

Comparing Venous Thromboembolism (VTE) Prophylaxis and Bleeding Risks: Low Molecular Weight Heparin vs. Unfractionated Heparin in Open Repairs of Large Hernias

Huzaifa Razzaq, Tariq Saleh, Rana Higgins MD, Kate Lak MD, Andrew Kastenmeier MD, Matthew Goldblatt MD, Wen Hui Tan MD
Division of Minimally Invasive and Gastrointestinal Surgery, Medical College of Wisconsin



Introduction

Venous thromboembolism (VTE) remains a major cause of postoperative morbidity and mortality in surgical patients. Open abdominal hernia repairs, often performed on patients with obesity, multiple comorbidities, and prolonged operative times, carry elevated VTE risk. Uncertainty persists about whether low molecular weight heparin (LMWH) or unfractionated heparin (UFH) provides superior protection against VTEs without increasing bleeding risk. Existing studies in general surgery populations are conflicting, and high-quality data specific to complex hernia repairs are sparse. We sought to compare the efficacy of LMWH and UFH in patients undergoing open repair of large abdominal wall hernias.

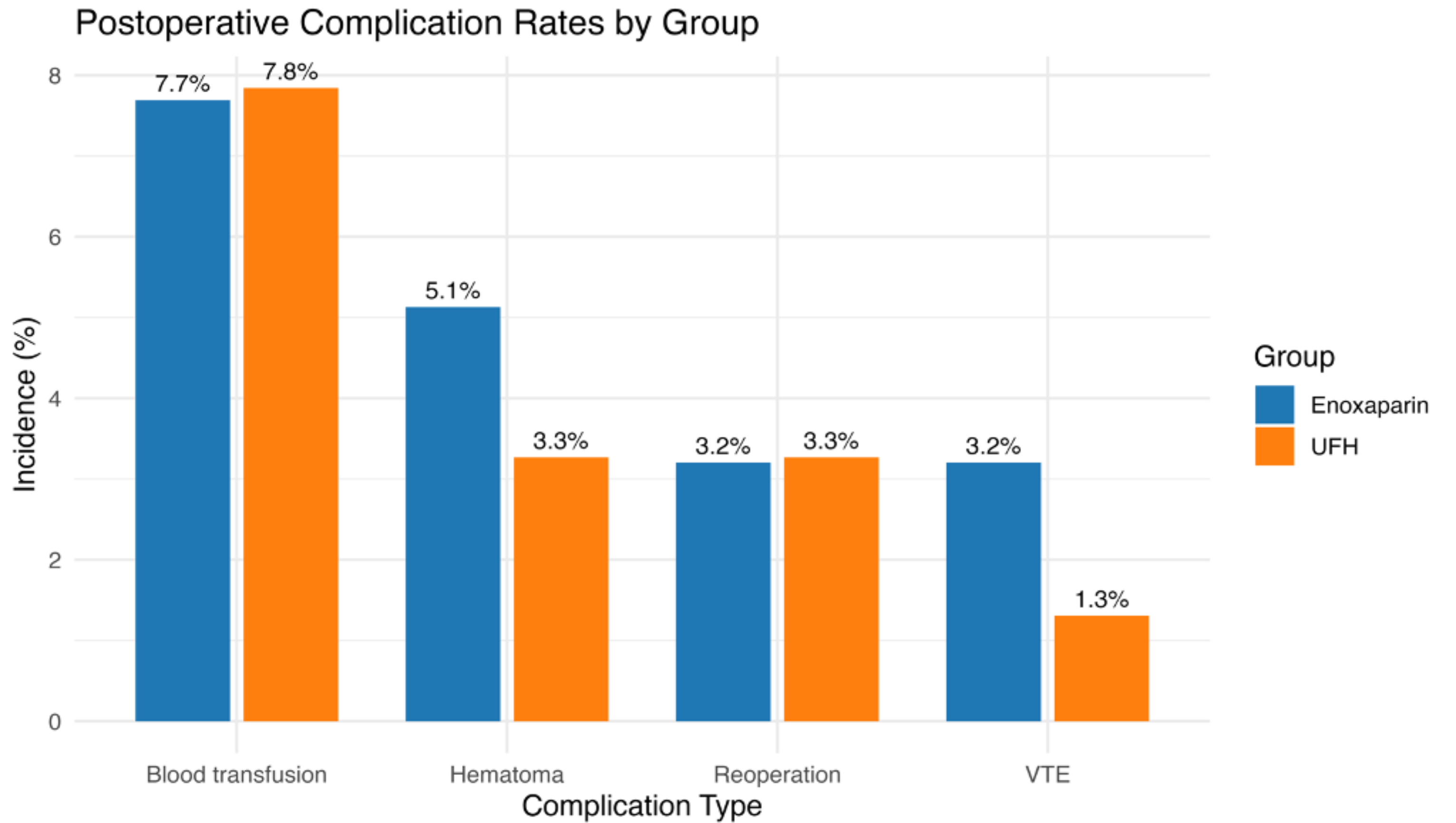
Study Design

We conducted a retrospective cohort study of adults undergoing open repair of large abdominal wall hernias at a single institution from 2019-2025. Patients received either LMWH or UFH for pre and postoperative VTE prophylaxis. Inclusion criteria included adults over the age of 18 who had open abdominal hernia repairs with size > 10 cm in one dimension performed from January 2019 to December 2024. The primary endpoint was VTE incidence within 30 days of surgery. Secondary endpoints included bleeding complications such as hematomas, transfusion requirements, and reoperations for bleeding. Multivariable logistic regression was performed to assess independent risk factors for VTE and bleeding complications.

Results

	All Patients (n = 309)	LMWH (n = 156)	UFH (n = 153)	p Value
Age (years, mean ± SD)	59.0 ± 12.6	58.4 ± 12.7	59.7 ± 12.5	0.36
Sex, n (%)				> 0.99
Female	194 (63%)	98 (63%)	96 (63%)	
Male	115 (37%)	58 (37%)	57 (37%)	
BMI (mean ± SD)	34.5 ± 7.7	34.2 ± 7.5	34.7 ± 8.0	0.51
8.5 – 24.9	23 (7%)	10 (6%)	13 (8%)	
25.0 – 29.9	71 (23%)	42 (27%)	29 (19%)	
30.0 – 34.9	92 (30%)	44 (28%)	48 (31%)	
≥ 35.0	123 (40%)	60 (38%)	63 (41%)	
ASA Class, n (%)				0.70
I	2 (1%)	2 (1%)	0 (0%)	
II	65 (21%)	32 (21%)	33 (22%)	
III	233 (75%)	118 (76%)	115 (75%)	
IV	9 (3%)	4 (3%)	5 (3%)	

