Mini-invasive Surgery

Review

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Minimally invasive right colectomy - from conventional laparoscopic resection to robotic-assisted surgery: a narrative review

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How to cite this article: Moroni P, Payá-Llorente C, Lauka L, Reitano E, Memeo R, Gavriilidis P, Brunetti F, Martínez-Pérez A. Minimally invasive right colectomy - from conventional laparoscopic resection to robotic-assisted surgery: a narrative review. *Mini-invasive Surg* 2019;3:36. http://dx.doi.org/10.20517/2574-1225.2019.34

Received: 8 Sep 2019 **First Decision:** 24 Oct 2019 **Revised:** 8 Nov 2019 **Accepted:** 13 Nov 2019 **Published:** 12 Dec 2019

Science Editor: Giulio Belli **Copy Editor:** Jing-Wen Zhang **Production Editor:** Tian Zhang

Abstract

Robotic-assisted abdominal surgery was introduced with the aim of overcoming the drawbacks of the conventional laparoscopic approach. The present narrative review focuses on the comparison between laparoscopic and robotic-assisted approaches for right colectomy (RC) regarding short- and long-term outcomes, costs, and learning curve. The main technical aspects related to the use of robotic assistance for this specific procedure are further discussed. Minimally invasive RC is considered technically challenging due to the particularities of the right and middle colic vascular anatomy. Robotic RC is not yet widespread due to its high cost and longer operating time. However, its use may result in advantages regarding short-term clinical outcomes, and it facilitates the acquisition of basic surgical skills by speeding up the learning curve of minimally invasive colorectal surgery.

Keywords: Minimally-invasive right colectomy, robotic surgery, laparoscopic surgery, colon cancer, anastomosis, learning curve, costs

INTRODUCTION

Colorectal cancer (CRC) is the most common malignant disease of the gastrointestinal tract and the third most common cancer worldwide with over 1,000,000 new diagnoses and 500,000 deaths per year in the United States[1]. Approximately 40% of all CRCs are located in the right colon[2]. In recent years, several technical requirements have been established to improve the post-surgery outcomes for colon cancer. The American Joint Committee on Cancer (AJCC) has defined that, for a radical colectomy, a minimum of 12 lymph nodes must be examined to avoid understaging[3,4]. Other milestones include the introduction of the principles of complete mesocolic excision (CME)[5] and the introduction and widespread use of minimally-invasive surgery (MIS)[6]. For the resection of colon cancer, the use of conventional laparoscopy seems to reduce the length of hospital stay, postoperative pain, and the time until daily activities return to normal, as well as improve cosmetic outcomes when compared to the open approach[7-10]. Nevertheless, the adoption of laparoscopic right colectomy (LRC) might not be as widespread as expected[11-15], probably due to the high complexity of the vascular anatomy of the right and transverse colon[16].

For minimally-invasive right colectomy (RC), the debate continues regarding whether the ileo-colonic anastomosis should be performed intra- or extra-corporeally. The majority of the published series on minimally invasive RC have reported an extra-corporeal anastomosis (EA) fashioning[16]. Few studies comparing EA with intra-corporeal anastomosis (IA) have been published recently[17]. The principles of CME require a meticulous dissection, which increases the technical challenge of LRC. In this scenario, the use of robotic assistance may overcome the limitations of the straight conventional laparoscopic instruments and allow performing a safer CME with central vascular ligation (CVL), especially in obese patients[18]. The latest *da Vinci Xi*® robotic system (dVXi) presents some additional advantages for colorectal procedures when compared with previous versions (*da Vinci S*® and *Si*®), such as simpler docking, possibility to position the optical system in all of its arms, which are thinner (width 1.7’ *vs.* 2.9’), easier to move, and allow multi-quadrant surgery. The present narrative review aims to describe the main technical aspects of robotic right colectomy (RRC) and compare the learning curve, the short- and long-term outcomes, and the costs between LRC and RRC. A literature search was performed in MEDLINE database (PubMed); articles published in English between 2000 and 2019 using the following terms were screened: “MIS”, “RC/colon resection”, “robotic surgery”, AND “laparoscopic surgery” [Tables 1-3][17,19-32].

