Validation of anti-Xa Based Dosing Nomograms for Adult Patients Treated with Enoxaparin

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Purpose/Background: Enoxaparin is a low molecular weight heparin (LMWH) used primarily for the prevention and treatment of venous thromboembolism (VTE). Researchers have studied the utility of enoxaparin anti-Xa monitoring in patients who may have unpredictable enoxaparin pharmacokinetics, including those with renal impairment or at extremes of weight. However, few studies have evaluated how to appropriately dose-adjust enoxaparin in response to low or high anti-Xa levels. In 2011, anti-Xa based dosing nomograms for patients receiving prophylactic and treatment doses of enoxaparin were implemented at a large, community hospital. The objective of this study is to determine the proportion of adult patients who achieved target anti-Xa levels after receiving a nomogram-based enoxaparin dose adjustment.

Methodology: This study was a retrospective, single-center chart review comprised of adult patients who were treated with prophylactic or therapeutic doses of enoxaparin. Patients were included if they had a peak anti-Xa level collected between February 1, 2015 and November 30, 2016. Pregnant patients and patients less than 18 years old were excluded. Additionally, patients were excluded if the peak anti-Xa levels were drawn inappropriately (e.g. not at steady state, too early, too late), the nomogram was used incorrectly or dose adjustments were made without using the nomogram. The primary endpoint of the study was to compare the proportions of adult patients who achieved target peak anti-Xa levels after receiving a nomogram-based dose adjustment. Secondary endpoints included patients who experienced VTE or bleeding in either group.

Results: A total of 43 patients met inclusion criteria for the study. The prophylactic enoxaparin dosing nomogram (n=26) was effective at adjusting enoxaparin doses 61.5% of the time, compared to 70.6% of the time for the therapeutic nomogram (n=17). There was no statistical difference in efficacy between the two nomograms (p=0.5). One patient in the prophylactic group developed a deep vein thrombosis (DVT) and one patient in the treatment group experienced a minor bleed. There were no differences in regards to body mass index (BMI), renal function, or ICU status between patients who achieved therapeutic anti-Xa levels and those who did not achieve therapeutic anti-Xa levels.

Conclusion: There were no differences in efficacy or safety between the prophylactic and treatment enoxaparin anti-Xa dosing nomograms. The findings of this study are limited by the small sample size, retrospective design, and the absence of a control group. These results should be confirmed in a larger, controlled trial.