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Robotic Assistance in Ventral Hernia Repair May Decrease the Incidence of Hernia Recurrence

Mitchell Goettman
Henry Ford Health System

Margaret Riccardi
Henry Ford Health System, mriccar1@hfhs.org

Lucky Vang
Henry Ford Health System

Chadi Faraj
Henry Ford Health System, CFARAJ1@hfhs.org

Moe Dughayli
Henry Ford Health System, MDughay1@hfhs.org

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**ROBOTIC ASSISTANCE
IN VENTRAL HERNIA
REPAIR MAY DECREASE
THE INCIDENCE OF
HERNIA RECURRENCE**

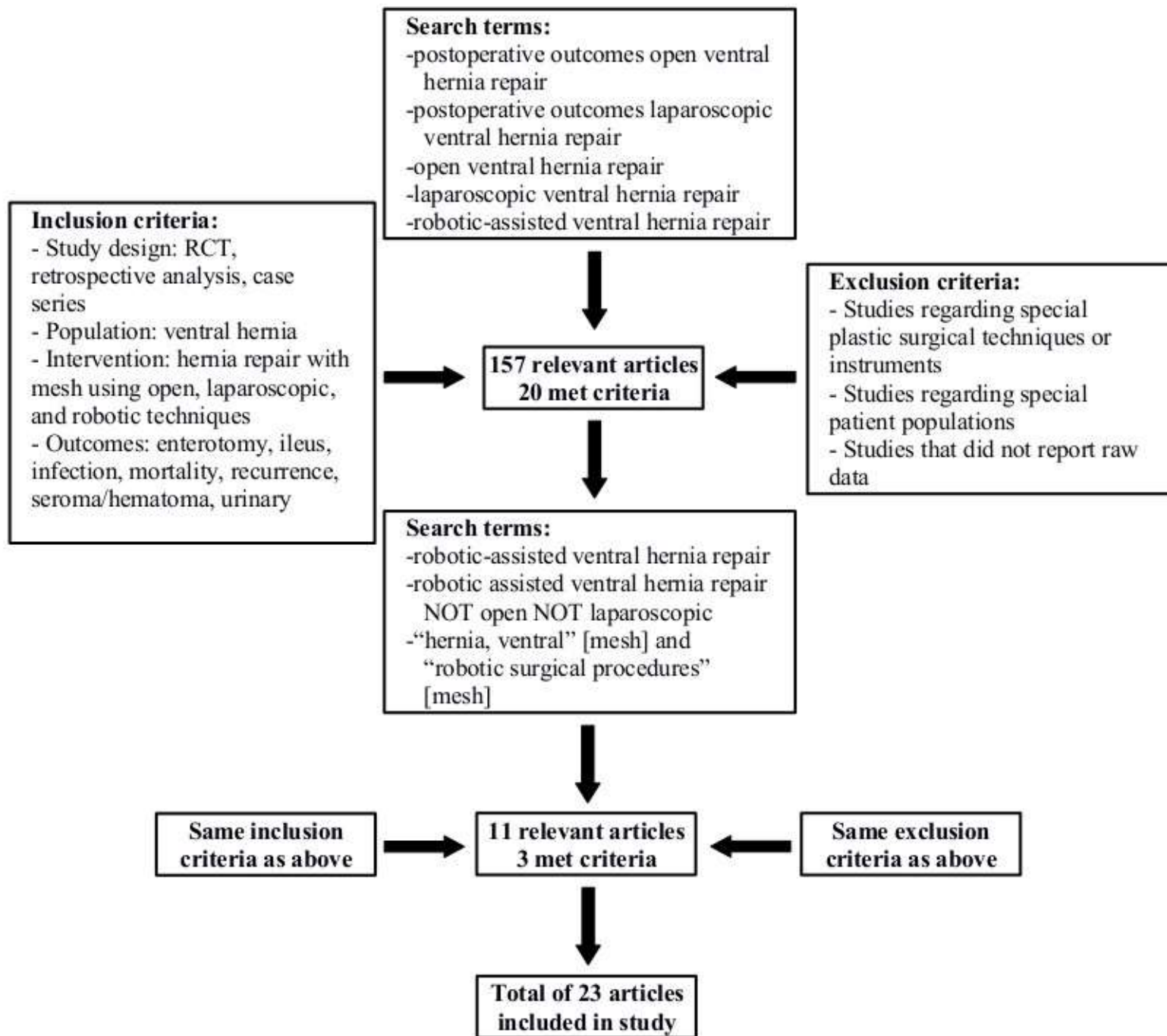
**MARGARET RICCARDI DO
MITCHELL GOETTMAN DO
CHADI FARAJ DO
MOE DUGHAYLI MD**

BACKGROUND

- **Since the advent of laparoscopic surgery, many studies have shown advantages of laparoscopic surgery over open surgery for ventral hernia repair.**
- **There is no consensus for best method of repair of ventral hernias between open, laparoscopic, and robotic.**
- **As robotic surgery is gaining popularity, we sought to compare the outcomes of this newer robotic assisted technique to the outcomes of established open and laparoscopic techniques to assess for any additional benefit.**

METHODS

- **A meta-analysis research design was employed.**
- **Multiple databases were queried for publications over the past 10 years.**
- **23 articles were selected based on predetermined selection criteria.**
- **Data was extracted and the arm-based network meta-analysis method was utilized to examine the effect difference for the 3 arms of our study: open, laparoscopic, and robotic assisted ventral hernia repair.**



