



AAST Acute Care Surgery Didactic Curriculum

DVT Prophylaxis in Trauma

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VTE in Trauma

Highlights:

- Trauma patients are at known risk for developing a hypercoagulable state due to immobility, alterations on clotting mechanisms, direct trauma to vessels amplifying coagulant response, etc
- Risk factors for DVT in trauma patients include:
 - Spinal cord injury, lower extremity and pelvic fractures, need for surgery, increased age, femoral line placement, surgical repair of venous injuries, prolonged immobility, prolonged hospital stay, severity of trauma, and mechanism of injury
- Without chemoprophylaxis, VTE rates in trauma patients can reach as high as 11.8-65%
 - Pulmonary Embolism (PE) rates estimated between 1.5-20%

VTE Prophylaxis in Trauma

Highlights:

- Chemical VTE prophylaxis is superior to mechanical prophylaxis and mobilization
- Low Molecular Weight Heparin (LMWH) has been found to be superior to unfractionated heparin (UH) in VTE prophylaxis for the injured patient
- Major LMWH dosing considerations-
 - Age > 65
 - Under/Overweight
 - Weight < 50kg
 - BMI > 35 kg/m²
 - Renal function
 - Creatinine Clearance < 30
 - Special injury populations (see below)
- Ideal dosing regimens are debatable
 - Standard LMWH 30mg BID
 - May result in sub-prophylactic levels
 - Anti-Xa based LMWH dosing
 - Serum levels of LMWH can be affected by renal function, weight, bioavailability, coagulation profiles
 - Literature varies on if Anti-Xa based LMWH dosing reduces VTE rates

- Weight based LMWH dosing
 - AAST recommends considering weight based dosing for those with BMI > 30 kg/m² and low bleeding risk
- WTA recommends algorithm for LMWH dosing at 40mg BID in patients < 65 years, weigh > 50kg, Creatinine clearance > 60 mg/dL
 - Thromboelastography based LMWH dosing
 - Not yet validated
- Alternatives
 - ASA- found to be noninferior to LMWH in preventing death in trauma patients with operative LE fracture or pelvic fractures
 - PREVENT CLOT Trial NEJM 2023
 - DTIs- not yet studied
 - Prophylactic Inferior Vena Cava Filter placement
 - Multi-center RCT of non-chemoprophylaxed patients comparing those receiving IVCF at 72 hrs to those that do not did not demonstrate difference in PE rates or mortality

VTE Prophylaxis in Trauma Special Populations

Highlights:

- Solid Organ Injury
 - Systematic Review/Meta-Analysis in 2022 (Murphy et al Eur J Trauma Emerg Surg) evaluating early (<48hrs) versus late (>48 hrs) chemoprophylaxis in patients with non-operatively managed solid organ injury demonstrated similar risk of failure of NOM in both groups, similar transfusion rates, increased risk of VTE in the late chemoprophylaxis group
 - Recommendation- can effectively initiate VTE chemoprophylaxis in non-operative blunt solid organ injury early (<48 hrs)
- Traumatic Brain Injury
 - Wu et al. Early venous thromboembolism prophylaxis in patients with trauma intracranial hemorrhage: Analysis of the prospective multicenter Consortium of Leaders in Traumatic Thromboembolism study, JTACS 2023
 - Secondary analysis of CLOTT study reviewed early and late (<48 hrs and >48 hrs) initiation of VTE chemoprophylaxis in trauma patients with head AIS >3 and no chemoprophylaxis in the first 24 hours due to presence of ICH or received invasive neuromonitoring/procedure.
 - VTE rates were higher in late chemoprophylaxis group, PE rates and progression of ICH rates were similar
 - Ratnaseka et al Early VTE prophylaxis in severe traumatic brain injury: A propensity score weighted EAST multicenter study, JTACS 2023.
 - Multicenter retrospective review of patients with isolated TBI comparing those patients that received no chemoprophylaxis, chemoprophylaxis within 24 hrs of stable head CT, and chemoprophylaxis > 24 hours from a stable head CT

- No significant difference in VTE rates or ICH progression between groups after propensity score matching
- Spinal Cord Injury
 - Lui et al. Safety and comparative efficacy of initiating low-molecular-weight heparin within 24 hours of injury or surgery for venous thromboembolism prophylaxis in patients with spinal cord injury: a prospective TRACK-SCI registry study, Neurosurg Focus 2023
 - Prospective database review of outcomes of patients with SCI that received VTE chemoprophylaxis within 24 hours of injury/surgery
 - Risk factors associated with VTE: admission lower extremity motor score, worse admission ASIA grade, thoracic spine SCI, and younger age were significantly associated with VTE. Overall VTE rate 12.2%. 2.4% had post-operative bleed
- Pediatric
 - Mahajerin et al. Prophylaxis against venous thromboembolism in pediatric trauma: A practice management guideline from the Eastern Association for the Surgery of Trauma and the Pediatric Trauma Society. JTACS 2017
 - Increased age > 15 years and increased ISS > 25 are associated with increased risk VTE
 - Recommend consideration of chemoprophylaxis for children > 15 years who are at low risk of bleeding, ISS > 25
 - Recommend AGAINST VTE chemoprophylaxis in prepubertal children