Postoperative Complication Rates



Multivariable Analysis : VTE

Variable	Odds ratio	95% CI	p value
LMWH vs UFH	2.21	0.52 – 12.64	0.29
Operative Time	1.01	1.00 – 1.01	0.013*
Preop Anticoagulation (Yes/No)	1.27	0.11 – 7.18	0.82

Multivariable Analysis : Bleeding Complications

Variable	Odds ratio	95% CI	p value
LMWH vs UFH	0.96	0.39 – 2.34	0.93
Operative Time	1.01	1.00 – 1.01	0.000018*
ASA class	6.52	1.84 – 28.11	0.0024*
Preop Anticoagulation (Yes/No)	0.20	0.014 – 1.29	0.10

Discussion

In patients undergoing open abdominal hernia repairs, LMWH and UFH demonstrated similar rates of VTEs and bleeding complications. These findings suggest that either agent is reasonable for postoperative prophylaxis in this population, and selection may be guided by patient-specific factors or institutional protocols.

Contact

Huzaifa Razzaq
Email: hrzzaq@mcw.edu
Phone: 262-443-4720

References

- Reiter, A. J., Prinz, J., Li, Y., Nagle, A. P., Hungness, E. S., & Teitelbaum, E. N. (2023). Increased bleeding risk with enoxaparin venothromboembolism prophylaxis compared with heparin in patients undergoing bariatric surgery. *Surgical Endoscopy*.
- Jones, H. U., Muhlestein, J. B., Jones, K. W., Bair, T. L., Lavasani, F., Sohrevardi, M., Horne, B. D., Doty, D., & Lappe, D. L. (2002). Preoperative use of enoxaparin compared with unfractionated heparin increases the incidence of re-exploration for postoperative bleeding after open-heart surgery in patients who present with an acute coronary syndrome: Clinical investigation and reports. *The Journal of Thoracic and Cardiovascular Surgery*, 123(3), 531-539.
- Staerkle, R. F., Hoffmann, H., Köckerling, F., Adolf, D., Bittner, R., & Kirchhoff, P. (2018). Does coagulopathy, anticoagulant or antithrombotic therapy matter in incisional hernia repair? Data from the Herniamed Registry. *Surgical Endoscopy*, 32(9), 3881-3889.
- De, A., Roy, P., Garg, V. K., & Pandey, N. K. (2010). Low-molecular-weight heparin and unfractionated heparin in prophylaxis against deep vein thrombosis in critically ill patients undergoing major surgery. *Journal of Critical Care*, 25(2), 202-209.
- Thind, T., Heye, T., Henson, C., Reif, R., Jensen, H. K., Kalkwarf, K. J., Bhavaraju, A., Robertson, R., & Jenkins, A. (2024). Weight-based dosing for low-molecular-weight heparin (enoxaparin) administration to achieve optimal VTE prophylaxis in trauma patients. *The American Surgeon*, 90(6), 1406–1411.