Pushing Boundaries from Laparoscopy to Robot in Pelvic Surgery

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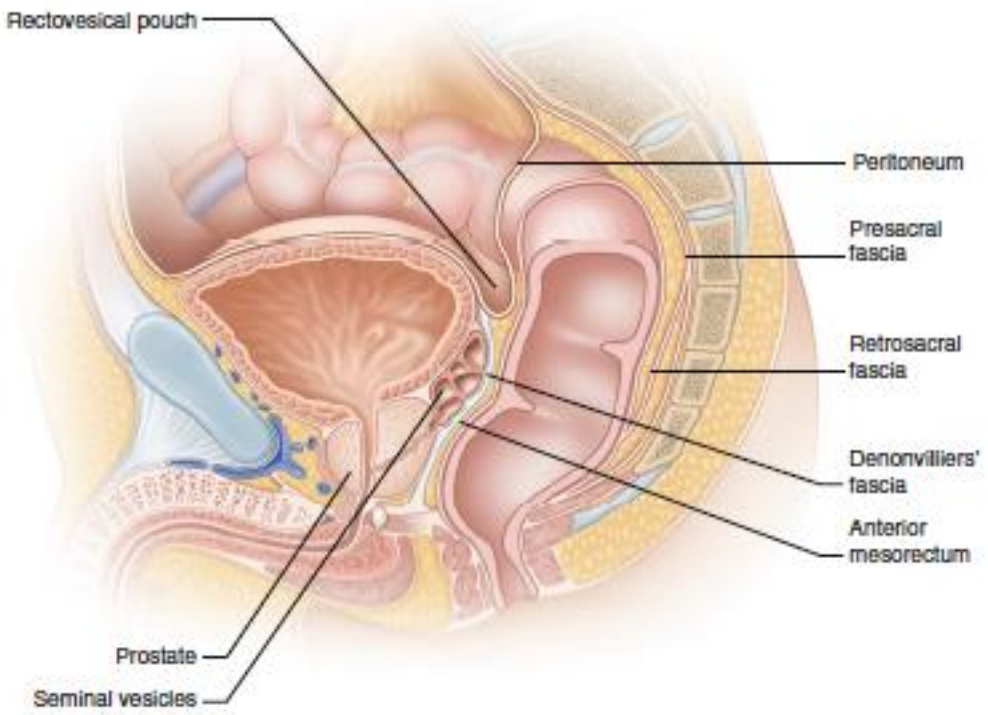
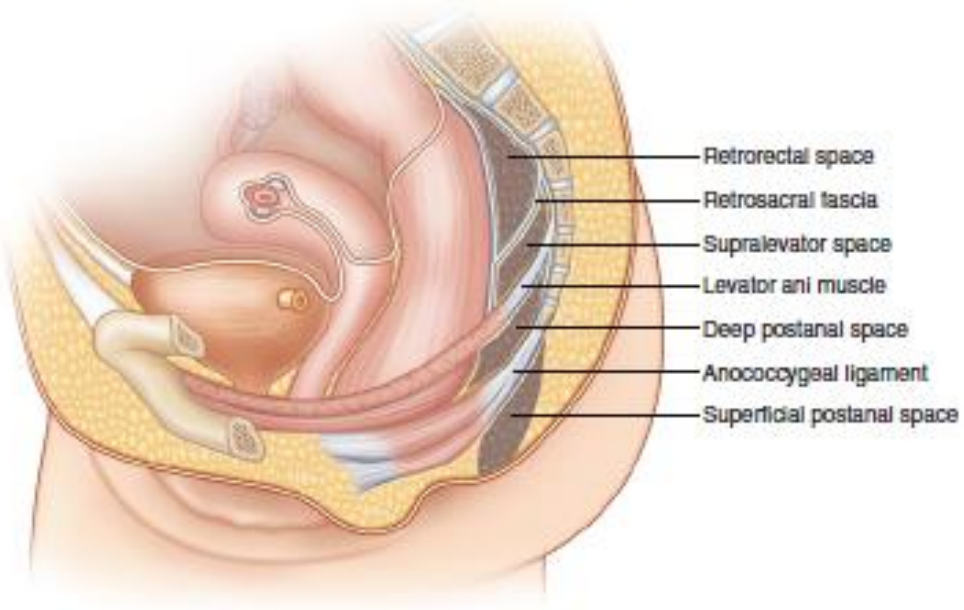
Veri Sınıflandırma Tipi: Genel / General

Pelvic Anatomy





- The close proximity of the rectum to essential structures like the urinary bladder, reproductive organs, and major blood vessels demands meticulous surgical planning and precision.
- Nerves and blood vessels in the pelvic region requires careful dissection to preserve function and minimize complications.
- Understanding and navigating this complex pelvic anatomy are crucial for achieving successful outcomes in Total Mesorectal Excision.

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Total Mesorectal Excision

- **Total mesorectal excision:** Complete excision of visceral mesorectum with pelvic nerve preservation.
- Preservation of pelvic autonomic nerves and associated with highly negative CRM rates.
- Significantly lower locoregional failure rates.
- Standart of care in rectal cancer management

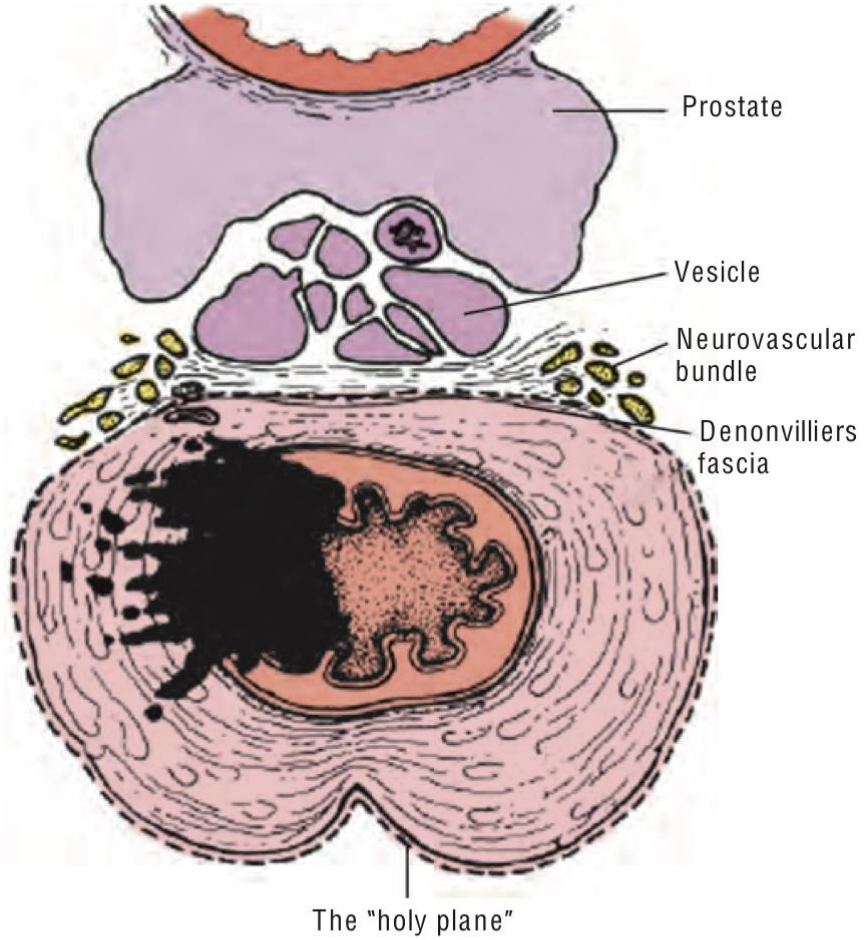

FIGURE 4 Schematic representation of the relationship of the mesorectum to the anterior anatomic structures in a male patient. The neurovascular bundle contains the nerves responsible for erection, ejaculation, and aspects of bladder function. *(From Heald RJ, Moran BJ. Embryology and anatomy of the rectum.* Semin Surg Oncol. *1998;15:70.)*

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Veri Sınıflandırma Tipi: Genel / General

Debeta for Techniques

- Open
- Laparoscopic
  - Standart care
  - Gold standart
    - COST, COLOR, CLASSIC
- Robotic
  - Standart care ?

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Limitations of Laparoscopic TME

- Limited range of motion of instruments in a narrow pelvic cavity
- Loss of dexterity associated with exposure problems
- Inadequate visual field associated with unstable camera view and assistant's traction
- Limited Surgeon control
- Robotic surgery offers solutions to most of those problems.

TABLE 1 Current main advantages and disadvantages of Robotic Surgery

Advantages	Disadvantages
Better ergonomics	High acquisition and maintenance cost
Intuitive handling of instruments	Material with a limit of uses
3D Immersive view	Lack of tactile sensations
Seven degrees of freedom (Endowrist ®)	Device volume
Filtering of physiological tremor	Docking time
Faster learning curve	Risk of mechanical failure
Digital network	
Dual-Console	
Incorporation of other elements: Visualization with fluorescent, optical in the four trocars.	

