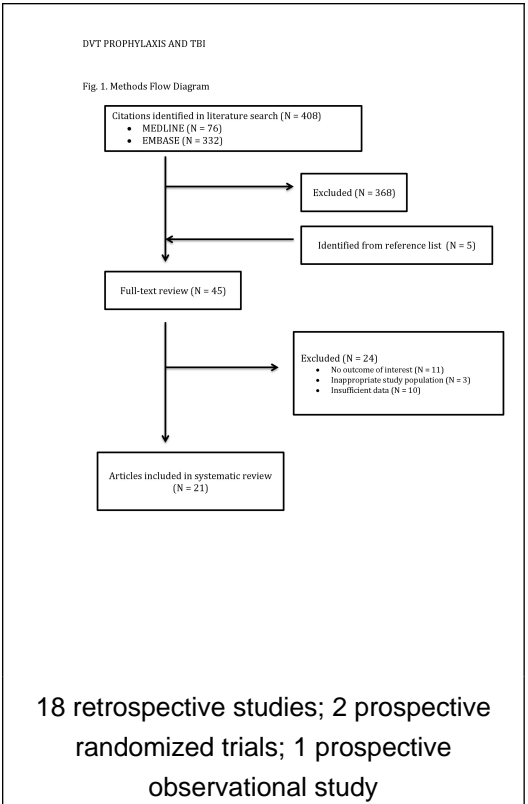


Background

Traumatic Brain Injury (TBI) is the worldwide leading cause of mortality in young patients. Traumatic brain injury patients are at increased risk of venous thromboembolism (VTE). VTE prophylaxis therefore important pillar of patient management. However, VTE prophylaxis increases risk of intracranial hemorrhage progression. Delay in VTE prophylaxis may cause undue risk of DVT and PE. Clinical decisions must therefore balance the risk of VTE with potential to cause iatrogenic progression. Currently insufficient research to support clinical guidelines on optimal timing of VTE prophylaxis

Methods - Literature review



- Accordance to PRISMA-P, Using Medline and Embase, January 1st 1999 and October 22nd 2014
- Search terms : traumatic brain injury, venous thromboembolism, anticoagulant agent, anticoagulants, fibrinolytic agent, prophylaxis, thromboprophylaxis, chemoprophylaxis, brain injuries and venous thrombosis
- Titles of articles reviewed, Abstracts reviewed for inclusion
- Two researchers evaluated full text of articles and assessed methodological quality based on the Oxford Centre for Evidence Based Medicine Levels of Evidence

Results

- 18 studies demonstrated that VTE prophylaxis in patients with stable head CT is safe and does not lead to radiographic or clinical TBI progression
- 14 studies demonstrated that prophylaxis given specifically 24-72 hours post injury is safe
- 4 studies suggested that prophylaxis is safe within 24 hours of injury

DVT Prophylaxis likely safe in TBI

- Metanalysis of 5 studies: RR of developing hemorrhagic progression when given VTE prophylaxis within 72 hours of injury was 0.64.
- RCT: no difference in hemorrhagic progression between patients given LMWH after stable CT head 24 hours post injury and those treated with pneumatic compression only (2.0% vs 2.0%, n =120)
- RCT: (non-inferiority trial) of 62 patients: no significant difference in TBI progression with VTE prophylaxis within 24 hours of stable repeat Head CT (5.9% vs 3.6% Phelan et al. 2012)

DVT Prophylaxis may be unsafe in unstable TBI

- Retrospective review (Levy et al. 2010)
- VTE prophylaxis does not increase risk of ICH progression if STABLE CT head.
- VTE prophylaxis associated with 13 fold increase in further ICH progression in those with progressive hemorrhage on CT scan.

DVT Prophylaxis likely unsafe in those with unstable hemorrhage

- Retrospective cohort with multivariate analysis: LMWH risk factor for ICH progression (OR 2.41) (Kwiat et al. 2012)
- Broader group of patients (recent neurosurgery, "high risk")
- Baseline progression rate of 24%
- Selection bias: those who received LMWH had lower GCS

Conclusion

- Clinical decisions must balance the risk of DVT and PE versus that of hemorrhagic progression
- No clinical guidelines to aid our decision
- Despite studies largely being retrospective or low-quality prospective studies the general consensus is that DVT prophylaxis is safe to use within 24-48 hours after a stable repeat head CT in patients who are "low risk" for hemorrhagic progression
- Future research could further delineate what is "low vs high risk"
- Next phase is to develop preliminary practice guidelines to test prospectively with a non-inferiority trial.

