Training Manual
Prevention & Treatment of Thromboembolism in Pregnancy & Puerperium

NATIONAL TECHNICAL COMMITTEE
CONFIDENTIAL ENQUIRIES INTO MATERNAL DEATHS

Coordinated by
Family Health Development Division
Ministry of Health, Malaysia
Training Manual
PREVENTION & TREATMENT OF THROMBOEMBOLISM IN PREGNANCY & PUERPERIUM

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Ministry of Health Malaysia
2014
Since the establishment of Confidential Enquiries into Maternal Deaths in Malaysia (CEMD) in 1991, the series of reports showed that the maternal deaths due to obstetric embolism had remained consistently high. The 2006-2008 CEMD report, obstetric embolism, which included both amniotic fluid and blood clots embolisms, had become the leading cause of maternal deaths for 2008. They contributed to 30% of direct and indirect maternal deaths. However, the percentage had decreased in the years 2009, 2010 and 2011 to a total of 14.9%, 20.5% and 12.3% respectively. Maternal deaths due to obstetric embolisms were no more the leading cause of maternal deaths in any of these preceding years.

While amniotic fluid embolism is often unpredictable and non-preventable, blood clots embolism (also more commonly known as Pulmonary Embolism) is potentially preventable if appropriate measures are taken in a timely manner. The National Technical Committee of the CEMD had therefore in 2012, decided to prepare this Training Manual on Prevention and Treatment of Thromboembolism in Pregnancy and Puerperium.

Training is one of the cornerstones in bringing about a significant change in our practice, besides guidelines and policy. We are confident that this training manual, we will mirror the success that we have had with the introduction of the Training Manual on Management of Postpartum Haemorrhage in 1998, in reducing PPH maternal deaths.

It is our fervent hope that with this manual we will be able to increase the awareness, knowledge and the skills of our healthcare providers in caring for our obstetric patients. With this enhanced state of preparation we hope to reduce further maternal deaths due to embolic events.

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July 2014
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# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ABG</td>
<td>Arterial Blood Gas</td>
</tr>
<tr>
<td>AGE</td>
<td>Acute Gastroenteritis</td>
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<tr>
<td>APH</td>
<td>Antepartum Haemorrhage</td>
</tr>
<tr>
<td>ART</td>
<td>Assisted Reproductive Therapy</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>BP</td>
<td>Blood Pressure</td>
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<tr>
<td>CEMD</td>
<td>Confidential Enquiries Into Maternal Death</td>
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<tr>
<td>CIC</td>
<td>Combined Injectable Contraceptives</td>
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<tr>
<td>COC</td>
<td>Low Dose Combined Oral Contraceptives</td>
</tr>
<tr>
<td>CTPA</td>
<td>Computed Tomography Pulmonary Angiogram</td>
</tr>
<tr>
<td>Cu-IUD</td>
<td>Copper Intrauterine Device</td>
</tr>
<tr>
<td>CXR</td>
<td>Chest X Ray</td>
</tr>
<tr>
<td>DMPA</td>
<td>Depot Medroxyprogesterone Acetate</td>
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<tr>
<td>DVT</td>
<td>Deep Vein Thrombosis</td>
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<tr>
<td>ETG</td>
<td>Etonogestrel</td>
</tr>
<tr>
<td>GFR</td>
<td>Glomerular Filtration Rate</td>
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<tr>
<td>GSH</td>
<td>Group, Screen and Hold</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
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<tr>
<td>IPC</td>
<td>Intermittent Pneumatic Compression</td>
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<tr>
<td>LFT</td>
<td>Liver Function Test</td>
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<tr>
<td>LMWH</td>
<td>Low Molecular Weight Heparin</td>
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<tr>
<td>LNG</td>
<td>Levonorgestrel</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
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<tr>
<td>LNG-IUD</td>
<td>Levonorgestrel – Releasing Intrauterine Device</td>
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<tr>
<td>MMR</td>
<td>Maternal Mortality Ratio</td>
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<tr>
<td>NET-EN</td>
<td>Norethisterone Enantate</td>
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<tr>
<td>NSAIDs</td>
<td>Non Steroidal Anti-Inflammatory Drugs</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>Obstetrics and Gynaecology</td>
</tr>
<tr>
<td>OHSS</td>
<td>Ovarian Hyperstimulation Syndrome</td>
</tr>
<tr>
<td>PIH</td>
<td>Pregnancy Induced Hypertension</td>
</tr>
<tr>
<td>P/R</td>
<td>Patch and Ring</td>
</tr>
<tr>
<td>PR</td>
<td>Pulse Rate</td>
</tr>
<tr>
<td>PE</td>
<td>Pre Eclampsia</td>
</tr>
<tr>
<td>POP</td>
<td>Progestogen-Only Pills</td>
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<tr>
<td>PPH</td>
<td>Postpartum Haemorrhage</td>
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<tr>
<td>PROM</td>
<td>Prelabour Rupture of Membrane</td>
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<tr>
<td>PT/PTT</td>
<td>Prothrombin Time/ Partial Thromboplastin Time</td>
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<tr>
<td>PTE</td>
<td>Pulmonary Thromboembolism</td>
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<tr>
<td>RFT</td>
<td>Renal Function Test</td>
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<tr>
<td>SLE</td>
<td>Systemic Lupus Erythematosus</td>
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<tr>
<td>SPD</td>
<td>Symphysis Pubis Dysfunction</td>
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<tr>
<td>TED</td>
<td>Thrombo-Embolic Deterrent</td>
</tr>
<tr>
<td>UFH/VFH</td>
<td>Unfractionated Heparin</td>
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<tr>
<td>V/Q</td>
<td>Ventilation/ Perfusion</td>
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<tr>
<td>VTE</td>
<td>Venous Thromboembolism</td>
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• INTRODUCTION
INTRODUCTION

Venous thromboembolism covers a spectrum of disorders characterised by thrombosis in the venous circulation that cumulates often with a fatal sequel Pulmonary Embolism.

Pulmonary thromboembolism remains as one of the leading causes of Direct Maternal Deaths in this country with an incidence of between 1.5 to 4.7 per 100,000 live births and in the recent CEMD report for 2006-2008 is the third commonest cause of direct maternal deaths after Postpartum Haemorrhage and Hypertensive Disorders of Pregnancies. (Table 1)

Table 1: Number of maternal deaths due pulmonary embolism and specific MMR per 100,000 live births 2001 -2008

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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<tbody>
<tr>
<td>Number of maternal deaths due to pulmonary embolism</td>
<td>11</td>
<td>13</td>
<td>16</td>
<td>9</td>
<td>14</td>
<td>9</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Specific MMR per 100,000 live births</td>
<td>2.1</td>
<td>2.7</td>
<td>3.3</td>
<td>1.9</td>
<td>3.0</td>
<td>1.9</td>
<td>1.5</td>
<td>4.7</td>
</tr>
</tbody>
</table>


Accurate data on the incidence of VTE for this country is not available but it has been estimated that thromboembolic events averages about 1.3 per 1000 pregnancies.

The relative risk of VTE in pregnancy is increased four to six fold in pregnancy and this is further increased in the postpartum period. Caesarean section is a definite risk factor with emergency caesarean carrying a higher risk than an elective caesarean section. Women having vaginal deliveries are also at risk and because of the higher proportion of women having vaginal deliveries, many of the thromboembolic deaths occur in this group.
The CEMD report has highlighted failures in obtaining objective diagnoses as well as failures in instituting adequate treatment. The subjective clinical assessment of DVT and PTE is particularly unreliable in pregnancy and this has been compounded by the lack of available resources for objective testing. These issues have contributed to difficulties in arriving at a reliable diagnosis and frequently the diagnosis is only made at post mortem or on retrospective review. Many of these cases of Pulmonary Thromboembolism are preventable with the early recognition of risk factors and with adequate thromboprophylaxis.

This teaching module is produced to supplement existing teaching manuals and protocols. The use of heparin, TED stockings, IPC, early mobilization and adequate hydration will be discussed.

This manual will also look at the risk factors, signs and symptoms of VTE and PTE and addresses issues on referral. This manual is primarily intended to be used for in service training of health care providers in the Hospital as well as for the staff in the Health Clinics and for Home Care providers.
• OBJECTIVES

• PATHOPHYSIOLOGY OF OBSTETRICS THROMBOEMBOLISM
OBJECTIVES

General Objective

To develop a comprehensive training manual on the prevention and treatment of thromboembolism in pregnancy and the puerperium.

Specific Objectives

1. To provide adequate knowledge and the understanding on the pathophysiology of thromboembolism in pregnancy.

2. To develop skills in the recognition of risk factors that will predispose to thromboembolic disease in pregnancy.

3. To provide knowledge on the drugs and methods that can be used to prevent thromboembolism.

4. To provide knowledge on the treatment of DVT and PTE.

5. To train the staff on the usage of existing check lists for the detection of risk factors and for the detection of thromboembolism.

6. To standardised referral procedures for a woman with suspected thromboembolism.
PATHOPHYSIOLOGY OF OBSTETRICS THROMBOEMBOLISM

A. Physiology of Haemostasis

1. Haemostasis is the normal mechanism the body utilizes to prevent bleeding from the intravascular compartment. It is also vital in wound healing.

2. The 3 mechanisms of primary haemostasis include:
   a. Vasoconstriction (usually lasting a few minutes)
   b. Primary platelet aggregation
   c. Fibrin deposition

3. The subsequent activation of the coagulation cascade (intrinsic pathway) re-enforces the clot.

4. Anticoagulation mechanisms then keep the clot size in check. It is subsequently responsible for the dissolution of the clot following healing of the vascular endothelium.

