The New York Presbyterian ENT DVT Prophylaxis Quality Initiative

Richard J. Lu, MD MBA MSc[1,2,3]; Heather Berman, BS[1,2]; Anthony P. Sclafani, MD MBA[1,2]

[1]NewYork-Presbyterian Hospital, [2]Weill Cornell Medicine, [3]Columbia University Medical Center

PROBLEM: Use of DVT chemoprophylaxis is inconsistent due to clinical uncertainty and impractical risk stratification tools

From uncertainty and complexity … **… to a simplified path forward for DVT chemoprophylaxis decision-making**

VTEs are a leading cause of preventable post-operative morbidity and mortality
- 0.4–1.3% risk in ENT surgeries
- Can exceed 2.4% in high-risk subspecialties

Chemoprophylaxis is underutilized due to clinical uncertainty despite lower risk of DVT
- Risk of increased post-operative hemorrhage, in a context where risk is already high

Current clinical decision-making workflows are cumbersome
- Caprini score requires up to 35 data inputs and has poor adoption due to high rates of incomplete / missing data

Traditional Risk Model | Simplified Risk Models

DVT Risk Model	Caprini (2005)	COBRA	Pannucci-NSQIP
Use Case	Any hospitalized patient	Surgical admissions	Ambulatory procedures
Variables	Age, Minor surgery, BMI, Swollen legs, Varicose veins, Pregnancy/postpartum, History of spontaneous abortion, Hormone therapy, Sepsis, Lung disease, Abnormal pulmonary function, Myocardial infarction, Congestive heart failure, Bed rest (medical patient), Arthroscopic surgery, Major surgery >45 min, Laparoscopic surgery >45 min, Malignancy, Bedridden ≥72 hours, Central venous access, History of DVT/PE, Family history of thrombosis, Factor V Leiden, Prothrombin 20210A, Lupus anticoagulant, Anticardiolipin antibodies, Elevated homocysteine, Heparin-induced thrombocytopenia, Other thrombophilia, Stroke, Lower extremity arthroplasty, Hip/pelvis/leg fracture, Spinal cord injury, Smoking, Inflammatory bowel disease	Age BMI >30 Cancer Race (Black/AA) ASA Score	Age BMI >40 Cancer Case >2 hours Pregnant Arthroscopic/Venous Procedure
DVT PPX Threshold Score (Range)	**7** (0-77)	**4** (1-9)	**6** (0-47)

DVT chemoprophylaxis is recommended as subcutaneous heparin or enoxaparin on POD1 until the patient is ambulatory

METHODS: We implemented a QI initiative to track adult ENT procedures at Columbia University and Weill Cornell

Stratify

Compile list of all adult ENT procedures (inpatient and ambulatory) for the following week

Determine VTE risk stratification for all ENT procedures using the COBRA and Pannucci-NSQIP models

Communicate

Share email (1) summarizing DVT chemoprophylaxis recommendations for all anticipated surgical admissions for the following week based on established guidelines and (2) including online risk-calculator for reference cases added on during the week

Reconcile

Compile list of all cases that occurred during the preceding week to identify cases that (1) did not proceed or (2) were added on

Evaluate

Determine whether DVT chemoprophylaxis recommendations were followed for surgical admissions, including rationale if not

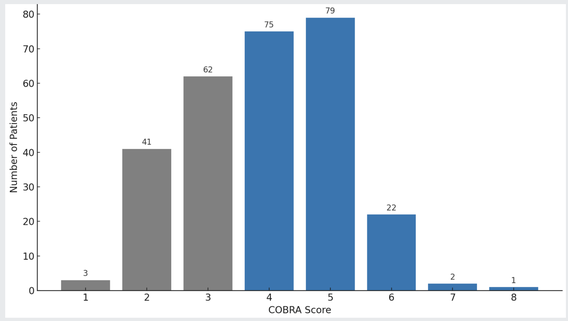
Assess 30-day outcomes of VTE and bleeding events[1]

FUTURE DIRECTIONS

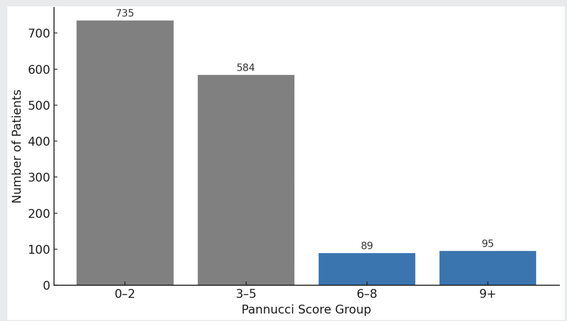
1. **Continued data collection** anticipated through end of 2025
2. **Double-click analyses** that are sub-specialty specific and explore further other potential causes of VTE / bleeding events
3. **Refinement of VTE recommendation thresholds** based on outcome data to optimize risk-benefit ratio of VTE prophylaxis specific to ENT patients
4. **Assessment of attending and resident feedback** to generate next iteration of DVT risk communication as part of Plan-Do-Study-Act cycle
5. **Integration into EPIC** to facilitate risk score classification and ease of clinical decision support
6. **Expansion across hospital system** to otolaryngology departments at other satellite hospitals and to other surgical departments

