

Timing of Enoxaparin Chemoprophylaxis for Venous Thromboembolism in Patients Undergoing Scoliosis Surgery: A Retrospective Cohort Analysis

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Introduction

At this time, there is a paucity of literature on the optimal timing for initiation of post-operative chemoprophylaxis for venous thromboembolism (VTE). As such, there is great variability in current practices [1]. We sought to examine potential outcomes differences between timing strategies in a single institutional series of patients at high risk for postoperative deep venous thrombosis.

Methods

We identified patients who had undergone elective thoracolumbar surgery for either degenerative or idiopathic scoliosis between 2008 and 2010 at the Duke University Medical Center. Patients were characterized by demographics, surgical characteristics, past medical history, and current medication usage. Patients were separated into three chemoprophylaxis groups based on timing of post-operative enoxaparin initiation— none, early (12-24 hours), and late (>24 hours). Cohorts were compared using multivariate logistic regression in terms of VTE rate, rate of symptomatic anemia requiring transfusion with packed red blood cells (pRBCs) and rate of bleeding complications (spinal epidural hematoma or post-operative coagulopathy requiring blood product transfusion).

Results

391 patients were identified. Of these 391, 62 (15.9%) patients received no chemoprophylaxis, 291 (74.4%) received early chemoprophylaxis, and 38 (9.7%) received late chemoprophylaxis. Overall, 5 (1.3%) patients experienced a thromboembolic event (None: 1 vs. Early: 2 vs. Late: 2) with no differences across treatment cohorts ($p=0.060$). 27 (6.9%) of patients experienced a bleeding complication. In multivariate logistic regression analysis, there was no observed difference in post-operative bleeding complications or post-operative RBC transfusion rate, after early or late initiation of chemoprophylaxis.

Outcomes by Cohort

	None (n=62)	Early (n=291)	Late (n=38)	p-value
DVT / PE	1 (1.6%)	2 (0.7%)	2 (5.3%)	0.060
Bleeding Complication	0	20 (6.9%)	7 (18.4%)	0.002*
Transfusion with FFP or Platelets	0	18 (6.2%)	7 (18.4%)	0.001*
Epidural Hematoma	0	2 (0.7%)	0	0.708
RBC Transfusion	9 (14.5%)	120 (41.2%)	20 (52.3%)	<0.001*

DVT = Deep Vein Thrombosis, PE = Pulmonary Embolism, RBC = Red Blood Cell. Significance determined by Pearson's chi-squared test. *Indicates variables that are significant at the $p=0.05$ level.

Conclusions

Early chemoprophylaxis in scoliosis surgery patients did not significantly increase the rate of bleeding complications in our cohort of patients. Future randomized, prospective studies are needed to establish effective protocols for timing anticoagulant therapy in spinal surgery patients.

Baseline Characteristics for All Patients

	None (n=62)	Early (n=291)	Late (n=38)	Total (n=391)	p-value
Age; mean (SD)	54.1 (22.8)	62.9 (12.5)	64.4 (11.7)	61.6 (14.9)	<0.001*
Female; n (%)	35 (56.5%)	210 (72.2%)	23 (60.5%)	268 (68.5%)	0.029*
Race; n (%)					
White	57 (91.9%)	270 (92.8%)	35 (92.1%)	362 (92.6%)	
Black	4 (6.5%)	17 (5.8%)	3 (7.9%)	24 (6.1%)	0.937
Other	1 (1.6%)	4 (1.4%)	0	5 (1.3%)	
Thrombogenic Hx; n (%)	2 (3.2%)	12 (4.1%)	2 (5.3%)	16 (4.1%)	0.882
Hx of Bleeding Disorder; n (%)	1 (1.6%)	5 (1.7%)	2 (5.3%)	8 (2.0%)	0.337
Other Antithrombotic Drugs Use; n (%)	20 (32.3%)	77 (26.5%)	12 (31.6%)	109 (28.9%)	0.565
Received Fusion; n (%)	61 (98.4%)	286 (98.3%)	38 (100%)	385 (98.5%)	0.719
No. of Levels; mean (SD)	5.2 (3.6)	5.2 (3.2)	6.8 (3.7)	5.4 (3.3)	0.019*
EBL; mean (SD)	662 (830)	1147 (1244)	1703 (1874)	1125 (1292)	<0.001*
EBL > 750; n (%)	21 (33.9%)	153 (52.3%)	21 (55.3%)	195 (49.9%)	0.022*
EBL > 1500; n (%)	8 (12.9%)	83 (28.5%)	16 (42.1%)	107 (27.4%)	0.004*

No. = Number, EBL = Estimated Blood Loss, DVT = Deep Vein Thrombosis, PE = Pulmonary Embolism, Hx = History, P-values are for 1-way analysis of variance and Pearson's chi-squared test as appropriate. *Values are significant at the $p=0.05$ level.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the current state of the literature regarding prophylaxis for venous thromboembolism in spinal surgery patients, 2) discuss the implications of early chemoprophylaxis in scoliosis surgery patients, and 3) establish more effective timing protocols for venous thromboembolism chemoprophylaxis in spinal surgery patients.

References

- 1) Glotzbecker MP, Bono CM, Harris MB, et al. "Surgeon Practices Regarding Postoperative Thromboembolic Prophylaxis After High-Risk Spinal Surgery" Spine 2008; 33(26):2915-2921.