## 1. INTRODUCTION

1.1. VTE prophylaxis is considered one of the most important patient safety interventions.

1.2. The incidence of in hospital VTE is common. It is estimated that 10-20% of medical patients and up to 40% of surgical patients will develop a hospital acquired VTE.

1.3. The policy aims to insure that all adult patients seen in PSMMC are offered an appropriate assessment, protection and advice related to an increased risk of venous thromboembolism.

1.4. Pulmonary Embolism PE is the most common preventable cause of in hospital death, as reported by the AHRQ. PE resulting from VTE is a common and significant complication with 51% of patients with VTE will develop a subsequent PE. In addition, up to 50% of VTE patients will develop post phelbitic-syndrome. The cost of a single episode of VTE is estimated to be more than 15,000 USD per case.

## 2. PURPOSE

2.1. Primary prevention of venous thromboembolism in patients admitted in MODHS hospitals and long-term care facilities.

2.2. To insure that the appropriate level of prophylaxis for prevention of thromboembolism is offered to all adult patients who are at risk of embolism taking into account the patient individual clinical situation.

2.3. This policy **doesn't** address the following:

2.3.1. Management of Venous thromboembolism.

2.3.2. Secondary prevention of venous thromboembolism.

2.3.3. Outpatient primary prevention of venous thromboembolism.

## 3. APPLICABILITY

3.1. Hospital Departments

3.1.1. Nursing

3.1.2. Medical Administration

3.1.3. Pharmacy

3.2. Patient Population (Inclusion Area)

3.2.1. All adult inpatients ages 14 years and above.

## 4. RESPONSIBILITY

4.1. Physician:

4.1.1. Conduct the VTE risk assessment for all admitted patients under his/her care.

4.1.2. Document the risk assessment in the patient's electronic file.

4.1.3. Assess patient after 24 hours or whenever clinically indicated

4.1.4. Order VTE prophylaxis, when indicated.

4.1.5. Consultant must remind his/her team to conduct electronic VTE risk assessment for all adult inpatients.

4.1.6. All initiated VTE prophylaxis assessment must be completed within 24 hours of admission.

## 5. POLICY

5.1 All Adults In-patients should be assessed for their risk of developing *venous thromboembolism* on admission (within 24 hours) and reassessed after 24 hours/or if there is a change in the patient's clinical condition, using qualitative **or** quantitative risk assessment models. (Appendix.1 & 2)

5.2 Any patient meeting one or more of the VTE risk assessment criteria must be considered as candidate to VTE prophylaxis.

5.3 The admitting physician should weigh the risk of VTE prophylaxis against the risk of bleeding.

5.4 In case of non-compliance, the primary nurse must initiate an incidence report.

| **Recommendation** | **Strength of Recommendation *** |
|---|---|
| The choice between qualitative or quantitative risk assessment tools shall depend on physician preference or physician group consensus. | ☐A ☒B ☐C<br><br>☐A ☐B ☒C |
| Patients found to be at risk for developing Venous thromboembolism shall receive low molecular weight heparin or unfractionated heparin or fondaparinux +/- Adjunct therapy. (Appendix.3). | ☒A ☐B ☐C |

***Strength-of-Recommendation Taxonomy (SORT):**
**A:** Consistent, good-quality patient-oriented evidence **B:** Inconsistent or limited-quality patient-oriented evidence **C:** Consensus, disease-oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

## 6. QUALITY CONTROL

### 6.1. COMPLIANCE (PROCESS) MEASURE

6.1.1. Percentage of patients who received VTE prophylaxis when indicated:

6.1.1.1. ***Inclusion:*** Adult in-patients age 14 years

6.1.1.2. ***Numerator***: Patients who received VTE prophylaxis or have a documentation of why no VTE prophylaxis was given:

6.1.1.2.1. the day of or the day after hospital admission

6.1.1.2.2. the day of or day after surgery end date for surgeries that start the day of or day after hospital admission

6.1.1.3. ***Denominator***: All patients admitted.

6.1.1.4. ***Sampling:*** See MODHS KPI manual. Indicator code: VTE-1.

6.1.2. Formula: N/D * 100

6.1.3. Target: 95%

6.2. **EFFECTIVENESS(OUTCOME) MEASURE**

6.2.1. Rate of in-hospital VTE

**6.2.1.1. Numerator:** All admitted patients who developed an episode of VTE during their admission

6.2.1.2 **Denominator:** Total number of discharges for that month.

6.2.1.3 **Sampling size:** All in patients.

6.2.1.4 **Sampling method:** All

6.2.1.5 **Formula:** N/D * 1000.