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Robotic Total Mesorectal excision

- Advantage of robotic surgery in colorectal surgery is best represented in narrow and deep pelvis.
- Laparoscopy is technically demanding and some maneuvers can be difficult to perform because of limited dexterity and lack of a 3D view.
- Robotic instruments enables 3D view, wrist like movements and easier to perform surgical maneuvers in pelvis.

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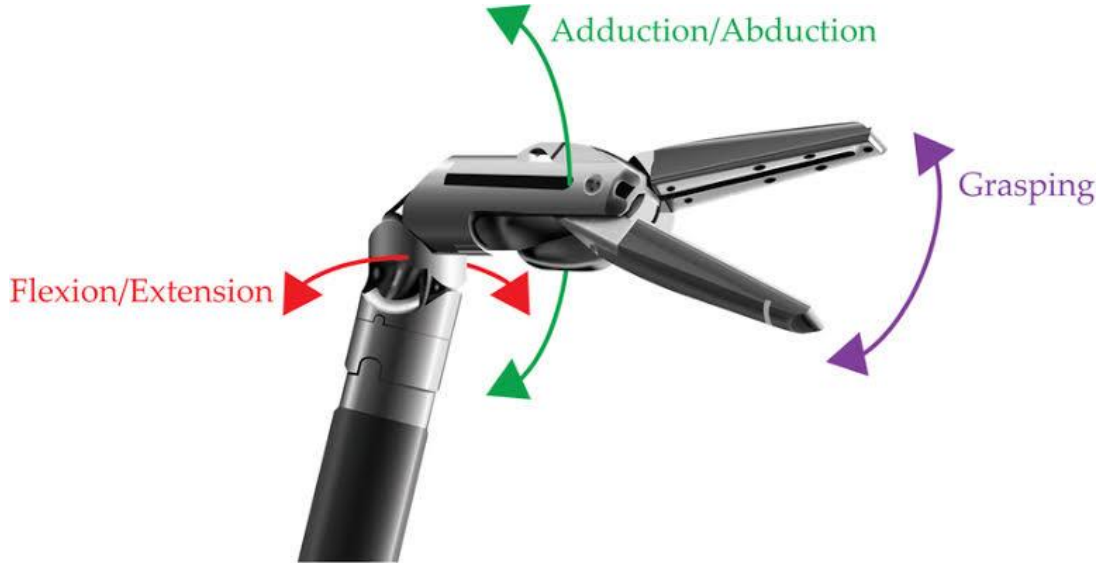
Laparoscopic vs Robotic TME

- The enhanced 3D visualization and magnification provide clarity, enables precise dissection and meticulous suturing even in confined spaces of the pelvis.
- The robotic system's Endowrist technology affords surgeons a greater range of motion and dexterity, crucial for intricate maneuvers during TME



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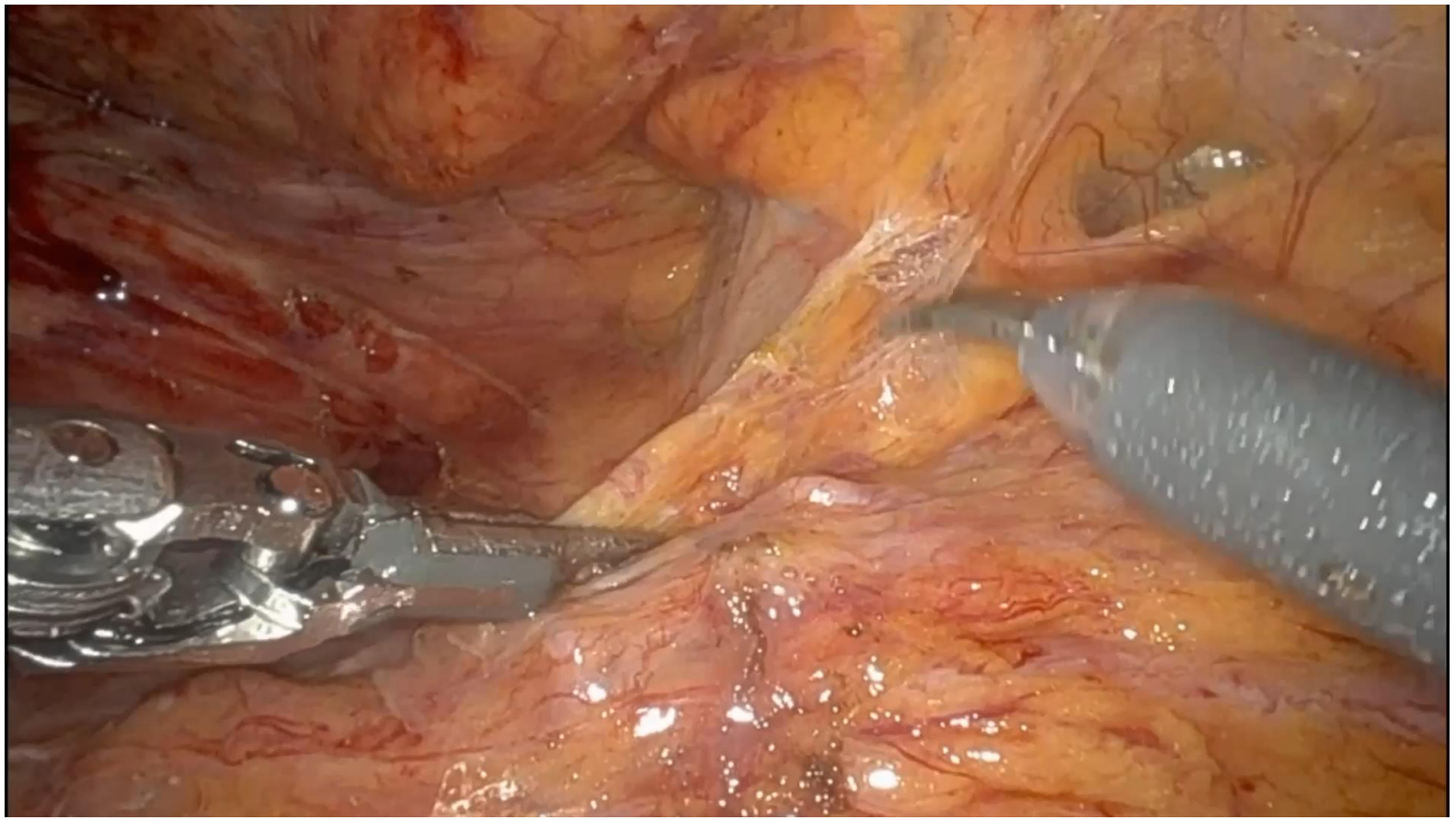

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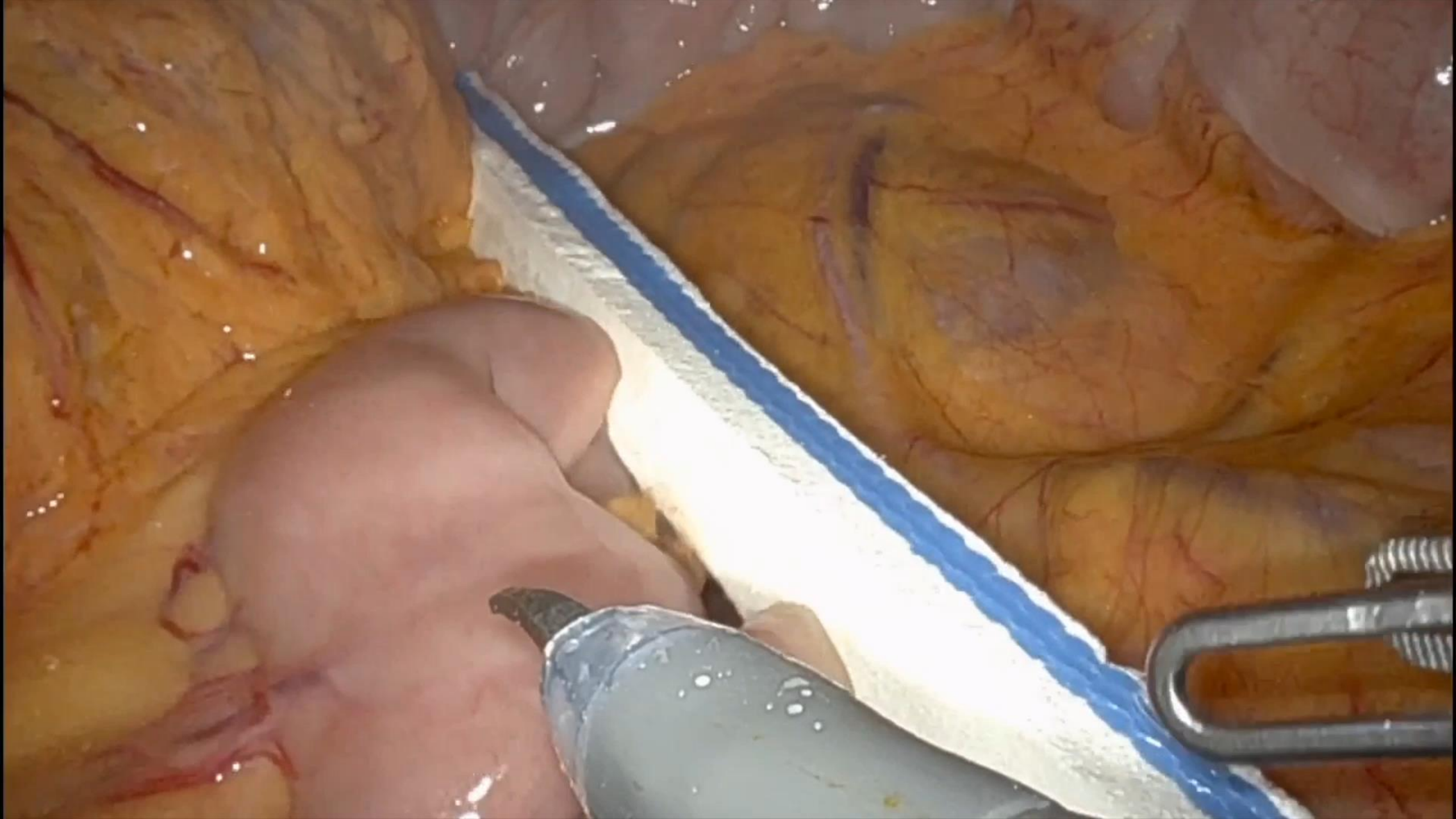

