

# Venous Thromboembolism (VTE)

## Prevention protocol for adult patients

**Version 1.2**

**31 December 2023**

**Aim and scope:**

To standardize Venous Thromboembolism (VTE) risk assessment that delivers decision support to the point of care and standardize the clinical practice for VTE prevention to reduce morbidity and mortality related to thrombosis. The VTE prevention protocol developed to cover all related clinical specialties.

**Targeted end users:**

This protocol intended to be used by the physicians and other Health Care Providers working at MOH hospitals.

**Targeted population:**

All adult patients admitted to MOH hospitals.

**Level of Evidence:**

Review of best practice and expert opinion.

**Disclaimer:**

This living guidance is subject to updates with new emerging data or within 2 years. The task force members have no conflict of interest. This protocol is not attached to any funding.

**Scoring**

VTE prevention protocols selected VTE and bleeding risk assessment based on:

- Modified Caprini tool for all cases except obstetric.
- Royal College of Obstetrics & Gynecology (RCOG) VTE and bleeding risk assessment tool for Obstetric cases only (Antenatal & Postnatal)

### Modified Caprini

RISK FACTORS			
<b>1 score for each</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Age 41-60 years</li> <li><input type="checkbox"/> BMI &gt; 25 Kg/m<sup>2</sup></li> <li><input type="checkbox"/> Minor surgery</li> <li><input type="checkbox"/> Swollen legs (current)</li> <li><input type="checkbox"/> Varicose veins</li> <li><input type="checkbox"/> Major Surgery (in the past month)</li> <li><input type="checkbox"/> lung disease (e.g., emphysema or COPD)</li> <li><input type="checkbox"/> Currently on bed rest or restricted mobility</li> <li><input type="checkbox"/> History of Inflammatory bowel disease</li> <li><input type="checkbox"/> Acute myocardial infarction</li> <li><input type="checkbox"/> Congestive heart failure (&lt;1 month)</li> <li><input type="checkbox"/> Sepsis/ <b>Pneumonia</b> (&lt;1 month)/</li> <li><input type="checkbox"/> History of unexplained or recurrent spontaneous abortion (&gt;3)</li> <li><input type="checkbox"/> Pregnant or post-partum (&lt;1 month)</li> <li><input type="checkbox"/> Oral contraceptives or hormone replacement</li> </ul>	<b>2 score for each</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Age: 61-74 years</li> <li><input type="checkbox"/> Arthroscopic Surgery</li> <li><input type="checkbox"/> Laparoscopy Surgery (&gt;45 min)</li> <li><input type="checkbox"/> Major open Surgery (&gt;45 min)</li> <li><input type="checkbox"/> Cancer (current or previous)</li> <li><input type="checkbox"/> Immobilizing Plaster cast</li> <li><input type="checkbox"/> Bed bound for more than 72hrs</li> <li><input type="checkbox"/> Central venous access</li> </ul>	<b>3 score for each</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Age ≥ 75 years</li> <li><input type="checkbox"/> History of DVT/PE</li> <li><input type="checkbox"/> <b>Family history of VTE</b></li> <li><input type="checkbox"/> Factor V Leiden</li> <li><input type="checkbox"/> Prothrombin 20210A</li> <li><input type="checkbox"/> Lupus anticoagulant</li> <li><input type="checkbox"/> Anticardiolipin antibodies</li> <li><input type="checkbox"/> Elevated serum homocysteine</li> <li><input type="checkbox"/> Heparin-induced thrombocytopenia</li> <li><input type="checkbox"/> Other congenital or acquired thrombophilia</li> </ul>	<b>5 score for each</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hip, pelvis or leg fracture (within the past month)</li> <li><input type="checkbox"/> Stroke (within past month)</li> <li><input type="checkbox"/> Multiple trauma (within past month)</li> <li><input type="checkbox"/> Elective major lower extremity arthroplasty</li> <li><input type="checkbox"/> Acute Spinal cord injury – <b>paralysis</b> (within the past month)</li> </ul>

Based on the calculation of scores from the selected risk factors the patient should fall in one of the following risk levels:

RISK LEVEL			
If total scores equal to 0 or 1: <b>Low</b> risk	If total scores equal to 2: <b>Moderate</b> risk	If total scores equal to 3 or 4: <b>High</b> risk	If total scores equal to or more than 5: <b>Highest</b> risk

### VTE prophylaxis based on Modified Caprini risk levels

#### I- For all MEDICAL and GENERAL SURGICAL conditions:

Category	Supportive Care	Pharmacotherapy	Precautions
• <b>Low Risk</b>	• Encourage ambulation if not restricted	• No thromboprophylaxis required	
• <b>Moderate Risk</b>	• Encourage ambulation if not restricted • Offer mechanical prophylaxis if pharmacological prophylaxis contraindicated	• Enoxaparin 40 mg SC <b>once</b> daily <b>OR</b> • Unfractionated Heparin 5000 Units SC BID or TID <b>OR</b> • Fondaparinux dose 2.5 mg SC q24h	If CrCl < 30ml/min, Enoxaparin 30 mg subcutaneously <b>once</b> daily and avoid Fondaparinux
• <b>High Risk</b>	• Encourage ambulation if not restricted <b>with or without</b> mechanical prophylaxis	• Enoxaparin 40mg SC <b>once</b> daily <b>OR</b> • Unfractionated Heparin 5000 Units SC TID <b>OR</b> • Fondaparinux dose 2.5 mg SC q24h	If CrCl < 30ml/min, Enoxaparin 30 mg subcutaneously <b>once</b> daily and avoid Fondaparinux
• <b>Highest Risk</b>	• Encourage ambulation if not restricted <b>with</b> mechanical prophylaxis	• Enoxaparin 40mg SC <b>once</b> daily <b>OR</b> • Unfractionated Heparin 5000 Units SC TID <b>OR</b> • Fondaparinux dose 2.5 mg SC q24h	If CrCl < 30ml/min, Enoxaparin 30 mg subcutaneously <b>once</b> daily and avoid Fondaparinux

