

Robotic Total Mesorectal Excision Brings Better Short-term Functions Recovery Compared with Laparoscopic Surgeries

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Instruction:
Laparoscopic and robotic surgeries are widely used for rectal cancer. However, the short-term outcomes of robotic and laparoscopic surgeries, especially intestinal, urinary, and sexual functions have not been demonstrated for low rectal cancer.

Methods and procedures:
Between January 2021 and July 2024, 96 patients with cT2-3N0-2M0 low rectal cancer in Jiangsu Cancer Hospital treated with robotic Total Mesorectal Excision (TME) by one surgeon were included in our study. Patients treated with Laparoscopic TME were matched at 1:1 ratio with tumor location, sex, clinical stage. All patients were conducted with TME with temporary ileostomy, with high ligation at the root of the inferior mesenteric artery (IMA). Blood examinations were taken before and 1 day after surgery. Urinary symptoms and sexual function were assessed using the EORTC QLQ-CR29 questionnaire 3 months after surgery. Perioperative clinicopathologic outcomes, Postoperative urinary function, male sexual function recovery, and bowel function of patients in the laparoscopic and robotic surgery groups collected and analyzed. Analysis of variance between groups was employed for categorical variables, whereas an independent sample t-test was used for continuous variables. SPSS 25 was used for statistical analysis and *p* < 0.05 was considered statistically significant.

Results:
A total of 192 patients were included in the study (table 1) . As shown in Table 2, the inflammatory factors (neutrophils, lymphocytes, NLR, and albumin) were similar between the two groups preoperatively. However, postoperative neutrophils and change of neutrophils were significantly higher in the laparoscopic TME group compared with those in the robotic TME group (table 2). Compared with laparoscopic total mesorectal excision (TME), robotic TME brings obviously quicker recovery of bowel function, first flatus at 26.31 hours after surgery. After surgery, the scores of sexual and urinary function in the laparoscopic and robotic groups were significantly changed. The sexual and urinary function of patients in the robotic group gradually approached normal at 6 months after surgery, whereas those of the laparoscopic group approached normal at 12 months post-surgery (figure1 and 2). After ileostomy restoration, The bowel function of robotic group was significant superior to the control at that time. However, the defecation function of both groups was significantly lower than that before surgery (figure 3).

Conclusions:
Compared with laparoscopic TME, robotic TME has less inflammatory response, and quicker postoperative recovery of intestinal, urinary, and sexual functions.

Table 1: The Demographic and clinicopathological characteristics of the study			
	Laparoscopic TME (n=96)	Robotic TME (n=96)	p value
Gender			0.45
Male	66 (68.75%)	60 (62.50%)	
Female	30 (31.25%)	36 (37.50%)	
Year	59.78±13.18	59.07±8.57	0.73
BMI(Kg/M²)	23.77±3.81	24.10±3.51	0.63
Distance from anus (cm)	3.73±1.14	3.48±1.14	0.23
ISR	27 (28.13%)	17 (17.71%)	0.20
T			0.29
T0	9 (9.38%)	3 (3.13%)	
T1	9 (9.38%)	13 (13.54%)	
T2	24 (25.00%)	23 (23.96%)	
T3	51 (53.13%)	43 (44.79%)	
T4	3 (3.13%)	4 (4.17%)	
N			0.14
N0	72 (75.00%)	56 (58.33%)	
N1	18 (18.75%)	26 (27.08%)	
N2	6 (6.25%)	12 (12.50%)	
Positive DRM	0	0	1.00
Positive CRM	0	0	
Number of lymph nodes	15.34±7.08	16.07±7.97	0.6
Number of positive lymph nodes	0.59±1.27	0.84±1.24	0.27
operation time(min)	182.16±40.21	290.93±89.13	< 0.01
First flatus(hour)	29.97±6.17	26.31±8.37	< 0.01
Hospital stay (day)	9.47±3.92	9.24±5.24	0.79

TME=total mesorectal excision.BMI=body mass index.ISR=Intersphicterectomy. DRM=distal resection margin.CRM=circumferential resection margin.