TECHNICAL ASPECTS OF RRC

Positioning

There is no consensus about the position of patient and robot in the operating room. In our center, we put the patient in a supine position tilted on the left side (10°-25°) with the arms tight to the body and legs closed. Generally, the table is positioned in Trendelenburg position (5°-10°)[33,34] and the robot is placed on the right side of the patient [Figure 1].

Docking

The pneumoperitoneum is first established. Different options to position the ports have been described, some of which are similar to the conventional laparoscopic approach[35,36]. Advances in robotic systems allow variations of the port placement. Moreover, dVXi arms are thinner and have more flexibility, thus decreasing the risk of external collisions when compared to previous robot versions.

Diagonal or oblique port placement

Four trocars are positioned drawing an oblique line from 4 cm above the pubic symphysis (Port 1) to the left mid-clavicular line crossing over the left sub-costal margin (Port 4), separated by 7.5 cm. One assistant port can be placed at the level of the umbilicus on the middle clavicular line [Figure 2, red points][37].

Table 1. Descriptive table

Author	Year	Journal	Period of recruitment	Type of paper	Number patients	Median age (range) *Mean age ± SD	Mean BMI	ASA			
								1	2	3	4
Ballantyne *et al.*[19]	2006	Surg Laparosc Endosc Percutan Tech	2003-2004	Prosp	16						
D'Annibale *et al*[20].	2004	Dis Colon Rectum	2001-2009	Retrosp	50	73.3	24 (49)	5 (10)	31 (62)	13 (26)	1 (2)
Juo *et al.*[21]	2015	Surg Endosc	2010-2013	Retrosp	31	60.3	26.6				
Trastulli *et al.*[17]	2015	Surg Endosc	2005-2014	Retrosp	102	68.8	25.6	8 (7.8)	55 (53.9)	39 (38.2)	0
Formisano *et al.*[22]	2016	Updates Surg		Retrosp	53						
Petz *et al.*[23]	2017	EJSO	2016	Prosp	20	69					
Lujan *et al.*[24]	2017	J Robot Surg	2009-2015	Retrosp	89	71	28.4				
Mégevand *et al*[25].	2019	Updates Surg	2010-2015	Retrosp	50	70.3		6 (12)	37 (74)	7 (14)	0
Blumberg[26]	2018	J Robot Surg	2003-2016	Retrosp	21	65	30	0	6 (39)	15 (71)	0
Cleary *et al.*[27]	2018	Surg Endosc	2010-2016	Retrosp	588						
Scotton *et al.*[28]	2018	J Laparoendosc Adv Surg Tech A	2001-2015	Retrosp	206	70.1	26	28 (13.7)	120 (58.8)	52 (25.5)	4 (2.0)
Johnson *et al*[29]	2018	J Robot Surg	2015-2016	Retrosp	113	66.4					
Spinoglio *et al*[30].	2018	Ann Surg Oncol	2005-2013	Prosp	101	71.2	25.1	13 (12.8)	40 (39.6)	38 (37.6)	10 (10)
Park *et al.*[31]	2019	Surg Endosc	2009-2011	Prosp	35	62.8	24.4	15 (42.9)	16 (45.7)	4 (11.4)	0
Schulte *et al.*[32]	2019	BMC Surg	2016-2018	Retrosp	31	75					

Prosp: prospective; Retrosp: restrospective

Suprapubic port placement

This approach has been increasingly used [Figure 2, blue points]. The trocars are positioned on a horizontal line 3-4 cm above the pubic symphysis, separated by 6.5-7.5 cm[23,32,38,39]. The unconventional viewpoint is a potential barrier against its widespread use. This placement allows the extraction of the specimen using trocar's incisions.

Single-Incision Robotic Colectomy

The approach is technically challenging as surgical instruments can collide and freedom of motion may be impaired. It has been recently described that this approach should not be recommended in obese patients (BMI > 30 kg/m^2)[21,40]. Further limitations for its current widespread use include the cost of multi-port access and increased incisional hernia rates[41-43].