Laparoscopic vs Robotic TME

- Reduced physical strain and improved ergonomics associated with robotics may lead to decreased surgeon fatigue and potentially shorter learning curves, ultimately translating into better patient outcomes and potentially higher adoption rates.

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Laparoscopic vs Robotic TME - Operative time

Systematic review analysis of robotic and transanal approaches in TME surgery- A systematic review of the current literature in regard to challenges in rectal cancer surgery

Julia K. Grass [1], Daniel R. Perez*,[1], Jakob R. Izbicki, Matthias Reeh

Department of General, Visceral and Thoracic Surgery, University Hospital Hamburg-Eppendorf, Germany

- Cost and operative time are major disadvantages of robotic TME compared to laparoscopic TME. However, once learning curve is completed operative time becomes closer to laparoscopic TME.

Author	Year	Operation time			
		taTME	laTME	roTME	p-value
Hellan [83]	2007			285 (180–540)	
Baik [31]	2008		204.3 ± 51.9	217 ± 51.6	0.477
Patriti [84]	2009		208.0 ± 7.0	202.0 ± 12.0	>0.05
Park [45]	2010		168.6 ± 49.3	231.9 ± 61.4	<0.001
Bianchi [27]	2010		237 (170–545)	240 (170–420)	0.2
Baek [85]	2010			270 (150–540)	
Pigazzi [86]	2010			297 (90–660)	
deSouza [87]	2010			347 (155–510)	
Baek [28]	2011		315 (174–585)	296 (150–520)	0.357
Kwak [46]	2011		228 (177–254)	270 (241–325)	**<0.001**
Koh [88]	2011			316 ± 57.4	
Kim [30]	2012		NR	NR	
Park [89]	2012			369 (306–410)	
Kang [29]	2013		277 ± 81.9	309 ± 115.2	**<0.001**
Park [90]	2013		185.4 ± 72.8	235.5 ± 57.5	**0.001**
Luca [91]	2013			276 (155–448)	
Baik [92]	2013			NR	
Kenadawekar [93]	2013			180 (150–230)	
D'Annibale [94]	2014		280 (240–350)	270 (240–315)	**<0.001**
Barnajian [47]	2014		180 (140–480)	240 (150–540)	0.066
Tam [95]	2014		240 (171–360)	260 (189–449)	**0.04**
Cho [48]	2015		272.4 ± 83.8	361.6 ± 91.9	**<0.001**
Melich [96]	2015		262 (252–272)	285 8266-305)	
Serin [97]	2015		140 (90–300)	182 (140–220)	
Pai [98]	2015			345 ± 78	
Allemann [49]	2016		313	291	0.24
Kim [60]	2016		277.0 ± 83.2	441.0 ± 90.2	**<0.001**
Kim [99]	2016		205.0 ± 163.8	441.0 ± 180	

Author	Year	Operation time			
		taTME	laTME	roTME	p-value
Feroci [55]	2016		192 (90–335)	342 (249–536)	**<0.001**
Ramji [100]	2016		240 ± 89	407 ± 97	**<0.001**
Shiomi [53]	2016		237 (125–421)	236.0 (123–484)	0.83
Yamaguchi [101]	2016		227 ± 62.6	232.9 ± 72.0	0.412
Sammour [102]	2016			NR	
Gomez Ruiz [103]	2016			292 (272–312)	
Colombo [104]	2016		228 (127–431)	274 (125–437)	**0.005**
Bedirli [105]	2016		208 ± 49	252 ± 62	**0.027**
Buchs [106]	2016	368.6 ± 101.7			7 –
Silva-Velazco [54]	2017		239 (96–505)	288 (141–544)	**<0.001**
Lim [107]	2017		311.6 ± 79.8	365.2 ± 108.4	**0.033**
Kim [50]	2017		233.8 ± 77.2	288.1 ± 77.0	**<0.001**
			249.7 ± 80.9	285.8 ± 78.5	**<0.001**
Law [108]	2017		225 (101–520)	260 (137–671)	**<0.001**

Veri Sınıflandırma Tipi: Genel / General

Laparoscopic vs Robotic TME – Conversion Rates

World Journal of Gastroenterology

Meta-analysis of robotic and laparoscopic surgery for treatment of rectal cancer

Shuang Lin, Hong-Gang Jiang, Zhi-Heng Chen, Shu-Yang Zhou, Xiao-Sun Liu, Ji-Ren Yu

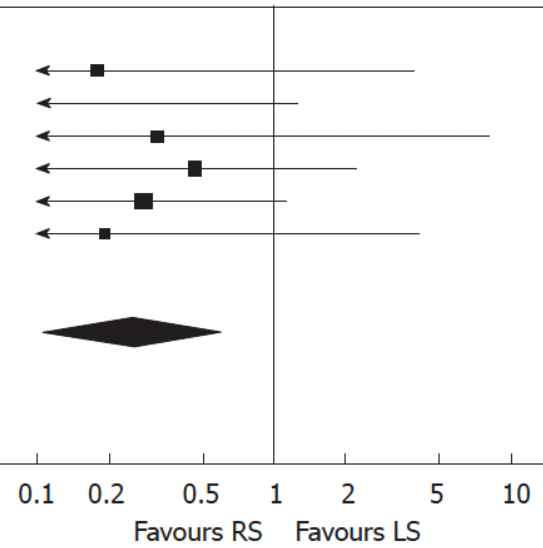
- Less conversion with robotic TME compared to laparoscopic surgery

C

Review: Meta-analysis of robotic and laparoscopic surgery for treatment of rectal cancer
Comparison: 01 Intraoperative data
Outcome: 03 Conversion

Study or sub-category	RS *n/N*	LS *n/N*	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
Pigazzi *et al*[13] 2006	0/6	0/6			Not estimable
Baik *et al*[12] 2008	0/18	2/18		9.17	0.18 (0.01, 3.99)
Patriti *et al*[11] 2009	0/29	7/37		24.51	0.07 (0.00, 1.26)
Bianchi *et al*[10] 2010	0/25	1/25		5.54	0.32 (0.01, 8.25)
Popescu *et al*[9] 2010	2/38	9/84		20.01	0.46 (0.10, 2.25)
Baek *et al*[7] 2011	3/41	9/41		31.42	0.28 (0.07, 1.13)
Kwak *et al*[8] 2011	0/59	2/59		9.34	0.19 (0.01, 4.11)
Park *et al*[6] 2011	0/52	0/123			Not estimable
Total (95% CI)				100	0.25 (0.11, 0.58)

Total events: 5 (RS), 30 (LS)
Test for heterogeneity: $\chi^2 = 1.46$, df = 5 ($P = 0.92$), $I^2 = 0\%$
Test for overall effect: $Z = 3.20$ ($P = 0.001$)



Laparoscopic vs Robotic TME – Perioperative Results

Surg Endosc (2008) 22:1601–1608
DOI 10.1007/s00464-008-9752-z

Robotic tumor-specific mesorectal excison of rectal cancer: short-term outcome of a pilot randomized trial

S. H. Baik · Y. T. Ko · C. M. Kang · W. J. Lee · N. K. Kim · S. K. Sohn · H. S. Chi · C. H. Cho

Methods Between April 2006 and February 2007, 36 patients were randomly assigned to receive R-TSME or L-TSME. During the study, 18 patients underwent robotic low anterior resection using the da Vinci Surgical System, and 18 patients had conventional laparoscopic low anterior resection. Patient characteristics, perioperative clinical results, complications, and pathologic details were compared between the two groups.

