Predictors of Venous Thromboembolism (VTE) Following Geriatric Distal Femur Fracture Fixation: Are These Patients at Higher VTE Risk Than Hip Fracture Patients?

Anthony Enzo Seddio¹, Rajiv Siddhartha Vasudevan², Michael J Gouzoulis, Sahir Jabbouri³, Adam Winter, Gregory Ronald Roytman, Akshay Raghuram, Jonathan N Grauer, Brianna Fram⁴

¹Yale School of Medicine Department of Orthopaedics, ²Yale New Haven Health, ³Yale School of Medicine, Department of Orthopaedic, ⁴Yale University School of Medicine

INTRODUCTION: Distal femur fractures (DFFx) primarily occur as low-energy fractures in geriatric patients. Similar to hip fractures (HFx), the risk of venous thromboembolism (VTE) following injury and operative fixation is associated with tremendous morbidity. Despite this, there is a paucity of DFFx specific literature regarding incidence of VTE and definition of associated risk factors.

METHODS:

Patients exclusively undergoing DFFx or HFx fixation were identified from the 2010-2022 PearlDiver M165 database. Exclusion criteria included: age <65y, high-energy trauma, <90-days of follow-up, and fractures managed nonoperatively.

To contextualize the relative 90-day VTE rate following fixation of DFFx, comparison was made to HFx patients matched 1:4 based on age, sex, and Elixhauser Comorbidity Index (ECI).

Among DFFx patients who developed VTE, patient demographics, and fracture morphologies were analyzed to determine their association with VTE. Additionally, relative to non-prescription/aspirin as post-discharge thromboprophylaxis, the association with VTE for Enoxaparin (Lovenox) and direct oral anticoagulant (DOAC) agents was assessed by multivariable analysis.

RESULTS:

Of 24,358 patients who underwent DFFx fixation, 1,684 (6.9%) had a VTE within 90-days of surgery. After matching with HFx patients, the relative VTE incidence was 6.8% versus 5.6% for DFFx and HFx, respectively (p<0.001).

Relative to patients who did not develop VTE following DFFx fixation, those who did had: prior VTE (OR 28.76), displaced fracture (condylar [OR 5.44], supracondylar without intracondylar extension [OR 3.96] and with extension [OR 3.75]), active cancer (OR 2.11), coagulopathy disorder (OR 1.15), and younger age (OR 1.03). Utilization of Lovenox and DOAC agents were both associated with lower risk of VTE (OR 0.51 and OR 0.58, respectively) (p<0.05 for all). DISCUSSION AND CONCLUSION:

Following operative management of DFFx, the current study identified a relatively high rate of 90-day VTE (6.9%), which was higher than matched HFx patients. Various factors were associated with VTE, while both Lovenox and DOACs may be effective therapeutic options for mitigating this risk. Together, these findings emphasize the importance of streamlined perioperative VTE risk identification and optimization of risk-reduction care pathways following DFFx fixation.