5. The normal balance between coagulation and anticoagulation is a key to normal haemostasis.

B. Modifications to Haemostasis by Pregnancy

1. Pregnancy tips the haemostasis balance towards coagulation, rendering the system hypercoagulable.

2. This is presumably in preparation for parturition.

3. There is increased concentration of clotting factors VIII, IX and X. Fibrinogen levels rise by 50% while fibrinolytic activity is decreased.

4. Levels in anticoagulators such as antithrombin and protein S decreased.
5. These changes are observed from the first trimester and for at least 6 weeks postpartum.

6. There is a peak in coagulation state immediate postpartum and tends to tail off after the 3rd postpartum week.

7. Venous stasis is exaggerated in pregnancy with venodilation, compression of the gravid uterus on the inferior vena cava and the compression of the left infundibulopelvic vessels on the iliac vein.

C. Pathophysiology of Thrombosis

1. Thrombosis occurs when there is disruption of the Virchow’s triad of endothelium, blood flow and coagulation.


3. In addition to the modifications described above, certain pregnancy specific conditions further contribute to thrombogenesis. These include hyperemesis and pre-eclampsia.

4. Excessive fluid loss in severe hyperemesis concentrates blood and the resultant bed rest further promotes stasis of blood flow.

5. Pre-eclampsia promotes thrombogenesis via several mechanisms:
   
a. Haemoconcentration: increased vascular permeability causes intravascular fluid shift to the extravascular compartment.

b. Vascular endothelial injury: it is postulated that the systemic deposition of inflammatory complements cause vasculitis thus inviting thrombogenesis.

c. The diagnosis prompts hospital admission, which further limiting the mobility of the affected patients.
D. Risk Factors

1. Age above 35 years
2. Weight > 80kg or pre pregnancy/booking BMI > 30
3. Parity four or more
4. Past history of thromboembolism
5. Thrombophilia
6. Gross varicose veins
7. Immobility e.g. long haul travel, hospital admission
8. Pre-eclampsia
9. Caesarean section
10. Prolonged labour > 12 hours or instrumental deliveries
11. Medical conditions:
   a. Heart disease (especially prosthetic valves)
   b. Nephrotic syndrome
   c. Systemic inflammatory diseases.
12. Massive postpartum haemorrhage
13. Pelvic sepsis e.g. Puerperal sepsis, causing pelvic septic thrombophlebitis and thrombosis
14. Hyperemesis gravidarum
15. Dehydration
16. OHSS
• DIAGNOSIS OF VTE
DIAGNOSIS OF VTE

Venous thromboembolism and pulmonary embolism can present with a myriad of clinical symptoms and signs. The health care provider should actively enquire about the symptoms and look for the signs suggestive of these conditions.

A. Venous Thromboembolism

In pregnancy and the puerperium VTE commonly involves the ilio-femoral vessels of the lower limb as compared to lower popliteal vessels in the non pregnant patients.

1. Symptoms

   a. Swelling of the limb
      In pregnancy it is more common to see the whole lower limb swelling than just the calves. This swelling is usually unilateral.

   b. Pain of the affected limb
      Commonly described as claudication pain or constant pain aggravated by movement.

   c. Feeling unwell
      Patient frequently describes of feeling unwell and decreases in mobility. These classical features are however less reliable in pregnancy.

2. Signs

   a. Non pitting swelling
      There is an increased in the circumference of the affected limb when compared to the contralateral limb.

   b. Increased warmth of the affected limb
      The affected limb will feel warmer than the non affected limb.
c. **Reduced capillary filling**
   There will be reduced capillary filling comparing to the non-affected limb. The limb will also appear more dusky.

d. **Fever**
   Patient may or may not be febrile.

3. **Investigations**

   a. **Baseline**
      i. Full blood count
      ii. Renal function test
      iii. Coagulation profile (PT/APTT)

   b. **Pulse Oximetry**
      The pulse oximeter can be used as a screening tool. A drop in exertional \( \text{PO}_2 \) may suggest impaired ventilation-perfusion ratio.

   c. **D-dimer**
      Not recommended in pregnancy because of inherently raised values, especially towards 3rd trimester.

   d. **Compression duplex ultrasonography**
      This is relatively easily available, non-invasive and is the modality of choice. Focus should be on the ilio-femoral and popliteal vessels.

   e. **Venogram**
      It is considered the gold standard for VTE diagnosis. However, it is associated with radiation risk and itself carries 1% venous thrombosis risk. It rarely utilized in pregnancy.
B. Pulmonary embolism

1. Symptoms

   a. Shortness of breath
      This usually of sudden onset.

   b. Chest pain
      Normally described as dull and pain is worsened with inspiration.

   c. Cough
      Usually non productive / dry cough but may occasionally blood stained.

2. Signs

   a. Tachypnoeic
      Respiratory rate is more than 16 breaths per minute.

   b. Tachycardia
      Pulse rate of more than 100 bpm.

   c. Cyanosis
      May be present and usually denotes a severe disease.

   d. Cardiorespiratory compromise and collapse
      In severe cases, the patient may present with sudden onset of collapse.

   e. Lungs clear
      On auscultation, the lungs are normally clear.
3. **Investigations**

- **Arterial blood gas (ABG)**
  May be normal with small emboli. The ABG will be deranged in severe cases.

- **Chest radiograph**
  Other causes of dyspnoea should be excluded. CXR will appear normal in most patients. In others there may be evidence of atelectasis or other focal parenchymal abnormalities.

  Pleural effusion may be seen but are usually small. There may also be regional oligemia (Westermark sign).

- **ECG (Echocardiogram)**
  Classical S1,Q3,TIII rarely seen in pregnancy. Sinus tachycardia maybe seen. In severe cases, right axis deviation, right bundle branch block and peaked P wave in Lead II will be evident.

- **CTPA (Computer Tomography Pulmonary Angiogram)**
  This is the investigation of choice. It is associated with less radiation risk and carries higher sensitivity and specificity. CTPA has significant breast radiation exposure. Women who undergo CTPA carry an increased lifetime risk of breast cancer and they should be counselled as such.

- **Lung ventilation-perfusion scan (V/Q)**
  The ventilation component can be omitted to reduce the radiation risk to the fetus. The radiation risk is small and considered safe in pregnancy. The lifetime risk for paediatric cancers is five times more than CTPA and women should be counselled. The breast radiation risk is negligible.

  Hence most authorities still opt for V/Q scan as 1st line modality as the negative predictive value is high with CTPA reserved for equivocal cases.

  Final decision will be guided by availability of modality mentioned. CTPA is more widely available.
• MANAGEMENT OF ACUTE VTE
MANAGEMENT OF ACUTE VTE

1. VTE is a medical emergency. VTE in pregnancy is one of the leading cause of maternal mortality. Pregnant women suspected to have VTE should be immediately referred to the regional tertiary hospital with O&G Specialist.

2. Women who complain of sudden calf pain (usually unilateral) and swelling should be assessed for possibility of deep vein thrombosis (DVT).

3. Women who complain of sudden onset of chest symptoms (dull ache on inspiration or sharp pleuritic pain, shortness of breath or cough without haemoptysis) should be assessed for possibility of pulmonary thromboembolism (PTE). Such cases should be referred to the regional O&G specialist immediately.

4. Lower limb deep vein thrombosis (ilio-femoral) is more common in pregnancy. Outside pregnancy DVT occurs more in the superficial calf (popliteal and foot) regions.

5. Treatment should be commenced immediately after specialist assessment. A multidisciplinary approach involving a haematologist or a physician is essential.
   a. All suspected cases of DVT / PTE should have treatment commenced upon clinical suspicion of VTE. Objective confirmation of DVT can wait until modality and its expertise becomes available. Diagnosis should not delay commencement of treatment.
   b. Thrombophilia screening (acquired and inherited) is not necessary prior to commencement of heparin treatment. It is thus not recommended. Investigations for thrombophilia can be carried out later after completion of treatment.
   c. Definitive diagnosis should be pursued in the first possible instance.
      i. Clinical diagnosis of VTE has a low sensitivity.
      ii. All clinically suspected VTE should have diagnostic testing to confirm or refute the diagnosis.
      iii. This testing should be conducted as early as possible after commencement of treatment.
iv. Unresolved diagnosis causes unnecessary anxiety to both the patients and clinicians. The patient may be unnecessarily subjected to repeat courses or even lifelong courses of thromboprophylaxis treatment should clinical diagnosis not be confirmed or refuted by a definitive diagnosis.

6. The treatment of choice for VTE in pregnancy is low molecular weight heparin (LMWH)

a. LMWH is superior to UFH in terms of efficacy.

b. UFH is associated with more side effects.

c. The following LMWHs are recommended in pregnancy:
   i. Enoxaparin—Adequate safety data
   ii. Dalteparin—Adequate safety data
   iii. Tinzaparin—Adequate safety data

d. Women who are allergic to heparins or have developed heparin resistance (antibodies) should be treated with heparinoids:
   i. Fondaparinux—Safety and efficacy data for use in pregnancy still lacking

e. LMWH (subcutaneous)
   i. Routine monitoring of platelet counts is not indicated.
   ii. Anti-Xa level monitoring is not indicated unless when the weight is less than 50kg or more than 90kg. The target level is 0.5-1.2
   iii. Sampling should be done 4 hours post dose.

f. UFH
   i. Subcutaneous: 10 000 BD to be adjusted to achieve aPTT 1.5-2.5 control.
   ii. Intravenous:
      a. Bolus: 80 units/kg
      b. Infusion: 18 units/kg/hour
   iii. aPTT target: 1.5 to 2.5 control.
iv. Platelet counts to be monitored daily during IV treatment and weekly for 4 weeks then monthly during subcutaneous (SC) treatment. Heparin-induced thrombocytopenia is a rare idiosyncratic complication of UFH.

g. In women who are unable to tolerate heparins, heparinoids such as danaparoid sodium or fondaparinux can be used.