Medial-to-lateral vs. lateral-to-medial approaches

Two main approaches are used for the right colonic mobilization in both LRC and RRC. Some authors suggest using the medial to lateral approach (MtL)[28] while others prefer the lateral to medial (LtM)[9,19,44] alternative. The MtL technique starts after identifying the inferior part of the duodenum and performing an incision in the mesocolon. Ileo-colic and right colic arteries are clipped close to the superior mesenteric axis in order to insure a CME. MtL mobilization continues with the dissection of Toldt-Gerota fascia from "bottom-to-up", ending with the division of the lateral peritoneal attachments. In the LtM approach, the ligation of vascular pedicle is performed after the mesocolic dissection and the mobilization of the lateral peritoneal attachments, as in an open

Table 2. Table for surgical approach

Author	Type Robot	Trocar's site	Approach	Mean Op. time (min)	Anastomosis					
					Stapled	Handsewn	Intracorporeal	Extracorporeal	Isoperistaltic	Anisoperistaltic
Ballantyne *et al.*[19]	S		MtL, LtM			Y		Y	Y	N
D'Annibale *et al.*[20]	S		MtL	223		Y	Y	Y	Y	N
Juo *et al.*[21]	SIRC	Umbilicus								
Trastulli *et al.*[17]	Si and Xi		MtL	287	Y	Y	Y	N	Y	N
Formisano *et al.*[22]	Xi	Diagonal/Suprapubic	MtL							
Petz *et al.*[23]	Xi	Suprapubic	MtL	249	Y		Y		Y	
Lujan *et al.*[24]	Xi		MtL		Y		Y		Y	
Mégevand *et al.*[25]	Xi		MtL	204	Y		Y		Y	
Blumberg[26]	Si		MtL	330	Y		Y		Y	
Cleary *et al.*[27]	Si and Xi		MtL-LtM		Y		Y (335)	Y (253)	Y	Y
Scotton *et al.*[28]	Xi	Diagonal	MtL	253	Y		Y		Y	
Johnson *et al*[29]	Xi			149	Y		Y			
Spinoglio *et al.*[30]	S and Si			279	Y		Y		Y	
Park *et al.*[31]	Si			195	Y		Y	Y		
Schulte *et al.*[32]	Xi	Suprapubic	MtL	285						

MtL: medial to lateral; LtM: lateral to medial; Y: yes; N: no

surgery. There is no evidence of relevant differences between the 2 approaches. MtL approach may reduce the necessary movements, therefore facilitating the use of robotic assistance[22,28]; early pedicle ligation may also prevent the tumor spreading throughout the mesentery[45].

Complete mesocolic excision

The surgical principles of total mesorectal excision (TME) for rectal cancer were applied in RC, resulting in the concept of CME with CVL, as described by Hohenberger *et al.*[5] in 2008. D3 lymphadenectomy has been performed for decades in Eastern countries when operated on colon cancer and is equivalent to CME[46]. The long-term outcomes after RC have not been improved to the same degree as those for rectal cancer after the introduction of TME[47]. Some studies showed that CME may decrease local recurrences (from 6.5% to 3.6%)[5] and improve survival rates, especially for stage III tumors[48]. The absence of data from well-powered studies, as well as the technical difficulty added by the extended dissection, has impeded the routine implementation of CME for RCC and it is nowadays far from being the "gold standard" in Western countries. Some authors suggest that robotic assistance allows overcoming the technical difficulties of CME in RCC with lower conversion rate than LRC[30].

Intra-corporeal *vs.* EA

EA has traditionally been the preferred method for intestinal reconstruction after LRC. IA may present some advantages, such as reducing the chance of twisting intestinal stumps and causing injuries by specimen traction. IA also allows choosing the location of the specimen extraction incision, reducing the possibility of incisional hernia[41,49,50]. IA application in LRC has been limited due to its technical difficulty[25,51-54], which may be mitigated by the use of