#### Prophylactic Dose Anticoagulation based on BMI and CrCl:

CrCl (ml/min)	BMI (Kg/m <sup>2</sup> )	Enoxaparin	Fondaparinux	Unfractionated heparin
>30	<40	40 mg SC q24h	2.5 mg SC q24h	5000 units SC q8-12h
	>40	40 mg SC q12h	5 mg SC q24h	7500 units SC q8h
<30	<40	7500 units SC q8h		
	>40	UFH 7500 units SC q8h		

#### Special consideration:

##### Oncology cases:

- Start prophylaxis early administration (postoperative, within 12 hours) or late administration (postoperative, after 12 hours) of antithrombotic prophylaxis in major surgical patients including cancer depending on bleeding risk
- Duration of anticoagulant for abdominal cancer surgery or previous VTE is **30 days**

##### Critical cases:

- For patient admitted to critical care units, routine assessment for VTE & bleeding risk is recommended and routine thrombo-prophylaxis is administered for at risk patients.
- For critical care patients who are at high-risk of bleeding, we recommend the optimal use of mechanical thromboprophylaxis with IPC at least until the bleeding risk decreases. When the high bleeding risk decreases.
- When the high bleeding risk decreases, we recommend that pharmacologic thromboprophylaxis be substituted for or added to the mechanical thromboprophylaxis.

## II- ORTHOPEDIC Surgery:

Category	Supportive Care	Pharmacotherapy	Precautions
<b>A. Elective hip replacement</b>			
<b>For patient undergoing elective total hip replacement (THR)</b>		<p>Recommended thromboprophylaxis either:</p> <p><b>a. LMWH:</b></p> <ul style="list-style-type: none"> <li>- At a usual high-risk dose 40 mg SC q24h initiated 12 h <b>before</b> surgery</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>- At a usual high-risk dose 30 mg SC q24h initiated 12 to 24 h <b>after</b> surgery</li> </ul> <p><b>OR</b></p> <p><b>b. Fondaparinux dose 2.5 mg SC q24h initiated 6-8 hr after surgery</b></p> <p><b>OR</b></p> <p><b>c. Apixaban 2.5 mg twice daily initiated 12-24 hr after surgery</b></p> <p><b>OR</b></p> <p><b>d. Adjusted-dose VKA (Warfarin)</b> started preoperatively the evening of the surgical day (<b>INR target 2.5, INR range: 2.0 – 3.0 for 35 days</b>)</p>	
<b>For patient undergoing THR who have a high risk of bleeding</b>	Optimal use of a mechanical method with IPC	When the high bleeding risk decreases, pharmacologic thromboprophylaxis be substituted for or added to the mechanical thromboprophylaxis	Patients placed on mechanical prophylaxis after surgery because of a high risk of bleeding should have their risk of bleeding consistently reassessed, with pharmacologic prophylaxis started as soon as the bleeding risk is decreased
<b>B. Elective Knee Replacement</b>			
<b>For patient undergoing total knee replacement (TKR)</b>		<p>Recommended thromboprophylaxis either:</p> <p><b>a. LMWH:</b></p> <ul style="list-style-type: none"> <li>- At a usual high-risk dose 30 mg SC q24h initiated 12 to 24 h after surgery</li> </ul> <p><b>OR</b></p> <p><b>b. Fondaparinux dose 2.5 mg SC q24h initiated 6-8 hr after surgery</b></p> <p><b>OR</b></p> <p><b>c. Apixaban 2.5 mg twice daily initiated 12-24 hr after surgery</b></p> <p><b>OR</b></p> <p><b>d. Adjusted-dose VKA (Warfarin)</b> started preoperatively of the evening of the surgical day (<b>INR target 2.5, INR range: 2.0 – 3.0 for 35 days</b>)</p>	
<b>For patient undergoing TKR who have a high risk of bleeding</b>	Optimal use of a mechanical method with IPC	When the high bleeding risk decreases, pharmacologic thromboprophylaxis be substituted for or added to the mechanical thromboprophylaxis to extend pharmacological prophylaxis beyond 10 days after discharge	

Category	Supportive Care	Pharmacotherapy	Precautions
<b>C. Hip Fracture Surgery (HFS)</b>			
<b>For patient undergoing HFS</b>		Routine thromboprophylaxis minimum 10 days up to 35 days is recommended: <b>a. Fondaparinux</b> 2.5 mg SC q24h initiated 6-8h after surgery <b>OR</b> <b>b. LMWH</b> 30mg SC q12h initiated 12-24hr after surgery <b>OR</b> <b>c. Adjusted dose VKA (Warfarin)</b> preoperatively (INR target. 2.5. INR range. 2.0 to 3.0)	
<b>D. Elective Spine Surgery</b>			
• <b>Low risk</b>	Encourage ambulation	No thromboprophylaxis required	
• <b>Moderate Risk such as:</b> - Advanced age - Malignancy - Neurological deficit - Previous VT - An anterior surgical approach	Optimal use of peri-operative IPC	The recommended thromboprophylaxis options: <b>a. Enoxaparin</b> 40 mg SC once daily <b>OR</b> <b>b. Unfractionated Heparin</b> 5000 Units SC or TID	VTE prophylaxis after elective spinal surgery can typically be initiated 12-24 hours postoperatively. Prophylaxis may need to be delayed if the surgical site remains open
• <b>Highest Risk</b>	Optimal use of a mechanical method (i.e. GCS and/or IPC)	The recommended thromboprophylaxis is one of the pharmacological thromboprophylaxis options combined with mechanical method: <b>a. Enoxaparin</b> 40 mg SC once daily <b>OR</b> <b>b. Unfractionated Heparin</b> 5000 Units SC or TID	
<b>E. Knee arthroscopy</b>			
• <b>Low risk</b>	Encourage ambulation	No thromboprophylaxis required	
• <b>High risk (multiple risk factors or following a complicated procedure)</b>	Early mobilization	The recommended thromboprophylaxis is one of the pharmacological thromboprophylaxis options combined with mechanical method: LMWH minimum of 10 days. <b>a. Enoxaparin</b> 40 mg SC once daily <b>OR</b> <b>b. Unfractionated Heparin</b> 5000 Units SC or TID	
<b>F. Isolated Lower Extremity Injuries Distal to the Knee</b>			
<b>For patient with Isolated Lower Extremity Injuries Distal to the Knee</b>		Routine use of thromboprophylaxis is <b>NOT</b> suggested	

