Does intraoperative subcutaneous heparin or tranexamic acid affect rate of vascular complications in Anterior Lumbar Interbody Fusion procedures?

Michael Albdewi BS[1], Kelsey Fearer BS, MSA[2], Jacob Joseph MD[2], Rushikesh Joshi MD[2], Osama Kashlan MD, MPH[2], Rakesh Patel MD[3], Mark Zaki MD, MBA[2]

[1]University of Michigan Medical School

[2]Department of Neurosurgery, University of Michigan, Ann Arbor, MI

[3]Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, MI

Introduction

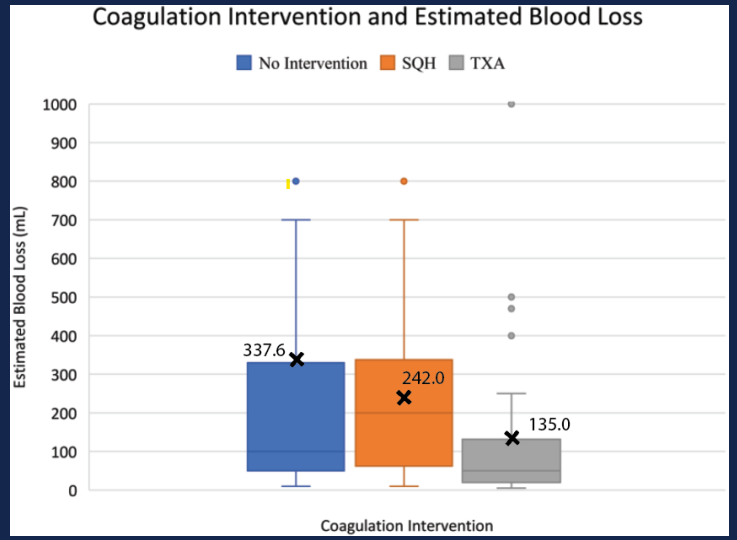
Anterior lumbar interbody fusion (ALIF) is a surgical technique commonly used to treat degenerative disc disease in the lower lumbar spine. As the procedure commonly involves retraction of the iliac arteries and veins, potential complications include deep vein thrombosis (DVT) and hemorrhagic vessel injuries. At our institution, there is practice heterogeneity in the use of prothrombotic and antithrombotic agents during ALIF procedures. The goal of this study is to assess whether the use of intraoperative tranexamic acid (TXA), subcutaneous heparin (SQH), or neither is associated with hospitalization outcomes and increased risk of vascular complications.

Methods

A retrospective review of patients who had undergone ALIF at a large tertiary academic center from 2015 to 2023 was performed. Patient demographics and surgical characteristics were extracted. Pain scores and neurologic deficits at presentation and 1-3 month follow-up were recorded. Logistic regressions, ANOVA tests, and Chi-Squared analyses were performed on categorical variables.

Results

One hundred eighty-nine patients were included; there were 86 (45.6%) females and an average age of 58.7+/-13.3 years. Twenty-two patients received SQH, 35 patients received TXA, and 115 received neither. There were no significant differences between coagulation intervention and intra- or post-operative complication rate, change in post-operative motor function ($p = 0.1468$), or change in post-operative VAS pain reporting ($p = 0.216$). No differences were found between length of hospital stay and coagulation intervention after correcting for staged procedures ($p = 0.422$). Although not statistically significant ($p = 0.071$), there was a decreased estimated blood loss with no intervention (337.6 ± 651 mL), SQH (242 ± 221.6 mL), and TXA (135 ± 211.8 mL). Additionally, patients with no intervention were more likely to receive blood transfusions (16, 20.8%), than patients receiving SQH (1, 5.56%) and TXA (0) ($p = 0.011$).



Conclusion

The use of perioperative SQH or TXA in ALIF procedures did not result in statistically significant differences in complication rates, motor function change, hospital length of stay, or estimated blood loss. Statistically significant differences were found with the use of coagulative intervention and blood transfusions.

References

1. Kapustka B, Kiwic G, Chodakowski P, Miodoński JP, Wysokiński T, Łączyński M, Paruzel K, Kotas A, Marcol W. Anterior lumbar interbody fusion (ALIF): biometrical results and own experiences. Neurosurg Rev. 2020 Apr;43(2):687-693. doi: 10.1007/s10143-019-01108-1. Epub 2019 May 20. PMID: 31111262; PMCID: PMC7186239.

2. Richter M, Weidenfeld M, Uckmann FP. Die ventrale lumbale interkorporelle Fusion. Indikation, Technik, Vor- und Nachteile [Anterior lumbar interbody fusion. Indications, technique, advantages and disadvantages]. Orthopade. 2015 Feb;44(2):154-61. German. doi: 10.1007/s00132-014-3056-x. PMID: 25501711.

3. Momin AA, Barksdale EM 3rd, Lone Z, Enders JJ, Nowacki AS, Winkelman RD, Krantz M, Hardy DM, Steinmetz MP. Exploring perioperative complications of anterior lumber interbody fusion in patients with a history of prior abdominal surgery: A retrospective cohort study. Spine J. 2020 Jul;20(7):1037-1043. doi: 10.1016/j.spinee.2020.03.009. Epub 2020 Mar 19. PMID: 32200118.

4. Varshneya K, Medress ZA, Jensen M, Azad TD, Rodrigues A, Stienen MN, Desai A, Ratliff JK, Veeravagu A. Trends in Anterior Lumbar Interbody Fusion in the United States: A MarketScan Study From 2007 to 2014. Clin Spine Surg. 2020 Jun;33(5):E226-E230. doi: 10.1097/BSD.0000000000000904. PMID: 31609798.

SPINE SUMMIT 2024