Retrospective review of intravenous unfractionated heparin monitoring at Alaska Native Medical Center: Assessment of monitoring using antifactor-Xa versus activated partial thromboplastin time

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Purpose: The purpose of this review is to evaluate data surrounding the use of the antifactor-Xa (anti-Xa) based protocol for continuous infusion heparin monitoring. Prior to the implementation of this protocol in 2011, heparin dosing at ANMC was titrated using activated partial thromboplastin time (aPTT). The most effective protocol to use at ANMC remains questionable due to a known discordance of Anti Xa and aPTT levels present in the literature. This review will look at efficiency, cost, and safety of both strategies. After completion, this information will be shared with ANMC to optimize patient care.

Methods: The review will evaluate data surrounding the use of the antifactor-Xa (anti-Xa) based protocol versus the activated partial thromboplastin time (aPTT) based protocol. All aPTT and anti-Xa lab values will be collected from two separate date ranges, January 2013-January 2014 and January 2009-January 2010. Each data set will be evaluated by reviewing the number of lab draws per patient, time to therapeutic values, number of times patients were supratherapeutic or subtherapeutic, and how many patients had both anti-Xa and aPTT drawn. Conclusions about the cost, how well the hospital follows protocols, and benefits of each test will be drawn from this study.

Results: There were 40 patients in the 2009 aPTT group and 55 patients in the 2013 Xa group. The aPTT had a significantly higher average number of supratherapeutic values per patient compared to Xa, 1.68 vs 0.60 ($p<0.05$). The average number of subtherapeutic values per patient was 2.30 for aPTT and 1.31 for Xa ($p = 0.05$). The average number of lab draws per patient per day for aPTT was 2.55 and for Xa was 1.89 ($p= 0.09$). Heparin rate changes were similar between both groups, aPTT had an average of 0.50 rate changes per patient per day and Xa had an average of 0.44 ($p=0.69$). Both groups had a similar safety endpoint with 5% of patients in both groups having a bleeding event while on heparin (3/55 for Xa and 2/40 for aPTT).

The total cost of lab draws for heparin monitoring in 2009 was $48,495 and in 2013 if the Xa and aPTT were both included was $100,740. If unnecessary aPTT labs are subtracted and only Xa are included the cost of monitoring for 2013 was $76,950. The average cost of lab draws per patient per day was $466.30 for aPTT and $423.28 for Xa, if unnecessary aPTT labs draws are subtracted from the Xa group the average cost per patient per day was $323.32. Monitoring heparin using the anti-Xa protocol was about $140 less expensive per day for each patient compared to the aPTT protocol if unnecessary aPTT lab draws were excluded.

Conclusion/Evaluation: Drawing aPTT levels when using a Xa monitoring protocol creates a larger burden on the staff and increases the cost of therapy. Having an aPTT in addition to Xa provides no therapeutic benefit, especially if the patient has known coagulopathy. Pharmacy can help assure aPTT tests are not drawn during a heparin monitoring using a Xa protocol unless it is therapeutically indicated for another reason. In conclusion The Xa protocol is effective, safe, and results in less frequent variations in supratherapeutic levels than the aPTT protocol. Pharmacy may also aide in ensuring unessary aPTT levels are not drawn,

Disclosures
None of the authors of the study have any conflicts of interest to disclose