

Medicare-linked Long-term Rates of Reoperation After IPOM Ventral Hernia Repair

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Disclosures

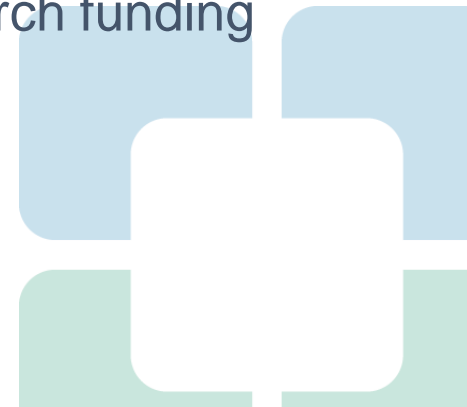
Dr. Prabhu is on the advisory board for Surgimatix and CMR Surgical and receives consulting fees from CMR Surgical and Verb Surgical.

Dr. Petro serves as Advanced Medical Solutions, Bard-Davol, and Surgimatix Consultant, and has received research grants from the American Hernia Society, the Central Surgical Association, and the Society of American Gastrointestinal and Endoscopic Surgeons.

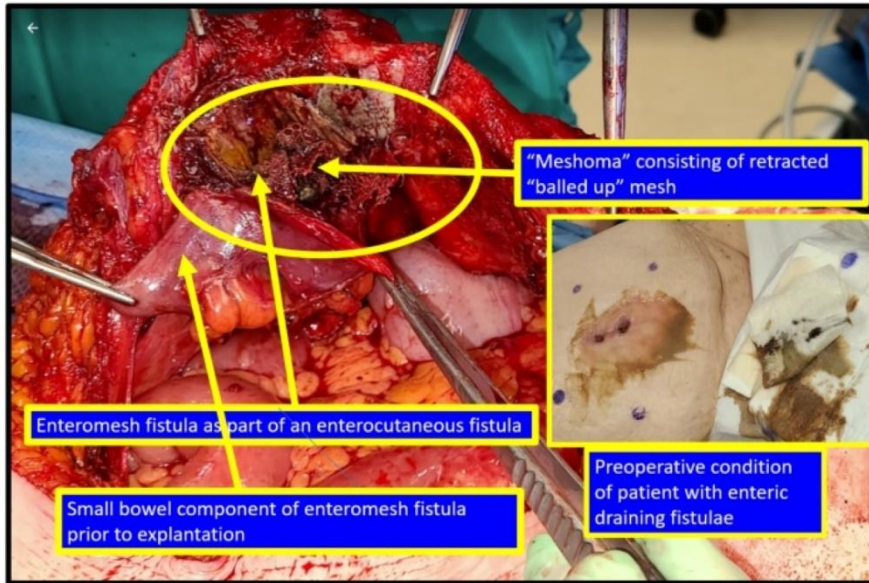
Dr. Rosen serves as the medical director of the ACHQC, received a grant to his institution for research from Telabio and has stock options with Ariste.

Dr. Polouse has received research support from Advanced Medical Solutions, Bard-Davol and serves as vice president of the ACHQC

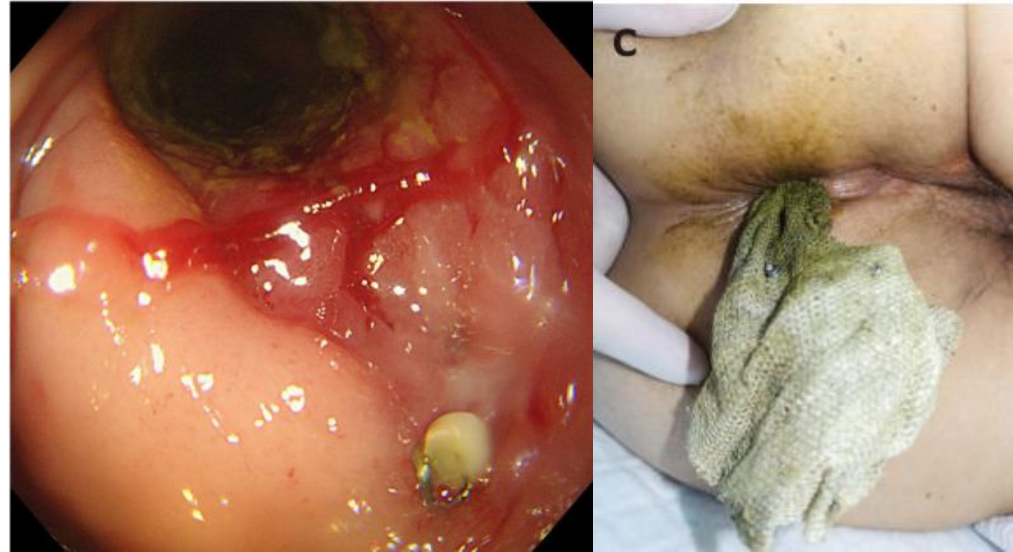
Dr. Miller received a research grant from the American Hernia Society and research funding from Integra.