### III. UROLOGIC Surgery:

Category	Supportive Care	Pharmacotherapy	Precautions
<b>For patient undergoing transurethral or other low risk procedures</b>	Early mobilization	The recommendation is <b>against</b> the use of thromboprophylaxis	
<b>For patient undergoing major open urologic procedures</b>		<p>The recommendation is to use <b>routine</b> thromboprophylaxis with:</p> <p><b>Pharmacological prophylaxis</b> alone:</p> <p><b>a. Enoxaparin</b> 40 mg SC once daily</p> <p><b>OR</b></p> <p><b>b. Unfractionated Heparin</b> 5000 Units SC TID</p> <p><b>OR</b></p> <p><b>Pharmacological plus mechanical prophylaxis</b></p>	<p>Patients with very high risk for bleeding, we recommend the optimal use of mechanical thromboprophylaxis with GCS and/or IPC at least until the bleeding risk decreases.</p> <p>When the high bleeding risk decreases, we recommend pharmacologic thrombo-prophylaxis substituted for or added to the mechanical thrombo-prophylaxis.</p>

### IV. LAPAROSCOPIC Surgery:

Category	Supportive Care	Pharmacotherapy	Precautions
<b>For patient undergoing entirely laparoscopic procedures who don't have additional risk factors</b>	Early mobilization	The recommendation is <b>against</b> the use of thromboprophylaxis	
<b>For patient undergoing entirely laparoscopic procedures who don't have additional risk factors</b>	Optimal use of a mechanical method (i.e., GCS and/or IPC)	<p>The recommendation is the use of <b>routine</b> thromboprophylaxis with either:</p> <p><b>Pharmacological prophylaxis</b> alone:</p> <p><b>a. Enoxaparin</b> 40 mg SC once daily</p> <p><b>OR</b></p> <p><b>b. Unfractionated Heparin</b> 5000 Units SC TID</p> <p><b>OR</b></p> <p><b>Pharmacological plus mechanical prophylaxis</b></p>	

### V. BARIATRIC Surgery:

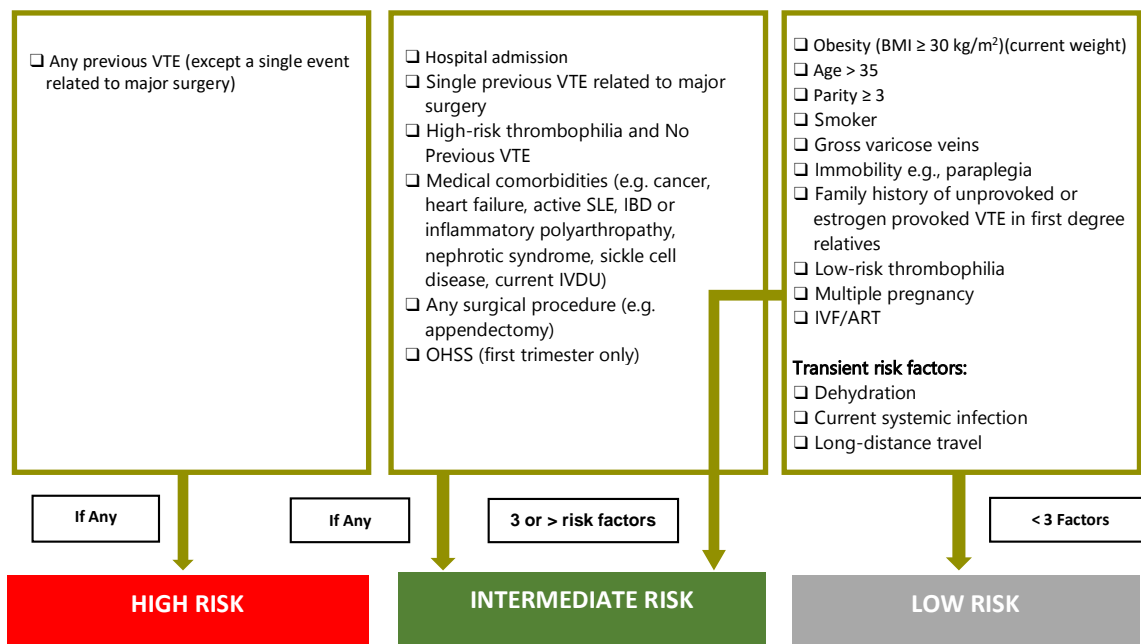
Category	Supportive Care	Pharmacotherapy	Precautions
<b>For patient undergoing inpatient bariatric surgery</b>	Optimal use of a mechanical method (i.e., GCS and/or IPC)	<p>The recommendation is the use of <b>routine</b> thromboprophylaxis with either:</p> <p><b>Pharmacological prophylaxis</b> alone:</p> <p><b>a. Enoxaparin</b> 40 mg SC once daily</p> <p><b>OR</b></p> <p><b>b. Unfractionated Heparin</b> 5000 Units SC TID</p>	



