Hip Fracture Patient on Warfarin: Is Delay of Surgery Necessary?

Matthew Cohn, BS[1]*; Ashley Levack, MD, MAS*[1]*; Nikunj Trivedi, BS*[2]*; Jordan Villa, MD*[1]*;*
Joseph Koressel, BS[3]*; David Wellman, MD*[1]*; John Lyden, MD*[1]*;*
Dean Lorich, MD[4]*; Joseph Lane, MD*[1]
[1]*Hospital for Special Surgery, New York, New York, USA;*
[2]*Weill Cornell Medical College, New York, New York, USA;*
[3]*Cornell, New York, New York, USA;*
[4]*New York Presbysterian Hospital, New York, New York, USA*

Background/Purpose: Hip fractures account for more hospital days than any other musculoskeletal injury. Delay from hospital admission to surgery has been shown to result in poorer functional outcomes and increased hospital costs. Guidelines suggest that surgery be delayed until a patient's international normalized ratio (INR) is reduced to 1.5 or lower to avoid excessive blood loss and to allow the use of regional anesthesia. However, there is a paucity of published data that suggests worse operative outcomes in patients undergoing surgery with INR above this threshold. The purpose of this study was to compare transfusion rates, blood loss, delay of surgery, and short-term adverse events in (1) patients admitted on warfarin versus non-anticoagulated controls and (2) patients on warfarin with day of surgery (DOS) INR ≥1.5 versus <1.5.

Methods: This retrospective case-control study included all patients over 55 years of age undergoing hip fracture surgery at a tertiary care hospital from 2012 to 2015. Patients with pathologic fractures, periprosthetic fractures, polytrauma, closed reduction and percutaneous pinning, and use of anticoagulants other than warfarin were excluded. All eligible patients on warfarin were included in the study and matched in a 1 to 1 ratio with controls for age, gender, year of surgery, and type of surgery. Outcome measurements included transfusion rate, calculated blood loss, hours from emergency department presentation to surgery, length of stay (LOS), and complication rate. Operative characteristics and outcomes were compared between groups using X2, Fisher's exact, Mann-Whitney U, and Student t tests. Multivariable logistic regression was used to identify factors associated with need for transfusion.

Results: Our study included 128 patients (64 patients admitted on warfarin and 64 matched controls). The total cohort included 74 female and 54 male patients. The mean age of patients admitted on warfarin was 84.3 years (SD, 8.2) and the mean age for controls was 84.2 (SD, 8.6). There were 64 intracapsular fractures (58 hemiarthroplasty, 6 total hip arthroplasty) and 64 extracapsular fractures (64 cephalomedullary nails). The mean INR at admission was 2.6 (standard error of the mean [SEM], 0.1) and 1.0 (SEM, 0.1) for the warfarin and control groups, respectively. Mean DOS INR was 1.5 (SEM, 0.1) and 1.0 (SEM, 0.0) for the warfarin and control groups, respectively. At least one blood transfusion was required in 58% of patients in the warfarin group compared to 56% of controls (P = 0.86). There were no significant differences in calculated blood loss between the warfarin group (1212 mL, SEM 82) and control group (1189 mL, SEM 72, P = 0.71) or in complication rates (P = 0.69). Patients on warfarin had significantly longer time to surgery (P <0.01) and LOS (P <0.01). Subanalysis of the warfarin group showed that 24 patients underwent surgery with INR ≥1.5 (range, 1.5-3.3). Patients with DOS INR at or above 1.5 had similar transfusion rates and

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blood loss compared to patients with INR below 1.5 (P = 0.65 and P = 0.69, respectively). Those with DOS INR <1.5 had longer time to surgery (P = 0.01) and LOS (P = 0.02), but no difference in complication rates (P = 0.23). Multivariate regression including DOS INR, anti-platelet use, and type of surgery indicated that only cephalomedullary nailing was associated with need for transfusion in comparison to arthroplasty procedures (odds ratio 3.1, 95% confidence interval 1.02-9.68, P = 0.047).

Conclusion: In this study, patients with hip fractures admitted on warfarin were at no higher risk for transfusion or adverse events compared to non-anticoagulated patients. Awaiting normalization of INR delayed surgery and increased LOS, without reducing bleeding or preventing complications. Within reason, surgeons may consider proceeding with surgery in patients with INR>1.5 if patients are otherwise medically optimized. The upper limit above which surgery causes increased blood loss is currently unknown. The need for general anesthesia must also be weighed against the impact of surgical delay in these patients.