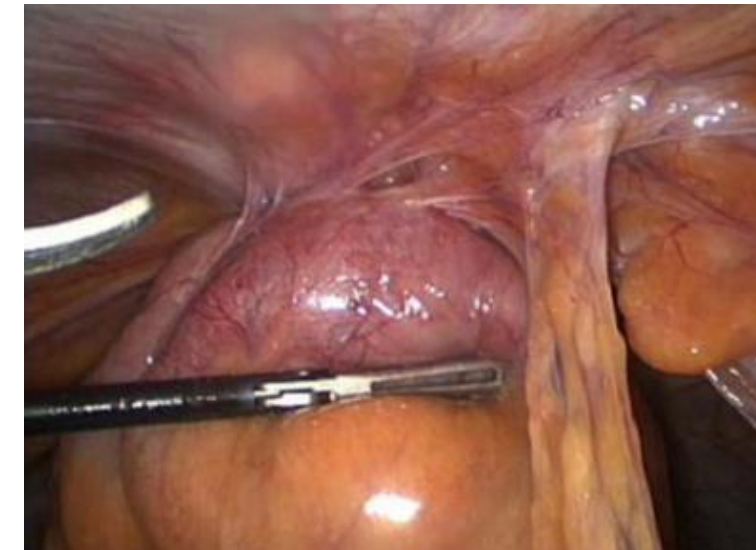
IPOM Mesh Complications



Kirkpatrick AW, Coccolini F, Tolonen M, et al. Are Surgeons Going to Be Left Holding the Bag? Incisional Hernia Repair and Intra-Peritoneal Non-Absorbable Mesh Implant Complications. *Journal of Clinical Medicine*. 2024; 13(4):1005.



Zhang Y, Lin H, Liu JM, et al. Mesh erosion into the colon following repair of parastomal hernia: A case report. *World J Gastrointest Surg*. 2023 Feb 27;15(2):294-302.



Muysoms FE, Bontinck J, Pletinckx P. Complications of mesh devices for intraperitoneal umbilical hernia repair: a word of caution. *Hernia*. 2011 Aug;15(4):463-8. doi: 10.1007/s10029-010-0692-x. Epub 2010 Jun 17. PMID: 20556448.

Long-term Follow Up

- Danish Hernia Database and Danish National Patient Registry linkage
- Median follow-up:
 - Non-mesh: 62 (IQR, 44-79) months
 - Open mesh: 59 (IQR, 44-80) months
 - Laparoscopic mesh: 61 (IQR, 48-78) months
- **100% follow up rate**
- 4.9% rate of reoperation for mesh related complications
- Cumulative risk of reoperation for recurrence at 5 years
 - Non-mesh repair: 17.1%
 - Open mesh: 12.3%
 - Laparoscopic mesh: 10.6%

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Long-term Recurrence and Complications Associated With Elective Incisional Hernia Repair

Dunja Kokotovic, MB¹; Thue Bisgaard, MD, DMSc^{2,3}; Frederik Helgstrand, MD, DMSc^{1,3}

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JAMA. 2016;316(15):1575-1582. doi:10.1001/jama.2016.15217