Table 2: The perioperative blood index			
	Laparoscopic TME	Robotic TME	p value
Preoperative neutrophils,*10 ⁹ /L	3.57±1.48	3.49±1.23	0.74
Preoperative Lymphcytes,*10 ⁹ /L	1.58±0.58	1.60±0.46	0.85
Preoperative NLR	2.90±2.52	2.37±1.08	0.14
Preoperative albumin,g/L	44.59±3.24	45.23±2.59	0.24
Postoperaprptive neutrophils,*10 ⁹ /L	9.43±3.16	7.52±2.44	< 0.01
Postoperative lymphcytes,*10 ⁹ /L	0.92±0.39	0.94±0.46	0.73
Postoperative NLR	13.50±10.17	11.66±12.60	0.38
Postoperative albumin,g/L	35.79±2.65	37.28±4.20	0.02
Change of neutrophils,*10 ⁹ /L	5.86±3.14	4.03±2.27	< 0.01
Change of lymphcytes,*10 ⁹ /L	0.66±0.53	0.66±0.51	0.93
Change of NLR	10.60±9.03	9.29±11.87	0.49
Change of albumin,g/L	8.80±3.96	7.95±4.96	0.29

TME= total mesorectal excision.NLR= neutrophils-to-lymphocytes ratio.

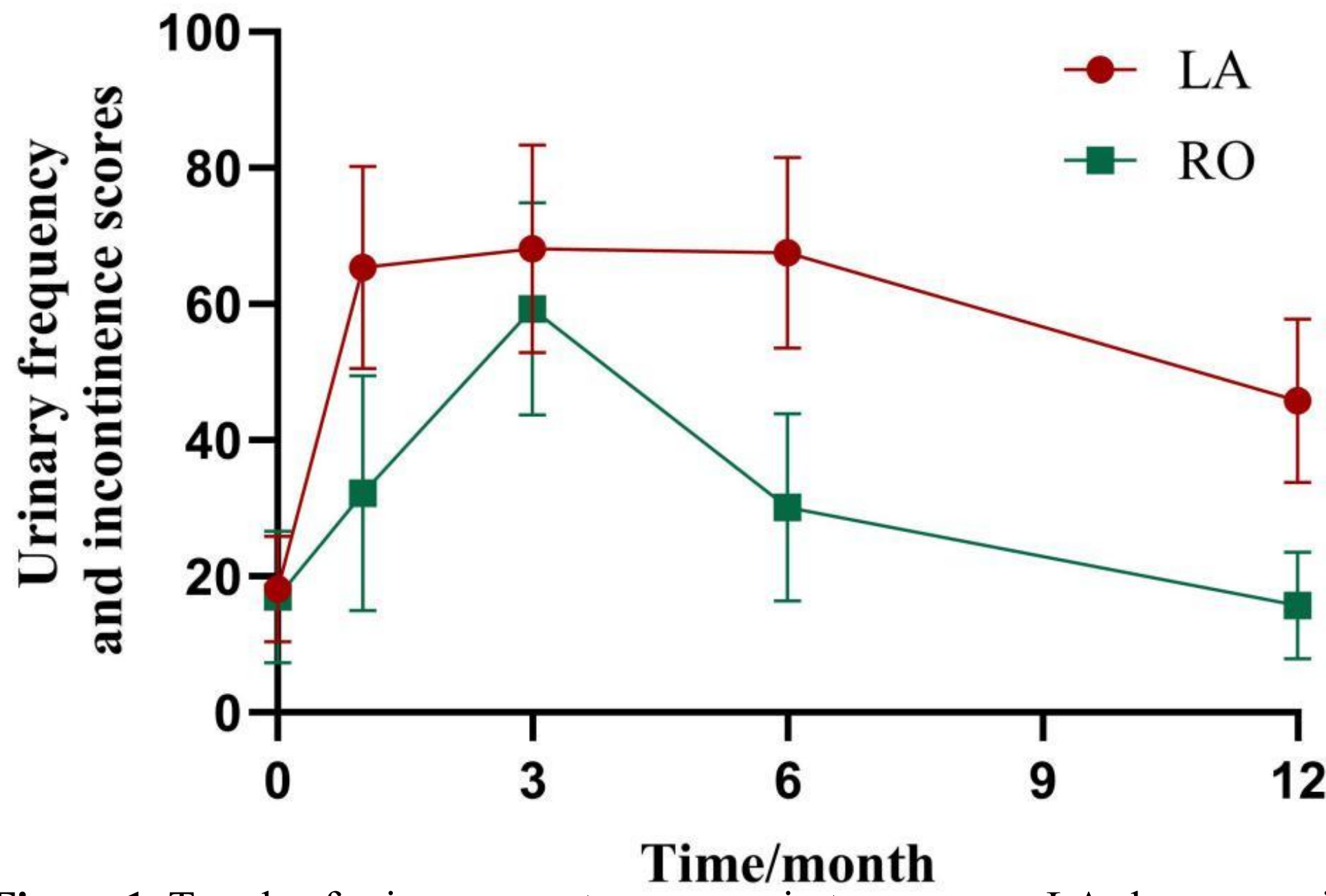


Figure 1. Trends of urinary symptom scores in two groups. LA=laparoscopic surgery, RO=robotic surgery.