6.2.1.6 **Target:** N/A.

## 7. REFERENCES


7.1. Saudi Association for Venous Thromboembolism, Guidelines for the prevention of venous thromboembolism mhttp://www.savte.com/download/SAVTE%20Guidelines%20Booklet.pdf

7.2. Borab ZM, Lanni MA, Tecce MG, Pannucci CJ, Fischer JP. Use of Computerized Clinical Decision Support Systems to Prevent Venous Thromboembolism in Surgical Patients: A Systematic Review and Meta-analysis. JAMA Surg. 2017 Jul;152(7):638–45.

7.3. Pannucci CJ, Swistun L, MacDonald JK, Henke PK, Brooke BS. Individualized Venous Thromboembolism Risk Stratification Using the 2005 Caprini Score to Identify the Benefits and Harms of Chemoprophylaxis in Surgical Patients: A Meta-analysis. Ann Surg. 2017 Jun;265(6):1094–103.

7.4. *Venous thromboembolism: reducing the risk for patients in hospital.* National institute for healthcare excellence (NICE) 2015. https://www.nice.org.uk/guidance/cg92

7.5. *VTE prophylaxis*. BMJ Best Practice. Jan 2017. http://bestpractice.bmj.com/best-practice/monograph/1087/treatment/step-by-step.html

7.6. MSD-H-1-AOP-002 VTE Prophylaxis Guideline Version No. 02

## 8. APPENDICES

8.1. Appendix 1 *VTE prophylaxis Physician order set/risk assessment* electronic form can accessed on Cerner (Home page, Scales and Assessment, go to Right corner down Arrow and chose VTE risk factor assessment)

8.2. Appendix 2 *VTE prophylaxis* ***CAPRINI*** *Risk assessment and order sheet* form Home page, Scales and Assessment, go to Right corner down Arrow and chose VTE risk factor assessment)

8.3. Appendix 3 Recommended VTE prophylaxis for medical and surgical patients.

| | | | | |
|---|---|---|---|---|
| **Medical City Wide Policy & Procedure** | **Dept.: Hospital Directorate** | | **Policy No: 1-1-8062-03-077**<br>**Version No: 03** | |
| **Title: Venous Thromboembolism Prophylaxis** | | | **JCI Code:** QPS | |
| **Supersedes:** *1-1-8062-03-077*<br>*Version No: 02; 16 August 2018* | **Issue Date:**<br>18 September 2022 | **Effective Date:**<br>13 September 2022 | **Revision Date:**<br>12 September 2025 | **Page 6 of 6** |

| | | |
|---|---|---|
| **Compiled by:**<br>**Care of Patient (COP) Team** | **Signature:** | **Date:**<br>14.8.2022 |
| **Reviewed by:**<br>• **Dr. Turki Al Mutairi**<br>**Executive Director of Nursing Affairs** | **Signature:** | **Date:**<br>28.8.2022 |
| • **Dr. Amr Momtaz Jad**<br>**Director of Medical Administration** | **Signature:** | **Date:**<br>25/8/2022 |
| • **Brig. Gen. Dr. Bander Al Harbi**<br>**Director of Pharmaceutical Services Department** | **Signature:** | **Date:**<br>31-8-2022 |
| **Reviewed by:**<br>**Dr. Samir Mohammed Bawazir**<br>**Director, Continuous Quality Improvement & Patient Safety (CQI&PS)** | **Signature:** | **Date:**<br>5.9.2022 |
| **Authorized by:**<br>**Maj. Gen. Dr. Mohsen Al Soqairy**<br>**Executive Director for Health Affairs**<br>**Chairman, Senior Medical Management Team (SMMT)** | **Signature:** | **Date:**<br>8.9.2022 |
| **Approved by:**<br>**Maj. Gen. Dr. Saud Othman Al Shlash**<br>**General Executive Director of Prince Sultan Military Medical City** | **Signature:** | **Date:**<br>13.9.2022 |

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# Adult In-Patient VTE Venous Thromboembolism Screening & order sheet (CAPRINI)

Department / Ward: _____ Code: _____ Date: _____

Consultant Name: _____ Number: ☐☐☐☐ Bleep: ☐☐☐☐

- All patients should be risk assessed on admission to hospital. Patients should be reassessed within 24 hours of admission and whenever the clinical situation changes.
- This form is considered as a physician order and should be filed in the ***"physician's orders"*** section of the medical record.

| ☐ **Admission** | ☐ **Post-surgical procedure** | ☐ **Change in condition** | ☐**Other; specify**_____ |
|---|---|---|---|

