Association Between Early Heparin Prophylaxis and Risk of Venous Thromboembolism through Two Months after Spine Fusion for Spinal Metastasis: A Retrospective Cohort Study of United States Academic Health Centers

Anthony Baumann, Robert J Trager¹, Omkar Anaspure², John T Strony³, Aditya Muralidharan⁴, Tyler Sanda⁵, Jacob Charles Hoffmann

¹Department of Family Medicine and Community Health, ²University of Pennsylvania Perelman School of Medi, ³University Hospitals Cleveland Medical Center, ⁴University of Michigan, ⁵Akron General INTRODUCTION:

There is limited evidence regarding the effectiveness of chemoprophylactic anticoagulation for preventing venous thromboembolism (VTE) after spine surgery for spinal metastasis. We aim to test the hypothesis that early heparin administration (0-2 days after surgery) is associated with a significant decrease in the risk ratio of VTE through two weeks after spine arthrodesis for spinal metastasis compared to matched controls not receiving any anticoagulation. We secondarily explored the risk and cumulative incidence of VTE over two months, and risk of severe postoperative bleeding (SPOB).

METHODS:

This retrospective cohort study used the United States TriNetX network to identify adults undergoing their first spinal arthrodesis surgery for spinal metastasis over the past 20 years and divided these patients into two cohorts according to the use of anticoagulation on the same date of surgery: a heparin cohort and a control cohort without anticoagulation. Patients were propensity matched according to key risk factors for VTE. Our primary outcome was the risk ratio (RR) with 95% confidence intervals (CI) of VTE through two weeks post-arthrodesis. We secondarily explored incidence and RR of VTE and SPOB through two months' follow-up.

RESULTS:

There were 847 patients per cohort after matching. There was no statistically significant difference in incidence of VTE in the heparin group compared to the no anticoagulation cohort through two-weeks' (4.0% versus 2.7%; RR: 1.48; 95% CI: 0.88, 2.49; P=0.1383) and two months' follow-up (9.4% versus 7.9%; RR: 1.2; 95% CI: 0.88, 1.63; P=0.2619). Furthermore, there was no statistically significant difference in incidence of SPOB in the heparin group compared to the no anticoagulation group at two-weeks' (1.5% versus 1.7%; RR: 0.93; 95% CI: 0.44, 1.96; P=0.8462) and two-months' follow-up (2.8% versus 2.5%; RR: 1.1; 95% CI: 0.64, 2.04; P=0.6504).

DISCUSSION AND CONCLUSION:

In this large, propensity-matched retrospective cohort study, early heparin administration after spine fusion for spinal metastasis was not associated with a significant difference in VTE or SPOB incidence compared to matched controls without early anticoagulation through two months after spinal fusion. Given the current limited and conflicting findings available, future studies should examine if the risk of VTE and SPOB varies according to the type of anticoagulant used. In addition, evidence synthesis on the topic may be warranted. Considering the lack of clear superiority of early heparin administration for VTE prophylaxis in surgical management of spinal metastasis in the present study, yet limited and conflicting available evidence, surgeons should only recommend this therapy on a case-by-case basis.



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