Mobility Device Use as a Predictor of Venous Thromboembolism after Bariatric Surgery

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INTRODUCTION

- Bariatric surgery patients are at increased risk for venous thromboembolism (VTE)
- Immobility is a risk factor for VTE
- There is little data describing the relationship between the preoperative use of mobility devices (UMD) and the risk of developing VTE after bariatric surgery

OBJECTIVE

Our objective was to investigate whether limited mobility, defined by the reported preoperative UMD, increases the risk for VTE and mortality after bariatric surgery.

METHODS

- MBSAQIP (2015-2018) data was retrospectively reviewed
- Adults (≥18 years of age) who had primary laparoscopic sleeve gastrectomy (LSG) or Roux-en-Y gastric bypass (LRYGB) were included
- Patients were excluded if they had:
  - Any prior obesity surgery; revision or conversion procedure
  - Open or converted to open surgery
  - Were lost to follow-up within 30 days after index procedure
  - Records with missing data
- Patients meeting criteria were stratified into two groups:
  - Users of mobility devices (UMD)
  - Non-users of mobility devices (NMD)
- Perioperative factors and 30-day postoperative outcomes were assessed
- DVT was defined by reported cases with either postoperative VT requiring therapy or anticoagulation initiated for presumed/confirmed VT

Results

Table 1: Demographic and Operative Factors

Patient and Operative Characteristics	No Mobility Device (N=515831)	Mobility Device (N=8376)
Age, mean (SD), y	44.3 (11.9)	52.9 (11.4)
Body mass index, mean (SD)	45.7 (7.6)	50.6 (10.6)
Black or African American, n (%)	93611 (18.1)	1483 (17.7)
Female Sex, n (%)	410593 (79.6)	6274 (74.9)
Hispanic, n (%)	66613 (12.9)	782 (9.3)
Cardiac surgery or other intervention, n (%)	5361 (1)	263 (3.1)
Chronic obstructive pulmonary disease	8012 (1.6)	736 (8.8)
Dialysis, n (%)	1493 (0.3)	111 (1.3)
Diabetes mellitus, n (%)	133895 (26)	3643 (43.5)
Functional status: partially/totally dependent, n (%)	3299(0.6)	1903 (22.7)
Gastroesophageal reflux disease, n (%)	156525 (30.3)	3868 (46.2)
Hyperlipidemia, n (%)	120716 (23.4)	3618 (43.2)
Hypertension, n (%)	246973 (47.9)	6004 (71.7)
Pulmonary embolism, n (%)	5860 (1.1)	388 (4.6)
Myocardial infarction, n (%)	6271 (1.2)	364 (4.3)
Obstructive sleep apnea, n (%)	198225 (38.4)	5063 (60.4)
Smoking, n (%)	43828 (8.5)	778 (9.3)
Steroid use, n (%)	8716 (1.7)	395 (4.7)
Therapeutic anticoagulation	13200 (2.6)	883 (10.5)
Venous stasis disease, n (%)	5023 (1)	563 (6.7)
Laparoscopic sleeve gastrectomy, n (%)	375490 (72.8)	5627 (67.2)
Robotic-assisted approach	40521 (7.9)	941 (11.2)
Operative length, mean (SD)	85.2 (46.7)	98.2 (54.0)



DVT 0.7% (P<0.01)

PE 0.2% (P<0.01)

Figure 1: The rates for deep venous thrombosis and pulmonary embolism were significantly greater in UMD patients in comparison to NMD patients.

Table 2: Multiple Logistic Regression Based on Nominally and Clinically Significant Factors

Variable	Adjusted Odds Ratio (95% CI)	P-Value
Age	1.005 (1.002, 1.009)	0.004
Body mass index	1.018 (1.014, 1.023)	<0.001
Male sex	1.150 (1.047,1.262)	0.003
Totally dependent*	2.031 (1.323, 2.350)	0.001
Gastroesophageal reflux disease	1.089 (1.003, 1.182)	0.042
Deep venous thrombosis	3.310 (2.802, 3.909)	<0.001
Pulmonary embolism	1.943 (1.606, 2.350)	<0.001
Therapeutic anticoagulation	2.230 (1.910, 2.603)	<0.001
Hypertension	1.943 (1.606, 2.350)	0.002
Mobility device	0.839 (0.637, 1.104)	0.211
Robotic-assisted approach**	0.750 (0.746, 0.996)	0.045
Operation length (minutes)	1.003 (1.003, 1.004)	<0.001

*References:*independent functional status and ** conventional laparoscopic approach. Other included control variables were diabetes, ethnicity/race, functional status, GERD, hypertension, sex, surgical approach, and therapeutic anticoagulation.*

Conclusions

- A substantial number of UMD patients with preoperative limited mobility are inflicted with VTE after bariatric surgery
- UMD and partially dependent functional status does not independently increase the risk for VTE.
- Robotic-assisted approach and reduction of operative length should be considered to minimize the probability of VTE in high-risk patients.

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