DVT Prophylaxis in Postoperative Spine Surgery Patients

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Introduction

Deep vein thrombosis (DVT) poses a significant risk in postoperative patients, particularly following spine surgery due to factors such as prolonged immobility, vascular injury, and patient comorbidities. Estimates indicate that the incidence of DVT can reach up to 40% in surgical patients without prophylaxis, underscoring the importance of effective preventative measures (Bahl et al., 2010). Additionally, pulmonary embolism (PE), a potentially fatal complication of DVT, occurs in 1-2% of postoperative patients (Kakkar et al., 2008).

Risk Assessment

Before initiating prophylaxis, assess individual risk factors that can elevate the risk of thromboembolism. These include:

- **Age > 40 years:** The risk of DVT increases significantly with age.
- **Obesity (BMI > 30):** Obesity is associated with a two- to three-fold increased risk of VTE.
- **History of venous thromboembolism (VTE):** A prior history of DVT or PE increases the likelihood of recurrence.
- **Prolonged immobility:** Extended periods of immobility can lead to stasis of blood flow, increasing DVT risk.
- **Trauma severity:** Severe trauma can lead to hypercoagulability, further increasing VTE risk (Schlager et al., 2022).

Pre-operatively:

- Hold heparin sq for 12 hours prior to surgery
- Hold Enoxaparin (Lovenox) for 24 hours prior to surgery
- Hold DOAC for 48 hours prior to surgery
- Coumadin INR < 1.5 prior to surgery (INR of FFP is 1.4)

Recommended Prophylaxis Strategies

Pharmacologic Prophylaxis

Low Molecular Weight Heparin (LMWH)

- **Drug:** Enoxaparin (Lovenox)
- **Route:** Subcutaneous
- **Dosing:** 30 mg sq every 12 hours
- **Timing to Start:** Initiate 7 days postoperatively
- **Duration:** Continue for a minimum of 10-14 days. Studies have shown that LMWH can reduce the incidence of DVT by approximately 60-70% compared to placebo (Kakkar et al., 2008; Nair et al., 2021).

Unfractionated Heparin

- **Drug:** Heparin
- **Route:** Subcutaneous
- **Dosing:** 5000 units every 8 hours subcutaneous
- **Timing to Start:** Initiate 72 hours postoperatively
- **Duration:** Continue for a minimum of 7-10 days. This method is often used in patients with contraindications to LMWH (Kahn et al., 2008). Heparin can decrease DVT occurrence by approximately 50-70% when administered prophylactically.

Direct Oral Anticoagulants (DOACs)

- **Drug:** Rivaroxaban (Xarelto)
- **Route:** Oral
- **Dosing:** 10 mg once daily
- **Timing to Start:** Initiate 1-3 weeks postoperatively
- **Duration:** Continue for 14 days. DOACs have been shown to be effective in preventing DVT and PE, with studies reporting a 40-60% reduction in thromboembolic events compared to placebo (Zahir et al., 2020; Spyropoulos et al., 2019).

Mechanical Prophylaxis

Intermittent Pneumatic Compression Devices (IPCDs)

- **Indication:** Recommended for patients at high risk of bleeding or when pharmacologic methods are contraindicated. All patients should have IPCD's from time of OR unless there is a complication.
- **Usage:** Apply during surgical recovery and until the patient is ambulating effectively. IPCDs can reduce the incidence of DVT by approximately 50% (Cohen et al., 2017).

Risks and Complications of DVT Prophylaxis

While the benefits of DVT prophylaxis are significant, potential complications must be considered:

- **Bleeding:** The most notable risk associated with pharmacologic prophylaxis, particularly with anticoagulants. Major bleeding complications occur in approximately 1-3% of patients receiving anticoagulation (Kakkar et al., 2008).
- **HIT (Heparin-Induced Thrombocytopenia):** A rare but serious condition that can occur in patients receiving heparin. The incidence is about 0.5-5% for unfractionated heparin and significantly lower for LMWH (Nair et al., 2021).
- **Gastrointestinal and Intracranial Hemorrhage:** Although rare, these complications are critical and may arise in anticoagulated patients, with reported rates of 0.5% or less (Weitz et al., 2016).

Monitoring and Follow-up

- **Clinical Monitoring:** Regularly assess patients for signs of DVT, such as swelling, pain, and warmth in the extremities. Ultrasound may be warranted if clinical suspicion arises (Weitz et al., 2016).
- **Laboratory Monitoring:** For patients on anticoagulants, monitor renal function and platelets as appropriate, particularly in those on DOACs where renal impairment can necessitate dose adjustments (Vasilyev et al., 2021).
- **Patient Education:** Inform patients about the signs and symptoms of DVT and PE, encouraging them to report any concerning symptoms promptly.

Conclusion

Implementing a comprehensive DVT prophylaxis strategy that combines pharmacologic and mechanical methods, tailored to individual risk profiles, is essential for minimizing the risk of thromboembolic events in postoperative spine surgery patients. Balancing the benefits of prophylaxis with the associated risks will enhance patient outcomes and safety.

Performance Improvement

- **Compliance Tracking:** Compliance with these guidelines will be monitored through the Trauma Performance Improvement Plan.
- **Goals:** Aim for 85% compliance with DVT prophylaxis started within 72 hours post operatively.

Key Performance Indicators:

- Appropriateness of admission location.
- Documentation of Incentive Spirometry volume in daily notes by the trauma team.

Version Control Record			
Version	**Date**	**Author/Reviewer**	**Description of Changes**
1		Paul Wisniewski, D.O.	Initial review and update to reflect latest evidence/practice

References

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This expanded guideline emphasizes the importance of a comprehensive approach to DVT prophylaxis, ensuring that both the benefits and risks are carefully considered in the management of postoperative spine surgery patients.

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