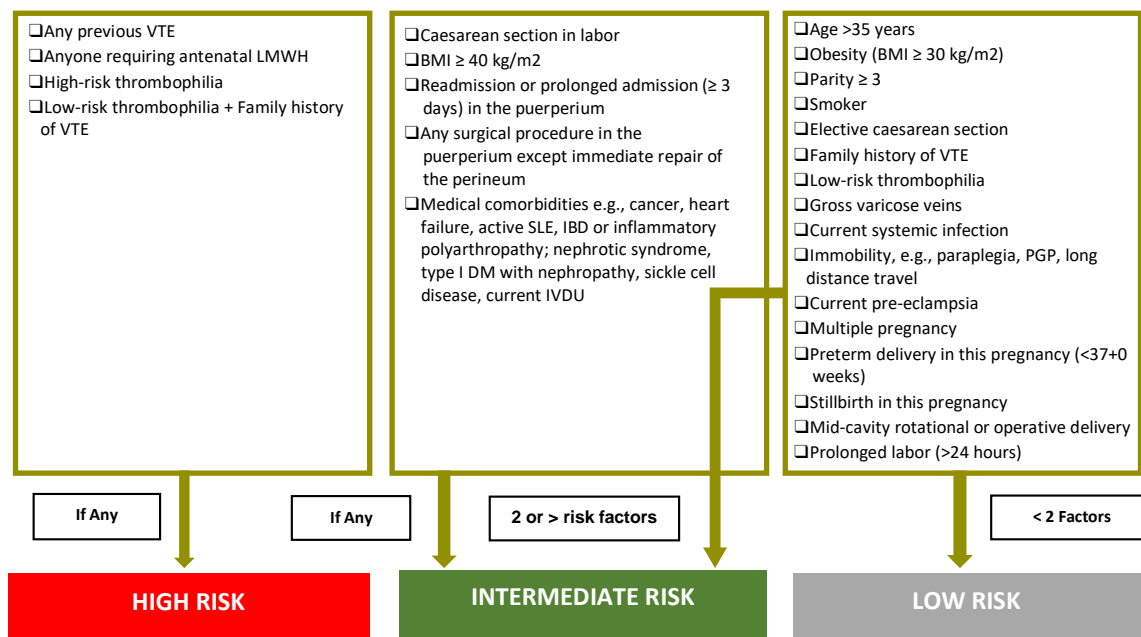
Category	Supportive Care	Pharmacotherapy	Precautions
		<b>OR</b> Pharmacological plus mechanical prophylaxis	

**RCOG VTE risk factors (refer to RCOG risk factor calculator):**

## VI. ANTENATAL:



## VII. POSTNATAL:





### VTE Prophylaxis based on RCOG risk levels

Risk factors in pregnancy and the puerperium	
Pre-existing risk factors	Score
Previous VTE (except a single event related to major surgery)	4
Previous VTE provoked by major surgery	3
Known high-risk thrombophilia	3
Medical comorbidities e.g., cancer, heart failure; active systemic lupus erythematosus, inflammatory polyarthropathy or inflammatory bowel disease; nephrotic syndrome; type I diabetes mellitus with nephropathy; sickle cell disease; current intravenous drug user	3
Family history of unprovoked or estrogen related VTE in first-degree relative	1
Known low-risk thrombophilia (no VTE)	1a
Age (> 35 years)	1
Obesity (body mass index [BMI] 30.0 kg/m <sup>2</sup> or higher) either pre pregnancy or in early pregnancy	1 or 2b
Parity ≥ 3	1
Smoker	1
Gross varicose veins	1

Obstetric risk factors	Score
Previous VTE (except a single event related to major surgery)	4
Previous VTE provoked by major surgery	3
Known high-risk thrombophilia	3
Medical comorbidities e.g., cancer, heart failure; active systemic lupus erythematosus, inflammatory polyarthropathy or inflammatory bowel disease; nephrotic syndrome; type I diabetes mellitus with nephropathy; sickle cell disease; current intravenous drug user	3
Pre-eclampsia in current pregnancy	1
ART/IVF (antenatal only)	1
Multiple pregnancy	1
Caesarean section in labor	2
Elective caesarean section	1
Mid-cavity or rotational operative delivery	1
Prolonged labor (> 24 hours)	1
PPH (> 1 liter or transfusion)	1
Preterm birth < 37+0 weeks in current pregnancy	1
Stillbirth in current pregnancy	1

Transient risk factors	Score
Any surgical procedure in pregnancy or puerperium except immediate repair of the 3 perineae, e.g., appendicectomy, postpartum sterilization	3
Hyperemesis	4
OHSS (first trimester only)	1
Current systemic infection	1
Immobility, dehydration	1

- If total score ≥ 4 antenatally, consider thromboprophylaxis from the first trimester. <sup>[1]</sup><sub>SEP</sub>
- If total score 3 antenatally, consider thromboprophylaxis from 28 weeks. <sup>[1]</sup><sub>SEP</sub>
- If total score ≥ 2 postnatally, consider thromboprophylaxis for at least 10 days. <sup>[1]</sup><sub>SEP</sub>

- If admitted to hospital antenatally consider thromboprophylaxis. <sup>[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100]</sup>
- If prolonged admission ( $\geq 3$  days) or readmission to hospital within the puerperium, consider thromboprophylaxis.

### VTE prophylaxis for OBSTETRICS (Ante and Post-natal):

- Pharmacological thromboprophylaxis should be avoided, discontinued or postponed in women at risk of bleeding after careful consideration of the balance of risks of bleeding and thrombosis.
- LMWH is safe and easy to use postpartum and has the advantage of not requiring monitoring.
- For those women receiving LMWH antenatally (and therefore for 6 weeks postpartum) or for those requiring 10 days' postpartum thromboprophylaxis, it is the agent of choice.
- Experience of LMWH in the puerperium reports no problems during breastfeeding