Table 3. Table post-operative

Author	Conversion (%)	Clavien-Dindo postoperative complications				Leak	Reoperation (%)	Readmission (%)
		1 (%)	2 (%)	3 (%)	4 (%)			
Ballantyne *et al.*[19]	0					0		
D'Annibale *et al.*[20]	0			1 (2)		0	1 (2)	0
Juo *et al.*[21]	1 (3.2)					0	0	0
Trastulli *et al.*[17]	4 (3.9)					3 (2.9)	7 (6.8)	0
Formisano *et al.*[22]	1 (1.8)					0	0	0
Petz *et al.*[23]	0	0	0	2 (10)	0	0	0	0
Lujan *et al.*[24]	2 (2.3)	19 (21.3)	6 (6.7)	1 (1.1)	0	1 (1.1)	1 (1.1)	2 (2.2)
Mégevand *et al.*[25]	0					2 (4)		
Blumberg[26]	0							
Cleary *et al.*[27]								
Scotton *et al.*[28]	5 (2.4)					1 (0.4)	6 (2.9)	
Johnson *et al*[29]	0						0	0
Spinoglio *et al.*[30]	0		2 (2)			1 (0.9)	2 (2)	
Park *et al.*[31]	0			1 (2.8)		1 (2.8)	1 (2.8)	0
Schulte *et al.*[32]	0	9 (29)	2 (6.4)	0	0	0		

robotic assistance[55,56]. EA may require an extensive mobilization of the transverse colon for reaching the specimen extraction incision[54,57]. Two recent meta-analyses in LRC have shown shorter time for first defecation, and oral liquid diet, and decreased length of hospital stay in the IA group[58,59]. Van Oostendorp *et al.*[59] also showed a reduction of the short-term postoperative morbidity and surgical-site infection rate in the IA group. No differences were found regarding the other short-term clinical and histopathological variables evaluated[59]. Technical advantages of robotic surgery permit performing an IA more easily. Mégevand *et al.*[25] reported a series of 100 cases comparing RRC and LRC with IA, and they observed faster intestinal recovery and fewer conversions in the RRC group. Solaini *et al.*[60], in a subgroup meta-analysis comparing only EA, found no significant differences between RRC and LRC. To date, no randomized controlled trial has been reported comparing RRC and LRC with the same type of anastomosis. Further studies are therefore needed before drawing any conclusion regarding the potential benefits of both IA and robotic assistance in decreasing the odds of anastomotic leak or improving intestinal recovery after RC.

THREE-DIMENSIONAL VERSUS TWO-DIMENSIONAL VIEW IN LRC

Since the first steps of minimally-invasive surgical procedures, technological research continues to improve its outcomes. In the field of surgical view, a notorious revolution is expected and it is still ongoing. The new laparoscopic platforms together with the new generation of optics allow exceeding the limits of the two-dimensional (2D) view. Abdelrahman *et al.*[61] reported that three-dimensional (3D) optics with ultra-high definition 4k allow a faster learning curve. This experimental evidence was confirmed by Currò *et al.*[62], who concluded that the 3D vision improves the depth of perception, which is especially useful in performing an IA, and it also produces less physical strain to the surgeon. However, further studies are needed before drawing any definitive conclusions regarding the potential benefits of 3D (with or without 4k) *versus* conventional 2D. To date, the choice between 3D and 2D systems relies only on the surgeon's preferences and the hospital's resources.

LEARNING CURVE OF MINIMALLY-INVASIVE RC

Robotic surgery, similar to all the minimally-invasive surgical procedures, requires the acquisition of specific abilities and skills. The learning curve is the number of cases required to achieve expertise with minimal procedural time and complications[63,64]. LRC requires a high degree of dexterity and technical skills which result in a learning curve of 20-30 procedures[36,65,66]; this number may increase with IA fashioning[59]. Operative time for the first cases of robotic surgery is shorter than that in laparoscopy[67].

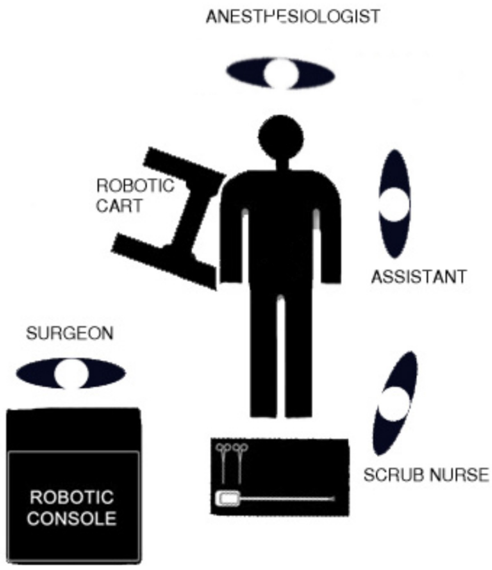

Figure 1. ROBOTIC CONSOLE: robotic platform. SURGEON: first surgeon; ROBOTIC CART: robotic arms; ANESTHESIOLOGIST: anesthesiologist; ASSISTANT: second surgeon; SCRUB NURSE: operative nurse