7. Duration of treatment

a. Outside pregnancy a total of 3 months treatment is recommended.

b. In pregnancy therapeutic doses is to be continued through pregnancy till 6 weeks postpartum. At 6 weeks postpartum therapy should be extended to complete a minimum total treatment duration of 3 months.

8. Peripartum

a. Women should be advised to stop injections 24 hours before a planned delivery (induction or caesarean).

b. Women should be advised to omit injection at onset of labour and to seek a review by a medical personnel in the following:
   i. Leaking liquor
   ii. APH
   iii. Contractions

c. Regional anaesthesia is contraindicated if the last therapeutic dose was less than 24 hours ago or if the last prophylactic dose was less than 12 hours ago. If a patient on therapeutic dose of anticoagulant undergoes caesarean section, placement of drainage tubes should be considered.

d. Postpartum
   i. Active management of 3rd stage.
   ii. PPH prophylaxis should be instituted: Blood grouped and saved, large IV access and 40 units oxytocin infused after delivery of placenta.
   iii. Therapeutic dose can be recommenced 4 hours postpartum (also for operative delivery).
iv. Epidural placement should be delayed until at least 24 hours after the last dose and epidural removal should be more than 12 hours after the last injection.

v. Use of warfarin for maintenance therapy may be considered.

vi. Women should be counselled that both heparins and warfarin are safe during breastfeeding.

9. Adjunct treatment

   a. Raise affected limb.

   b. Compression stockings for at least 2 years in the affected limb.

   c. Analgesia (avoid NSAIDS especially after 32 weeks period of gestation).

   d. Consider caval filter if:
      i. Recurring despite adequate anticoagulation.
      ii. Non-resolving or worsening emboli.
      iii. Causing pulmonary emboli.

10. In severe cases of PTE with cardiorespiratory compromise

    a. Consider thrombolytic therapy (streptokinase or urokinase) although no clear survival benefits have been established. Complications include 3-5% non-fatal maternal haemorrhage and 2% fetal demise.

    b. If all fails, to consider for thoracotomy after cardiothoracic input.

11. Prevention of post-DVT limb syndrome

    a. 60% of women develop this condition characterized by chronic swelling and pain.

    b. Wearing graduated compression stockings (DVT stockings) for 2 years on the affected limb reduces this by more than half.
• RISK FACTORS AND PREVENTION OF VTE
RISK FACTORS AND PREVENTION OF VTE

A. Antenatal Risk Assessment And Management

All women should have a documented assessment for the risk factors of VTE in pre pregnancy, early pregnancy and to be repeated if the woman is admitted to hospital for any reasons or develops intercurrent problems.

Antenatal thromboprophylaxis to be started as early as possible in pregnancy whenever necessary.

Pre pregnancy counselling and the prospective management plan should be discussed with the couple.

LMWH are the agents of choice for antenatal thromboprophylaxis (just as effective and safer than unfractionated heparin).

Women with a previous single provoked (excluding oestrogen related) VTE and no other risk factors require close surveillance, antenatal LMWH can be considered but not routinely recommended.

Women receiving antenatal LMWH should be advised not to administer further doses until assessment by medical personnel if she presents with any vaginal bleeding or once labour begins.

Risk assessment and categorisation should be done prior to start thromboprophylaxis.

1. Very High Risk

   a. Women with recurrent VTE associated with either antithrombin deficiency or the antiphospholipid syndrome.

   b. These women require higher dose LMWH (either high prophylactic 12 hourly) or weight adjusted (75% of treatment dose) antenatally and for 6 weeks postpartum or until conversion to warfarin.

   c. These women require specialist management.
2. **High Risk**

These women require thromboprophylaxis with LMWH antenatally and 6 weeks postpartum:

a. Single previous VTE with
   i. Thrombophilia or family history of thrombophilia.
   ii. Unprovoked/oestrogen-related.

b. Previous recurrent VTE >1

3. **Intermediate Risk**

These women should be offered thromboprophylaxis with LMWH for 6 weeks postpartum:

a. Single previous provoked and non-oestrogen related VTE with no family history of thrombophilia.

b. Thrombophilia with no history of VTE.

c. Medical co-morbidities, e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease.

d. Intravenous drug user.

e. Surgical procedure, e.g. appendicectomy.
4. **Lower Risk**

These women need mobilisation and avoidance of dehydration.

Considered lower risk if < 3 risk factors and intermediate risk if 3 or more risk factors or 2 or more if admitted

a. Age > 35 years
b. Obesity (BMI > 30kg/m2)
c. Parity ≥ 3
d. Smoker
e. Gross varicose veins
f. Current systemic infection
g. Immobility, e.g. paraplegia, SPD, long distance travel (≥ 4 hours)
h. Pre-eclampsia
i. Dehydration/ hyperemesis/ OHSS
j. Multiple pregnancy or ART

B. **Postnatal Risk Assessment And Management**

All postpartum women should have a documented risk assessment for venous thromboembolism (VTE) - (refer appendix)

All women should be encouraged to mobilise during postpartum period and avoid dehydration.

Pharmacologic agents for thromboprophylaxis are LMWH or UFH. Agents of choice are LMWH, which are safer than and at least as effective as UFH.
1.  **High Risk**

Any postpartum woman with any of the following risk factors is considered to have high risk for VTE:

a.  Any previous VTE before current pregnancy

b.  Was on antenatal LMWH

She will require at least 6 weeks postnatal prophylactic LMWH.

2.  **Intermediate Risk**

Any postpartum woman with any of the following risk factors is considered to have intermediate risk for VTE:

a.  Caesarean section in labour / emergency caesarean section

b.  Asymptomatic thrombophilia (inherited or acquired)

c.  BMI >40kg/m2

d.  Prolonged hospital admission (>3 days)

e.  Medical morbidities, e.g.
   i.  Heart or lung disease
   ii.  SLE
   iii.  Cancer
   iv.  Inflammatory conditions
   v.  Nephrotic syndrome
   vi.  Sickle cell disease
   vii.  Intravenous drug user

f.  Two or more risk factors from “Lower Risk for VTE” (refer below)

She will require at least 7 days postnatal prophylactic LMWH. If the risk factor persists (lasting more than 7 days postpartum) or >3 risk factors, consider extending thromboprophylaxis up to 6 weeks or until the additional risk factors are no longer present.
3. **Lower Risk**

Any postpartum woman with any of the following risk factors is considered to have lower risk for VTE:

a. Age >35 years
b. Obesity (BMI >30kg/m2)
c. Parity >3
d. Smoker
e. Elective caesarean section
f. Any surgical procedure in the puerperium
g. Gross varicose veins
h. Current systemic infection
i. Immobility, e.g.
   i. Paraplegia,
   ii. SPD (symphysis pubis dysfunction with reduced mobility)
   iii. Long distance travel (>4 hours)
j. Pre-eclampsia
k. Mid-cavity rotational operative delivery
l. Prolonged labour (>24 hours)
m. PPH >1 litre or received blood transfusion

Mobilisation and avoidance of dehydration is advised.

If she has 2 or more (>2) risk factors listed above, she will be considered as having intermediate risk for VTE and appropriate thromboprophylaxis advised.
Doses of prophylactic LMWH are adjusted according to the women’s weight as below:

<table>
<thead>
<tr>
<th>Body weight (kg)</th>
<th>Enoxaparin</th>
<th>Dalteparin</th>
<th>Tinzaparin</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50kg</td>
<td>20mg daily</td>
<td>2500 units daily</td>
<td>3500 units daily</td>
</tr>
<tr>
<td>50 - 90kg</td>
<td>40mg daily</td>
<td>5000 units daily</td>
<td>4500 units daily</td>
</tr>
<tr>
<td>91 - 130kg</td>
<td>60mg daily</td>
<td>7500 units daily</td>
<td>7000 units daily</td>
</tr>
<tr>
<td>131 - 170kg</td>
<td>80mg daily</td>
<td>10000 units daily</td>
<td>9000 units daily</td>
</tr>
<tr>
<td>&gt; 170kg</td>
<td>0.6mg/kg/day</td>
<td>75 units/kg/day</td>
<td>75 units/kg/day</td>
</tr>
</tbody>
</table>

Women receiving LMWH antenatally should continue prophylactic doses of LMWH until 6 weeks postpartum but a postnatal risk assessment should be made. If they are receiving long-term anti-coagulation with warfarin, this can be started when the risk of haemorrhage is low.

Woman with bleeding risk should warn against use of pharmacologic agents for thromboprophylaxis. Bleeding risks include:

a. Active bleeding

b. Acquired bleeding disorders e.g. acute liver failure

c. Untreated inherited bleeding disorders e.g. Hemophilia and Von Willebrand’s disease

Both warfarin and LMWH are safe when breastfeeding.

Women should be repeatedly assessed for risk factors for VTE if they develop intercurrent problems or require surgery or readmission in the puerperium.
Respective department to decide on method of postnatal thromboprophylaxis administration. The options include:

a. Self-administration by patients (or family member) at home (community level)

b. Administration by nurses during home visits (community level)

c. Administration by nurses in health clinic (health facility level)

d. To complete thromboprophylaxis in parent hospital (health facility level)
• CONTRACEPTIVE CONSIDERATIONS

• REFERRAL PROCEDURES
CONTRACEPTIVE CONSIDERATIONS

The combined contraceptive pill is associated with a low risk of VTE of 15 per 100,000 women years as compared to 5 per 100,000 women years in non users. This risks further increases to 25 per 100,000 women years in contraceptives containing desogestrel or gestodene. Risks are also higher with combinations that have a higher dose of ethinylestradiol.