Category	Supportive Care	Pharmacotherapy	Precautions												
<ul style="list-style-type: none"><li><u>Low Risk</u></li></ul>	<ul style="list-style-type: none"><li>- Early mobilization &amp; avoid dehydration</li></ul>	<ul style="list-style-type: none"><li>- No thromboprophylaxis required</li></ul>													
<ul style="list-style-type: none"><li><u>Moderate Risk</u></li></ul>	<ul style="list-style-type: none"><li>- Encourage ambulation</li><li>- Intermittent pneumatic compression or Graduated compression stockings</li></ul>	<p>The recommendation is the use of <u>routine</u> thromboprophylaxis with either:</p> <p><b>a. Enoxaparin</b> SC once daily according to <b>current</b> weight as the following:</p> <table><thead><tr><th>Weight</th><th>Enoxaparin</th></tr></thead><tbody><tr><td>&lt; 50 kg</td><td><input type="checkbox"/>20 mg daily</td></tr><tr><td>50–90 kg</td><td><input type="checkbox"/>40 mg daily</td></tr><tr><td>91–130 kg</td><td><input type="checkbox"/>60 mg daily</td></tr><tr><td>131–170 kg</td><td><input type="checkbox"/>80 mg daily</td></tr><tr><td>&gt; 170 kg</td><td><input type="checkbox"/>0.6 mg/kg/ day</td></tr></tbody></table> <p><b>OR</b></p> <p><b>b. Unfractionated Heparin</b> 5000 Units SC BID or TID Antenatal prophylaxis from 28 weeks in pregnancy.</p>	Weight	Enoxaparin	< 50 kg	<input type="checkbox"/> 20 mg daily	50–90 kg	<input type="checkbox"/> 40 mg daily	91–130 kg	<input type="checkbox"/> 60 mg daily	131–170 kg	<input type="checkbox"/> 80 mg daily	> 170 kg	<input type="checkbox"/> 0.6 mg/kg/ day	
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Medication Related Information				
Medication	Contraindication	Major Drug Interactions	Required dose adjustment	Pregnancy
<b>Unfractionated Heparin (UFH)</b>	<ul style="list-style-type: none"> <li>- Severe thrombocytopenia</li> <li>- Uncontrolled active bleeding; except when due to DIC</li> </ul>	Apixaban Dabigatran Endoxaban Mifepristone Rivaroxaban Streptokinase Urokinase	<b>Renal impairment:</b> No specific recommendations are available <b>Hepatic impairment:</b> No specific recommendations are available <b>Geriatric:</b> No adjustment necessary; however, a higher incidence of bleeding has been reported in patients over 60 years of age, especially women, therefore lower doses of heparin may be indicated in these patients.	Fetal risk cannot be ruled out
<b>Enoxaparin</b>	<ul style="list-style-type: none"> <li>- Active major bleeding</li> <li>- History of immune-mediated heparin-induced thrombocytopenia within the past 100 days or in presence of circulating antibodies</li> <li>- Hypersensitivity to benzyl alcohol (present in multi-dose formulation)</li> <li>- Hypersensitivity to enoxaparin sodium, heparin, or pork products</li> </ul>	Apixaban Dabigatran Endoxaban Mifepristone Rivaroxaban Urokinase	<b>Renal impairment</b> (CrCl 30 to 80 mL/min): No adjustment necessary. <b>Renal impairment</b> (CrCl less than 30 mL/min): Unfractionated heparin recommended instead of low-molecular-weight heparin (LMWH); if LMWH is used, reduce usual recommended dose by 50%. <b>Renal impairment</b> (CrCl less than 30 mL/min) in prevention of DVT following abdominal surgery: 30 mg subQ once daily. <b>Renal impairment</b> (CrCl less than 30 mL/min) in prevention of DVT following hip or knee replacement surgery: 30 mg subQ once daily. <b>Renal impairment</b> (CrCl less than 30 mL/min) in prevention of DVT in medical patients during acute illness: 30 mg subQ once daily.	Fetal risk cannot be ruled out
<b>Warfarin</b>	<ul style="list-style-type: none"> <li>- Blood dyscrasias</li> <li>- Cerebral aneurysms</li> <li>- CNS hemorrhage</li> <li>- Dissecting aorta</li> <li>- Eclampsia, preeclampsia, threatened abortion</li> <li>- Gastrointestinal, genitourinary, or respiratory tract ulcerations or overt bleeding</li> <li>- Hemorrhagic tendencies</li> <li>- Hypersensitivity to warfarin or any component of the product</li> <li>- Major regional or lumbar block anesthesia</li> <li>- Malignant hypertension</li> <li>- Pericarditis and pericardial effusion</li> <li>- Pregnancy, except in pregnant women with mechanical heart valves, who are at high risk of thromboembolism</li> <li>- Recent or potential surgery of central nervous system or eye</li> <li>- Recent or potential traumatic surgery resulting in large open surface</li> <li>- Spinal puncture and other procedures with potential for uncontrollable bleeding</li> <li>- Unsupervised and potentially noncompliant patients</li> </ul>	Tamoxifen Streptokinase Urokinase Allopurinol Amiodarone Barbiturates Cholestyramine resin	<b>Renal impairment:</b> No adjustment necessary; monitor INR more frequently in patients with compromised renal function to maintain INR within the therapeutic range <b>Geriatric:</b> Consider using lower initial and maintenance dosage <b>Pregnancy, mechanical valve:</b> Warfarin to goal INR plus aspirin 75 mg to 100 mg/day during second and third trimesters; during first trimester, warfarin may be continued in patients who can achieve therapeutic INR with doses of 5 mg/day or less. Frequent monitoring required. Discontinue warfarin and initiate continuous infusion unfractionated heparin prior to planned vaginal delivery (guideline dosing)	Contraindicated

