Dual Mechanical and Pharmacological Thromboprophylaxis Significantly Decreases Risk of Pulmonary Embolus after Laparotomy for Gynecologic Malignancies

JMV Nguyen^a, LT Gien^b, A Covens^b, R Kupets^b, R Osborne^b, M Sadeghi^c, AB Nathens^d, D Vicus^b.

^a Division of Gynecologic Oncology, University of Toronto, Toronto, Canada

^b Division of Gynecologic Oncology, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, Canada

^c Department of Surgery, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, Canada.

^d Division of General Surgery, Department of Surgery, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, Canada.

BACKGROUND

- Thromboembolic events are the second most common cause of mortality in patients living with cancer.
- Patients undergoing laparotomies for gynecologic malignancies are high risk of venous thromboembolism (VTE) with reported rates as high as 13%. VTE can increase mortality by up to 2-fold.
- Currently, there is no consensus for perioperative thromboprophylaxis specific to Gynecologic Oncology.
- Dual thromboprophylaxis with mechanical and pharmacological methods is recommended by the American College of Chest Physicians and American Society of Clinical Oncology for high-risk post-operative patients.

OBJECTIVES

- The primary objective was to compare rates of symptomatic pulmonary embolus (PEs) within 30 days of surgery before and after implementation of dual thromboprophylaxis.
- The secondary objective was to identify risk factors for PEs.

METHODS

- The Gynecologic Oncology division at Sunnybrook Health Sciences Centre (SHSC) in Toronto, Canada, implemented a three-fold strategy in 12/2017 for patients undergoing laparotomies.
- Prospective cohort study of patients who underwent laparotomies for a suspected or confirmed malignancy by a Gynecologic Oncology surgeon between 12/2017 to 10/2018, with comparison to a historical cohort who underwent surgery between 01/2016 to 11/2017.

Three-fold strategy

- ✓ SCDs were applied prior to start of surgery and worn during hospital stay
- ✓ LMWH during admission
- ✓ LMWH for an extended duration of 28 days when a malignancy was confirmed.

RESULTS

534 patients were included: there were 371 and 163 laparotomies pre-and postintervention.

Demographic and operative details

There were more cytoreductive surgeries in the postintervention cohort, but **when comparing by surgical complexity score, there were no differences.** All other patient and surgical details were similar in both groups.

Demographic and Operative Details			
	Pre-intervention n = 371	Post-intervention n = 163	p- value
Age (median, range)	62 (21-89)	62 (24-98)	0.75
BMI (median, range)	28 (17-63)	29 (17-60)	0.86
Diabetes	54 (15%)	19 (12%)	0.41
Smoking	29 (8%)	19 (12%)	0.19
Confirmed malignancy	334 (90%)	143 (88%)	0.55
Advanced stage	236 (64%)	105 (64%)	0.92
Cytoreductive surgery	186 (50%)	50 (28%)	0.0001
Surgical complexity score** (median, range)	3 (1-14)	3 (1-13)	0.82
Surgical complexity score group ** (median)	low (low to high)	low (low to high)	0.87
Blood loss (median, mL)	350 (50-9000)	350 (50-7000)	0.92
Operative time (median, h)	2:32 (0:42-10:16)	2:35 (1:04-11:14)	0.82
Length of stay (median, d)	4 (2-101)	4 (2-35)	0.22

** Surgical complexity score and surgical complexity score group adapted from Aletti et al.

Incidence of PE and DVT

The risk of PE was significantly lowered in the postintervention group, from **5.1% to 0%.**

Incidence of PE and DVT			
	Pre-intervention n = 371	Post-intervention n = 163	p- value
Pulmonary embolus	19 (5.1%)	0 (0%)	0.001
Deep vein thrombosis	3 (0.8%)	2 (1.2%)	0.64

We identified that rates of DVTs were not a reliable measure, as it is not routine practice at our institution to order lower extremity doppler ultrasound following diagnosis of a symptomatic PE.

Risk factors for pulmonary embolus

On multivariate analysis, surgery preintervention was associated with a significantly higher risk of PE.

Multivariable analysis		
Risk factors for PEs	OR (95% CI)	p-value
Surgery preintervention	4.16 (1.03-16.79)	0.045
EBL ≥ 500 mL	2.75 (1.05-7.19)	0.04

Univariate analysis		
Risk factors for PEs	OR (95% CI)	p-value
Surgery preintervention	4.25 (1.04-17.43)	0.04
LOS ≥ 5 days	11.94 (2.65-53.92)	0.002
EBL ≥ 500 mL	2.85 (1.05-7.78)	0.04
Age categories (56-70 vs ≤ 55)	0.84 (0.25-2.82)	0.28
Smoking	1.41 (0.15-6.49)	0.90
DM	1.61 (0.37-5.33)	0.59
Cytoreductive surgery	2.24 (0.77-7.35)	0.16
Confirmed malignancy	0.31 (0.001-1.47)	0.12
Advanced stage	2.22 (0.69-9.38)	0.23
Operative time (≥3h vs 2-3h)	1.54 (0.54-4.37)	0.41

CONCLUSIONS

- This dual mechanical and pharmacological thromboprophylaxis strategy resulted in a sharp decrease in risk of pulmonary embolus, from 5.1% to 0%.
- Our results highlight the importance of a standardized protocol for perioperative thromboprophylaxis.
- Given the significant morbidity and mortality associated with thromboembolic events, and their highly preventable nature, guidelines and consensus specific to the Gynecologic Oncology population are warranted.

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