Reference	Level of Evidence	Design	Duration of Study (Years)	N Open	N Laparoscopic	N Robotic
Aher <i>et al.</i> , 2015 ^[4]	3B	Retrospective comparative	4	90721	26286	
Ahonen-Siirtola <i>et al.</i> , 2015 ^[7]	3B	Retrospective comparative	7	291	527	
Asti <i>et al.</i> , 2016 ^[3]	3B	Retrospective comparative	5	70	54	
Bianco <i>et al.</i> , 2016 ^[14]	4	Case Series	4.25			95
Bittner <i>et al.</i> , 2017 ^[15]	2B	Retrospective comparative	1.7	76		26
Cassie <i>et al.</i> , 2014 ^[5]	2B	Retrospective comparative	2	13109	1543	
Chen <i>et al.</i> , 2017 ^[1]	2B	Retrospective comparative	3		33	39
Coakley <i>et al.</i> , 2017 ^[11]	3B	Retrospective comparative	5.2		32243	351
Colativa <i>et al.</i> , 2012 ^[16]	2B	Prospective comparative	3.8	402	308	
Davies <i>et al.</i> , 2012 ^[2]	2B	Retrospective comparative	2	110	158	
Dheri <i>et al.</i> , 2015 ^[13]	2B	Retrospective comparative	3		116	111
Ecker <i>et al.</i> , 2016 ^[17]	3B	Retrospective comparative	5	9228	4339	
Eker <i>et al.</i> , 2013 ^[8]	2B	Randomized Clinical Trial	7.6	100	94	
Gherardi <i>et al.</i> , 2013 ^[18]	4	Case Series	10		118	
Gonzalez <i>et al.</i> , 2017 ^[9]	4	Case Series	3.6			368
Huang <i>et al.</i> , 2013 ^[19]	4	Case Series	3.7		100	
Kaoutzanis <i>et al.</i> , 2013 ^[6]	2B	Retrospective comparative	2	21463	5303	
Kudsi <i>et al.</i> , 2015 ^[10]	4	Case Series	3			106
Kumar <i>et al.</i> , 2015 ^[20]	4	Case Series	4		53	
Langbach <i>et al.</i> , 2015 ^[21]	4	Case Series	10.25	73	82	
Liang <i>et al.</i> , 2013 ^[22]	2B	Case Series	11	79	79	
Prabhu <i>et al.</i> , 2017 ^[12]	2B	Retrospective comparative	4		452	186
Tsuruta <i>et al.</i> , 2014 ^[23]	2B	Retrospective comparative	4.9	21	24	
Total				135743	71912	1282

RESULTS

- **As expected, laparoscopy had an advantage over open ventral hernia repair in terms of infection rates.**
- **This advantage was also observed in the robotic group over the open group.**
- **There was no statistical difference between the laparoscopic and robotic groups when infection rates were compared head-to-head.**
- **The robotic group did have a significant advantage over both the open and laparoscopic groups in recurrence rates.**

Complication		Studies	Cases (Incidence)
Ileus	Open	[3][7][8][15][18][23]	18 (0.018)
	Laparoscopic	[3][7][8][11][12][18][21][22][23]	2729 (0.080)
	Robotic	[9][10][11][12][15]	32 (0.031)
Enterotomy	Open	[7][8][19][23]	136 (0.014)
	Laparoscopic	[7][8][12][19][22][23]	64 (0.012)
	Robotic	[9][12]	(0.004)
Infection	Open	[2][4][5][6][7][8][15][18][19][23][25]	4833 (0.136)
	Laparoscopic	[1][2][4][5][6][7][8][11][14][18][19][21][22][23][25]	6611 (0.009)
	Robotic	[1][9][10][11][15]	9 (0.010)
Mortality	Open	[4][5][7][15][19]	364 (0.003)
	Laparoscopic	[4][5][7][11][12][19]	105 (0.002)
	Robotic	[11][12][15]	1 (0.002)
Recurrence	Open	[2][3][7][8][14][18][23][25]	120 (0.105)
	Laparoscopic	[1][2][3][4][7][8][12][14][18][20][21][23]	154 (0.073)
	Robotic	[1][4][10][12][16]	6 (0.011)
Seroma/Hematoma	Open	[2][3][7][14][15][18]	69 (0.067)
	Laparoscopic	[2][3][7][14][18][25]	87 (0.075)
	Robotic	[10][15][16]	4 (0.018)
Urinary	Open	[4][7][8][14][18]	779 (0.008)
	Laparoscopic	[1][4][7][8][11][12][14][18][21]	1347 (0.022)
	Robotic	[1][11][12][15][16]	22 (0.021)

Complication	Lap vs Open	Robot vs Open	Robot vs Lap
Infection	0.44 (0.29-0.66)	0.30 (0.08-0.81)	0.68 (0.19-1.80)
Enterotomy	1.01 (0.39-3.78)	0.19 (0.01-1.22)	0.18 (0.01-1.03)
Ileus	1.76 (0.87-4.16)	1.17 (0.45-3.47)	0.66 (0.31-1.44)
Mortality	0.76 (0.29-2.50)	0.80 (0.03-5.90)	1.03 (0.04-6.90)
Recurrence	0.98 (0.59-1.40)	0.32 (0.07-0.93)	0.33 (0.09-0.91)
Seroma/hematoma	1.28 (0.56-3.28)	0.50 (0.08-2.84)	0.39 (0.05-2.39)
Urinary	0.97 (0.51-1.89)	0.93 (0.34-2.29)	0.96 (0.39-2.10)

CONCLUSIONS

- **Robotic surgery maintains some of the advantages of laparoscopic surgery such as lower incidence of surgical site infections.**
- **Robotic surgery may also provide the additional advantage of recurrence rate reduction.**
- **This may be explained by the ability to perform a more complex hernia repair with robotic assistance secondary to the ease of closure of the fascial defect.**
- **More research is needed to validate this finding.**

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