Table 2 Operative clinical results

	R-TSME ($n = 18$) Mean ± SD, median (range)	L-TSME ($n = 16$) Mean ± SD, median (range)	p
Operative time (min)			
	217.1 ± 51.6, 202.5 (149–315)	204.3 ± 51.9, 196.0 (114–297)	0.477
Hemoglobin change (g/dl)	0.6 ± 0.6, 0.5 (0.0–1.6)	0.8 ± 1.0, 0.9 (0.0–3.4)	0.511
Days to peristalsis	1.8 ± 0.4, 2 (1–2)	2.4 ± 1.3, 2 (1–6)	0.071
Length of stay (days)	6.9 ± 1.3, 7 (5–10)	8.7 ± 1.3, 9 (6–12)	<0.001
Conversion: *n*.(%)]	0 (0.0)	2 (11.1)	0.486

R-TSME, robotic tumor-specific mesorectal excision; L-TSME, laparoscopic tumor-specific mesorectal excision; SD, standard deviation

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Laparoscopic vs Robotic TME – Perioperative Results

ORIGINAL ARTICLE

The Impact of Robotic Surgery for Mid and Low Rectal Cancer

A Case-Matched Analysis of a 3-Arm Comparison—Open, Laparoscopic, and Robotic Surgery

Jeonghyun Kang, MD, Kyu Jong Yoon, MD, Byung Soh Min, MD, Hyuk Hur, MD, Seung Hyuk Baik, MD, PhD, Nam Kyu Kim, MD, PhD, and Kang Young Lee, MD, PhD

- Propensity score matched analysis of 165 patients in each group
- Robotic surgery showed **better outcomes** than laparoscopic surgery with regard to time to resumed soft diet and lenght of hospital stay.
- No significant difference in means of 2 years disease free survival was seen in all of three groups

TABLE 5. Postoperative Recovery and Pain Control Between the 3 Groups

	OS	LS	RS	*P*
Time to first flatus, mean ± SD	3.0 ± 1.4	2.4 ± 1.2	2.2 ± 1.1	**<0.001**
Time to resumed soft diet, mean ± SD	6.4 ± 2.5	5.2 ± 2.4	4.5 ± 1.9	**<0.001**
Length of hospital stay, mean ± SD	16.0 ± 8.6	13.3 ± 9.2	10.8 ± 5.5	**<0.001**
PCA route, n (%)				**<0.001**
None	0 (0)	0 (0)	1 (0.6)	
IV	42 (25.5)	134 (81.2)	149 (90.3)	
Epidural	123 (74.5)	31 (18.8)	15 (9.1)	
No. postoperative IV analgesics				
Nonopioids, mean ± SD				
POD 1	0.4 ± 0.8	0.4 ± 0.7	0.3 ± 0.7	0.630
POD 2	0.7 ± 0.9	0.5 ± 0.9	0.5 ± 0.8	0.156
POD 3	0.6 ± 0.9	0.5 ± 0.9	0.5 ± 0.9	0.264
POD 4	0.5± 0.8	0.5 ± 0.9	0.2 ± 0.7	**0.006**
POD 5	0.4 ± 0.7	0.4 ± 0.8	0.2 ± 0.5	**0.016**
Opioids, mean ± SD				
POD 1	0.7 ± 1.0	0.4 ± 0.7	0.2 ± 0.6	**<0.001**
POD 2	0.8 ± 1.0	0.6 ± 1.0	0.2 ± 0.6	**<0.001**
POD 3	0.5 ± 0.9	0.4 ± 0.7	0.2 ± 0.6	**0.004**
POD 4	0.3 ± 0.7	0.2 ± 0.7	0.1 ± 0.5	0.229
POD 5	0.2 ± 0.6	0.2 ± 0.5	0.1 ± 0.3	**0.015**

Bold values indicate statistically significant.
SD indicates standard deviation; PCA, patient controlled anesthesia; VAS, visual analog scale; POD, postoperative day.

Veri Sınıflandırma Tipi: Genel / General

Laparoscopic vs Robotic TME – Perioperative

Comparison of laparoscopic *versus* robot-assisted *versus* transanal total mesorectal excision surgery for rectal cancer: a retrospective propensity score-matched cohort study of short-term outcomes

J. C. Hol [1,2,*], T. A. Burghgraef [3,4], M. L. W. Rutgers[5], R. M. P. H. Crolla[6], N. A. W. van Geloven[7], R. Hompes[5], J. W. A. Leijtens[8], F. Polat[9], A. Pronk[10], A. B. Smits[11], J. B. Tuynman[1], E. G. G. Verdaasdonk[12], E. C. J. Consten[3,4] and C. Sietses[2]

BJS

More primary anastomoses are formed with robotic surgery

Table 3 Intraoperative parameters after propensity score matching

	Matched cohort				Post hoc testing		
	Laparoscopy ($n = 108$)	Robot ($n = 108$)	TaTME ($n = 108$)	P	P Laparoscopy *versus* robot	P Laparoscopy *versus* TaTME	P Robot *versus* TaTME
Procedure							
LAR + colostomy	36 (33.3)	11 (10.2)	17 (15.7)	<0.001	<0.001	0.003	0.227
LAR + anastomosis	72 (66.7)	97 (89.8)	91 (84.3)				
Operating time (min)*	149(53)	186(59)	209(74)	<0.001	<0.001	<0.001	0.015
Conversion	4 (3.7)	5 (4.6)	2 (1.9)	0.518			
Reason for conversion							
Extensiveness of tumour	0 (0.0)	0 (0.0)	1 (50.0)				
Accessibility	3 (75.0)	5 (100.0)	1 (50.0)				
Preoperative complication	1 (25.0)	0 (0.0)	0 (0.0)				
Primary anastomosis	72 (66.7)	97 (89.8)	91 (84.3)	<0.001	<0.001	0.003	0.227
Stoma							
No stoma	29 (26.9)	32 (29.6)	48 (44.4)	<0.001	0.653	0.005	0.018
Diverting ileostomy	36 (33.3)	65 (60.2)	43 (39.8)	<0.001	<0.001	0.323	0.003
Diverting colostomy	7 (6.5)	0 (0.0)	1 (0.9)				
End colostomy	36 (33.3)	11 (10.2)	16 (14.8)		<0.001	0.003	0.291
Additional resection	2 (1.9)	6 (5.6)	6 (5.6)	0.303			
Intraoperative complication	3 (2.8)	5 (4.6)	4 (3.7)	0.771			

Values in parentheses are percentages, unless indicated otherwise; *values are mean(s.d.). TaTME, transanal total mesorectal excision; LAR, low anterior resection.

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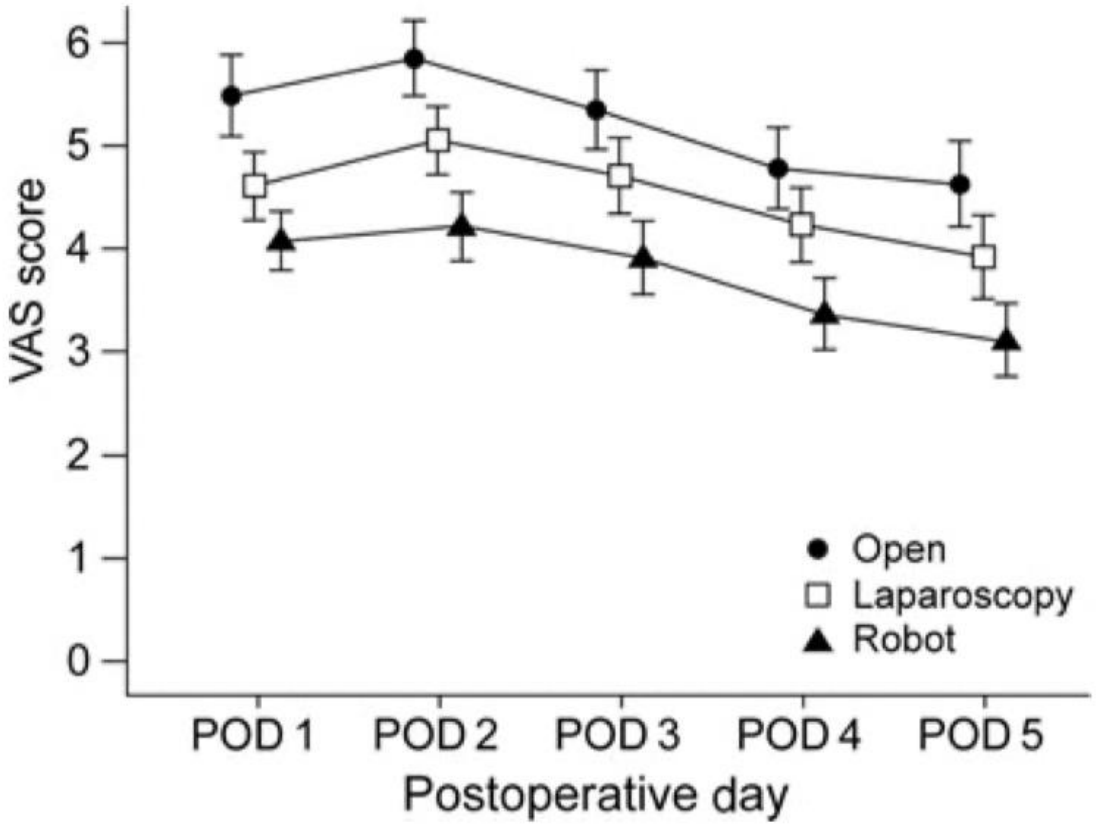
- In a comparison of postoperative pain status, the visual analog scale was **significantly lower** in the RS group than in the OS group and the LS group from postoperative day 1 to postoperative day 5 ($P < 0.001$, $P < 0.001$, $P < 0.001$, $P < 0.001$, $P < 0.001$, respectively)