### Medication Related Information

Medication	Contraindication	Major Drug Interactions	Required dose adjustment	Pregnancy
<b>Fondaparinux</b>	<ul style="list-style-type: none"> <li>- Contraindicated in patients with a CrCl &lt; 30 mL/min/1.73 m<sup>2</sup> Body weight less than 50 kg in VTE prophylaxis</li> <li>- Active major bleeding</li> <li>- Thrombocytopenia associated with positive in vitro test for antiplatelet antibody in the presence of fondaparinux sodium</li> <li>- History of serious hypersensitivity reaction (eg, angioedema, anaphylactoid or anaphylactic reactions)</li> </ul>	Apixaban Dabigatran Endoxaban Mifepristone Rivaroxaban	<b>Renal impairment (CrCl 30 to 50 mL/min):</b> Use with caution; may cause prolonged anticoagulation. <b>Hepatic impairment (mild to moderate):</b> No dosage adjustment required; however, observe closely for signs/symptoms of bleeding. <b>Geriatric:</b> Pay particular attention to dosing directions and concomitant medications (especially anti-platelet medication). <b>Hemodiafiltration in patients with heparin-induced thrombocytopenia:</b> Initiate at 0.03 mg/kg post dialysis body weight, administered via the efferent line of the dialyzer; titrate in increments of 0.01 mg/kg post dialysis body weight based on post dialysis anti-Xa activity.	Fetal risk cannot be ruled out
<b>Apixaban</b>	<ul style="list-style-type: none"> <li>- Contraindicated in patients with a CrCl &lt; 25 mL/min/1.73 m<sup>2</sup> SCr &gt; 2.5 mg/dL</li> <li>- Active pathological bleeding</li> <li>- Severe hypersensitivity (eg, anaphylactic reactions) to apixaban</li> </ul>	Rifampin, phenytoin, carbamazepine, St. John's wort) protease inhibitors, itraconazole, ketoconazole	50% dose reduction if receiving 5 or 10 mg twice daily with strong CYP3A4 and P-gp inhibitor (e.g., protease inhibitors, itraconazole, ketoconazole, conivaptan)	Fetal risk cannot be ruled out

### References:

1. American College of Chest Physician VTE prevention guideline 2012
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3. Ay C, Dunkler D, Marosi C, et al. Prediction of venous thromboembolism in cancer patients. Blood 2010; 116:5377.
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**Dept./Unit:** \_\_\_\_\_ القسم/ الوحدة: \_\_\_\_\_

<b>MRN:</b>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	رقم الملف الطبي
<b>ID/PP .NO:</b>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	رقم اثبات الهوية /جواز
<b>NAME of Patient:</b>		
<b>NATIONALITY:</b>		
<b>AGE:</b>	<input type="text"/> YEARS سنه <input type="text"/> MONTHS شهر <input type="text"/> DAYS يوم	العمر:
<b>DATE OF BIRTH:</b>	20 <input type="text"/> / <input type="text"/> / <input type="text"/> هـ	تاريخ الميلاد
<b>GENDER:</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female	الجنس: <input type="checkbox"/> ذكر <input type="checkbox"/> انثى

## Adult In-Patient Venous Thromboembolism (VTE) Assessment and Prophylaxis

**Note: (To be assessed for all adult ( $\geq 18$  years) patients during admission and repeated if patients' condition changed)**

**Diagnosis:**

☐ Admission      ☐ Post-surgical procedure      ☐ Change in condition      ☐ Other

**STEP 1 : Mark risk factors then calculate the total score**

Risk Factor Score =1	Risk Factor Score = 2	Risk Factor Score = 3
<ul style="list-style-type: none"> <li>① Age 41 to 60 years</li> <li>① Medical patient at bed rest (e.g: Sick cell disease, dehydration, diabetes, .... etc )</li> <li>① Minor surgery planned</li> <li>① History of prior major surgery (&lt; 1 month)</li> <li>① Varicose veins</li> <li>① History of inflammatory bowel disease</li> <li>① Swollen legs (current)</li> <li>① Obesity (BMI &gt; 25)</li> <li>① Acute myocardial infarction</li> <li>① Congestive heart failure (&lt; 1 month)</li> <li>① Sepsis(&lt; 1 month)</li> <li>① Serious lung disease incl. pneumonia (&lt; 1 month)</li> <li>① Abnormal pulmonary function (COPD)</li> <li>① Oral contraceptives or hormone replacement therapy</li> <li>① Pregnancy or postpartum <b><u>(refer to antenatal and postnatal VTE prophylaxis forms)</u></b></li> <li>① History of unexplained stillborn infant, recurrent spontaneous abortion (≥ 3), premature birth with toxemia or growth restricted infant</li> </ul>	<ul style="list-style-type: none"> <li>② Age 61- 74 years</li> <li>② Arthroscopic surgery</li> <li>② Malignancy (present or previous)</li> <li>② Major surgery (&gt; 45 minutes) under G.A.</li> <li>② Laparoscopic surgery(&gt; 45 minutes)</li> <li>② Patient confined to bed (&gt; 72 hours)</li> <li>② Immobilizing plaster cast for lower limbs (&lt; 1 month)</li> <li>② Central venous access</li> </ul>	<ul style="list-style-type: none"> <li>③ Age ≥ 75 years</li> <li>③ Personal history of DVT/PE</li> <li>③ Family history of thrombosis</li> <li>③ Positive Factor V Leiden</li> <li>③ Elevated serum homocysteine</li> <li>③ Positive lupus anticoagulant</li> <li>③ Elevated anticardiolipin antibodies</li> <li>③ Positive prothrombin 20210A</li> <li>③ Heparin-induced thrombocytopenia (HIT)</li> <li>③ Other congenital or acquired thrombophilia : Protein C, Protein S, Antithrombin III</li> </ul>
		<p style="text-align: center;"><b>Risk Factor Score = 5</b></p> <ul style="list-style-type: none"> <li>⑤ Elective Knee or Hip Arthroplasty</li> <li>⑤ Hip and / or Pelvis fracture (&lt; 1 month)</li> <li>⑤ Stroke(&lt; 1 month)</li> <li>⑤ Multiple trauma(&lt; 1 month)</li> <li>⑤ Acute spinal cord (paralysis), (&lt; 1 month)</li> </ul>