This chapter will attempt to address contraceptive needs for women at risk of VTE as well as for women with a history of VTE / PTE and with reference to the WHO Medical Eligibility Criteria for Contraceptive Use.

IN GENERAL

1. Women who have a higher risk of VTE or who may have a history of VTE/ PTE should avoid the combined contraceptive pill (COC).

2. Progestogen only contraceptions are safe and should be considered :
   a. Progestogen-only pill (POP)
   b. Depot Medroxyprogesterone Acetate (DMPA) and Norethisterone Enantate (NET-EN)
   c. The LNG/ ETG implants may be considered.

3. Intrauterine devices can be used once the uterus has returned to normal size or in post aborted cases.

4. Barrier methods are safe.
REFERRAL PROCEDURES

A. Patients with risk factors

1. Pre pregnancy

   a. Patients who are contemplating pregnancy who have a significant risk of developing VTE or PE during pregnancy should be referred to a pre pregnancy clinic where risks can be discussed and appropriate management instituted. This should include patients with:
      i. Previous history of VTE / PE
      ii. Protein S and Protein C deficiencies
      iii. Collagen diseases especially SLE
      iv. Antiphospholipid Syndrome
      v. Other risk factors – obesity, elderly, hypertensive, ART, smoker, varicose veins, paraplegia etc.

2. Antenatal

   a. Patients in the antenatal period should be routinely assessed for risks of VTE in the clinic or at admission. Patients who assessed to have intermediate or high risk should be referred immediately to the FMS or Obstetrician.

   b. Patients who are assessed as having low risk can continue with their normal antenatal care unless otherwise indicated.

3. Postpartum

   a. All patients should have their risks reassessed immediately postpartum. This is especially so for patients who may have had:
      i. Caesarean sections
      ii. Instrumental delivery
      iii. Complicated labour / prolonged labour
      iv. Other complications during labour e.g. eclampsia, PPH etc.
B. Patients suspected to have VTE or PTE

This is an acute emergency. Patients who are suspected to have VTE or PTE should be referred immediately to the nearest hospital. They should be coded RED.

Patients should be sent to the nearest hospital accompanied by an appropriately trained staff. This should be a medical officer where possible. In hospitals where an Obstetric Retrieval Team is available, this retrieval team should be mobilised.

During transfer the following equipment should be available:

a. BP/ PR monitoring
b. Pulse Oximeter
c. Oxygen and high flow mask
d. Equipment and drugs for maternal resuscitation
1. **District Hospitals without Specialist**

   Medical officers should fully reassess the patient. After assessment, the case should be discussed with the Obstetrician / Physician / Haematologist at the nearest specialist hospital. Decision should then be made:

   a. If patient required further investigations
   b. If diagnosis is highly probable to start heparinization
   c. If intubation (in the cases of suspected PTE) is warranted
   d. If the patient should be referred to a specialist hospital or will need further consultation with a Physician / Anaesthetist / Haematologist

2. **Hospitals with Specialists**

   Patients should be managed jointly with the Radiologist / Haematologist / Physician / Anaesthetist. Patients should be managed in a High Dependency Unit setting or in cases of suspected PTE, should be managed in Intensive Care Unit.
• CASE DISCUSSION
CASE DISCUSSION

Case Scenario 1

A 32 year-old gravida 4 para 3 at first trimester of pregnancy attended to antenatal clinic for the first antenatal booking. She is a known case of iron deficiency anaemia in previous pregnancy required blood transfusion and has appendicectomy done 5 years ago after the first delivery. Currently she suffers from persistent vomiting with poor oral intake and body weakness for the past one week. She has no fever, abdominal pain, abnormal per vaginal bleed, loose stool or dysuria. Clinically she is thin, appears mild pallor and dehydrated. Her vital signs are stable. Systemic examination shows otherwise unremarkable. Her urine ketone is 4+ and Hb is 9 g/dL. Transabdominal ultrasound scan reveals intrauterine pregnancy which corresponds to 10 weeks of gestations.

1. What are the risk factors for thromboembolism for her during the first antenatal visit?

2. Does she require antenatal prophylaxis at this moment? How would you manage her as outpatient to reduce risk of thromboembolism?

3. In view of her poor oral intake, she is admitted to hospital for further management. Does she need thromboprophylaxis during inpatient management?

4. What is your thromboprophylaxis regime for her if she is admitted?
Case Scenario 2

A 38 year-old obese (BMI 35) para 4 post emergency LSCS day 7 for triplet pregnancy at 34 weeks of gestation, presented to casualty with history of fever, right calf muscle pain and not been taking orally for 2 days. This was an IVF pregnancy, as she had secondary infertility after her second marriage and was in patient for one month prior to her delivery. Clinically she was dehydrated, with recorded fever of 38 °C, mild oedema of her right leg and she had pus discharge from her wound. She was discharged well on Day 3 post op with analgesia and haematinics.

1. What is your diagnosis?

2. What are her risk factors?

3. How would you have managed her antenatally?

4. Comment on her discharge plan.

Case Scenario 3

A 36 year-old lady recently married is contemplating pregnancy. She was previously diagnosed to have VTE involving the right popliteal vein following a long plane trip (13 hours flight). She has completed treatment with warfarin 6 months ago.

1. Where would you refer her to?

2. How would you rate her risks for a recurrent VTE in pregnancy?

3. Is there any investigation you would do?

4. What treatment would you recommend should she become pregnant?
Case Scenario 4

A 37 year-old woman at her 28 weeks of gestation is a known case of pregnancy induced hypertension (PIH). Her BMI is 35. She complained of leg swelling that makes her difficult to walk.

1. How is pedal oedema of pregnancy different from swelling of DVT?
2. What are the risk factors present for DVT in this woman?
3. Upon assessing, you find that the woman most likely to have VTE of the right leg. What are your possible actions?
4. At the receiving hospital, you think it would be VTE. What are your actions?
5. How could you diagnose a lower limb VTE?

Case Scenario 5

A 35 year-old para 2 post SVD day 5, well with no antenatal complication or postnatal complication till date. She complained of swollen over the left lower limb and mild chest discomfort upon review during the home visit on day 5.

1. What should be checked?
2. What is the next step?
3. While arrangement was being made for admission she suddenly complained of pleuritic chest pain and SOB? What do you do?
Case Scenario 6

A 17 year-old primigravida at 34 weeks gestation was referred to the hospital for pre-eclampsia. She booked early at 12 weeks gestation, with a weight of 75kg and height of 1.45 metres. She was not anaemic, and remained normotensive until 32 weeks, where BP became elevated and she was commenced on antihypertensives. During her scheduled antenatal visit, her BP was noted elevated at 160/100mmHg, with proteinuria 3+. She has no active complaint, was asymptomatic for impending eclampsia and was not in labour. Physical examination was otherwise unremarkable, with normal reflexes. Her uterine size corresponded to dates. She was referred to the hospital for further management.

1. Is she at risk for VTE?

2. What are her risk factors for VTE?

3. Which category of risk would you place her?

4. Does she need thromboprophylaxis?

5. What methods of thromboprophylaxis would you offer her?

The attending doctor admitted her to hospital.

6. Does this alter her risk category?

7. What methods of thromboprophylaxis would you offer her?

During her stay in hospital, she had nausea and vomiting, and complained of blurred vision. She was admitted to the high dependency unit and was being fasted in preparation for caesarean section.

8. What are the additional risk factors for VTE in her?

9. Would you offer any change in her thromboprophylaxis methods, why?
She underwent an uneventful caesarean section and delivered a healthy 2.2kg infant. She was transferred back to the high dependency unit post-operatively.

10. What are the additional risk factors for VTE in her?

11. Would you offer any change in her of thromboprophylaxis methods, why?

Case Scenario 7:

29 years old, primigravida with twin pregnancy and at 32 weeks gestation. She was admitted in a hospital for pre eclampsia and for BP monitoring. On day 9 of admission, patient complained of sudden onset of chest pain and shortness of breath.

1. What are your differential diagnosis?

2. What are the features to support diagnosis of PTE?

You examine the lady and find the following: sudden onset, tachycardic, tachypnoea and lung fields clear. You make a diagnosis of pulmonary embolism.

3. What are the baseline investigations you would perform in this case?

The radiology department is closed during the weekend and you are not sure of the diagnosis. The symptoms are suggestive.