Veri Sınıflandırma Tipi: Genel / General

Laparoscopic vs Robotic TME - Pathological outcomes

RANDOMIZED CONTROLLED TRIAL

Robot-assisted Versus Laparoscopic Surgery for Rectal Cancer

A Phase II Open Label Prospective Randomized Controlled Trial

Min Jung Kim, MD, Sung Chan Park, MD,* Ji Won Park, MD,*† Hee Jin Chang, MD, PhD,* Dae Yong Kim, MD, PhD,* Byung-Ho Nam, PhD,‡ Dae Kyung Sohn, MD, PhD,* and Jae Hwan Oh, MD, PhD**

- No difference in means of completeness of TME specimen and CRM positivity between laparoscopic and robotic surgery

TABLE 3. Postoperative Pathologic Outcomes

	RG (n = 66)	LG (n = 73)	*P*
Tumor size, cm, median (range)	2.5 (0–6.0)	2.1 (0–11.0)	0.84
Number of harvested lymph nodes			0.04
Median	18.0	15.0	
Range	7.0–59.0	4.0–40.0	
<12, n (%)	6 (9.1)	19 (26.0)	0.009
≥12, n (%)	60 (90.9)	54 (74.0)	
Tumor differentiation, n (%)			0.412
Well differentiated	9 (13.6)	8 (11.0)	
Moderately differentiated	53 (80.3)	64 (86.2)	
Poorly differentiated	3 (4.6)	1 (1.4)	
Mucinous	1 (1.5)	0 (1.4)	
Tumor Regression Grade Scale, n (%)*			0.99
1	11 (16.7)	11 (15.1)	
2	28 (42.4)	31 (42.5)	
3	8 (12.1)	10 (13.7)	
4	5 (7.6)	6 (8.2)	
p/ypT classification, n (%)			0.956
T0	5 (7.6)	6 (8.2)	
Tis	2 (3.0)	4 (5.5)	
T1	8 (12.1)	7 (9.6)	
T2	17 (25.8)	18 (24.6)	
T3	30 (45.5)	36 (49.3)	
T4a	2 (3.0)	1 (1.4)	
T4b	2 (3.0)	1 (1.4)	
p/ypN classification, n (%)			0.713
N0	46 (69.7)	56 (76.7)	
N1a	9 (13.7)	5 (6.9)	
N1b	7 (10.6)	6 (8.2)	
N1c	2 (3.0)	2 (2.7)	
N2a	2 (3.0)	3 (4.1)	
N2b	0 (0)	1 (1.4)	
Proximal resection margin, cm, median (range)	12.3 (4.7–35.8)	13.2 (6.8–29.0)	0.727
Distal resection margin, cm, median (range)	1.5 (0.04–6.7)	0.7 (0–2.5)	0.11
Radial resection margin, cm, median (range)	0.7 (0–2.5)	0.7 (0–1.8)	0.551
Circumferential resection margin, n (%)†			0.999
Positive (≤1 mm)	4 (6.1)	4 (5.5)	
Negative (>1 mm)	61 (92.4)	68 (93.2)	
Quality of TME as rated by pathologist, n (%)			0.599
Complete	53 (80.3)	57 (78.1)	
Nearly complete	12 (18.2)	16 (21.9)	
Incomplete	1 (1.5)	0 (0)	

*Data from patients with preoperative CRT or chemotherapy.
†One patient in each group had a peritonealized tumor.
CRT indicates chemoradiotherapy; TME, total mesorectal excision.

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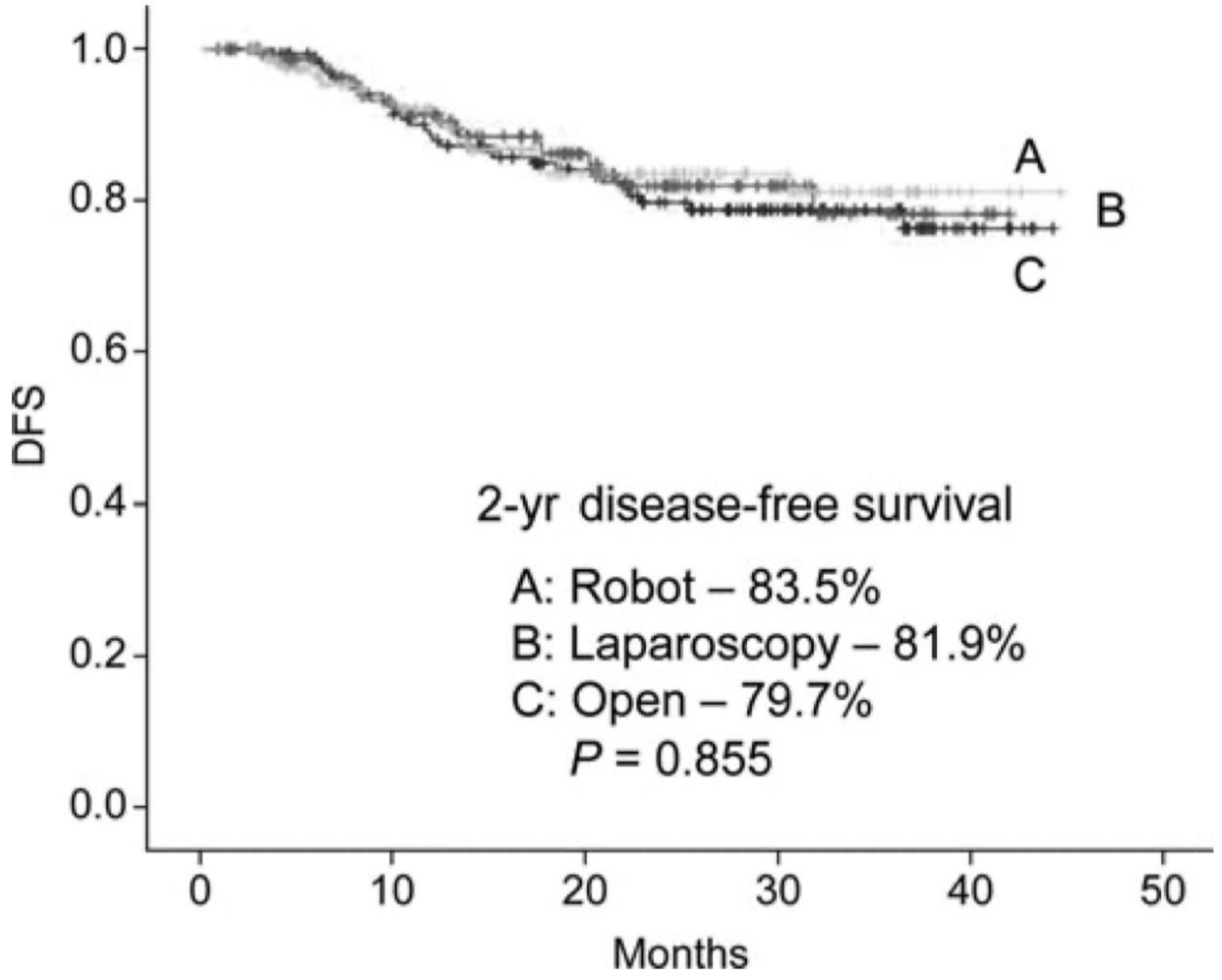
Jeonghyun Kang, MD, Kyu Jong Yoon, MD, Byung Soh Min, MD, Hyuk Hur, MD, Seung Hyuk Baik, MD, PhD, Nam Kyu Kim, MD, PhD, and Kang Young Lee, MD, PhD

- **No difference** in 2-year disease-free survival was observed among the 3 groups (RS vs LS vs OS, 83.5 vs 81.9 vs 79.7, respectively,p=0.855)



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Laparoscopic vs Robotic TME – Oncological Results

Annals of
SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

Laparoscopic Versus Robot-Assisted Versus Transanal Low Anterior Resection: 3-Year Oncologic Results for a Population-Based Cohort in Experienced Centers

T. A. Burghgraef, MD[1,2], J. C. Hol, MD[3,4], M. L. Rutgers, MD[5], R. M. P. H. Crolla, MD[6], A. A. W. van Geloven, MD, PhD[7], R. Hompes, MD, PhD[5], J. W. A. Leijtens, MD, PhD[8], F. Polat, MD, PhD[12], A. Pronk, MD, PhD[9], A. B. Smits, MD, PhD[10], J. B. Tuynman, MD, PhD[4], E. G. G. Verdaasdonk, MD, PhD[11], P. M. Verheijen, MD, PhD[1], C. Sietses, MD, PhD[3], and E. C. J. Consten, MD, PhD[1,2]

The oncologic results during the 3-year follow-up were **good and comparable** between laparoscopic, robot-assisted, and transanal total mesorectal technique at experienced centers. These techniques can be performed safely in experienced hands.