IPOM Mesh Complications



Registry Data

- Surgeon-entered
- Prospective
- Granular operative details
- Easily accessed



Administrative Data

- Complete and thorough
- Long-term follow up



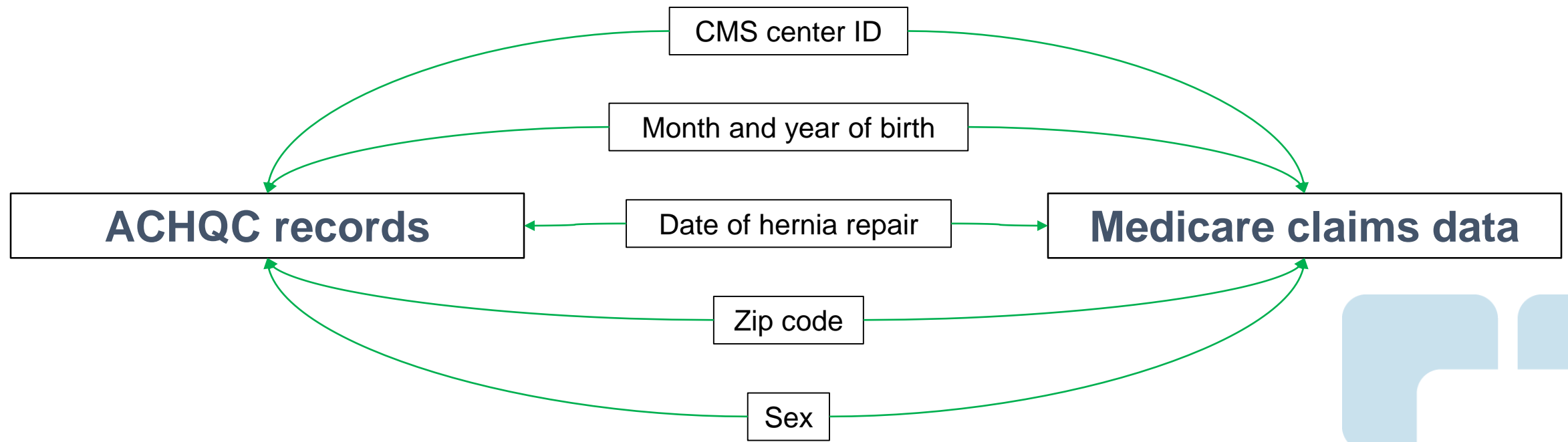
Primary Aim

To determine the long-term **rate of reoperation** in patients with mesh placed in the **intraoperative position (IP)** compared to mesh placed in the **retromuscular and/or preperitoneal positions (RM)**



ACHQC-Medicare Linkage

Patients aged ≥ 65 years or with Medicare insurance undergoing ventral hernia repair between 2014-2019



Medicare Data

- Only patients who were enrolled in both Medicare Part A and Part B at the time of initial hernia repair were included.
- Medicare claims for ventral hernia repair were retrieved using **ICD-9 and ICD-10 procedure codes**.

