FACTORS ASSOCIATED WITH VENOUS THROMBOEMBOLISM IN RETROMUSCULAR VENTRAL HERNIA REPAIR

Sofia Piperno

Vincent Yang, August B. Schaeffer, MD, Jacelyn Dempsey, MD, Rui-Min Mao, MD, Richard Lu, MD

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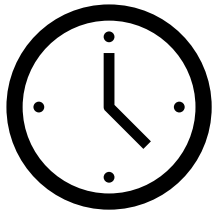
INTRODUCTION



- Venous thromboembolism (VTE) represents the third most common cause of cardiovascular death worldwide
- The VTE rate for generalized ventral hernia repair has been recorded to be between 0.2% to 7.9%
- Previous studies have identified some factors linked to VTE after hernia repair: operation duration, component separation, BMI, sex, complexity of the operation, and increased intra-abdominal pressure

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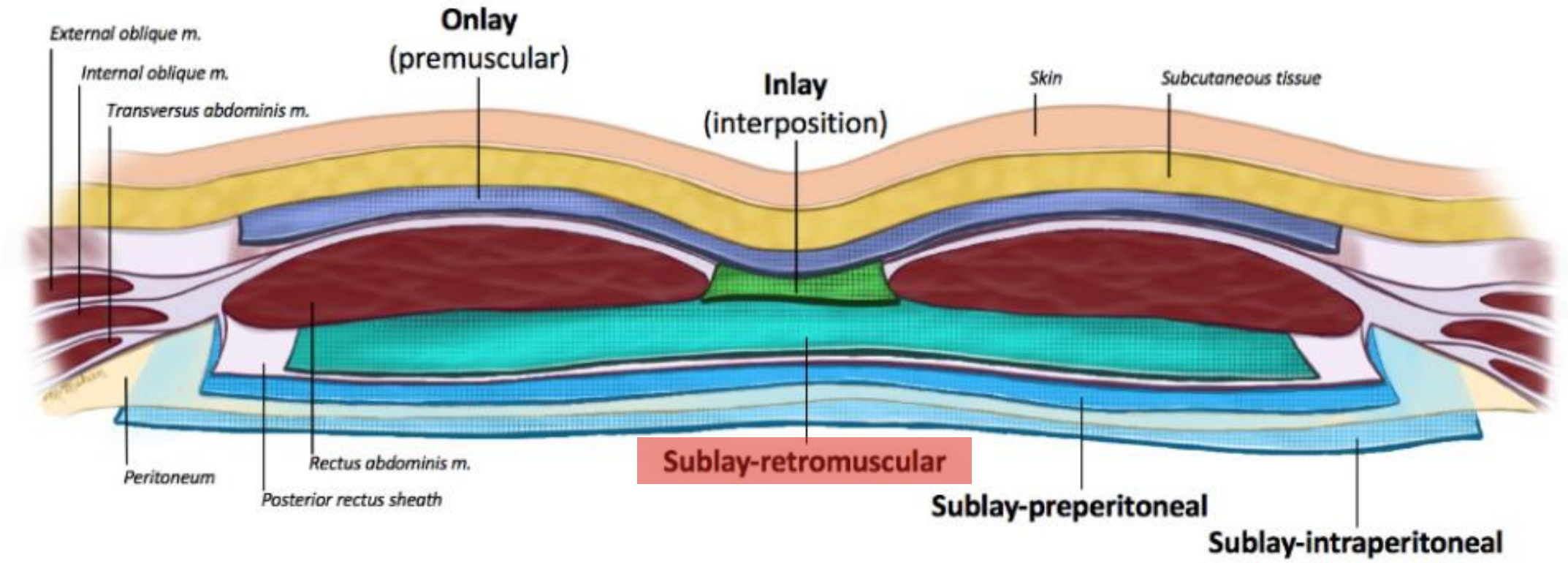
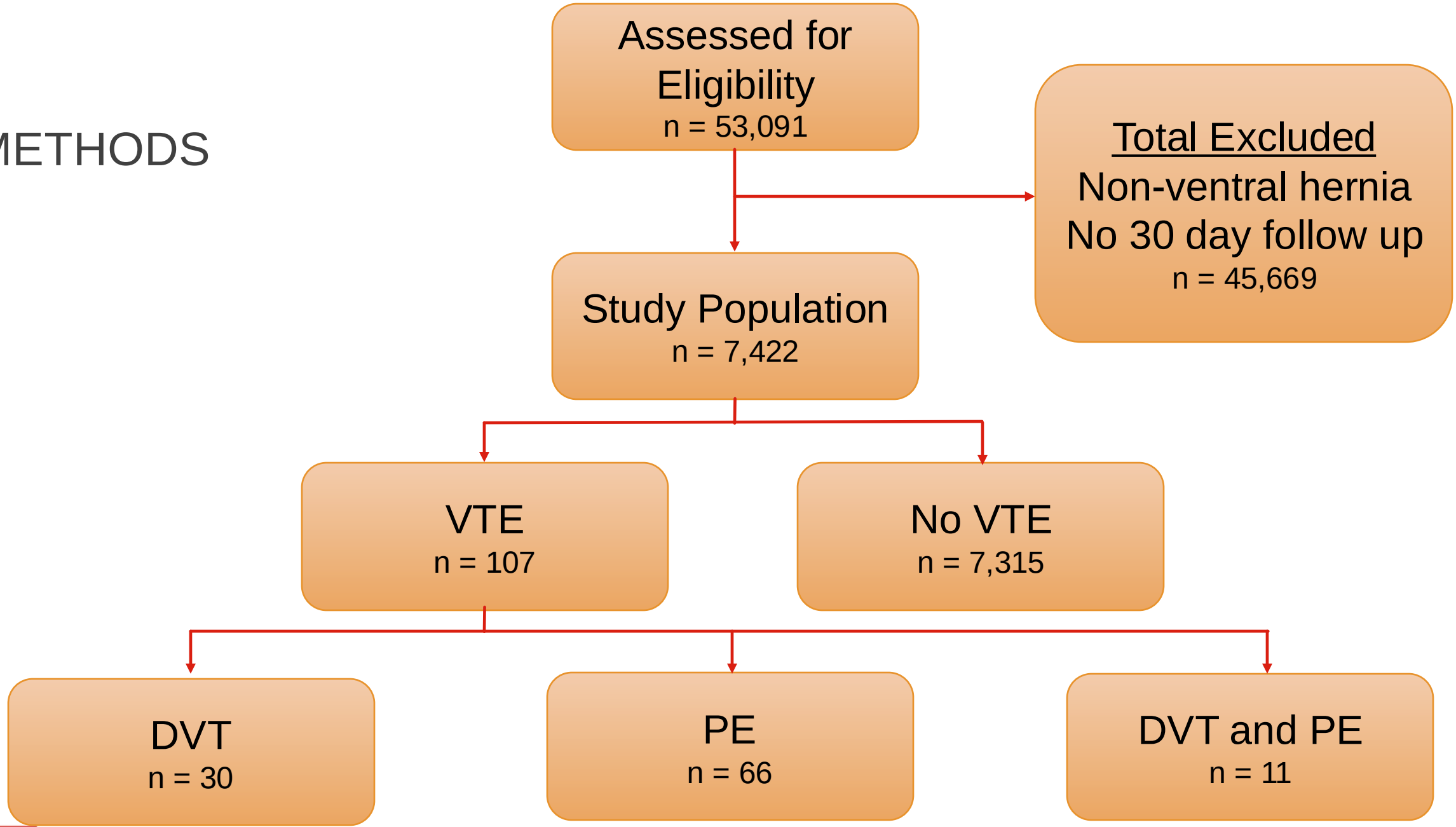
We aim to identify patient and operative factors that increase the likelihood of VTE after retromuscular ventral hernia repair using data from the Abdominal Core Health Quality Collaborative (ACHQC)



Sublay-retromuscular mesh placement has the best recurrent hernia incidence, with some studies reporting numbers as low as 5%

METHODS



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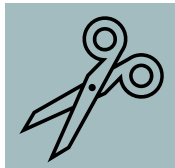
RESULTS