Veri Sınıflandırma Tipi: Genel / General

Laparoscopic vs Robotic TME - Quality of Life

Colorectal Disease

Original article

doi:10.1111/codi.14051

The impact of robotic surgery on quality of life, urinary and sexual function following total mesorectal excision for rectal cancer: a propensity score-matched analysis with laparoscopic surgery

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The robotic approach for TME was associated with **less impairment** of urinary and sexual function

Table 3 International Prostatic Symptom Scores (IPSS) in male and female patients.

		Baseline*	3 months*	6 months*	12 months*
Total	Robot	4.4 (4.8)	8.1 (6.8)	6.3 (4.6)	5.0 (5.6)
	P-value (baseline *vs*)		<0.001	<0.001	0.883
	Laparoscopy	4.4 (3.8)	9.0 (7.3)	7.9 (7.3)	5.7 (6.7)
	P-value (baseline *vs*)		<0.001	<0.001	0.170
	P-value	0.614	0.231	0.019	0.423
Male	Robot	4.5 (4.7)	8.4 (7.3)	6.5 (4.7)	5.5 (6.0)
	P-value (baseline *vs*)		<0.001	<0.001	0.243
	Laparoscopy	4.2 (3.4)	9.4 (7.5)	8.4 (7.5)	6.0 (6.7)
	P-value (baseline *vs*)		<0.001	<0.001	0.023
	P-value	0.404	0.310	0.027	0.776
Female	Robot	4.4 (5.4)	5.5 (5.2)	3.8 (4.0)	3.7 (4.4)
	Laparoscopy	4.5 (5.1)	5.8 (6.9)	4.9 (6.9)	4.6 (6.8)
	P-value	0.896	0.816	0.441	0.564

*Values are mean (standard deviation).

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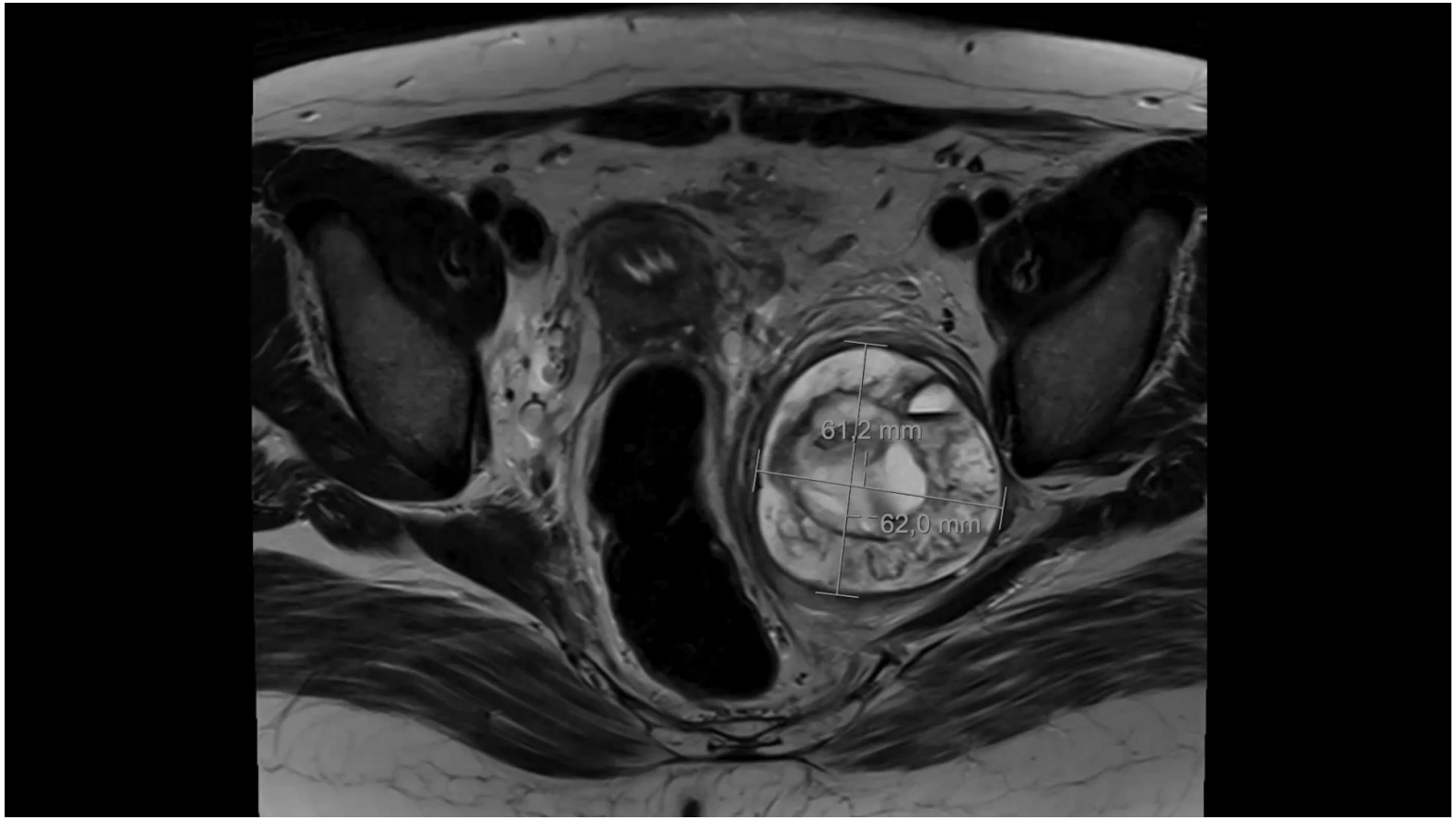

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Multivisceral Resection

- Traditionally: Most pelvic exenteration still performed with an open approach
- Laparosopic pelvic exenteration introduced in 2003
- Robotic pelvic exenteration: First reported in 2009

Case Reports > Gynecol Oncol. 2004 May;93(2):543-5. doi: 10.1016/j.ygyno.2004.01.021.

Laparoscopic hand-assisted Miami Pouch following laparoscopic anterior pelvic exenteration

C Pomel [1], D Castaigne

Case Reports > Gynecol Oncol. 2009 Nov;115(2):310-1. doi: 10.1016/j.ygyno.2009.06.023. Epub 2009 Jul 23.

Robotic assisted total pelvic exenteration: a case report

Peter C W Lim [1]

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Multivisceral Resection

Yamaguchi, T., Akiyoshi, T., Fukunaga, Y. *et al.* Robotic extralevator abdominoperineal resection with en bloc multivisceral resection and lateral lymph node dissection for rectal cancer. *Tech Coloproctol* **24**, 1093–1094 (2020).

Veri Sınıflandırma Tipi: Genel / General

Multivisceral Resection

Colorectal Dis. 2024 May;26(5):949-957. doi: 10.1111/codi.16964. Epub 2024 Apr 4.

Perioperative and oncological outcomes following robotic en bloc multivisceral resection for colorectal cancer

Sandra R DiBrito [1 2], Naveen Manisundaram [1 3], Youngwan Kim [1], Oliver Peacock [1], Chung-Yuan Hu [1], Brian Bednarski [1], Y Nancy You [1], Abhineet Uppal [1], Matthew Tillman [1], Tsuyoshi Konishi [1], Harmeet Kaur [4], Sarah Palmquist [4], Emma Holliday [5], Arvind Dasari [6], George J Chang [1]

- 86 patients | 2009–2021 |
- Tumors: T3 (47%), T4 (47%), rectum 78%
- Conversions to open: 3 (3.5%)
- Median OR time: 430 min
- LOS: 4 days (vs. 11–16 for open)
- Complications: 38% overall, 11% major, 1% mortality

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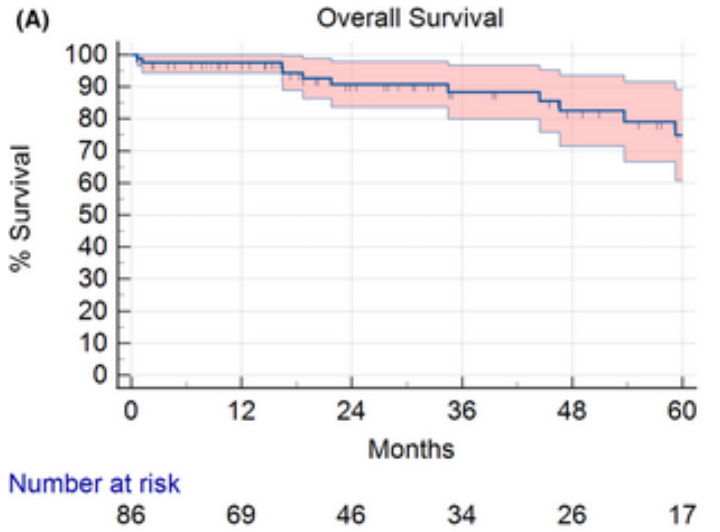
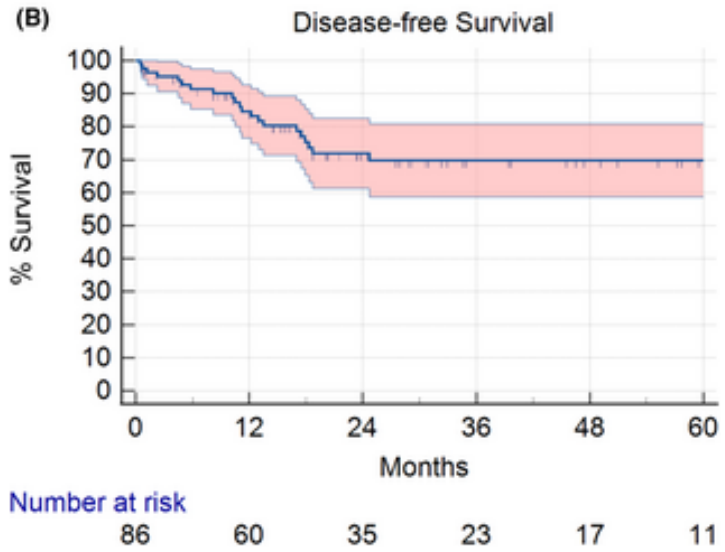
Multivisceral Resection