**:Total Risk Factor Score**

**STEP 2 : Assess risk versus the benefit of prophylaxis in the patients with any of the following**

Contraindications	Warnings/Precaution
<input type="checkbox"/> Patient on therapeutic doses of: <b>Heparin / Enoxaparin / Fondaparinux / Warfarin / Rivaroxaban / Dabigatran / Apixaban</b>	<input type="checkbox"/> History of gastrointestinal bleed or Hemorrhagic stroke
<input type="checkbox"/> Hypersensitivity to low molecular weight heparin, unfractionated heparin, (including heparin-induced thrombocytopenia)	<input type="checkbox"/> Renal failure with Creatinine clearance less than 30 ml/min (for Enoxaparin-modify the dose)
Active bleeding / Fall Patients <input type="checkbox"/>	<input type="checkbox"/> Coagulopathy (high aPTT, PT/INR $\geq 1.5$ )
<input type="checkbox"/> Uncontrolled HTN (SBP >185 and/or DBP > 110 mmHg)	<input type="checkbox"/> Clinically significant thrombocytopenia (Platelet count less than 50)
<input type="checkbox"/> Epidural anesthesia (within last 12 hours or planned within next 12 hours)	<input type="checkbox"/> Recent intraocular surgery or intracranial surgery

**If the patient has any of the above or contra indicated to anticoagulation, order Mechanical Prophylaxis**

☐ Sequential Compression Device (SCD)[ **first priority** ]    ☐ Properly fitted graduated elastic compression stockings (ECS) (15-30mmHg)    ☐ Both

**If there are any contraindications to (SCD) & (ECS): Gangrene; Recent Skin Graft; Suspected existing lower limb Deep Venous Thrombosis: Use electric stimulation device.**







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**MRN:**  رقم الملف الطبي

**NAME of Patient:** \_\_\_\_\_ الاسم :

**NATIONALITY:** \_\_\_\_\_ الجنسية:

**AGE:**  YEARS سنة  MONTHS شهر  DAYS يوم \_\_\_\_\_ العمر :

**DATE OF BIRTH:** 20\_\_\_\_/\_\_\_\_/\_\_\_\_ هـ \_\_\_\_/\_\_\_\_/\_\_\_\_ تاريخ الميلاد

**GENDER:** ☐ Male ☐ Female انثى ☐ ذكر الجنس :

## Antenatal Venous Thromboembolism Assessment and Prophylaxis

**(to be assessed at first visit to obstetrics clinic and repeated in 2nd and 3rd trimester or if admitted)**

☐ Any previous Venous thromboembolism (VTE) except a single event related to major surgery

- ❑ Hospital admission.
- ❑ Single previous VTE related to major surgery.
- ❑ High-risk thrombophilia + no VTE
- ❑ BMI  $\geq 40$  kg/m<sup>2</sup>
- ❑ Medical comorbidities e.g., cancer, heart failure, active systemic lupus erythematosus, irritable bowel disease or inflammatory polyarthropathy, nephrotic syndrome, type I DM with nephropathy, sickle cell disease
- ❑ current IV Drug user
- ❑ Any surgical procedure e.g., appendectomy
- ❑ Ovarian hyper stimulation syndrome (OHSS) (first trimester only)

- ☐ Obesity (BMI  $\geq 30$  kg/m<sup>2</sup>)
- ☐ Age  $>35$
- ☐ Parity  $\geq 3$
- ☐ Smoker
- ☐ Gross varicose veins
- ☐ Current pre-eclampsia
- ☐ Immobility, e.g., paraplegia, pelvic girdle pain
- ☐ Family history of unprovoked or estrogen provoked VTE in first-degree relative
- ☐ Low-risk thrombophilia
- ☐ Multiple pregnancy
- ☐ IVF/ART (Antiretroviral Therapy / In Vitro Fertilization (IVF) pregnancy)

**Transient risk factors:** Dehydration/  
hyperemesis; Current systemic Infection,  
long-distance travel.

**If Any**

## HIGH RISK

Requires antenatal prophylaxis with LMWH.  
Refer to Consultant in pregnancy expert/team

**If Any**

## INTERMEDIATE RISK

Consider antenatal prophylaxis with LMWH.

**Four** or more risk factors:  
prophylaxis from first  
trimester.

**Three** risk factors:  
prophylaxis from 28weeks.

### <3Factors

## LOWER RISK

**Fewer than Three risk factors.**  
Mobilization and avoidance of dehydration

### Thromboprophylaxis doses for antenatal and postnatal LMWH

The recommended LMWH could be used as alternative according to hospital formulary

Weight	Enoxaparin	Tinzaparin (75 u/kg/day)	CrCl
< 50 kg	❑20 mg daily	❑3500 units daily	<b>CrCl &gt; 30 ml/min</b> Enoxaparin dose based to Wight. <b>CrCl &lt; 30 ml/min</b> Heparin 5000 IU subcutaneously of unfractionated heparin could be used and repeated every 12 hours until LMWH can be resumed after delivery.
50–90 kg	❑40 mg daily	❑4500 units daily	
91–130 kg	❑60 mg daily	❑7000 units daily	
131–170 kg	❑80 mg daily*	❑9000 units daily	
> 170 kg	❑0.6 mg/kg/day	❑75 u/kg/day	
High prophylactic dose for women weighing 50–90 kg	❑40 mg 12 hourly	❑4500 units 12 hourly	

### Mark contraindications to LMWH

- ☐ Known bleeding disorder
- ☐ Active bleeding
- ☐ Thrombocytopenia (platelet count < 50,000)
- ☐ Acute stroke in previous 4 weeks (hemorrhagic or ischemic)
- ☐ Uncontrolled hypertension
- ☐ Severe renal disease (glomerular filtration rate [GFR] < 30 ml/min/1.73 m<sup>2</sup>)
- ☐ Severe liver disease (prothrombin time above normal range or known varices)

Patient at significant risks for bleeding or contraindication to anticoagulation: ☐

- ☐ Use Sequential Compression Device (SCD) [first priority]
- ☐ Properly fitted graduated compression stockings (15-30mmHg)