Patient Characteristics

Hernia Characteristics



Operative Characteristics

Postoperative Characteristics

Patient Characteristics

Table 1
Patient Characteristics

	Total	VTE	No VTE	*P* Value
	N = 7422 (100.0%)	n = 107 (1.44%)	n = 7315 (98.56%)	
Age	58.7 (12.2)	63.7 (10.2)	58.6 (12.2)	**<0.0001 ***
Age ≥ 60 years	3547 (47.8%)	74 (69.2%)	3473 (47.5%)	**<0.0001 ***
Gender, Male	3541 (47.7%)	51 (47.7%)	3490 (47.7%)	0.9924
BMI ≥ 30	4805 (65.0%)	83 (77.6%)	4722 (64.8%)	**0.0061 ***
Functional Status				
Independent	7198 (97.2%)	100 (94.3%)	7098 (97.2%)	0.1230
Partially Dependent	128 (1.7%)	5 (4.7%)	123 (1.7%)	
Totally Dependent	8 (0.1%)	0 (0.00%)	8 (0.1%)	
Unknown	75 (1.0%)	1 (0.9%)	74 (1.0%)	
ASA Class				
I and II	2241 (30.2%)	15 (14.0%)	2226 (30.5%)	**0.0002 ***
III and IV	5172 (69.8%)	92 (86.0%)	5080 (69.5%)	
Comobordities				
Stroke	5 (0.1%)	2 (1.9%)	3 (0.0%)	**0.0020 ***
Diabetes	1703 (22.9%)	28 (26.2%)	1675 (22.9%)	0.4245
COPD	590 (7.9%)	15 (14.0%)	575 (7.9%)	**0.0194 ***
Hypertension	4160 (56.0%)	71 (66.4%)	4089 (55.9%)	**0.0305 ***
Current Smoker	697 (9.4%)	6 (5.6%)	691 (9.4%)	0.1766
Smoker within one year	1013 (13.7%)	13 (12.3%)	1000 (13.7%)	0.6707
History of abdominal wall SSI	1549 (20.9%)	26 (24.3%)	1523 (20.8%)	0.3793
Current Medications				
Anti-platelet medications	959 (12.9%)	14 (13.1%)	945 (12.9%)	0.9596
Anti-coagulation medications	580 (7.8%)	15 (14.2%)	565 (7.7%)	**0.0147 ***

VTE, venous thromboembolism; *BMI*, body mass index; *ASA*, American Society of Anesthesiologists; *COPD*, chronic obstructive pulmonary disease; *SSI*, surgical site infection

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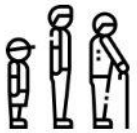

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Hernia Characteristics

Table 2
Hernia Characteristics

	Total	VTE	No VTE	*P* Value
	N = 7422 (100.0%)	n = 107 (1.44%)	n = 7315 (98.56%)	
Hernia Characteristics				
Hernia length, cm, median (IQR)	18 (13, 23)	24.0 (16.0, 27.0)	18.0 (13.0, 23.0)	**<0.0001** *
Hernia width, cm, median (IQR)	11 (8, 15)	15.0 (11.0, 19.0)	11.0 (8.0, 15.0)	**<0.0001** *
Hernia Size, cm^2, median (IQR)	200 (105, 336)	360.0 (192.0, 475.0)	200.0 (105.0, 330.0)	**<0.0001** *
Recurrent hernia	3632 (48.9%)	67 (62.6%)	3565 (48.7%)	**0.0043** *
Number of prior hernia repairs				
0	3791 (51.1%)	40 (37.4%)	3751 (51.3%)	
1	1688 (22.7%)	22 (20.6%)	1666 (22.8%)	
2	1032 (13.9%)	12 (11.2%)	1020 (13.9%)	**<0.0001**
3	444 (6.0%)	8 (7.5%)	436 (6.0%)	
4	205 (2.8%)	7 (6.5%)	198 (2.7%)	
5	262 (3.5%)	18 (16.8%)	244 (3.3%)	
Prior mesh	2597 (35.0%)	55 (51.4%)	2542 (34.8%)	**0.0003** *
Hernia related to cancer operation	780 (16.1%)	12 (16.4%)	768 (16.0%)	0.9279

VTE, venous thromboembolism; *IQR*, interquartile range

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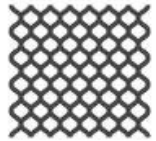