- Oncological Outcomes
  - R0 resections: 91%
  - 3-year OS: 88%
  - 3-year DFS: 70%
  - Recurrence: 6% local, 26% distant





Colorectal Dis. 2024 May;26(5):

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Robotics Beyond TME

- Korea Univ. Anam Hospital (2008–2018, n=137)
- Three Types of bTME
  - Radial: invasion of adjacent pelvic organs
  - Lateral: pelvic lateral lymph node involvement
  - Longitudinal: very low tumors → ISR
- Key Outcomes
  - Morbidity: 49%
  - Mortality: 0.7% (1 patient)
  - R0 resections: 93% overall
  - Local recurrence: 15% (highest in lateral, p=0.041)
  - Distant metastasis: 34%

› Updates Surg. 2021 Jun;73(3):1103-1114. doi: 10.1007/s13304-020-00898-0. Epub 2020 Oct 17.

Robotic-assisted resection for beyond TME rectal cancer: a novel classification and analysis from a specialized center

G N Piozzi [1 2], T-H Lee [2], J-M Kwak [2], J Kim [2], S-H Kim [3]

Veri Sınıflandırma Tipi: Genel / General

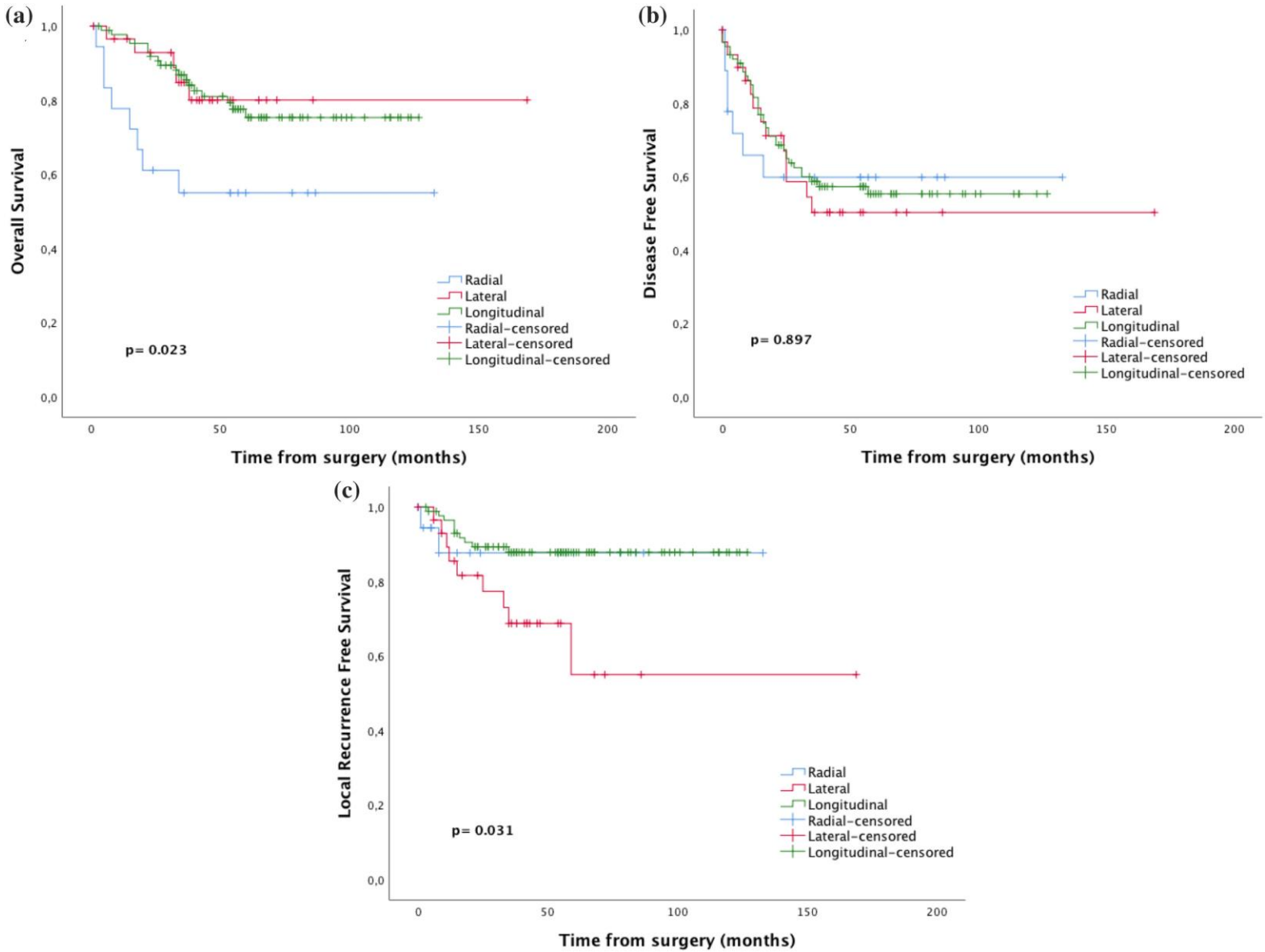
Robotics Beyond TME

- Overall Survival (3y):
  - Radial: 55% (worst)
  - Lateral: 85%
  - Longitudinal: 87%

- DFS: No significant difference (p=0.897)

- LRFS: Worse in lateral group (p=0.031)

- Prognostic factors for OS: (y)pT, (y)pN, type of bTME



Updates Surg. 2021 Jun;73(3)

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Lateral Lymph Node Dissection

- Studies: 11 (667 robotic, 568 laparoscopic cases)
- Postoperative morbidity: ↓ with robotic (OR 0.52; p = 0.02)
- Hospital stay: shorter with robotic (–2.3 days; p = 0.0003)
- Operative time: longer with robotic (+40 min; p = 0.003)
- Lymph nodes harvested: no difference
- Major complications: no difference

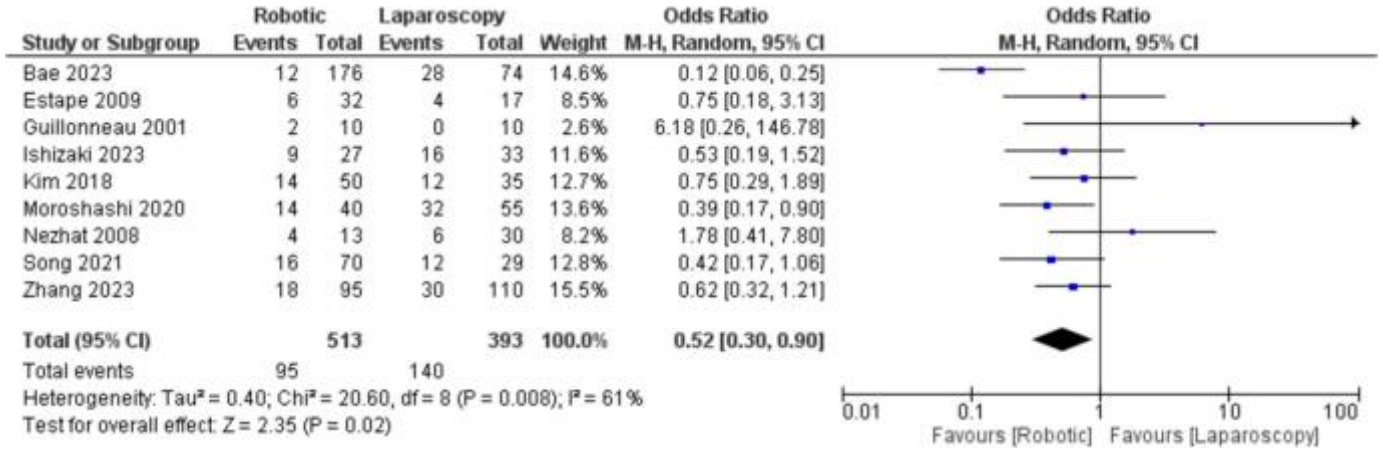
Meta-Analysis > J Gastrointest Cancer. 2025 Jul 15;56(1):151.
doi: 10.1007/s12029-025-01251-7.