4. What would be your action at this moment?
   a. Treat and diagnose later
   b. Wait and diagnose and then treat
   c. None of the above

5. Outline the treatment for PTE in pregnancy.
ANSWERS

Case Scenario 1

1. Parity and dehydration
2. No, she is in lower risk. Encourage mobilization and hydration
3. Yes, currently she has 2 times hospitalization – intermediate risk, consider antenatal prophylaxis with LMWH
4. Subcutaneous Enoxaparin 20mg OD

Case Scenario 2

1. Venous thromboembolism, TRO other causes of fever i.e breast engorgement, infection (hospital acquired pneumonia, post op wound infection)
2. Risk factors divided into :
   a. Patient related
      i. Age
      ii. Parity
      iii. IVF pregnancy
      iv. Triplet pregnancy
      v. Obese (BMI 35)
   b. Surgery related – immobilization
      i. Dehydration
      ii. Infection (post op wound)
      iii. Emergency surgery
3. Considering her risk factors, she should be categorized under intermediate risk, hence optimal management would have been to see her in the
   a. Early pregnancy- consider antenatal prophylaxis with LMWH
   b. Avoidance of dehydration
      i. Mobilization
      ii. Repeated assessment during her admission and encourage ambulation in ward
4. Discharge plan:
   a. Thromboprophylaxis should have been continued for at least 7 days postpartum and since the risk factors are persisting and there are more than 3 factors, consider extending thromboprophylaxis with LMWH.
   b. It is a high risk discharge hence postpartum home visits should have been carried out. (case needs to be informed to the nearest health clinic upon discharge)
   c. Pre pregnancy clinic prior to the next pregnancy and counselling regarding thromboprophylaxis antenatally in the next pregnancy.
Case Scenario 3

1. Pre pregnancy clinic in hospital with specialist
2. Very high risk
3. Venogram, pulsed Doppler, V/Q scan, d-dimer
4. Antenatal thromboprophylaxis with LMWH

b. Treat and confirm diagnosis if necessary
c. The following would be your treatment plan:
   i. Antibiotic
   ii. Leg elevation
   iii. TED stockings
   iv. Analgesia
   v. Warfarin
   vi. Heparin

5. Investigations: X ray, venogram, pulsed Doppler, V/Q scan, D – dimer

Case Scenario 4

1. Differences between pedal oedema from DVT
   a. Pedal oedema of pregnancy affect usually both legs
   b. Swelling DVT usually affects one leg only
   c. Swelling of DVT is usually red, warm and tender
2. Risk factors: Gender, age 37, BMI, PIH, immobility, pregnancy
3. Action to be taken:
   a. Referral for urgent clinic appointment
   b. Referral to the emergency unit
4. Management considered
   a. Confirm diagnosis first and then treat

Case Scenario 5

1. CHECK LIST – home visit postnatal monitoring chart (see appendix) documented and noted calf muscles were red, inflamed with swollen legs. Her vitals were normal, systemic examination was unremarkable and uterus was well contracted with normal lochia.
2. High suspicion of thromboembolism.
   Advisable for admission, hence she should be referred to the medical officer (then to follow the referral pathway to be referred to hospital)
3. Urgent referral and arrange transfer to nearest hospital. (if obstetric retrieval available to ask for help)
Case Scenario 6

1. Yes
2. Risk factors – Pre eclampsia, booking BMI more than 30 kg/m²
3. Lower risk group
4. Yes
5. Mobilization and avoidance of dehydration
6. Yes, upgrade to intermediate risk group
7. Prophylactic LMWH antenatally
8. Emergency caesarean sections
9. Yes, consider at least 7 days postnatal prophylactic LMWH
10. Prolonged hospital admission
11. No, unless persisting or >3 risk factors in intermediate risk group, consider extending thromboprophylaxis with LMWH

2. The following features support diagnoses of pulmonary embolism
   a. Chronic onset
   b. Acute onset
   c. Tachycardia
   d. Hypoxia on exertion
   e. Chest pain worst on inspiration
   f. Bilateral crepitations on lung auscultation
   g. Bilateral wheezing on lung auscultation
   h. Blood stained sputum

3. The following are baseline investigations you would perform: CTG, LFT, ABG, RFT, CXR with abdominal shield, CXR without abdominal shield, CTPA

Case Scenario 7

1. The following are differential diagnoses:
   a. Costochondritis
   b. Pneumonia
   c. Pulmonary oedema
   d. Pulmonary embolism
   e. Physiological

2. a.

5. The following are used to treat PTE in pregnancy:
   Intravenous UFH, SC LMWH, Warfarin, Streptolysin
PRE TEST AND POST TEST

1. Obstetric thromboembolism is a common cause of maternal mortality in Malaysia True / False

2. List 5 risk factors for venous thromboembolism (VTE).
   a.
   b.
   c.
   d.
   e.

3. What are the 3 common signs and symptoms of VTE?
   a.
   b.
   c.

4. How does pulmonary thromboembolism (PTE) commonly present?
   a.
   b.
   c.

5. Name one investigation that will help you make a diagnosis of VTE.

6. Should the D-dimer test be used to diagnose acute VTE? Yes / No

7. In a high risk patient with symptoms highly suggestive of venous thromboembolism, should we wait for investigations to confirm VTE before starting treatment? Yes / No

8. List 3 common drugs that can be used to treat VTE.

9. Is warfarin the treatment of choice for VTE in pregnancy? Yes / No

10. What type of contraception would be suitable for patients with a history of VTE in pregnancy?
    a.
    b.
    c.
APPENDIX
APPENDIX

A. TED Stockings

TED (thrombo-embolism deterrent) stockings are mechanical devices used as a preventive measure against the formation of thrombosis and embolus. This graduated compression stockings come in a variety of lengths and sizes. The graduated compression applies pressure to the legs in varying amounts, with the most compression furthest away from the heart, namely the ankle and then lessening the compression further up the leg.

Clinical review of few studies about comparison between the effectiveness of mechanical devices reveals no significant difference in risk for the mortality, symptomatic DVT or PE, yet the risk of lower extremity skin damage is increased among those who treated with compression stockings.

Measurement of TED Stockings

1. Measure widest circumference of calf while standing using flexible tape measure.

2. Measure from the bottom of the heel to the bend of the knee along the back of the leg. This is for proper sizing of knee high TED hose only.

3. For the thigh high TED stocking, measure the thigh circumference and from bottom of the heel to the gluteal furrow along the back of the leg.

Thigh high TED stockings  Knee high TED stockings
Application of TED stockings

Due to the tough elastic material of TED stockings, many people have trouble wearing compression stockings. There are some tips to apply TED stockings correctly:

1. First, turn the upper part of the stocking inside out to the heel and gently slide the stocking down to the foot part.

2. Now carefully slip one foot into the foot part of the stocking.

3. Gently pull the remaining part of the compression stocking over the heel.
4. Use the palms of hands to massage the stocking up toward the knee. Try not to pull at the upper edge of the compression stocking.

5. Now use the same steps for the other leg.

6. Compression thigh high stocking: Use the steps above until the compression stocking is by the knee. Using the palms of hands, ease the stocking upward (don't pull on the upper edge of the stocking) until it reaches upper thigh.

B. Intermittent Pneumatic Compression

IPC consists of a garment which is fitted to the calf or foot and inflated by a pump. As the garment inflates with air, it compresses the veins and pushes the blood back to the heart. The garment deflates again after a few seconds. This action copies the squeezing action on the veins by the calf or foot muscle when you walk. IPC is a safe, natural and effective alternative to drug therapies or may sometimes be used in combination with drugs if the patient particularly at high risk.

The garments are made to fit snugly around the legs or feet. Once the pump is turned on the patient will feel a gentle squeezing of one limb for a short period of time, followed by a rest period and then the other limb will be squeezed. The compression will continue to alternate from limb to limb. If the garments are too loose, too tight, the patient may experience some pain, numbness or tingling.

1. Calf Garments

A garment, which has an inflatable section at the back, is wrapped around each calf. The garment connects to the pump that has a pre-set pressure and cycle for inflating and deflating. The pump inflates them once a minute on each leg. Garments come in various sizes and are fitted according to the size of the patient’s leg. Some garments are designed for the calf and thigh area together.
2. Foot Garments

The foot garment is wrapped around each foot with an inflatable section that gently squeezes the sole and sides of the foot. The garments, when inflated, gently squeeze the foot around the sides and base. This opens up the blood vessels in the foot to allow the blood to flow more freely. The heel strap can be adjusted for comfort. The garments come in different sizes depending on shoe size, and can be applied to either foot (there is no left or right). The garment connects to the pump that is pre-set. The pump inflates each foot garment every 30 seconds, and remains inflated for 3 seconds.

Calf, thigh and foot garments can be worn in any combination as per the patient photographed below. IPC should be applied just before surgery and needs to be maintained until the patient is walking properly again, usually after about 3 days. It is essential to keep the device working at all times, including while the patient sleeps, to keep the blood moving.
### C. Drugs Informations

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfractionated heparin (UH)</td>
<td>s.c. 5000 units 8 to 12 hourly</td>
<td>Easy to administer, relative half-life of more than 12 hours, more complete reversal with protamine sulfate</td>
<td>Prolonged use may result in osteoporosis and fractures, increased risk of heparin-induced thrombocytopenia</td>
<td>May be used around the time of delivery in women at very high risk of thrombosis (e.g. regional anaesthesia is required) or at increased risk of thromboembolism in bariatric patients.</td>
</tr>
<tr>
<td>Low molecular weight heparins (LMWHs)</td>
<td>s.c. daily or 12-hourly, see Table 1</td>
<td>More effective than UH without increasing the risk of bleeding</td>
<td>More expensive than UH and heparin-induced thrombocytopenia is still a risk.</td>
<td>Agents of choice for women requiring 7 days of prophylaxis postpartum. Consideration should be given to use of LMWHs in women requiring 7 days of prophylaxis postpartum (e.g. women with mechanical heart valves).</td>
</tr>
<tr>
<td>Oral anticoagulants (Warfarin)</td>
<td>Dose adjusted to maintain INR 1.5-2.5</td>
<td>Ease of administration, low cost</td>
<td>Crosses the placenta, leading to an increased risk of congenital abnormalities in foetuses exposed between 6-12 weeks of gestation, increased risk of spontaneous miscarriage, stillbirth, neurological problems in the baby, fetal and maternal haemorrhage.</td>
<td>Limited experience of use in pregnancy, at this time its role is reserved for women intolerant of heparin compounds.</td>
</tr>
<tr>
<td>Fondaparinux</td>
<td>s.c. 2.5 mg daily</td>
<td>Safe during breastfeeding</td>
<td>Limited experience in pregnancy; contraindicated in pregnancy.</td>
<td>Conversion from LMWH back to warfarin should be delayed at least 5-7 days after delivery to minimize the risk of haemorrhage during the period of overlap in treatment.</td>
</tr>
<tr>
<td>Low-dose aspirin</td>
<td></td>
<td>No controlled trials on use for thromboprophylaxis in pregnancy.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Medication**

