A Retrospective Review of Enoxaparin Dosing Practices in a Large Burn Center

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Introduction

Enoxaparin, a low molecular weight heparin, has been proven to safely and effectively prevent venous thromboembolism (VTE) in acutely ill patients. Burn patients may be particularly vulnerable to the occurrence of a VTE due to prolonged immobility, frequent operating room procedures, and low flow states. Treatment of acute VTE is associated with a direct medical cost of $12000-$15000 and subsequent complications increase costs to $18000 to $23000 per case. Current institutional protocol for initiation of enoxaparin on all burn adult patients is 40 mg administered subcutaneously every 12 hours. Anti-Xa levels are used to monitor anticoagulation prophylaxis, with 0.3-0.5 units/mL recognized as the prophylactic range. Doses are subsequently modified in 10 mg increments to achieve goal prophylactic anti-Xa levels. The purpose of this study was to evaluate current practice (CP) and assess if the implementation of a published enoxaparin dosing algorithm could minimize delay in achieving anticoagulation prophylaxis.

Methods

A retrospective chart review was performed of 94 adult burn patients. The doses and time required to reach goal prophylactic anti-Xa levels using (CP) were compared to the predicted algorithm dose (AD). The number of dose adjustments and the number of days needed for adjustments for CP were documented. Charges related for laboratory determinations and medication administration were calculated.

Results

Of the 94 patients reviewed, the average age was 47 years, the majority were male (74%), **mean** actual weight 92 kilograms and **mean** TBSA 15.7%. The most common mechanism of injury was flash/flame (63%) with 18% suffering an inhalation injury. On average, using CP, it took 9.3 days to get to goal prophylactic anti-Xa levels, with a mean of 2.86 anti-Xa lab tests needed and an average prophylactic dose of 55.5 mg. A total of 360 labs draws were performed and 74% were timed correctly. The CP average starting dose was lower than the AD 40 mg versus 45 mg ($p < .0001$). If the algorithm had been used the number of dosing adjustments would have been 25% less. The algorithm overestimated the starting dose in only 2.1% of the population. The average charges until goal was met for enoxaparin were $2,933 and $787 for anti-Xa levels.

Conclusion

This study demonstrates increased clinical efficacy and cost-effectiveness for an algorithm driven enoxaparin dosing regimen for burn patients. Prospective study with larger patient numbers is warranted.

Dosing Equation

$$mgQ_{12hr} = 22.8 + \left(3.3 \times \frac{TBSA(\%)}{10}\right) + \left(1.89 \times \frac{Weight\ (kg)}{10}\right)$$

Table 1. Demographics

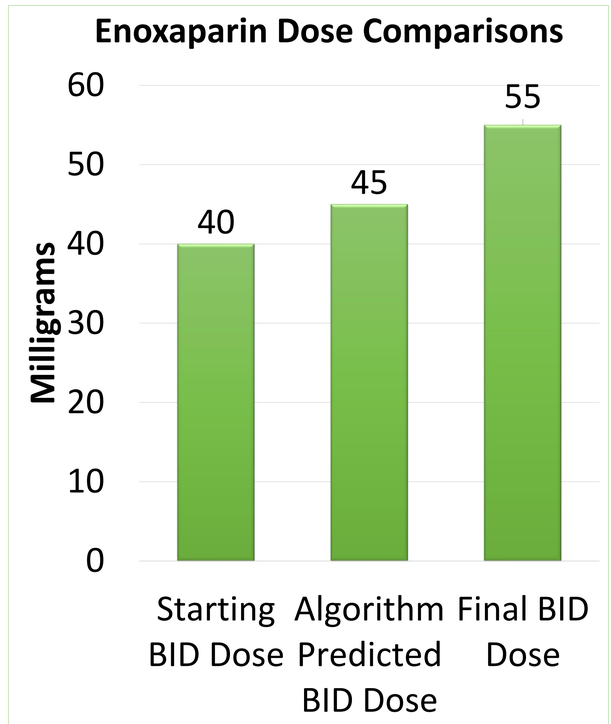
	Number (±SD, range)
Male	70 (74.5%)
Female	24 (25.5%)
Age (years)	47 (±16.05, 20-79)
TBSA	15.7% (±14.89, 1-65)
Actual Body Weight (kg)	92.9 (±19.60, 56.30-177.80)
BMI (kg/m^2)	30 (±5.69, 20.10-46.20)

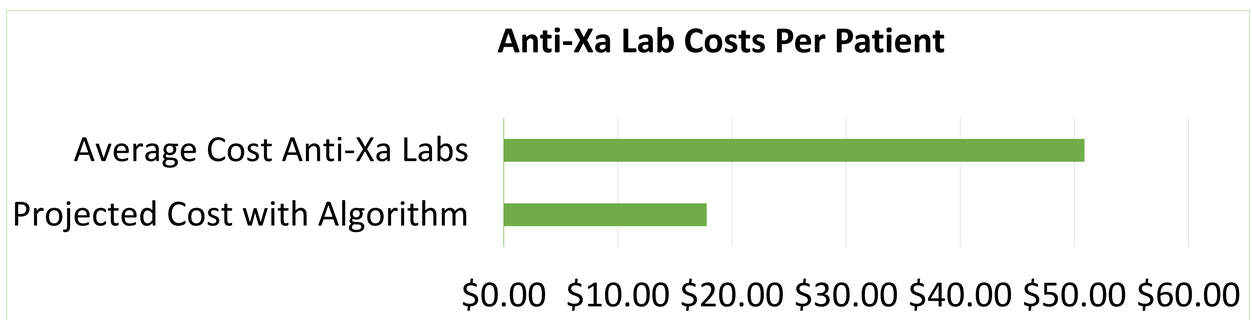
Table 2. Enoxaparin Data

Total Duration of Treatment (days)	24.87 (±24.85, 6-197)
Time to Prophylactic Goal (days)	9.30 (±6.04, 2-41)

Table 3. Anti-Xa Lab Data

Initial Anti-Xa Lab value (U/mL)	0.13 (±0.06, 0-0.2)
Number of Labs Until Within Prophylactic Range	2.86 (±1.11, 2-6)





Applicability to Practice

Decrease of healthcare costs and patient never events with the implementation of enoxaparin empiric dosing formula.

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