Robotic Versus Laparoscopic Lateral Lymph Node Dissection for Advanced Pelvic Cancers: a Systematic Review and Meta-analysis

Mohamed Ali Chaouch [1], Paul Leblanc-Even [2], Ahmed Loghmari [3], Adriano Carneiro da Costa [4], Alessandro Mazzotta [5], Salah Khayat [2], Bassem Krimi [2], Amine Gouader [2], Jim Khan [6], Christoph Reissfelder [7], Wahid Fattal [7], Hani Oweira [7]

Veri Sınıflandırma Tipi: Genel / General

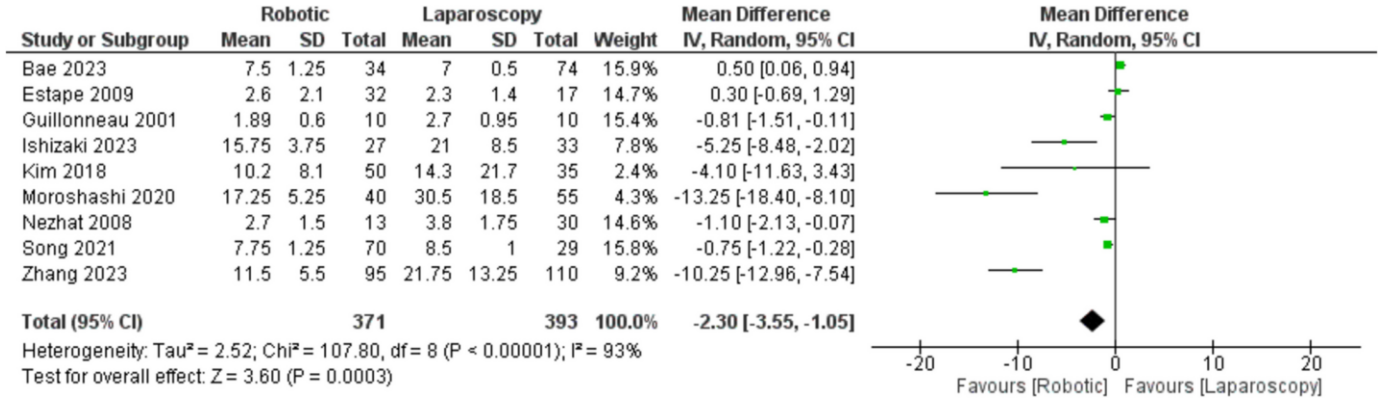
Lateral Lymph Node Dissection



Study or Subgroup	Robotic Events	Robotic Total	Laparoscopy Events	Laparoscopy Total	Weight	Odds Ratio M-H, Random, 95% CI
Bae 2023	12	176	28	74	14.6%	0.12 [0.06, 0.25]
Estape 2009	6	32	4	17	8.5%	0.75 [0.18, 3.13]
Guillonneau 2001	2	10	0	10	2.6%	6.18 [0.26, 146.78]
Ishizaki 2023	9	27	16	33	11.6%	0.53 [0.19, 1.52]
Kim 2018	14	50	12	35	12.7%	0.75 [0.29, 1.89]
Moroshashi 2020	14	40	32	55	13.6%	0.39 [0.17, 0.90]
Nezhat 2008	4	13	6	30	8.2%	1.78 [0.41, 7.80]
Song 2021	16	70	12	29	12.8%	0.42 [0.17, 1.06]
Zhang 2023	18	95	30	110	15.5%	0.62 [0.32, 1.21]
Total (95% CI)		**513**		**393**	**100.0%**	**0.52 [0.30, 0.90]**
Total events	95		140			

Heterogeneity: Tau² = 0.40; Chi² = 20.60, df = 8 (P = 0.008); I² = 61%
Test for overall effect: Z = 2.35 (P = 0.02)

Odds of Morbidity



Study or Subgroup	Robotic Mean	Robotic SD	Robotic Total	Laparoscopy Mean	Laparoscopy SD	Laparoscopy Total	Weight	Mean Difference IV, Random, 95% CI
Bae 2023	7.5	1.25	34	7	0.5	74	15.9%	0.50 [0.06, 0.94]
Estape 2009	2.6	2.1	32	2.3	1.4	17	14.7%	0.30 [-0.69, 1.29]
Guillonneau 2001	1.89	0.6	10	2.7	0.95	10	15.4%	-0.81 [-1.51, -0.11]
Ishizaki 2023	15.75	3.75	27	21	8.5	33	7.8%	-5.25 [-8.48, -2.02]
Kim 2018	10.2	8.1	50	14.3	21.7	35	2.4%	-4.10 [-11.63, 3.43]
Moroshashi 2020	17.25	5.25	40	30.5	18.5	55	4.3%	-13.25 [-18.40, -8.10]
Nezhat 2008	2.7	1.5	13	3.8	1.75	30	14.6%	-1.10 [-2.13, -0.07]
Song 2021	7.75	1.25	70	8.5	1	29	15.8%	-0.75 [-1.22, -0.28]
Zhang 2023	11.5	5.5	95	21.75	13.25	110	9.2%	-10.25 [-12.96, -7.54]
Total (95% CI)			**371**			**393**	**100.0%**	**-2.30 [-3.55, -1.05]**

Heterogeneity: Tau² = 2.52; Chi² = 107.80, df = 8 (P < 0.00001); I² = 93%
Test for overall effect: Z = 3.60 (P = 0.0003)

Length of Hospital Stay

Gastrointest Cancer. 2025 Jul 15;56(1):151.

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Conclusion

- Robotic TME offers unparalleled visualization, enhanced dexterity, and ergonomic benefits when compared to laparoscopic techniques.
- Robotic TME offers less conversion, better functional outcomes and quality of life while offering comparable oncological results
- Its potential to reduce surgeon fatigue, an ease the learning curve can provide better patient outcome.

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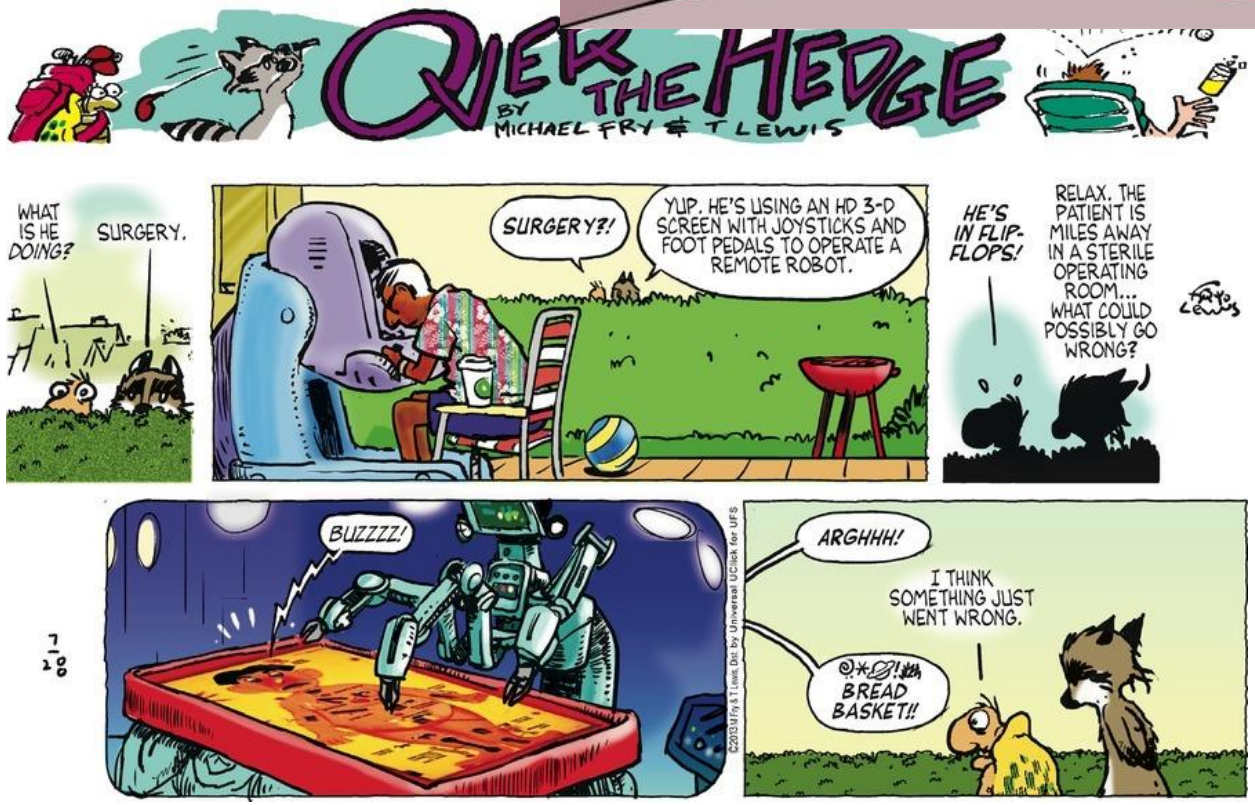
Conclusion

- Robotics gives more flexibility
- Oncologic results are same in good hands
- Pathologic results are similar
- Functional results are better
- Future ……. NOM or Robotics



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