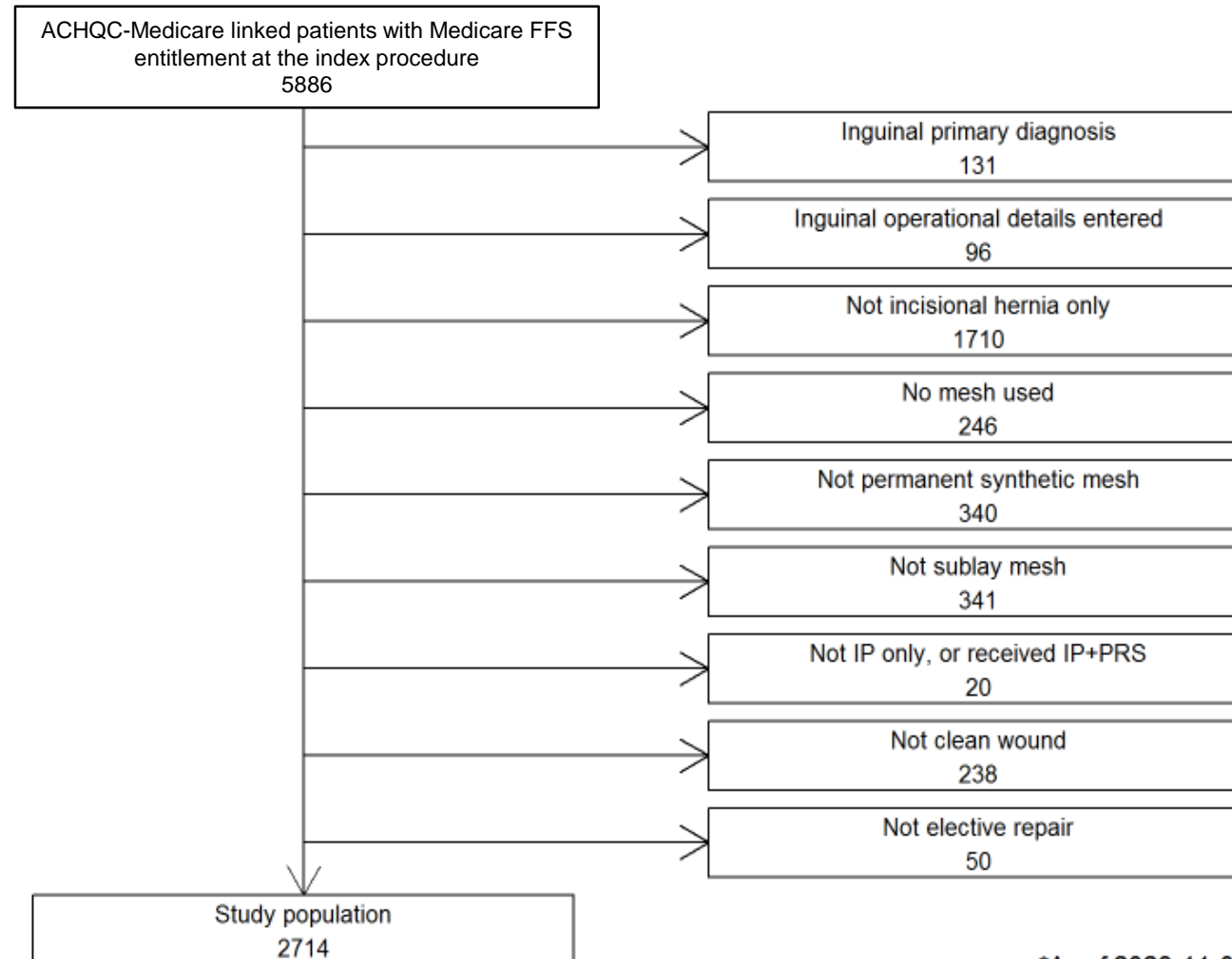


Outcomes

- Rate of reoperation for recurrence as identified from Medicare claims
- Cox proportional hazards models to examine the association between reoperation and mesh placement



Study Population



*As of 2023-11-09



Baseline Characteristics

Characteristic	RM (n = 1,783)	IP (n = 931)	p-value
Age, median (IQR), y	69 (65, 73)	70 (65, 74)	0.039
Sex			0.025
Female	896 (50%)	510 (55%)	
Male	887 (50%)	421 (45%)	
Race			0.5
Black or African American	87 (4.9%)	46 (5.0%)	
Hispanic	31 (1.7%)	>=11	
White	1,637 (92%)	846 (92%)	
Other	17 (1.0%)	<11	
Functional Status			<0.001
Independent	1,704 (96%)	873 (94%)	
Dependent	56 (3.2%)	55 (5.9%)	
BMI, median (IQR)	30.5 (27.0, 34.7)	30.5 (27.1, 34.7)	0.6
Active smoker (within 30 d)	99 (5.6%)	69 (7.5%)	0.055