**Dose**

**Advantage**

**Disadvantage**

**Remarks**
Table 1:  Suggested thromboprophylactic doses for antenatal and postnatal LMWH

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Enoxaparin</th>
<th>Tinzaparin (75u/kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>20 mg daily</td>
<td>3500 units daily</td>
</tr>
<tr>
<td>50-90</td>
<td>40 mg daily</td>
<td>4500 units daily</td>
</tr>
<tr>
<td>91-130</td>
<td>60 mg daily*</td>
<td>7000 units daily*</td>
</tr>
<tr>
<td>131-170</td>
<td>80 mg daily*</td>
<td>9000 units daily*</td>
</tr>
<tr>
<td>&gt; 170</td>
<td>0.6 mg/kg/day*</td>
<td>75 u/kg/day</td>
</tr>
<tr>
<td>High prophylactic</td>
<td>40 mg 12-hourly</td>
<td>4500 units 12-hourly</td>
</tr>
<tr>
<td>(intermediate) dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for women weighing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-90 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment dose</td>
<td>1 mg/kg/12 hourly</td>
<td>175 u/kg/daily</td>
</tr>
<tr>
<td></td>
<td>antenatal</td>
<td>(antenatal and postnatal)</td>
</tr>
<tr>
<td></td>
<td>1.5 mg/kg/daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>postnatal</td>
<td></td>
</tr>
</tbody>
</table>

*may be given in two divided doses

Table 2:  Dose adjustment for LMWH use for women on long-term oral anticoagulants

<table>
<thead>
<tr>
<th>Dose adjustment LMWH</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>High prophylactic / intermediate dose</td>
<td>Enoxaparin 40 mg 12-hourly</td>
</tr>
<tr>
<td></td>
<td>Tinzaparin 4500 iu 12-hourly</td>
</tr>
<tr>
<td>Therapeutic dose</td>
<td>Enoxaparin 1 mg/kg 12-hourly</td>
</tr>
<tr>
<td></td>
<td>Tinzaparin 175 iu/kg daily</td>
</tr>
<tr>
<td>Women with antithrombin deficiency</td>
<td>Weight adjusted: either 75% or 100% or treatment dose, judged by anti-Xa levels monitoring</td>
</tr>
</tbody>
</table>
### Table 3: Risk factors for bleeding

- women with active antenatal or postpartum bleeding
- women considered at increased risk of major haemorrhage (e.g. placenta praevia)
- women with a bleeding diathesis (e.g. Von Willebrand’s disease, haemophilia or acquired coagulopathy)
- women with thrombocytopenia (platelet count < 75 x 10⁹)
- acute stroke in the last 4 weeks (ischaemic or haemorrhagic)
- severe renal disease (GFR < 30 ml/minute/1.73 m²)
- severe liver disease (prothrombin time above normal range or known varices)
- uncontrolled hypertension (systolic BP > 200 mmHg or diastolic BP > 120 mmHg)
D. Administration of Subcutaneous LMWH

1. Site of injection – must not inject within 5cm (2 inches) from umbilicus and above iliac crests. Do not inject near any scars or bruises. Choose the opposite side from the site of previous injection.

2. Clean the area with sterile alcohol swab and allow to dry before injection. Carefully remove the needle guard covering the needle. To keep the needle clean.

3. Gather a fold of skin with other hand. Insert the needle fully into the skin fold at 90° angle. Press down the plunger slowly over 10-15 seconds. Continues to hold the skin fold during injection.

4. Pull the needle completely out of the skin. Do not rub the injection site.

5. Immediately dispose the used syringe back into the plastic container and close the lid. This prevents accidental injury.
E. Algorithm

1. Referral Algorithm

Patients with risk factors, pre-pregnancy

- Patients with risk factors contemplating pregnancy (refer checklist / appendix)

- Refer to Pre-Pregnancy Clinic (either at Health Clinic with FMS or Specialist Hospital)

- Appropriate counselling and management
2. **Suggested Algorithm For The Management Of VTE**

- **Signs and Symptoms suggestive of VTE**
  - 1. Refer to an appropriate specialist
  - 2. Baseline investigations
     - a. Full Blood Count
     - b. Renal Profile
     - c. Coagulation Profile

  **Initiate Treatment**

  **Compression duplex ultrasonography**

  **Normal**
  - Sign and symptoms highly suggestive
    - Continue treatment
    - Repeat compression duplex ultrasonography after one week
    - If still normal
      - For venography or MRI

  **Abnormal**
  - Symptoms indefinite
    - Stop treatment
    - Serial compression duplex ultrasonography
F. Antenatal and Postnatal Assessment Checklist For VTE

1. Antenatal Assessment Checklist

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Tick where appropriate</th>
<th>Risk Category</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single VTE and - thrombophilia or family history, or - unprovoked / estrogen-related</td>
<td></td>
<td>High Risk</td>
<td>Requires antenatal prophylaxis with LMWH</td>
</tr>
<tr>
<td>Previous recurrent VTE (&gt;1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single previous VTE with no family history or thrombophilia, or</td>
<td></td>
<td>Intermediate Risk</td>
<td>Consider antenatal prophylaxis with LMWH</td>
</tr>
<tr>
<td>Thrombophilia + no VTE, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical comorbidities, e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease, intravenous drug user</td>
<td></td>
<td>Intermediate Risk</td>
<td>Manage as for Intermediate Risk (refer above)</td>
</tr>
<tr>
<td>Surgical procedure, e.g. appendicectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &gt; 35 years, or</td>
<td></td>
<td>If &gt;3 risk factors, or &gt;2 if admitted, the woman is of Intermediate Risk</td>
<td>Manage as for Intermediate Risk (refer above)</td>
</tr>
<tr>
<td>Obesity (BMI &gt;30kg/m²), or</td>
<td></td>
<td></td>
<td>Mobilisation and Avoidance of Dehydration</td>
</tr>
<tr>
<td>Parity &gt; 3, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective caesarean section, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any surgical procedure in the puerperium, or</td>
<td></td>
<td>Lower Risk (&lt; 3 risk factors)</td>
<td></td>
</tr>
<tr>
<td>Gross varicose veins, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current systemic infection, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immobility, e.g. paraplegia, SPD, long distance travel, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-eclampsia, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehydration / hyperemesis / OHSS, or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple pregnancy or ART</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2. Postnatal Assessment Checklist

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Tick where appropriate</th>
<th>Risk Category</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any previous VTE, or</td>
<td></td>
<td>High Risk</td>
<td>At least 6 weeks postnatal prophylactic LMWH</td>
</tr>
<tr>
<td>Anyone requiring antenatal LMWH</td>
<td></td>
<td>High Risk</td>
<td>At least 6 weeks postnatal prophylactic LMWH</td>
</tr>
<tr>
<td>Caesarean Section in Labour / Emergency Caesarean Section, or</td>
<td></td>
<td>Intermediat</td>
<td>At least 7 days postnatal prophylactic LMWH if persisting or &gt;3 risk factor, consider extending thromboprophylaxis with LMWH</td>
</tr>
<tr>
<td>Asymptomatic thrombophilia (inherited or acquired), or</td>
<td></td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>BMI &gt;40kg/m2, or</td>
<td></td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Prolonged hospital admission (&gt;3 days), or</td>
<td></td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Medical comorbidities, e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease, intravenous drug user</td>
<td></td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Age &gt;35years, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Obesity (BMI &gt;30kg/m2), or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Parity &gt;3, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Smoker, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Elective caesarean section, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Any surgical procedure in the puerperium, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Gross varicose veins, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Immobility, e.g. paraplegia, SPD, long distance travel, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Pre-eclampsia, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Mid-cavity rotational operative delivery, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Prolonged labour (&gt;24 hours), or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>PPH &gt;1 litre or blood transfusion</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Age &gt;35years, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Obesity (BMI &gt;30kg/m2), or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Parity &gt;3, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Smoker, or</td>
<td></td>
<td>Lower Risk</td>
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</tr>
<tr>
<td>Elective caesarean section, or</td>
<td></td>
<td>Lower Risk</td>
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</tr>
<tr>
<td>Any surgical procedure in the puerperium, or</td>
<td></td>
<td>Lower Risk</td>
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<tr>
<td>Gross varicose veins, or</td>
<td></td>
<td>Lower Risk</td>
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<tr>
<td>Immobility, e.g. paraplegia, SPD, long distance travel, or</td>
<td></td>
<td>Lower Risk</td>
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<tr>
<td>Pre-eclampsia, or</td>
<td></td>
<td>Lower Risk</td>
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<tr>
<td>Mid-cavity rotational operative delivery, or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Prolonged labour (&gt;24 hours), or</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>PPH &gt;1 litre or blood transfusion</td>
<td></td>
<td>Lower Risk</td>
<td></td>
</tr>
</tbody>
</table>
G. Home Visit Monitoring

Home Visit Postnatal Monitoring Chart

- as taken from Rekod Kesihatan Ibu KIK/1(a)/96 (Pind. 2012) dan KIK/1(b)/96 (Pind. 2012).
- Section on VTE (DVT / Pulmonary Thromboembolism) risk is highlighted.

