Rationale for an Initiative to Prevent the Development of Thromboprophylaxis

It is estimated that rates of asymptomatic deep venous thrombosis in patients undergoing general surgical procedures range between 15 and 30% in the absence of prophylaxis. For more than 40 years, randomized trials have shown that thromboprophylaxis safely prevents clinically important thromboembolic events. In 1975, a randomized controlled trial demonstrated that low dose heparin significantly reduced the rates of asymptomatic DVT, symptomatic DVT and fatal PE. Since then, hundreds of randomized controlled trials, meta-analyses, systematic reviews, and guidelines on thromboprophylaxis in major abdominal general surgery have been published.

Despite the overwhelming evidence that thromboprophylaxis is an essential component of the post operative care of general surgery patients, there is evidence that prophylaxis is not used as consistently as recommended nor as well as surgeons think it is being used in their patients. An audit of 123,000 patients hospitalized in the United States found that the majority received no prophylaxis. Among general surgical patients, 78% received no prophylaxis and 83% did not receive a prophylaxis option recommended by the 6th American College of Chest Physicians (ACCP) Consensus Guidelines on the Prevention of Venous Thromboembolism. A recent chart review in eight hospitals in the Greater Toronto Area revealed that only 43% of major general surgery patients received a recommended method of thromboprophylaxis.

The primary objectives of this document are to briefly review the rationale and evidence behind strategies for thromboprophylaxis, to describe circumstances where evidence is lacking and to provide recommendations for implementation of thromboprophylaxis in the University of Toronto Division of General Surgery as part of the Best Practice in General Surgery initiative.

1. Low risk patients

Includes all patients who have outpatient surgery as well as patients undergoing minor procedures such as anorectal procedures, inguinal hernia repairs, laparoscopic cholecystectomy, or breast surgery who have no additional thromboembolic risk factors.
Recommendation:

- No thromboprophylaxis is required
- Encourage early and frequent ambulation

Rationale:

The risk of VTE in patients undergoing procedures such as hernia repairs and laparoscopic cholecystectomies is extremely low⁵,⁶. For this reason, the ACCP guidelines recommend against the use of thromboprophylaxis apart from early ambulation unless the patient is at increased risk for other reasons. If the patient undergoes an open cholecystectomy, then the same prophylaxis should be employed as for other abdominal operations.

There are no RCTs assessing DVT prophylaxis in breast cancer surgery. The reported thrombosis risk is low in this group and there are concerns about wound hematomas with anticoagulant use. Anticoagulant prophylaxis should be considered in patients having breast surgery who have additional thromboembolic risk factors and an extended hospital stay⁷.

2. General surgery patients having elective or emergency abdominal surgery

Includes all patients having an open or laparoscopic procedure for benign or malignant disease irrespective of their age or other risk factors for VTE. This also includes patients having open cholecystectomy. (see guideline 1 for patients having elective laparoscopic cholecystectomy)

Recommendation:

- In patients where there is no contraindication to anticoagulant prophylaxis, they should receive one of the following LMWHs:
  - Lovenox (enoxaparin) 40 mg subcutaneously q 24 hours OR
  - Fragmin (dalteparin) 5000 units subcutaneously q 24 hours
- Prophylaxis should be started pre-operatively at the time of the “time out”.
- LMWH (enoxaparin or dalteparin) should be given on the first post-operative day preferably between 1000-1200 hours and daily thereafter
- Prophylaxis should be continued until patient is discharged from hospital
- For patients at high risk for bleeding, where anticoagulation prophylaxis is contraindicated, bilateral well measured below knee support stockings or SCDs should be used. Patients should be reassessed daily and converted to LMWH when the risk of bleeding is decreased.
- Encourage early and frequent ambulation

Rationale:

Numerous RCTs and meta-analyses in patients undergoing major abdominal surgery over a 40 year period have demonstrated a consistent 70% or greater relative risk reduction in DVT as well as a similar decrease in PE. This evidence is summarized in the ACCP guidelines and elsewhere.
In patients with cancer undergoing major abdominal or pelvic surgery there is evidence that asymptomatic DVT can be reduced by extending LMWH prophylaxis to about one month after surgery. However, the ACCP guidelines do not recommend routine post-discharge prophylaxis because it was felt that the evidence was insufficient to make such a recommendation. There was no significant difference in either the rate of proximal DVT or symptomatic VTE in the best clinical trial and there would be enormous cost and logistical implications and possible risks if such a policy was implemented. The ACCP guidelines, therefore, suggest that this option be considered in selected high-risk patients.