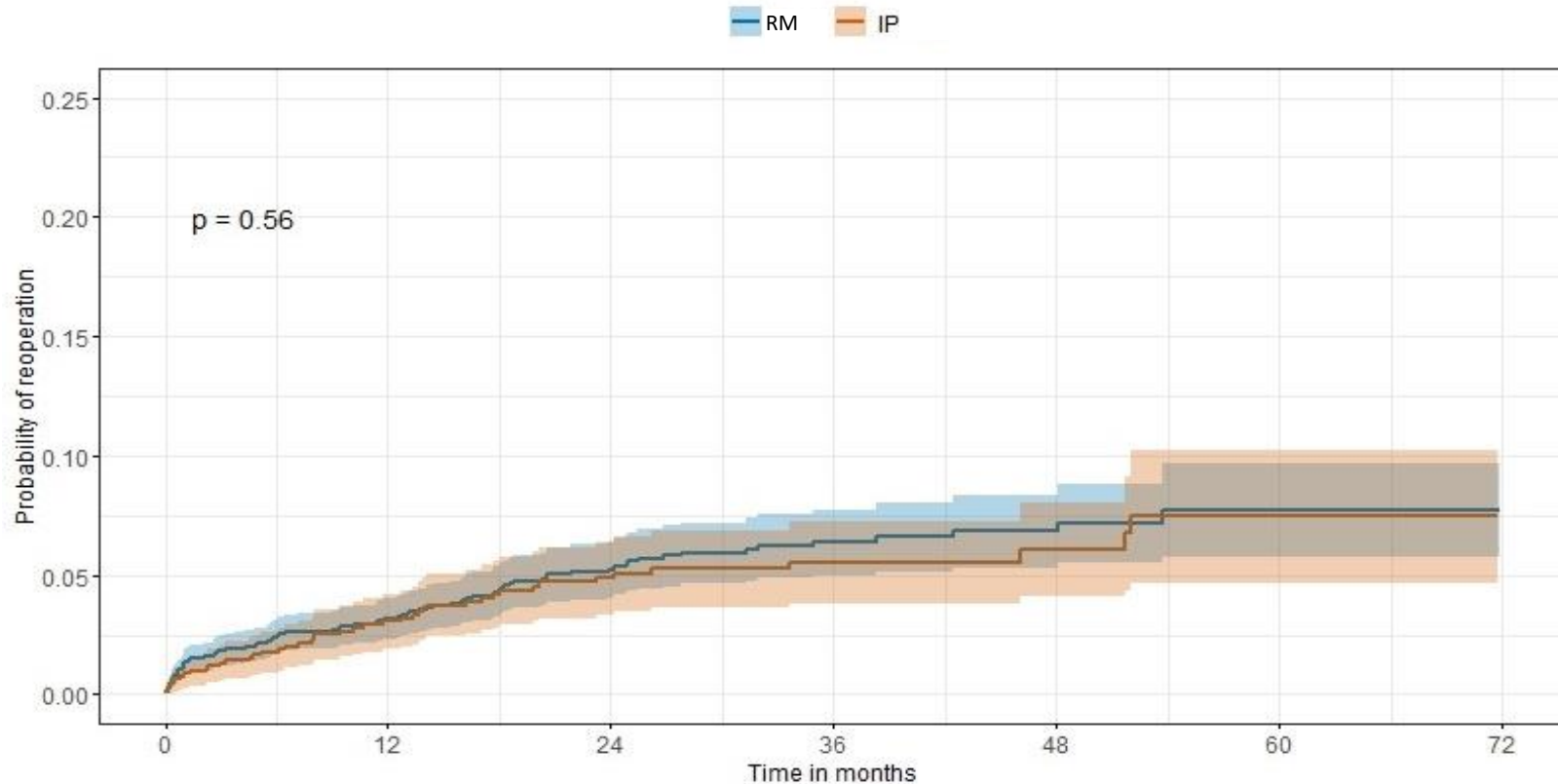
Baseline Characteristics

Characteristic		RM (n = 1,783)	IP (n = 931)	p-value
ASA Class				<0.001
	1	15 (0.8%)	23 (2.5%)	
	2	488 (27%)	322 (35%)	
	3	1,205 (68%)	545 (59%)	
	4	72 (4.0%)	41 (4.4%)	
	5	0 (0%)	0 (0%)	
Dialysis		23 (1.3%)	13 (1.4%)	0.8
COPD		188 (11%)	90 (9.7%)	0.5
Immunosuppression		153 (8.6%)	68 (7.3%)	0.2
Stoma present		12 (0.7%)	<11	0.6
History of abdominal wall SSI		299 (17%)	69 (7.4%)	<0.001
Recurrent hernia		720 (40%)	297 (32%)	<0.001
History of open abdomen		164 (9.2%)	85 (9.1%)	>0.9

Operative Details

Characteristic		RM (n = 1,783)	IP (n = 931)	p-value
Operative time, minutes				<0.001
	0-59	86 (4.8%)	197 (21%)	
	60-119	345 (19%)	416 (45%)	
	120-179	525 (29%)	216 (23%)	
	180-239	419 (23%)	66 (7.1%)	
	240+	408 (23%)	36 (3.9%)	
Operative approach				<0.001
	Laparoscopic	29 (1.6%)	448 (48%)	
	Laparoscopy-assisted ventral hernia repair	11 (0.6%)	>=11	
	MIS convert to open	33 (1.9%)	<11	
	Open	1,338 (75%)	158 (17%)	
	Robotic	321 (18%)	262 (28%)	
	Robotic-assisted ventral hernia repair	51 (2.9%)	18 (1.9%)	
Hernia width, median (IQR), cm		9 (5, 14)	4 (3, 6)	<0.001
VHWG grade				<0.001
	1	497 (28%)	271 (29%)	
	2	986 (55%)	590 (63%)	
	3-4	300 (17%)	70 (7.5%)	
Myofascial Release		1,354 (76%)	19 (2.0%)	<0.001

Rate of Reoperation for Recurrence



IP group: 7.5% [95%
CI 4.7%, 10.2%]