RESULTS: Across 1700+ procedures, 63% of surgical admissions and 12% of ambulatory procedures were stratified as high risk for DVT

Distribution of ENT Admissions by COBRA Score (n = 285)



Distribution of ENT Ambulatory Procedures by Pannucci Score (n = 1503)



COBRA Variable	High Risk (n = 179)	Low Risk (n = 106)	p-value
Age (SD)	67.0 (13.8)	44.2 (15.4)	0.000
BMI (SD)	27.3 (5.5)	25.6 (4.6)	0.009
% Female	45%	50%	0.371
COBRA Score	4.7 (0.8)	2.6 (0.6)	0.000
Age > 60	80%	16%	0.000
BMI > 30	27%	13%	0.001
Cancer	54%	11%	0.000
Black Race	15%	5%	0.02
ASA Score	2.97 (0.49)	2.10 (0.41)	0.000

Pannucci Variable	High Risk (n = 184)	Low RIsk (n = 1319)	p-value
Age (SD)	63.4 (14.1)	44.9 (18.2)	0.000
BMI (SD)	26.8 (6.2)	26.1 (5.3)	0.139
% Female	53%	51%	0.613
Pannucci Score	8.7 (1.2)	2.5 (1.7)	0.000
Age Score	2.5	1.4	0.000
BMI >40	6%	2%	0.04
Cancer	96%	1%	0.000
Case >2h	60%	53%	0.047
Pregnant	1%	0%	0.158

We have demonstrated a 37% relative risk reduction of VTE in high-risk surgical admissions with the use of VTE chemoprophylaxis

Followed recommendation | Did not follow recommendation

Case Type	Chemoprophylaxis	VTE	Bleeding Events[1]
High Risk Surgical Admission (n = 179)	Yes (n = 100, 56%)	**3** (3.0%)	**11** (11.1%)[2]
	No: LOS 2+ days (n = 42, 24%)	**2** (4.8%)	**4** (9.5%)
	No: LOS 1 Day (n = 37, 21%)	**0** (0%)	**1** (2.7%)
Low Risk Surgical Admission (n = 106)	Yes (n = 38, 36%)	**0** (0%)	**2** (0%)
	No (n = 38, 65%)	**0** (0%)	**3** (2.6%)
High Risk Ambulatory Procedure (n = 184)	No (n = 184, 100%)	**0** (0%)	**4** (2.2%)
Low Risk Ambulatory Procedure (n = 1319)	No (n = 1319, 100%)	**2** (0.0%)	**23** (1.7%)

Rationale FOR NOT prescribing DVT chemoprophylaxis
- **48%** not ENT primary patient[3]
- **14%** high risk of post-op bleeding based on surgery[4]
- **14%** recent/post-op hematoma or hemorrhage
- **7%** early ambulation
- **2%** low-risk surgery (no incision)
- **14%** unknown

Rationale FOR prescribing DVT chemoprophylaxis
- **70%** not ENT primary patient[3]
- **10%** free flap procedure
- **20%** unknown

1 Bleeding events include hemorrhage or hematoma within 30-days, excluding POD 0, requiring intervention (e.g., OR, nasal packing); minor self-resolved bleeding and ecchymoses excluded
2 Of 9 bleeding events, 4 had COBRA 4 and COBRA 5 each, and 1 had COBRA 6
3 E.g., patient managed solely by ICU, medicine, neurosurgery, etc.
4 E.g., TORS, intra-operative bleeding, severe thrombocytopenia

REFERENCES

Bartlett MA, Mauck KF, Stephenson CR, Ganesh R, Daniels PR. Perioperative Venous Thromboembolism Prophylaxis. *Mayo Clin Proc*. 2020;95(12):2775-2798. doi:10.1016/j.mayocp.2020.06.015

Cramer JD, Shuman AG, Brenner MJ. Antithrombotic Therapy for Venous Thromboembolism and Prevention of Thrombosis in Otolaryngology–Head and Neck Surgery: State of the Art Review. *Otolaryngol Neck Surg*. 2018;158(4):627-636. doi:10.1177/0194599818756599

Kahn SR, Morrison DR, Diendéré G, et al. Interventions for implementation of thromboprophylaxis in hospitalized patients at risk for venous thromboembolism. *Cochrane Database Syst Rev*. 2018;2018(4). doi:10.1002/14651858.CD008201.pub3

Pannucci CJ, Shanks A, Moote MJ, et al. Identifying Patients at High Risk for Venous Thromboembolism Requiring Treatment After Outpatient Surgery. *Ann Surg*. 2012;255(6):1093-1099. doi:10.1097/SLA.0b013e3182519ccf

Shuman AG, Hu HM, Pannucci CJ, Jackson CR, Bradford CR, Bahl V. Stratifying the Risk of Venous Thromboembolism in Otolaryngology. *Otolaryngol Neck Surg*. 2012;146(5):719-724. doi:10.1177/0194599811434383

Weitzman RE, Zhao K, Sclafani MS, et al. Venous Thromboembolism Risk Assessment in Inpatient and Ambulatory Otolaryngology Surgical Patients. *Laryngoscope*. 2025;135(4):1359-1366. doi:10.1002/lary.31856

Contact: Richard Lu, MD MBA MSc (New York Presbyterian Department of Otolaryngology-Head and Neck Surgery, ujo9003@nyp.org)

FUNDING None