Special Circumstances:

a. Patients having elective or emergency abdominal surgery after 6 PM

Recommendation:

- Patients should receive half of the regular dose of LMWH preoperatively. Thus, they should receive:
  - Lovenox (enoxaparin) 20 mg subcutaneously OR
  - Fragmin (dalteparin) 2500 units subcutaneously
- Prophylaxis should be started pre-operatively at the time of the “time out”.
- Full dose of LMWH (enoxaparin 40 mg or dalteparin 5,000 units, subcutaneously q 24 hours) should then be given on the first post-operative day preferably between 1000-1200 hours and daily thereafter
- Prophylaxis should be continued until patient is discharged from hospital
- Encourage early and frequent ambulation

b. Patients having an epidural catheter

Recommendation:

- Epidural catheter should be inserted before surgery
- The first dose of prophylaxis can be given 2-8 hours after the epidural catheter is inserted provided it has not been a traumatic insertion. Full prophylactic dose can be given including either:
  - Lovenox (enoxaparin) 40 mg subcutaneously
  - Fragmin (dalteparin) 5000 units subcutaneously
- Full dose of LMWH (enoxaparin 40 mg or dalteparin 5,000 units) should then be given on the first post-operative day preferably between 1000-1200 hours and daily thereafter
  - Lovenox (enoxaparin) 40 mg subcutaneously q 24 hours
  - Fragmin (dalteparin) 5000 units subcutaneously q 24 hours
- Generally the epidural catheter should be removed between 8 and 10 AM (ie: 20-24 hours after a dose of LMWH) and prophylaxis can be restarted 2 hours following removal
- Encourage early and frequent ambulation
There is no evidence from randomized controlled trials on the timing of thromboprophylaxis following insertion of epidural catheters. Furthermore, the risk of a spinal hematoma is exceeding low but can be a devastating complication. The American Society of Regional Anaesthesia and Pain Medicine (ASRA) guidelines recommend delaying administration of prophylaxis for 6-8 hours post-operatively (one presumes the recommendation is actually meant to be post-insertion of an epidural catheter). On the other hand, others have concerns that the risk of a VTE in high risk individuals is significant so that delay of prophylaxis may have negative consequences. The ASRA also recommends that thromboprophylaxis may be given 2 hours after removal of an epidural catheter. To accommodate these concerns, the BPIGS recommendation is to give VTE prophylaxis between 2-8 hours after catheter insertion with the final decision being made in consultation with the anaesthetist and surgeon.

c. Adjustment of thromboprophylaxis according to weight

Recommendation:

- For patients weighing <40kg, the dose should be adjusted to:
  - Lovenox (enoxaparin) 30 mg subcutaneously q 24 hours OR
  - Fragmin (dalteparin) 2500 units subcutaneously q 24 hours

- For morbidly obese patients having bariatric or other abdominal surgery the dose should be adjusted to:
  - BMI 35-50
    - Lovenox (enoxaparin) 40 mg bid
    - Fragmin (dalteparin) 5000 units bid
  - BMI ≥ 50
    - Lovenox (enoxaparin) 60 mg bid
    - Fragmin (dalteparin) 7500 units bid

Rationale:

Obesity is a known risk factor for the development of VTE. There is no Level 1 evidence on the effectiveness of thromboprophylaxis in bariatric surgery. However, the American Society for Metabolic and Bariatric Surgery recommends that perioperative thromboprophylaxis should be given. Furthermore, indirect evidence suggests that dosing should be weight based.

d. Patients with renal dysfunction

Recommendation:

- The dose of Lovenox (enoxaparin) should be decreased to 30 mg/day in individuals with a creatinine clearance less than 30 cc/hour
- No dose modification is required for individuals receiving Fragmin (dalteparin)
- Encourage early and frequent ambulation
e. Patients at very high risk of VTE

Recommendation:

- Consideration may be given to patients who have major cancer operations or have multiple risk factors to receive LMWH up to 28 days following discharge from hospital
- Encourage early and frequent ambulation

3. General surgery patients admitted with acute abdominal conditions treated non-operatively or for observation prior to surgery

Includes all patients admitted through the emergency department with acute abdominal conditions treated non-operatively or for observation prior to an operation

Recommendation:

- In patients where there is no contraindication to anticoagulant prophylaxis, all patients should receive one of the following LMWHs:
  - Lovenox (enoxaparin) 40 mg subcutaneously q 24 hours OR
  - Fragmin (dalteparin) 5000 units subcutaneously q 24 hours
- Prophylaxis should be continued until patient is discharged from hospital
- Encourage early and frequent ambulation

Rationale:

Many general surgery patients admitted from the emergency department for observation prior to an operation or for non operative management appear to have a thromboembolic risk similar to that of acutely ill medical patients. There is evidence from trials with patients admitted acutely to general medicine wards that thromboprophylaxis is effective in reducing the risk.

Please see recommendation 2a. Patients having elective or emergency abdominal surgery after 6 PM for further recommendations regarding prophylaxis for emergency patients requiring surgery

4. Implementation of Guideline

Recommendation:

- Hospitals should develop standardized order sheets
- Auditing of thromboprophylaxis practices should be performed on a regular basis

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References:


12. ASMBS. Prophylactic measures to reduce the risk of venous thromboembolism in bariatric surgery patients. Surg Obes Rel Dis 2007; 3:494