Additionally, RRC has been proposed as an ideal procedure for the surgeon's initial steps with robotics[68]. de'Angelis *et al.*[36] observed that RRC with EA was associated with a faster learning curve than LRC with EA. Only 16 procedures in the RRC group were needed to significantly reduce operative time versus 25 surgeries in the LLC group. This may be explained by the fact that robotic surgery improves the surgeon's dexterity and depth of perception. Parisi *et al.*[69] concluded that the learning curve for RRC is around 44 procedures. This long curve was necessary to significantly reduce operative time and conversion to open surgery rate, as well as to significantly increase the number of harvested lymph nodes. Performing RRC can be justified in different situations depending on the type of surgical unit, for example as a training procedure for robotic colorectal surgery for young surgeons in centers that are already skilled at performing RRC. Moreover, centers aiming to incorporate complex robotic procedures could start with RRC as one of the first of them.

SHORT- AND LONG-TERM OUTCOMES

Several studies have demonstrated the safety and efficacy of RRC for both short- and long-term outcomes[31,60,70,71]. Only one randomized controlled trial found no differences in lengths of hospital stay and the surgical complications rate between RRC and LRC groups[72]. The latest meta-analysis published by Ma *et al.*[73] in 2019 concluded that RRC has a longer operation time, lower estimated blood loss, shorter hospital stay, and lower postoperative complication rate than LRC. Solaini *et al.*[60] reported that conversion to open surgery was more common during LRC, with no significant differences in mortality and postoperative complication rate. Lim *et al.*[70] concluded that the time for diet, first flatus, and first defecation, and the length of hospital stay were significantly decreased for RRC. Similarly, Rondelli *et al.*[74] showed that the time for the first flatus was significantly shorter in RRC. Such differences in recovery may also be related to the less traumatic intra-peritoneal approach provided by the use of IA, rather than purely by the use of robotic assistance. When combined, they can provide a quicker bowel recovery with less need of analgesics[17,75] and fewer post-operative complications[24,74,76-78] [Tables 4 and 5][17,24,30,54,72,76-79].

In a recent retrospective study with 101 patients receiving RRC with CME from 2005 to 2015, Spinoglio *et al.*[30] showed that it is possible to perform routine RRC with CME and IA safely, with comparable long-term oncologic outcomes to laparoscopic techniques [five-year overall survival (OS) of 77% and disease-free survival (DFS) of 85%]. They also showed a non-significant improvement in DFS for AJCC/UICC stage

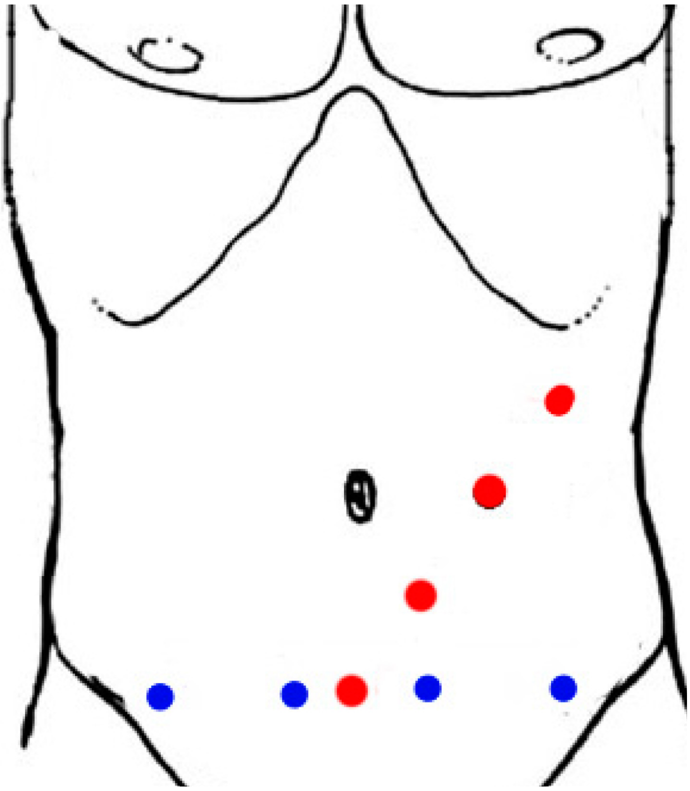

Figure 2. Robot trocar's positions. Red points: diagonal approach; blue points: suprapublic approach

