postpartum. It was documented that she was also measured for TED stocking while in the ward but it was not clear if she had actually used it.

The patient was discharged at postnatal day 2 with S/C Heparin 5000 iu BD, to be continued for the next 8 days. During the confinement period, she stayed at her mother's home which is about 10 minutes away from the hospital. The medication was administered by trained healthcare workers in the nearest clinic. The patient was also reviewed on day 3, 4, 5, 8, 9, 10 and 11 postnatal and noted that she was ambulating well at home and was able to breastfeed her baby. Her vital signs were stable and the tachycardia seemed to have resolved during the postpartum period. She had normal lochia and there were no signs of deep vein thrombosis (DVT).

On day 23 postpartum, at 2 am, the patient had a sudden severe chest pain and was brought to ED. She had cough since 1 week prior but did not seek any medical attention. Her GCS was full, BP 94/42 mmHg, pulse 128, respiratory rate 24/ min and oxygen saturation 82% under room air, 100% under HFM oxygen 15 L/min. Chest examinations showed reduced air entry bilaterally. There was no calf tenderness or leg swelling. ECG showed sinus tachycardia with S1 and T inversion in lead III, V2 to V6. Cardiac echo noted dilated right ventricle with D shaped septum, no thrombus or pericardial effusion seen. Diagnosis of pulmonary embolism was made but she had quickly deteriorated. She was intubated and resuscitated but Madam Y was pronounced dead one hour later.

Post mortem examination found thromboembolus in bilateral pulmonary arteries. Lungs were found with acute hemorrhagic infarction with pulmonary thromboembolism.

Substandard care identified in this case were:

1. Inadequate, inappropriate or delayed therapy - treatment dose of LMWH was not initiated despite high index of suspicion of acute pulmonary embolism
2. Failure to appreciate severity - early intubation and multi-disciplinary team management may improve patient's outcome

Decision to proceed with post mortem in this case was commendable and helped to establish the cause of death.

PULMONARY EMBOLISM (PE) AMONG PREGNANT WOMEN

What

Venous thromboembolism (VTE) is a term referring to blood clots in the veins. VTE includes deep vein thrombosis (DVT) and pulmonary embolism (PE). A pulmonary embolism (PE) occurs when a blood clot gets stuck in an artery in the lung, blocking blood flow to part of the lung. Blood clots most often start in the legs and travel up through the right side of the heart and into the lungs. This causes issues with blood flow and oxygen levels in your lungs. A PE is a medical emergency. You need a prompt diagnosis and treatment.

Importance

VTE can happen to anybody and can cause serious illness, disability, and in some cases, death. Blood clot embolism accounts for half of the total maternal deaths due to obstetric embolism. The good news is that VTE is often preventable and treatable.

Why

During pregnancy, a woman's blood clots more easily to lessen blood loss during labour and delivery. Pregnant women may also experience slower blood flow to the legs later in pregnancy because the blood vessels around the pelvis are pressed upon by the growing baby.

Symptoms & Signs	Venous Thromboembolism (VTE)	Pulmonary Embolism (PE)
Symptoms	1. Unilateral swelling of limb 2. Claudication pain - pain occur upon walking 3. Heavy ache in the limb	1. Sudden onset of shortness of breath 2. Chest pain – dull, worsened on inspiration 3. Non productive cough (occasionally blood stained)
Signs	1. Swelling – non pitting 2. Increased warmth of lower limb 3. Reduced capillary filling 4. Fever	1. Tachypnoea 2. Tachycardia 3. Cyanosis (if severe) 4. Cardiorespiratory compromise or sudden collapse
Investigations	1. Full blood count, renal, liver function & coagulation 2. Pulse oximetry 3. Compression duplex ultrasonography (ilio-femoral and popliteal vessels) 4. Venogram (rarely utilized in pregnancy)	1. Arterial blood gas (ABG) 2. Chest radiograph 3. ECG • ± sinus tachycardia, • S1,Q3 & T III rarely seen in pregnancy • Right axis deviation, right bundle branch block & peaked P wave in Lead II (severe cases) 4. CTPA (CT Pulmonary Angiogram) 5. Lung ventilation - perfusion scan (V/Q)

PULMONARY EMBOLISM (PE) Prevention & Treatment

How

Thromboembolism risk assessment and scoring for ALL WOMEN

When

- Pre-pregnancy
- Booking
- Admission/New illness
- Immediate postpartum

Intervention based on total score

Total Score 1: Lifestyle modifications

Total Score 2: Thromboprophylaxis for 10 days post-delivery. Consider longer if postnatal score >2

Total Score 3: Initiate thrombo-prophylaxis at 28 weeks and continue 3 weeks post-delivery

Total Score 4: Immediate thromboprophylaxis and continue 6 weeks postpartum

Types of risk	Specific Risk	Risk score
Pre-existing	Previous VTE	4
	High Risk thrombophilia (anti thrombin, protein)	3
	Medical comorbidities (malignancies, cardiac failure, active SLE, IVDU, TB, nephrotic syndrome, DM with nephropathy, thalassemia major or intermedia post splenectomy	3
	Obesity ● BMI ≥ 40 kg/m2 ● BMI 30-39 kg/m2	 2 1
	Current vaper or cigarette smoking (≥ 10/year)	1
	Family history of VTE	1
	Low risk thrombophilia (factor V Leiden, High FVIII).	1
Obstetric risk	Caesarean section (elective & emergency).	2
	Pre-eclampsia.	1
	Rotational instrumental delivery.	1
	Prolonged labour (>24 hours).	1
	PPH (≥1,000mls) or requires blood transfusion.	1
	Stillbirth (current).	1
	IVF (1st trimester risk only).	1
Transient*	Surgical procedures (excluding episiotomy1st and 2nd degree perineal tear repair, evacuation of retained products of conception).	4
	Hyperemesis gravidarum/OHSS.	4
	Immobility/ Dehydration/Admission beyond 3 days.	1
	Systemic/ Postpartum infection.	1
	Long distance travel (>4 hours).	1

Highlights for primary care providers

1. All women should have a documented thrombo-embolism risk assessment done during
   - pre-pregnancy
   - booking
   - admission to hospital for any intercurrent illness, &
   - immediate postpartum

through detailed history taking and physical examination.

2. All women should be risk stratified into four groups for initiation of thromboprophylaxis.
3. Patients who are suspected to have VTE or PE should be referred immediately to the nearest hospital.

Highlights for hospital care providers

- If the VTE is suspected the case should be discussed with the obstetrician/ physician/ haematologist/ specialist for early thromboprophylaxis treatment.
- Investigation and diagnostic imaging should be considered early depending on patient's clinical situation.

References

1. Prevention & Treatment of Thromboembolism In Pregnancy and Puerperium – A Training Manual, Ministry of Health Malaysia, 2nd edition 2018.

2. Understanding Your Risk for Blood Clots with Pregnancy, https://www.cdc.gov/blood-clots/risk-factors/pregnancy.html#

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