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Operative Characteristics

Table 3
Operative Characteristics

	Total N = 7422 (100.0%)	VTE n = 107 (1.44%)	No VTE n = 7315 (98.56%)	*P* Value
Operation approach				
MIS	1265 (17.0%)	16 (15.0%)	1249 (17.1%)	0.5620
Open	6156 (83.0%)	91 (85.0%)	6065 (82.9%)	
Myofacial release approach				
External Oblique	92 (1.3%)	2 (1.9%)	90 (1.3%)	
Transversus Abdominis	1036 (15.0%)	17 (16.3%)	1019 (15.0%)	0.7657
Anterior Rectus Sheath Incision	48 (0.7%)	0 (0%)	48 (0.7%)	
Post Rectus Sheath Incision	5317 (83.0%)	85 (81.7%)	5628 (83.0%)	
Operating Room time ≥ 2 hours	6515 (87.8%)	100 (93.5%)	6415 (87.7%)	0.0708
Mesh used	7403 (99.7%)	107 (100.0%)	7296 (99.7%)	1.0000
Mesh Dimensions				
Mesh length, cm, median (IQR)	30 (28, 36)	30.0 (30.0, 45.0)	30.0 (28.0, 36.0)	**0.0200** *
Mesh width, cm, median (IQR)	30 (20, 30)	30.0 (30.0, 40.0)	30.0 (20.0, 30.0)	**<0.0001** *
Total dimension, cm^2, median (IQR)	900 (512, 1036)	900.0 (900.0, 1872.0)	900.0 (510.0, 1015.0)	**0.0006** *
Estimated blood loss, mL	88.0 (92.4)	117.7 (105.3)	87.6 (92.1)	**0.008** *
Any intraoperative complication	301 (4.1%)	2 (1.9%)	299 (4.1%)	0.3277
Intraoperative hemorrhage requiring transfusion	301 (4.1%)	2 (1.9%)	299 (4.1%)	0.3277
Drains used	7422 (100.0%)	107 (100.0%)	7315 (100.0%)	NA
Length of stay, days, median (IQR)	4 (3, 6)	9 (6, 13)	4 (3, 6)	**<0.0001** *

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Postoperative Characteristics

Table 4
Postoperative Outcomes

	Total N = 7422 (100.0%)	VTE n = 107 (1.44%)	No VTE n = 7315 (98.56%)	*P* Value
Wound status				
Class 1: Clean	6991 (94.2%)	98 (91.6%)	6893 (94.2%)	0.1259
Class 2: Clean-contaminated	240 (3.2%)	4 (3.7%)	236 (3.2%)	
Class 3: Contaminated	129 (1.7%)	5 (4.7%)	124 (1.7%)	
Class 4: Dirty/Infected	61 (0.8%)	0 (0.00%)	61 (0.8%)	
Readmission Reason				
Thrombotic complication (non-cardiac)	17 (0.2%)	14 (13.1%)	3 (0.0%)	**<0.0001** *
Cardiac complication	12 (0.2%)	1 (0.9%)	11 (0.2%)	**<0.0001** *
Surgical site occurrences (SSO) complications	811 (10.9%)	20 (18.7%)	791 (10.8%)	**0.0095** *
SSO or SSI requiring procedural intervention	486 (6.5%)	14 (13.1%)	472 (6.5%)	**0.0059** *
SSO Complication				
Hematoma	93 (1.3%)	9 (8.4%)	84 (1.1%)	**<0.0001** *
Infected hematoma	18 (0.2%)	2 (1.9%)	16 (0.2%)	**0.0271** *

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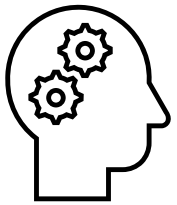
CONCLUSION



- 1.44% of our studied cohort had a reported venous thromboembolism (compared to 0.2% to 7.9% in Ventral Hernias)
- VTEs can be an acute life threating acute complication of RVHR
- Increasing complexity of hernia and its repair can increase the risk of VTEs in RVHR

STRENGTHS AND LIMITATIONS

Strengths

- Large database study
- Retromuscular ventral hernia repairs are niche

Limitations

- Lack of information about the individual's risk of VTE based on family and personal history
- Lack of information about patient's use of VTE prophylaxis
- Lack of information about when the VTE was diagnosed compared to discharge

THANK YOU

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