**STEP 1: Select the risk factors then add subtotal and calculate the total score**

| **Risk Factor Score** *Assign 1 point for each of the following* | **Risk Factor Score** *Assign 2 points for each of the following* | **Risk Factor Score** *Assign 3 points for each of the following* | **Risk Factor Score** *Assign 5 points for each of the following* |
|---|---|---|---|
| ❑ Age 41 to 60 years<br>❑ Leg Swelling (current)<br>❑ Varicose veins<br>❑ Obesity (BMI>25)<br>❑ Minor surgery planned<br>❑ Acute myocardial infarction<br>❑ Congestive heart failure (<1 month)<br>❑ Medical patient currently at bed rest<br>❑ History of prior major surgery (<1month)<br>❑ Sepsis (<1month)<br>❑ Abnormal pulmonary function (COPD)<br>❑ Serious lung disease including pneumonia (<1month)<br>❑ Oral contraceptive or hormone replacement therapy<br>❑ Inflammatory Bowel Disease<br>❑ Pregnancy and Post-Partum (up to 1 month)<br>❑ History of unexplained stillborn infant, recurrent spontaneous abortion (≥3), premature birth with toxemia or growth-restricted infant | ❑ Age 61 to74 years<br>❑ Arthroscopic surgery<br>❑ Central venous access<br>❑ Major surgery (>45 minutes)<br>❑ Laparoscopic surgery (>45 minutes)<br>❑ Malignancy (present or previous)<br>❑ Patient confined to bed (>72 hours)<br>❑ Immobilizing plaster cast (<1month) | ❑ Age 75 years or older<br>❑ History of VTE/PE<br>❑ Family history of thrombosis *<br>❑ Positive Prothrombin 20210A<br>❑ Positive Lupus anticoagulant<br>❑ Positive factor V Leiden<br>❑ Elevated serum homocysteine<br>❑ Heparin induced thrombocytopenia (HIT)<br>❑ Elevated cardiolipin antibodies<br>❑ Other congenital or acquired thrombophilia<br><br>** Commonly missed risk factor* | ❑ Stroke with paralysis<br>❑ Multiple trauma (<1month)<br>❑ Stroke (<1month)<br>❑ Elective major lower extremity arthroplasty<br>❑ Hip, pelvis or leg fracture (<1month)<br>❑ Acute spinal cord injury (<1month) |
| **Subtotal:** | **Subtotal:** | **Subtotal:** | **Subtotal:** |

| **Total Risk Factor Score:** | ❑ **Very low risk**<br>0 score<br>**Early ambulation** | ❑ **Low risk**<br>Score of 1-2<br>**Sequential Compression Device (SCD)** | ❑ **Moderate Risk**<br>Score of 3 or 4<br>**Prophylaxis needed** | ❑ **High Risk**<br>Score of 5 or more<br>**Prophylaxis needed** |
|---|---|---|---|---|

***Complete next page for contraindications/precautions (STEP 2) and VTE prophylaxis order (STEP3)***

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Appendix.1

| STEP 2: Assess risk versus benefit of prophylaxis in the patients with any of the following: | |
|---|---|
| **Contraindications** | **Warnings/Precaution** |
| ❑ Active bleeding / Patients at risk of fall<br>❑ Hypersensitivity to low molecular weight heparin,<br>❑ unfractionated heparin, (including heparin-induced thrombocytopenia)<br>❑ Patient on therapeutic doses of Heparin/Enoxaparin or therapeutic INR<br>❑ Uncontrolled HTN (SBP greater than 185 and/or DBP greater than110 mmHg)<br>❑ Epidural anesthesia (within last 12 hours or planned within next 12 hours)<br>❑ Recent intraocular surgery or intracranial surgery | ❑ History of gastrointestinal bleed or hemorrhagic stroke<br>❑ Renal failure with Creatinine clearance < 30 ml/minute<br>❑ (for Enoxaparin Consult-Clinical Pharmacist)<br>❑ Coagulopathy (high aPTT, PT/INR)<br>❑ Clinically significant thrombocytopenia (platelet count less than 50) |

**If the patient has any of the above or anticoagulation is otherwise contra-indicated, order the following Mechanical Prophylaxis:**

□ Sequential Compression Device (SCD)
□ Properly fitted Graduated Compression Stocking (15-30 mmHg)
□ Both

**Note that mechanical devices are contraindicated in patient with;** Severe peripheral vascular disease (ABPI ≤ 0.5), Severe CHF, compartment syndrome of affected extremity, fracture of affected extremity, local conditions such as: gangrene, recent skin graft, or open wound of the affected extremity, known or suspected acute/subacute DVT (apply Sequential Compression Device to contralateral limb if indicated)