**Contraindications of SCD:** Gangrene; Recent Skin Graft; Suspected existing Deep Venous Thrombosis

### Special Cases:

- ☐ Previous VTE + Anti phospholipid syndrome (APS): High dose. (The same dose of LMWH but TWICE daily)
- ☐ Previous VTE + Anti Thrombin deficiency: High dose. (The same dose of LMWH but TWICE daily)
- ☐ Recurrent VTE (2 or more): High dose. (The same dose of LMWH but TWICE daily)

**NAME of Patient:** \_\_\_\_\_

**MRN:** \_\_\_\_\_

الـمـلف الـطـبـي

**Unfractionated Heparin: Indications**

- ☐ Around the time of delivery in women at very high risk of thrombosis (when there may be reluctance to use LMWH in case regional anesthetic techniques are required)
- ☐ In women at increased risk of hemorrhage
- ☐ The required interval between a prophylactic dose of unfractionated heparin and regional analgesia or anesthesia is less (4 hours) than with LMWH (12 hours)

- ✓ This is a general guideline and the physician's clinical judgment may override it.
- ✓ If the patient's condition changes or if there is a procedure with bleeding risk, the risk stratification must be revised using a new form by the Primary Team
- ✓ Labs: Check baseline CBC and at least every 72 hours thereafter. Notify physician if platelet count less than 100,000 or drop by 50% from baseline, or renal impairment (CrCl < 30mL/min)

**Admission Date& time**

**Physicians Name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date &time :** \_\_\_\_\_

Nurse interventions:

- ☐ The nurse notified the physician to fill out the form
- ☐ Providing VTE mechanical prophylaxis devices.
- ☐ The nurse provided patient/family education (the patient received his/her injection by him/her-self.
- ☐ The patient receive only education about administration.
- ☐ The nurse applies prevention measures (nonpharmacologic measures):
  - ☐ Assist in early mobilization.
  - ☐ teaching foot-leg exercises.
  - ☐ Compression/elastic stockings

**Nurse'/Midwifery Name and Stamp:** \_\_\_\_\_

**Date, Time and**

**Signature:** \_\_\_\_\_

- ☐ Patient educated by pharmacist (medication information: indication, duration, frequency, important for adherence, suspected side effect...etc.
- ☐ Patient educated by health educator



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(to be assessed after delivery and repeated during obstetrics clinic visit or if re-admitted)

- ☐ Cesarean section in labor
- ☐ BMI  $\geq 40$  kg/m<sup>2</sup>
- ☐ Readmission or prolonged admission ( $\geq 3$  days) in the puerperium
- ☐ Any surgical procedure in the puerperium except immediate repair of the perineum
- ☐ Medical comorbidities e.g., cancer, heart failure, active systemic lupus erythematosus, irritable bowel disease or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease
- ☐ Current IV Drug user

- ☐ Age >35 years
- ☐ Obesity (BMI  $\geq$  30 kg/m<sup>2</sup>)
- ☐ Parity  $\geq$  3
- ☐ Smoker
- ☐ Elective caesarean section
- ☐ Family history of VTE
- ☐ Low-risk thrombophilia
- ☐ Gross varicose veins
- ☐ Current systemic infection
- ☐ Immobility, e.g., paraplegia, pelvic girdle pain, long distance travel
- ☐ Current pre-eclampsia
- ☐ Multiple pregnancy
- ☐ Preterm delivery in this pregnancy (<37+0 weeks)
- ☐ Stillbirth in this pregnancy
- ☐ Mid-cavity rotational or operative delivery
- ☐ Prolonged labour (>24 hours)
- ☐ Postpartum Hemorrhage >1 liter or blood transfusion

If

## HIGH RISK

**At least 6 weeks' postnatal prophylactic LMWH**

If

## INTERMEDIATE RISK

## At least 10 days 'postnatal prophylactic LMWH

**Note: If persisting or > 3 risk factors consider extending thromboprophylaxis with LMWH**

**Two or more risk factors**

## LOWER RISK

**(Fewer than two risk factors)**

Early mobilization and avoidance of dehydration

### Thromboprophylaxis doses for antenatal and postnatal LMWH

\*The recommended LMWH could be used as alternative according to hospital formulary

Weight	Enoxaparin	Tinzaparin (75 u/kg/day)	CrCl	<input type="checkbox"/> Known bleeding disorder <input type="checkbox"/> Active bleeding <input type="checkbox"/> Thrombocytopenia (platelet count < 50,000) <input type="checkbox"/> Acute stroke in previous 4 weeks (hemorrhagic or ischemic) <input type="checkbox"/> Uncontrolled hypertension <input type="checkbox"/> Severe renal disease (glomerular filtration rate [GFR] < 30 ml/min/1.73 m <sup>2</sup> ) <input type="checkbox"/> Severe liver disease (prothrombin time above normal range or known varices)
< 50 kg	<input type="checkbox"/> 20 mg daily	<input type="checkbox"/> 3500 units daily	<b>CrCl &gt; 30 ml/min</b> Enoxaparin dose based to wight. <b>CrCl &lt; 30 ml/min</b> Heparin 5000 IU subcutaneously of unfractionated heparin could be used and repeated every 12 hours until LMWH can be resumed after delivery.	
50–90 kg	<input type="checkbox"/> 40 mg daily	<input type="checkbox"/> 4500 units daily		
91–130 kg	<input type="checkbox"/> 60 mg daily	<input type="checkbox"/> 7000 units daily		
131–170 kg	<input type="checkbox"/> 80 mg daily	<input type="checkbox"/> 9000 units daily		
> 170 kg	<input type="checkbox"/> 0.6 mg/kg/day	<input type="checkbox"/> 75 u/kg/day		
High prophylactic dose for women weighing 50–90 kg	<input type="checkbox"/> 40 mg 12 hourly	<input type="checkbox"/> 4500 units 12 hourly		

Patient at significant risks for bleeding or contraindication to anticoagulation:

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