III patients undergoing RRC. Park *et al.*[31] randomized 71 patients and compared robotic and LRC, and they observed that the long-term outcomes were similar between RRC and LRC with no statistically significant differences at three- and five-year DFS and OS. These findings are consistently reproduced in the contemporary literature[80] [Table 6][20,30,72,80,81].

COSTS

Cost evaluation in robotic colorectal surgery is crucial to implementing and maintaining the new technology. Nowadays, increased costs are the most important drawback of robotic-assisted surgery and could imply a non-neglectable burden on healthcare systems. Direct costs can be divided into fixed and variable types. The fixed costs include the acquisition of the robotic system, ranging $0.6-2.5 million, and the costs of further maintenance. The variable costs depends on the consumable instruments, operating room charges, and professional fees. There is a consensus that RRC is more expensive than LRC[36,60,74,82,83]. Park *et al.*[72] determined that the mean direct patient payment for a robotic colectomy was about US $3600 more expensive than for a laparoscopic procedure. Cleary *et al.*[27] reported lower rates of conversion in RRC than in LRC; they also found that RRC was more expensive than LRC, but, when converted patients were included, the difference in cost between RRC and LRC decreased substantially. The total length of hospital stay has an impact on the costs; some of the recent meta-analyses showed that RRC is associated with shorter hospital stay, which may translate to reduced costs[73]. It is clearly difficult to assign a monetary value to measured outcomes in cost-effectiveness studies. In a recent study, laparoscopic and robotic colectomy were shown to be more cost-effective than the traditional open resection, laparoscopy being the most cost-effective approach[84]. Decreasing costs of robotic platforms and devices is mandatory for its future widespread adoption. Under careful assessment of indications for the different robotic system applications, the advantages of robotic assistance, such as higher degrees of rotation, articulation, and 3D imaging, can outweigh the existing drawbacks provided by the higher costs. The expected arrival of competitive industry players could dramatically change this situation soon.

Table 4. Operative data table

Author	Year	Journal	Number patients		Mean Op. time (min)		Mean BL (mL)		Conversion (%)		Harvest Node		Anastomotic Leak (%)	
			RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC
Delaney *et al.*[77]	2003	Dis Colom Rectum	2	2	270.5	138	100	150	0	0	NR	NR	0	0
Rawlings *et al*[79]	2007	Surg Endosc	17	15	218.9	198.2	40	66.3	0	2 (1.3)	NR	NR	1 (0.6)	0
Park *et al.*[72]	2012	Br J Surg	35	35	195	130	35.8	56.8	0	0	29.9	30.8	1 (0.2)	0
Deutsch *et al.*[78]	2012	Surg Endosc	18	47	219.2	214.4	76.4	123.2	2 (1.1)	0	21.1	18.7	1 (5.5)	1 (2.1)
Morpurgo *et al.*[54]	2013	J Laparoendosc Adv Surg Tech A	48	48	266	223	NR	NR	NR	NR	26	25	0	3 (6.2)
Lujan *et al.*[24]	2013	J Robot Surg	22	25	251	149	40	50	0	0	24	15	NR	NR
Casillas *et al.*[76]	2014	Am J Surg	54	110	143	79	63	57	4 (7.4)	11 (10)	28	24	0	7 (6.4)
Trastulli *et al.*[17]	2015	Surg Endosc	102	134	287.4	207	30	40	4 (3.9)	14 (10.4)	20.3	19	3 (2.9)	2 (1.5)
Spinoglio *et al.*[30]	2018	Ann Surg Oncol	100	100	279	236	NR	NR	0	7 (7)	28.2	30.4	1 (1)	1 (1)