**STEP 3: Select one or more of the treatment options (MANDATORY)**

| Risk Level | Risk Score | Non-Pharmacologic | Pharmacologic | Mechanical Device |
|---|---|---|---|---|
| **Very Low** | 0 | □ Early ambulation | □ Other; specify: _____ | |
| **Low** | 1-2 | □ Early ambulation | □ Other; specify: _____ | |
| **Moderate** | 3-4 | □ Early ambulation | ❑ Heparin 5000 units SQ TID<br>❑ Enoxaparin 40mg SQ daily (WT < 150kg, CrCl > 30mL/min)<br>❑ Enoxaparin 30mg SQ daily (WT < 150kb, CrCl = 10-29mL/min)<br>❑ Enoxaparin 30mg SQ BID (WT > 150kg, CrCl > 30mL/min | |
| **High** | ≥ 5 | □ Early ambulation | ❑ Heparin 5000 units SQ TID<br>❑ Enoxaparin 40mg SQ daily (WT < 150kg, CrCl > 30mL/min)<br>❑ Enoxaparin 30mg SQ daily (WT < 150kb, CrCl = 10-29mL/min)<br>❑ Enoxaparin 30mg SQ BID (WT > 150kg, CrCl > 30mL/min) | **Plus,** Sequential Compression Device or Graduated Compression Stockings |

❑ **No orders for prophylaxis; (Reason):** _____

**Check the baseline CBC and at least every 72 hours thereafter. Notify physician if platelet count less than 100,000 or drop by 50% from the baseline.**

**Physician's Name:** _____ **Signature:** _____ **Date:** _____ **Time:** _____

**This document is a general guideline and the Physician's clinical judgment may override it.**

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# VTE prophylaxis - NICE

Physician order set

Department / Ward: ..... Code: ..... Date: .....

Consultant Name: ..... Number: ☐☐☐☐ Bleep: ☐☐☐☐

- ***Step1***: *All patients should be risk assessed on admission to hospital. Patients should be reassessed within 24 hours of admission and whenever the clinical situation changes. Review the patient-related factors shown on the assessment sheet (page 2) against thrombosis risk, ticking each box that applies (more than one box can be ticked).*
- ***Step 2***: *Review the patient-related factors shown against bleeding risk and tick each box that applies. Any tick should prompt clinical staff to consider if bleeding risk is sufficient to preclude pharmacological intervention*
- ***Step3:*** *Any tick for thrombosis risk should prompt thromboprophylaxis. Order VTE prophylaxis using the standard order set in page 1.*

| Time / Date | Doctors order | Doctors authentication | Action by | Time / Date |
|---|---|---|---|---|
| | ☐ **VTE prophylaxis not indicated.**<br>*Please specifiy the reason:.....* | | | |
| | ☐ Early mobilization<br>*Offer to all patients*<br>*Special instructions:.....* | | | |
| | ***Pharmacological***<br>*Offer to all patients at risk unless contraindicated*<br>*(Choose one)* | | | |
| | ☐ Enoxaparin ..... mg SC ***daily*** for ..... days | | | |
| | ☐ Enoxaparin ..... mg SC ***BID*** for ..... days | | | |
| | ☐ Fondaparinux ..... mg SC ***daily*** for ..... days<br>*Fondaparinux is contraindicated in patients with CrCl less than 30 mL/min* | | | |
| | ☐ Heparin ..... units SC ***TID*** for. ..... days<br>*(for patients with severe renal impairment or established renal failure estimated glomerular filtration rate of less than 30 ml/min/1.73m2 ).* | | | |
| | ☐ Other (specifiy):..... | | | |
| | ***Non-pharmacological***<br>*Use if pharmacological treatment is <u>contraindicated</u> **or** in combination in <u>special clinical situations</u>* | | | |
| | ☐ Apply graduated anti-embolic stockings | | | |
| | ☐ Intermittent pneumatic compression (IPC)<br>*IPC devices can also be added to pharmacological agents in selected high-risk patients, such as those with cancer undergoing major surgery* | | | |

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Appendix.2

Patient Number ☐☐☐☐☐☐☐☐☐☐

# VTE Risk assessment

## Mobility – all patients (tick one box)

☐ Surgical patient
*If Ticked: Assess for thrombosis and bleeding risk below*

☐ Medical patient expected to have ongoing reduced mobility relative to normal state
*If Ticked: Assess for thrombosis and bleeding risk below*