<table>
<thead>
<tr>
<th>Keadaan Ibu</th>
<th>Hari</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>20</th>
<th>1/12</th>
<th>2/12</th>
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<tbody>
<tr>
<td>Tekanan darah</td>
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<td>Suhu badan</td>
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<td>Nadi</td>
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<tr>
<td>Perineum</td>
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</tbody>
</table>

Gejala dan tanda-tanda DVT / Pulmonary Thromboembolism

<table>
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<tr>
<th>Masalah</th>
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</thead>
<tbody>
<tr>
<td>Sakit / bengkak di kaki</td>
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<tr>
<td>Sakit dada</td>
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<tr>
<td>Susah bernafas</td>
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<tr>
<td>'Redness/Inflammation of lower limbs'</td>
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<td></td>
<td></td>
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<tr>
<td>'Calf tenderness' (sakit betis)</td>
<td></td>
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</tbody>
</table>

Masalah dan Pengendalian Postnatal Ibu

Amalan Perancang Keluarga: Ada / Tiada

Cara: ______________________
H. Medical Eligibility Criteria For Contraceptive Use

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA</th>
<th>LNG/ETG</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = initiation, C = continuation, BF = breastfeeding, NA = not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 40 = 2</td>
<td>18 - 45 = 1</td>
<td>&gt; 45 = 1</td>
<td>18 - 45 = 1</td>
<td>&gt; 45 = 2</td>
<td>18 - 45 = 1</td>
<td>&gt; 45 = 1</td>
<td>≥ 20 = 1</td>
<td></td>
</tr>
</tbody>
</table>

**Evidence:** In premenopausal adult women, combined hormonal contraceptive use has little to no effect on bone health, while appearing to preserve bone mass in the perimenopause. Postmenopausal women who have ever used COCs have similar BMD to women who have never used COCs. BMD in adolescent or premenopausal women may not accurately predict postmenopausal fracture risk.

**Age ≥ 40 years:** the risk of cardiovascular disease increases with age and may also increase with combined hormonal contraceptive use. In the absence of other adverse clinical conditions, combined hormonal contraceptives can be used until menopause.

**Evidence:** Most studies have found that women lose bone mineral density (BMD) while using DMPA, but regain BMD after discontinuing DMPA. It is not known whether DMPA use among adolescents affects peak bone mass levels or whether adult women with long duration of DMPA use can regain BMD to baseline levels before entering menopause. The relationship between DMPA-associated changes in BMD during the reproductive years and future fracture risk is unknown. Studies find no effect or have inconsistent results regarding the effects of POCs other than DMPA on BMD.
### Prevention & Treatment of Thromboembolism in Pregnancy & Puerperium (2014)

#### Training Manual

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = initiation, C = continuation, BF = breastfeeding, NA = not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SMOKING

| a) Age < 35 years | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| b) Age ≥ 35 years | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 |
| i. < 15 cigarettes /day | 4 | 3 | 4 | 1 | 1 | 1 | 1 | 1 |

**Evidence:** COC users who smoked were at increased risk of cardiovascular diseases, especially myocardial infarction, compared with those who did not smoke. Studies also showed an increased risk of myocardial infarction with increasing number of cigarettes smoked per day.

#### OBESITY

| a) ≥ 30 kg/m² BMI | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |

**Evidence:** Obese women who use COCs are more likely to experience VTE than obese women who do not use COCs. The absolute risk of VTE in healthy women of reproductive age is small.Limited evidence suggests that obese women who use COCs do not have a higher risk of acute myocardial infarction or stroke than obese non-

**Evidence:** Obese adolescents who used DMPA were more likely to gain weight than obese non-users, obese COC users, and non-obese DMPA users. This relationship was not observed among adult women.
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
</table>

I = initiation, C = continuation, BF = breastfeeding, NA = not applicable

users. Limited evidence is inconsistent regarding whether COC effectiveness varies by body weight or BMI. Limited evidence suggests obese women are no more likely to gain weight after three cycles of the vaginal ring or COCs than overweight or normal weight women. A similar weight gain during the three months was noted between the COC group and the vaginal ring group across all BMI categories. The effectiveness of the patch decreased among women who weighed > 90 kg; however, no association was found between pregnancy risk and BMI.
### Table: Prevalence of Thromboembolism in Pregnancy & Puerperium

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA</th>
<th>LNG/ETG</th>
<th>Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = initiation, C = continuation, BF = breastfeeding, NA = not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### HYPERTENSION

For all categories of HPT, classifications are based on the assumption that no other risk factors for cardiovascular disease exist. When multiple risk factors do exist, the risk of cardiovascular disease may increase substantially. A single reading of BP level is not sufficient to classify a woman as hypertensive.

<table>
<thead>
<tr>
<th>HYPERTENSION</th>
<th>3°</th>
<th>3°</th>
<th>3°</th>
<th>2α</th>
<th>2α</th>
<th>2α</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>c) History of HPT where BP CANNOT be evaluated (including HPT during pregnancy)</td>
<td>3Ψ</td>
<td>3Ψ</td>
<td>3Ψ</td>
<td>1ξ</td>
<td>2ξ</td>
<td>1ξ</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>d) Adequately controlled HPT, where BP CAN be evaluated</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>e) Elevated BP levels (properly taken measures)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>iii. systolic 140-159 or diastolic 90-99 mmHg</td>
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<tr>
<td>iv. systolic ≥ 160 or diastolic ≥ 100 mmHg</td>
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<td></td>
</tr>
<tr>
<td>f) Vascular disease</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

° Clarification: Evaluation of cause and level of HPT is recommended, as soon as feasible.

Evidence: Women who did not have a BP check before COC use had an increased risk of AMI and stroke.

α Clarification: It is desirable to have BP measurements taken before initiation of POC use. However, in some settings BP measurements are unavailable. In many of these settings pregnancy morbidity and mortality risks are high, and POCs are one...
### Prevention & Treatment of Thromboembolism in Pregnancy & Puerperium (2014)

**TRAINING MANUAL**

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = initiation, C = continuation, BF = breastfeeding, NA = not applicable</td>
<td></td>
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</tbody>
</table>

**Clarification:** Women adequately treated for HPT are at reduced risk of AMI and stroke as compared with untreated women.

Although there are no data, COC, P, R or CIC users with adequately controlled and monitored HPT should be at reduced risk of AMI and stroke compared with untreated hypertensive COC, P, R or CIC users.

**Evidence:** Among women with HPT, COC users were at increased risk of stroke, AMI, and peripheral arterial disease compared with nonusers. Discontinuation of COCs in women with HPT may improve BP control.

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Evidence:** Women who had a history of high BP in pregnancy, who also used COCs, had an increased risk of MI and VTE, compared with COC users who did not have a history of high BP during pregnancy. The absolute risks of AMI and VTE in this population remained small.
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEEP VEIN THROMBOSIS (DVT) / PULMONARY EMBOLISM (PE)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>a) History DVT/PE</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b) Acute DVT/PE</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>c) DVT/PE and established on anticoagulant therapy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e) Major surgery</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>i. with prolonged immobilisation</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ii. without prolonged immobilisation</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>f) Minor surgery without immobilisation</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

**Family history of DVT/PE (first-degree relatives):** some conditions which increase the risk of DT/PE are heritable.

**Evidence:** There is no direct evidence on the use of POCs among women with DVT/PE on anticoagulant therapy. Although evidence on the risk of venous thrombosis with the use of POCs is inconsistent in otherwise healthy women, any small increased risk is substantially less than that with COCs. Limited evidence indicates that intramuscular injections of DMPA in women on chronic anticoagulation therapy does not pose a significant risk of hematoma.

**Evidence:** Although evidence on the risk of venous thrombosis with the use of POCs is inconsistent, any small increased risk is substantially less than that with COCs. Limited evidence indicates that insertion of the LNG-IUD does not pose major...
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
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<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
</table>

I = initiation, C = continuation, BF = breastfeeding, NA = not applicable

- **DVT/PE:** Women on anticoagulation therapy who have a history of hemorrhagic ovarian cysts may benefit from DMPA use.
- **DVT/PE:** The LNG-IUD may be a useful treatment for menorrhagia in women on chronic anticoagulation therapy.

**KNOWN THROMBOGENIC MUTATIONS**

(e.g. factor V Leiden; prothrombin mutation; protein S, protein C and antithrombin deficiencies)

| 4 | 4 | 4 | 2 | 2 | 2 | 1 | 2 |

**Clarification:** Routine screening is not appropriate because of the rarity of the conditions and the high cost of screening.

**Evidence:** Among women with thrombogenic mutations, COC users had a two to twenty-fold higher risk of thrombosis than non-users

at the injection site or increase the risk of heavy or irregular vaginal bleeding.

bleeding risks in women on chronic anticoagulant therapy.
SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)

People with SLE are at increased risk of ischaemic heart disease, stroke and venous thromboembolism. Categories assigned to such conditions in the Medical eligibility criteria for contraceptive use should be the same for women with SLE who present with these conditions. For all categories of SLE, classifications are based on the assumption that no other risk factors for cardiovascular disease are present; these classifications must be modified in the presence of such risk factors. Available evidence indicates that many women with SLE can be considered good candidates for most contraceptive methods, including hormonal contraceptives.

