Incidence and Risk Factors for Deep Venous Thrombosis and Pulmonary Embolism Following Surgical Treatment of Ankle Fractures

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Summary:
The purpose of this study is to identify the rates and patient factors that predict readmission to the hospital for deep venous thrombosis or pulmonary embolism following open reduction and internal fixation of ankle fractures using observational, population-based data from all inpatient admissions in California over an eleven-year period.

Abstract:
Purpose:
The incidence and risk factors for thromboembolic disease associated with ankle fractures has not been definitively documented. The purpose of this study is to identify the rates and patient factors that predict readmission to the hospital for deep venous thrombosis or pulmonary embolism following open reduction and internal fixation of ankle fractures using observational, population-based data from all inpatient admissions in California over an eleven-year period. Our hypothesis was that we could identify patient factors that predict a higher risk of thromboembolic disease associated with ankle fracture treatment.

Methods:
We identified patients undergoing open reduction and internal fixation of a lateral malleolar, bimalleolar, or trimalleolar fracture in the years 1995-2005 as inpatients using California’s discharge database. The outcomes analyzed included readmission within 90 days of surgery for either deep venous thrombosis or pulmonary embolism. Logistic regression models were used to estimate the impact of the severity of fracture and patient factors such as age and Charlson comorbidity in predicting the rates of adverse outcomes.

Results:
A total of 57,183 ankle fracture ORIF procedures were performed during the eleven-year study period. Regression analysis was used to estimate the relationship of various potential risk factors to the development of pulmonary embolism and deep venous thrombosis. The overall rate of readmission for pulmonary embolism was low at 0.34%. The risk was increased in patients aged 50 to 75 (Odds ratio 1.89), those with open fractures (Odds ratio 1.63), and those with higher Charlson Comorbidity score (Odds ratio 1.23). The overall rate of readmission for deep venous thrombosis was also low at 0.05%, with an increased risk in patients aged 50 to 75 (Odds ratio 3.36) and those with peripheral vascular disease (Odds ratio 3.90).

Conclusion and Significance:
The overall rate of thromboembolic disease was low in this large observational study, consistent with the findings of previous smaller studies. This study suggests that the routine use of thromboprophylaxis may not be necessary. Further controlled trials would be useful to identify specific age and comorbidity criteria for the use of thromboprophylaxis following surgical treatment of lateral malleolar, bimalleolar, and trimalleolar fractures.