☐ Medical patient NOT expected to have significantly reduced mobility relative to normal state
*If Ticked: Risk assessment now complete*

## Thrombosis Risk (tick more than one box)

*Any tick for thrombosis risk should prompt thromboprophylaxis. Order VTE prophylaxis using the standard order set in page 1*

### Patient related

- ☐ Active cancer or cancer treatment
- ☐ Age > 60
- ☐ Dehydration
- ☐ Known thrombophilia's
- ☐ Obesity (BMI >30 kg/m2)
- ☐ One or more significant medical comorbidities (eg heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- ☐ Personal history or first-degree relative with a history of VTE
- ☐ Use of hormone replacement therapy
- ☐ Use of estrogen-containing contraceptive therapy
- ☐ Varicose veins with phlebitis
- ☐ Pregnancy or < 6 weeks post-partum with any additional risk factor of the above risk factors or one of the following: excess blood loss or blood transfusion, pregnancy related risk factor (such as ovarian hyperstimulation, hyperemesis gravidarum, multiple pregnancy)

### Admission related

- ☐ Significantly reduced mobility for 3 days or more
- ☐ Hip or knee replacement
- ☐ Hip fracture
- ☐ Total anaesthetic + surgical time > 90 minutes
- ☐ Surgery involving pelvis or lower limb with a total anaesthetic + surgical time > 60 minutes
- ☐ Acute surgical admission with inflammatory or intra-abdominal condition
- ☐ Critical care admission
- ☐ Surgery with significant reduction in mobility
- ☐ Expected to have significantly reduced mobility for 3 or more days

## Bleeding risk (tick more than one box)

*Any tick should prompt clinical staff to consider if bleeding risk is sufficient to preclude pharmacological intervention*

### Patient related

- ☐ Active bleeding
- ☐ Acquired bleeding disorders (such as acute liver failure)
- ☐ Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with INR >2)
- ☐ Acute stroke
- ☐ Thrombocytopenia (platelets< 75x109 /l)
- ☐ Uncontrolled systolic hypertension (230/120 mmHg or higher)
- ☐ Untreated inherited bleeding disorders (such as hemophilia and von Willebrand's disease)

### Admission related

- ☐ Neurosurgery, spinal surgery or eye surgery
- ☐ Other procedure with high bleeding risk
- ☐ Lumbar puncture/epidural/spinal anesthesia expected within the next 12 hours
- ☐ Lumbar puncture/epidural/spinal anesthesia within the previous 4 hours

***Appendix. 3 Recommended VTE prophylaxis for medical and surgical patients***

| Population | Early mobilization | Pharmacological treatment | Graduated compression stockings | Intermittent pneumatic compression devices (IPC) |
|---|---|---|---|---|
| ***At risk medical patients*** | √ | √<br>Unless contraindicated | Use when pharmacological treatment is contraindicated | |
| ***Trauma patients*** | √ | √<br>Unless contraindicated | | √<br>when not contraindicated by lower-extremity injury |
| ***Major orthopedic surgery*** | √ | √<br>Unless contraindicated | √<br>• Add to pharmacological treatment<br>• IPC is more effective than compression stocking as adjunct | |
| ***Minor orthopedic surgery with additional risk factors for VTE*** | √ | √<br>Unless contraindicated | Use when pharmacological treatment is contraindicated | |
| ***Bariatric surgery*** | √ | √<br>Unless contraindicated | √<br>In selected high-risk patients | |
| ***Vascular surgery*** | √ | √<br>Unless contraindicated | | √<br>Can be added to treatment with pharmacological agents in selected high-risk patients if there is no peripheral arterial disease |
| ***Major gynecological, urological, or general surgery or with additional VTE risk factors*** | √ | √<br>Consider extended prophylaxis up to 28 days | √<br>• Add to pharmacological treatment<br>• IPC is more effective than compression stocking as adjunct | |
| ***Minor gynaecological, urological, or general surgery, including laparoscopic surgery, without additional VTE risk factors*** | √ | | √ | |
| ***Thoracic surgery*** | √ | √<br>Unless contraindicated | √<br>Add to treatment with pharmacological agents in selected high-risk patients | |
| ***Cardiac surgery*** | √ | √<br>Unless contraindicated | √<br>• Add to pharmacological treatment<br>• IPC is more effective than compression stocking as adjunct | |
| ***Neurosurgery & Elective spinal surgery*** | √ | √<br>Unless contraindicated | √<br>• Add to pharmacological treatment<br>• IPC is more effective than compression stocking as adjunct | |