RM group: 7.8% [95%
CI 5.8%, 9.7%]

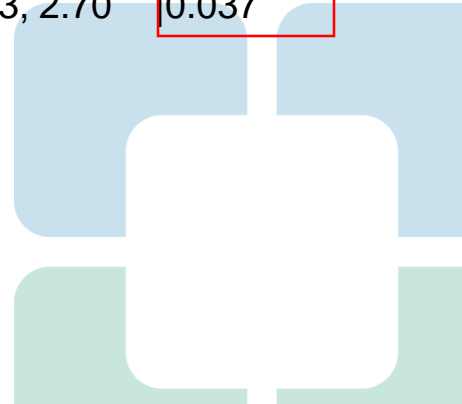
Number at risk (number censored)

	0	12	24	36	48	60	72
RM	1783 (0)	1276 (455)	870 (837)	525 (1173)	257 (1439)	88 (1607)	0 (1694)
IP	931 (0)	708 (197)	506 (387)	320 (570)	158 (731)	78 (810)	0 (887)

Multivariable Analysis

Characteristic	Hazard Ratio	95% CI	p-value
Age	0.99	0.97, 1.00	0.11
Gender			
Female	1	(Reference)	
Male	1.26	0.88, 1.79	0.2
Race			
Non-white	1	(Reference)	
White	0.69	0.38, 1.24	0.2
BMI	1.02	0.99, 1.05	0.3
Nicotine use (within 30 d)			
No	1	(Reference)	
Yes	1.02	0.53, 1.96	>0.9
Immunosuppressants			
No	1	(Reference)	
Yes	0.86	0.44, 1.69	0.7
ASA class			
1	1	(Reference)	
2	1.44	0.20, 10.6	0.7
3	1.83	0.25, 13.4	0.5
4	3.09	0.38, 24.8	0.3
Functional status			
Independent	1	(Reference)	
	0.97	0.42, 2.26	>0.9

Characteristic	Hazard Ratio	95% CI	p-value
COPD			
No	1	(Reference)	
Yes	0.89	0.49, 1.60	0.7
Dialysis			
No	1	(Reference)	
Yes	0.69	0.16, 2.96	0.6
Diabetes Mellitus			
No	1	(Reference)	
Yes	0.94	0.62, 1.43	0.8
Recurrent			
No	1	(Reference)	
Yes	1.46	1.01, 2.10	0.042
History of open abdomen			
No	1	(Reference)	
Yes	1.67	1.03, 2.70	0.037



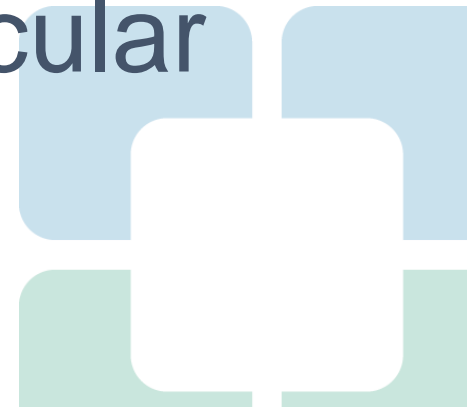
Multivariable Analysis

Characteristic	Hazard Ratio	95% CI	p-value
Mesh Location			
RPS	1	(Reference)	
IP only	1.35	0.73, 2.49	0.3
Myofascial Release			
No	1	(Reference)	
Yes	0.95	0.53, 1.68	0.8
Stoma present			
No	1	(Reference)	
Yes	5.27	1.61, 17.3	0.006
Planned concomitant procedure			
No	1	(Reference)	
Yes	0.96	0.58, 1.60	0.9
Hernia width	1.04	1.01, 1.07	0.009
Operative approach			
Laparoscopic	1	(Reference)	
Laparoscopy-assisted ventral hernia repair	1.41	0.32, 6.16	0.6
MIS convert to open	3.97	1.22, 12.9	0.022
Open	1.4	0.70, 2.78	0.3
Robotic	1.97	1.05, 3.72	0.036
Robotic-assisted ventral hernia repair	1.2	0.33, 4.29	0.8



Future Direction: Rate of reoperation for any indication

Conclusion: Medicare-linked long-term follow up of patients undergoing VHR **does not demonstrate an increased risk of reoperation for recurrence associated with intraperitoneal mesh** compared to mesh placed in the retromuscular and/or preperitoneal positions.





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