

Laparoscopic Intraperitoneal Onlay Mesh (IPOM) vs Robotic Retromuscular (RM) for Small and Medium-Sized Ventral Hernia Repair: A Systematic Review and Meta-Analysis

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Introduction

This study aims to perform a systematic review and meta-analysis to compare the laparoscopic intraperitoneal onlay mesh (IPOM) versus the robotic retromuscular (RM) techniques and their respective outcomes for small and medium-sized ventral hernia repair.

Material & Methods

A comprehensive online search was conducted using PubMed, Cochrane, and Embase. Studies comparing laparoscopic IPOM to robotic RM techniques were included. The results analyzed were the length of stay (LOS), surgical site infection (SSI), surgical site occurrence (SSO), readmission, and reoperation. Statistical analysis was performed with Review Manager 5.4 using a random-effects model.

Results

From 956 records, 3 retrospective observational studies were included, encompassing 1351 patients (laparoscopic IPOM n = 882; robotic RM n = 469). Primary hernias represented 63%, and 88% had horizontal defects between 3.1 and 3.4 cm (Figure 1). Overall analysis showed comparable results between groups regarding LOS (MD 0.58 days; 95% CI -0.07 to 1.24 days; p = 0.08), SSI (RR 0.90; 95% CI 0.28 to 2.85; p = 0.85), and SSO rates (RR 1.07; 95% CI 0.17 to 6.55; p = 0.94).

Additionally, no statistically significant results were seen for readmission (RR 1.50; 95% CI 0.79 to 2.85; p = 0.21) and reoperation rates (RR 1.16; 95% CI 0.47 to 2.86; p = 0.74), as shown in Figure 2.

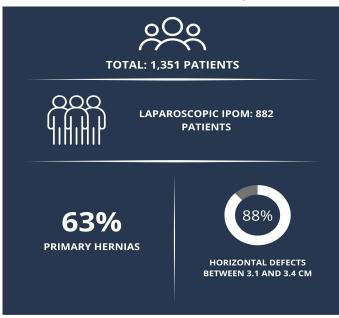


Figure 1. Summary of Patient distribution and key characteristics.

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Table 1 and

references!



	Lap	Lap IPOM			Robotic RM			Mean Difference		Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total N	Weight	IV, Random, 95% CI		IV, Random,	95% CI
Christoffersen 2023	1.22	0.96	32	0.12	0.25	27	33.9%	1.10 [0.75, 1.45]			
Jensen 2024	0.21	2.54	747	0.69	5.42	389	29.2%	-0.48 [-1.05, 0.09]			
Warren 2017	2.11	0.39	103	1.16	0.44	53	36.8%	0.95 [0.81, 1.09]			-
Total (95% CI)			882			469	100.0%	0.58 [-0.07, 1.24]		-	
Test for overall effect:	7 - 17	A (P -	0.08)						-2	-1 0	1
	Z = 1.7	4 (P =	0.08)						-2	-1 0 Favors Lap IPOM Fa	avors Robotic RM
		4 (P =		obotic	RM			Risk Ratio	-2	-1 0 Favors Lap IPOM Fa Risk Rat	
B)	Lap		R		RM Total	Weight		Risk Ratio Random, 95% Cl	-2		io
B) Study or Subgroup	Lap Event	IPOM ts To	R			Weight 8.3%	м-н,		-2	Risk Rat	io
B) Study or Subgroup Christoffersen 2023	Lap Event	IPOM ts Tot 4	R tal Ev		Total		<mark>м-н,</mark> З 3	Random, 95% CI	-2	Risk Rat	io
Test for overall effect: B) <u>Study or Subgroup</u> Christoffersen 2023 Jensen 2024 Warren 2017	Lap Event	IPOM ts To 4 7 7	R tal Ev 32	vents 1	Total 27	8.3%	<u>м-н,</u> З	Random, 95% Cl .38 [0.40, 28.42]	-2	Risk Rat	io
B) Study or Subgroup Christoffersen 2023 Jensen 2024	Lap Event	IPOM ts Tot 4 7 7 5 1	R tal Ev 32 47	26	Total 27 389	8.3% 71.3% 20.4%	<u>М-Н,</u> 3	Random, 95% CI .38 [0.40, 28.42] 1.74 [1.14, 2.65]	-2	Risk Rat	io

31 Heterogeneity: $Tau^2 = 0.10$; $Chi^2 = 2.60$, df = 2 (P = 0.27); $I^2 = 23\%$ Test for overall effect: Z = 1.24 (P = 0.21)

0 02 Favors Lap IPOM Favors Robotic RM

(C)

	Lap IPOM		Robotic RM			Risk Ratio	Risk Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% CI	
Christoffersen 2023	1	32	0	27	13.4%	2.55 [0.11, 60.04]		
Jensen 2024	10	113	2	26	63.0%	1.15 [0.27, 4.94]		
Warren 2017	1	103	2	53	23.7%	0.26 [0.02, 2.77]		
Total (95% CI)		248		106	100.0%	0.90 [0.28, 2.85]		
Total events	12		4					
Heterogeneity: Tau ² =	0.00; Cl	$ni^2 = 1.$	59, df =	2 (P =	0.45); I ² =	= 0%	0.02 0.1 1 10 50	
Test for overall effect:	Z = 0.18	B (P = 0)	.85)				Favors Lap IPOM Favors Robotic RM	

Figure 2. Laparoscopic intraperitoneal onlay mesh versus robotic retromuscular techniques for small and medium-sized ventral hernia repair were not significant between groups for (A) length of stay; (B) readmission; and (C) surgical site infection rates.

Conclusion

This meta-analysis found similar postoperative outcomes for both laparoscopic IPOM and robotic RM techniques. Future studies are still required to evaluate the role of these operative methods following small and medium-sized VHR.