Venous Thromboembolism (VTE) Prevention and Anticoagulation Reversal for Trauma Patients
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Rationale:
This clinical pathway was developed by a consensus group of JHACH clinicians and pharmacists to standardize venous thromboembolism prophylaxis, anticoagulation dosing, and rapid anticoagulation reversal in injured children.

Background
Venous thromboembolism (VTE) is associated with increased morbidity and mortality in trauma patients. While pediatric trauma patients are generally at lower risk of VTE than adults, VTE risk assessment and prevention remains an important aspect of clinical care. Standardization of VTE prophylaxis optimizes risk assessment, ensures timely and appropriate application of mechanical and chemical prophylaxis, and prevents inappropriate delays or withholding of chemical prophylaxis.

Diagnostics
Radiologic studies: Doppler ultrasound, computed tomography

Clinical Management
Please see pathway algorithms.
Venous Thromboembolism (VTE) Prevention
Clinical Pathway for Trauma Patients

Pediatric Trauma Patient
Is patient age 12 years or younger and previously healthy?

- Routine VTE prophylaxis typically not indicated
- Prophylaxis per trauma team leader/primary team attending

NO

Assess number of risk factors

- No risk factors
- 1-2 risk factors
- 3 or more risk factors

Early ambulation

Early ambulation and mechanical prophylaxis

Contraindication to anticoagulation?

- Intracranial hemorrhage/intracranial operation within past 48 hrs
- Paraspinal hematoma
- Active bleeding
- Uncorrected coagulopathy (e.g. INR >1.5, platelets ≤50)

NO

YES

- Mechanical prophylaxis
- Mobility as tolerated

Pharmacologic prophylaxis
- Enoxaparin (Lovenox)
  - <18 yrs: 0.5 mg/kg SQ q12hrs
  - ≥18 yrs: 30 mg SQ q12hrs
- Alternative: Unfractionated heparin IV 10 units/kg/hr
- Pharmacy consult to assist with dosing & anti-Xa monitoring if obesity or renal dysfunction (CrCl <30 ml/min)

If acute VTE:
- Treat per hospital anticoagulation protocol: JHACH Management of Anticoagulation Therapy
- Hematology consultation

- Mechanical prophylaxis
- Mobility as tolerated
- Document contraindication in chart
- Re-evaluate every 24 hours for resolution of contraindication

VTE Risk Factors

- Projected immobility > 5 days
- Traumatic brain injury with Glasgow Coma Scale less than 9
- Presence of central venous catheter
- Spinal cord injury
- Complex lower extremity fracture
- Operative pelvic fracture
- Exogenous estrogen
- Major infection or chronic inflammatory state
- History of previous DVT/PE (personal or 1st degree relative <50 yrs old)
- Known thrombophilia
- Current malignancy
- Obesity
  - Weight >80 kg, age 14-16
  - Weight >85 kg over age 16
Rapid Anticoagulation Reversal
Clinical Pathway for Trauma Patients

Pediatric Trauma Patient
Is the patient on anticoagulation medication and actively bleeding or high bleeding risk?

YES

Identify anticoagulation agent and follow corresponding hospital protocol

NO

Resuscitation and hemostasis per standard trauma protocols

Warfarin (Coumadin)
Direct oral anticoagulant: Dabigatran (Pradaxa), Rivaroxaban (Xarelto), Apixaban (Eliquis), Edoxaban (Savaysa),

Enoxaparin (Lovenox) or unfractionated heparin

Heparin Reversal Protocol
Warfarin Reversal Protocol
DOAC Reversal Protocol

Other agent: consult pharmacy
Emergency Center Management
In the EC, emergency anticoagulation reversal agents will be ordered if indicated. With respect to VTE prophylaxis, EC management will consist of stabilizing patient and evaluating for risk factors.

Admission/Inpatient
Admitting service will place orders for appropriate VTE prophylaxis and re-assess risk factors and anticoagulation contraindications on an ongoing basis.

References

Eastern Association for the Surgery of Trauma - Management Guidelines
https://www.east.org/education/practice-management-guidelines


See linked hospital protocols for additional references.

Outcome Measures:

- Compliance with guideline
- Major clinical bleeding events
- Time to VTE prophylaxis (from Trauma Quality Improvement Program, TQIP)
- Incidence of VTE among all trauma patients (TQIP)
- Incidence of VTE among patients with traumatic brain injury (TQIP)
Clinical Pathway Team
VTE Prophylaxis Clinical Pathway
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Disclaimer

Clinical Pathways are intended to assist physicians, physician assistants, nurse practitioners and other health care providers in clinical decision-making by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of specific diseases or conditions. The ultimate judgment regarding care of a particular patient must be made by the physician in light of the individual circumstances presented by the patient.

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