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
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</table>

**SYSTEMIC LUPUS ERYTHEMATOSUS**

a) Positive (or unknown) antiphospholipid antibodies

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<tr>
<th></th>
<th>I</th>
<th>C</th>
<th></th>
<th>I</th>
<th>C</th>
<th></th>
<th>I</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

b) Severe thrombocytopenia

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>C</th>
<th></th>
<th>I</th>
<th>C</th>
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</tr>
</thead>
<tbody>
<tr>
<td>b)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>C</th>
<th></th>
<th>I</th>
<th>C</th>
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</tr>
</thead>
<tbody>
<tr>
<td>c)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>d)</td>
<td>2</td>
<td>2</td>
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</tbody>
</table>

Evidence:
Antiphospholipid antibodies are associated with a higher risk for both arterial and venous thrombosis.

SLE:
Severe thrombocytopenia increases the risk of bleeding. POCs may be useful in the treatment of menorrhagia in women with severe thrombocytopenia. However, given the increased or erratic bleeding that may be seen on initiation of DMPA and its irreversibility for 11-13 weeks after administration.

Clarification:
Severe thrombocytopenia increases the risk of bleeding. The category should be assessed according to the severity of the thrombocytopenia and its clinical man...
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
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<th>LNG-IUD</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>initiation of this method in women with severe thrombocytopenia should be done with caution.</td>
<td>ifestations. In women with very severe thrombocytopenia thrombocytopenia increases the risk of bleeding. The category should be assessed according to the severity of the thrombocytopenia and its clinical manifestations. In women with very severe thrombocytopenia who are at risk for spontaneous bleeding, consultation with a specialist and certain pretreatments may be warranted. Evidence: The LNG-IUD may be a useful treatment for menorrhagia in women with severe thrombocytopenia.</td>
<td></td>
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</tr>
</tbody>
</table>
### Prevention & Treatment of Thromboembolism in Pregnancy & Puerperium (2014)

#### POSTPARTUM

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = initiation, C = continuation, BF = breastfeeding, NA = not applicable</td>
<td></td>
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</tbody>
</table>

**POSTPARTUM**

(non-breastfeeding women)

a) < 21 days

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. without other risk factors for VTE</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ii. with other risk factors for VTE</td>
<td>3/4</td>
<td>3/4</td>
<td>3/4</td>
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</tbody>
</table>

b) ≥ 21 days

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. without other risk factors for VTE</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ii. with other risk factors for VTE</td>
<td>2/3</td>
<td>2/3</td>
<td>2/3</td>
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</tbody>
</table>

c) > 42 days

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<thead>
<tr>
<th></th>
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</thead>
</table>

**POSTPARTUM**

(breastfeeding or non-breastfeeding women, including after caesarean section)

a) < 48 hours including insertion immediately after delivery of the placenta

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>1 = not BF</td>
<td></td>
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</table>

b) ≥ 48 hours to < 4 weeks

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>3</th>
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</table>

c) ≥ 4 weeks

<table>
<thead>
<tr>
<th></th>
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</table>

d) Puerperal sepsis

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>4</th>
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</thead>
</table>
CONDITION | COC | CIC | P/R | POP | DMPA NET-EN | LNG/ETG Implants | Cu-IUD | LNG-IUD
--- | --- | --- | --- | --- | --- | --- | --- | ---

I = initiation, C = continuation, BF = breastfeeding, NA = not applicable

**Clarification:** For women up to 6 weeks postpartum with other risk factors for VTE, such as previous VTE, thrombophilia, immobility, transfusion at delivery, BMI > 30 kg/m², PPH, immediately post-caesarean delivery, pre-eclampsia or smoking, use of combined hormonal contraceptives may pose an additional increased risk of VTE. The category should be assessed according to the number, severity and combination of VTE risk factors present. Because each woman is unique with respect to her personal risk profile, clinical judgment will be necessary to determine if she may safely use CHCs.

**Evidence:** There is no direct evidence examining the risk of VTE among postpartum women using CHCs. VTE risk is elevated during pregnancy and the postpartum; this risk is most pronounced in the first weeks after delivery, declining to near baseline levels by 42 days postpartum. Use of CHCs, which increases the risk of VTE in healthy reproductive age women, may pose an additional risk if used during this time.

**Evidence:** Immediate postpartum copper IUD insertion, particularly when insertion occurs immediately after delivery of the placenta, is associated with lower expulsion rates than delayed postpartum insertion. Additionally, post-placental placement at the time of caesarean section has lower expulsion rates than post-placental vaginal insertions.

Insertion complications of perforation and infection are not increased by IUD placement at any time during the postpartum period.

**POSTPARTUM**

< 48 hours, ≥ 48 hours to < 4 weeks: there is concern that the neonate may
## Prevention & Treatment of Thromboembolism in Pregnancy & Puerperium (2014)

### CONDITION

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
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<th>P/R</th>
<th>POP</th>
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<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSTPARTUM &lt; 21 days: There is some theoretical concern regarding the association between combined hormonal contraceptive use up to three weeks postpartum and risk of thrombosis in the mother. Blood coagulation and fibrinolysis are essentially normalized by three weeks postpartum.</td>
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<tr>
<td>POST-ABORTION</td>
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<td></td>
</tr>
<tr>
<td>a) First trimester</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
<td>b) Second trimester</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c) Immediate post-septic abortion</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
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<td>4</td>
</tr>
</tbody>
</table>

**Clarification:** COCs, P, R or CICs may be started immediately post-abortion.

**Evidence:** Women who started taking COCs immediately after first-trimester medical or surgical abortion did not experience more side-effects or adverse vaginal bleeding outcomes or clinically significant changes in coagulation parameters compared to exposure to steroid hormones with LNG - IUD use during the first 4 weeks.

**Puerperal Sepsis:** Insertion of an IUD may substantially worsen the condition.

**Evidence:** Limited evidence suggests that there are no adverse side effects when Norplant or NET-EN are initiated after first-trimester abortion.

**Clarification:** IUDs can be inserted immediately after first-trimester, spontaneous or induced abortion.

**Evidence:** There was no difference in risk of complications for abortion versus following a first-trimester abortion.

### Evidence:

- Risk of pregnancy during the first 21 days postpartum is very low, but increases after that point; ovulation before first menses is common.
- Evidence: Women who started taking COCs immediately after first-trimester medical or surgical abortion did not experience more side-effects or adverse vaginal bleeding outcomes or clinically significant changes in coagulation parameters compared

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82
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
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<td></td>
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<tr>
<td>with women who used a placebo, an IUD, a non-hormonal contraceptive method, or delayed COC initiation. Limited evidence on women using the ring immediately after first-trimester medical or surgical abortion found no serious adverse events and no infection related to use of the combined vaginal contraceptive ring during three cycles of follow-up post-abortion.</td>
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<td>abortion. There were no differences in safety or expulsions for post-abortion insertion of an LNG-IUD compared with a Cu-IUD. <strong>Immediate post-septic abortion:</strong> insertion of a n IUD may substantially worsen the condition.</td>
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</tbody>
</table>
## I. Training Programme

<table>
<thead>
<tr>
<th>Session</th>
<th>Teaching Method</th>
<th>Time</th>
<th>Suggested Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>Self Administered Questionnaire</td>
<td>30 minutes</td>
<td>8.00 – 8.30am</td>
</tr>
<tr>
<td>Introduction</td>
<td>Briefing</td>
<td>10 minutes</td>
<td>8.30 – 8.40am</td>
</tr>
<tr>
<td>Pathophysiology of Obstetrics</td>
<td>Lecture</td>
<td>20 minutes</td>
<td>8.40 – 9.00 am</td>
</tr>
<tr>
<td>Thromboembolism</td>
<td></td>
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</tr>
<tr>
<td>Recognising Risk Factors</td>
<td>Lecture</td>
<td>40 minutes</td>
<td>9.00 – 9.40 am</td>
</tr>
<tr>
<td>&amp; Check List</td>
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</tr>
<tr>
<td>Prevention of VTE</td>
<td>Lecture</td>
<td>40 minutes</td>
<td>9.40 – 10.30 am</td>
</tr>
<tr>
<td></td>
<td>Tea Break</td>
<td>20 minutes</td>
<td>10.30 – 10.50 am</td>
</tr>
<tr>
<td>Diagnosis &amp; Treatment</td>
<td>Lecture</td>
<td>40 minutes</td>
<td>10.50 – 11.30 am</td>
</tr>
<tr>
<td>of Thromboembolism</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Referral Procedures</td>
<td>Lecture</td>
<td>30 minutes</td>
<td>11.30 – 12.00 noon</td>
</tr>
<tr>
<td>Contraceptive Considerations</td>
<td>Lecture</td>
<td>30 minutes</td>
<td>12.00 – 12.30 pm</td>
</tr>
<tr>
<td></td>
<td>Lunch</td>
<td>90 minutes</td>
<td>12.30 – 2.00 pm</td>
</tr>
<tr>
<td>Case Studies</td>
<td>Discussion / Group Work</td>
<td>120 minutes</td>
<td>2.00 – 4.00pm</td>
</tr>
<tr>
<td>Q &amp; A</td>
<td>Discussion</td>
<td>20 minutes</td>
<td>4.00 – 4.20 pm</td>
</tr>
<tr>
<td>Demonstration–Administration of</td>
<td>Demonstration</td>
<td>30 minutes</td>
<td>4.20 – 4.40 pm</td>
</tr>
<tr>
<td>LMWH &amp; Proper Application of TED</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>stocking</td>
<td></td>
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</tr>
<tr>
<td>Post Test</td>
<td>Self Administered Questionaire</td>
<td>30 minutes</td>
<td>4.40 – 5.10 pm</td>
</tr>
</tbody>
</table>
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