RRC: robotic right colectomy; LRC: laparoscopic right colectomy; BL: blood loss; NR: not reported

Table 5. Short-term outcomes comparative table

Author	Year	Journal	Number patients		First flatus (days)		Major complication*		Mean hospital stay (days)		30 days mortality [N (%)]	
			RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC
Delaney *et al.*[77]	2003	Dis Colom Rectum	2	2	NR	NR	0	0	3.5	2.5	0	0
Rawlings AL *et al*[79]	2007	Surg Endosc	17	15	NR	NR	0	2 (1.3)	5.2	5.5	0	0
Park *et al.*[72]	2012	Br J Surg	35	35	2.6	2.9	NR	NR	7.9	8.3	0	0
Deutsch *et al.*[78]	2012	Surg Endosc	18	47	3	3.6	NR	NR	4.3	6.3	0	1 (2.1)
Morpurgo *et al.*[54]	2013	J Laparoendosc Adv Surg Tech A	48	48	2.4	3.4	NR	NR	7.5	9	0	0
Lujan *et al.*[24]	2013	J Robot Surg	22	25	NR	NR	NR	NR	3	3	NR	NR
Casillas *et al.*[76]	2014	Am J Surg	54	110	NR	NR	NR	NR	6.2	5.5	0	1 (0.9)
Trastulli *et al.*[17]	2015	Surg Endosc	102	134	2	3.5	NR	NR	4	6.5	0	0
Spinoglio *et al.*[30]	2018	Ann Surg Oncol	100	100	NR	NR	4 (4)	6 (6)	7.9	7.9	1 (1)	0

*Clavien-Dindo III or IV. RRC: robotic right colectomy; LRC: lapaproscopic right colectomy; NR: not reported

CONCLUSION

RRC is a safe and feasible procedure with comparable outcomes to the standard laparoscopic approach. The slight benefits regarding recovery outcomes still need to be confirmed by future prospective studies. The cornerstone of those studies should be comparing the techniques with respect to the anastomotic fashioning (EA *vs*. IA). To date, there is no difference in terms of three- and five-year DFS and OS between laparoscopic and robotic approaches, supporting RRC as a safe and feasible technique. If CME provides better oncologic results, robotic surgery may improve the ability to assess it by decreasing the technical complexity. RRC remains much more expensive than LRC. Further studies demonstrating clinically relevant benefits over the other alternatives are still needed to determine the definitive role of robotic surgery for right colonic cancer resection. Breaking the monopoly by competitive producers of robotic

Table 6. Long-term outcomes comparative table

Author	Year	Journal	Number patients		DFS 3-year		DFS 5-year		OS 3-year		OS 5-year	
			RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC	RRC	LRC
D'Annibale *et al.*[20]	2010	Ann Surg Oncol	50	0	90.0%	NR	NR	NR	92.0%	NR	NR	NR
Cho[80]	2015	Ann Surg	0	205	NR	NR	NR	82.9%	NR	NR	NR	89.8%
Spinoglio *et al.*[30]	2018	Ann Surg Oncol	100	0	NR	NR	91.4%*	NR	NR	NR	90.3%*	NR
Kang[81]	2016	Surg Lap Endosc Percutan Tech	20	43	NR	NR	89.5%	84.0%	NR	NR	73.1%	79.2%
Park *et al.*[72]	2012	Br J Surg	35	36	88.1%	91.1%	77.4%	83.6%	96.8%	94.0%	91.1%	91.0%
Spinoglio *et al.*[30]	2018	Ann Surg Oncol	101	101	NR	NR	85%	83%	NR	NR	77%	73%

*40 months follow-up. RRC: robotic right colectomy; LRC: laparoscopic right colectomy; DFS: disease free survival; OS: overall survival; NR: not reported

systems could dramatically increase accessibility and widespread use of this approach.

DECLARATIONS

Authors' contributions

Concept and design: Moroni P, Martínez-Pérez A

Manuscript writing: Moroni P, Payá-Llorente C

Provision of study materials or patients, collection and assembly of data, data analysis and interpretation, and final approval of manuscript: All authors.

Availability of data and materials

Not applicable.

Financial support and sponsorship

None.

Conflicts of interest

All authors declared that there are no conflicts of interest.

Ethical approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

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