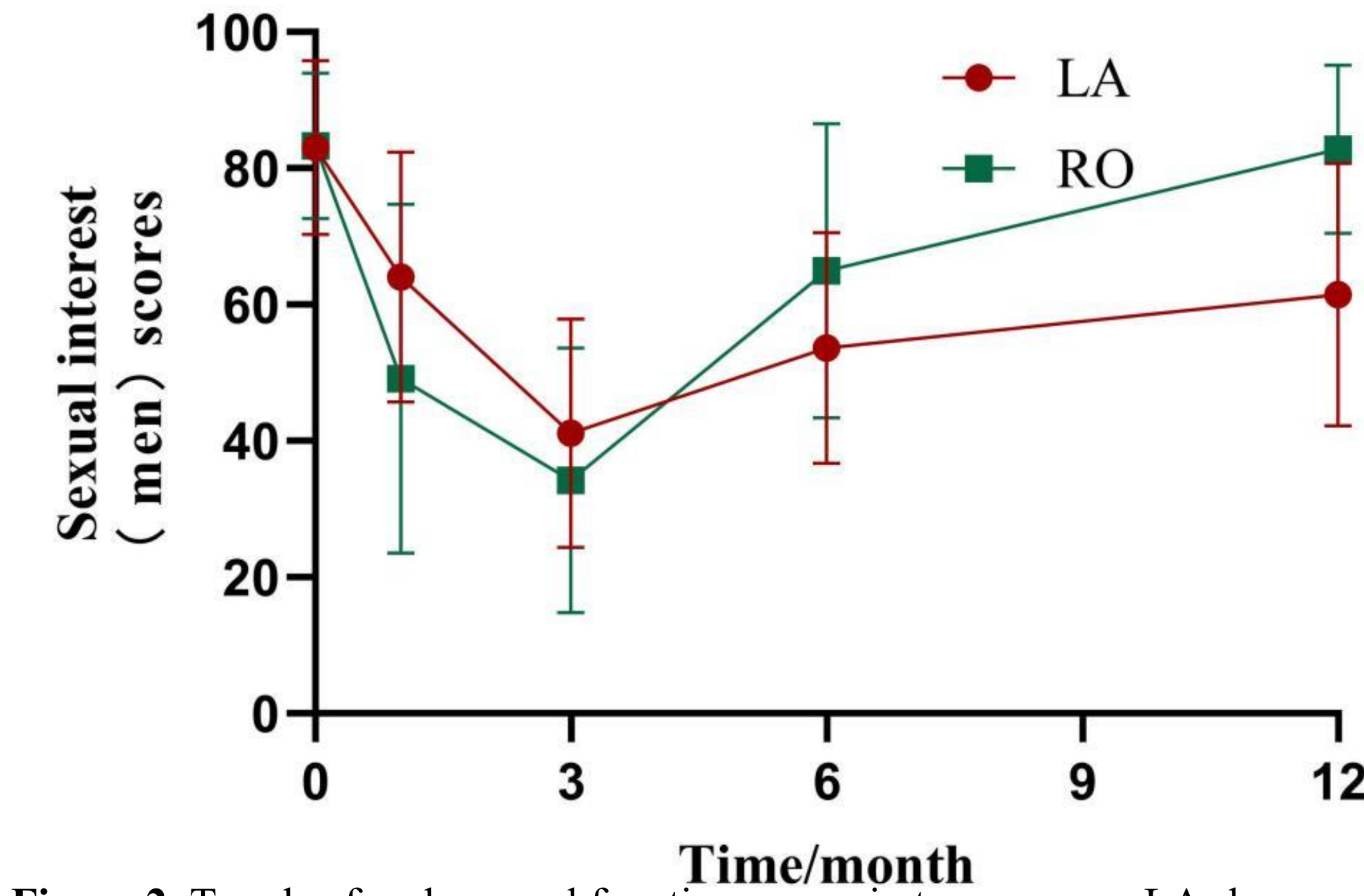


Figure 2. Trends of male sexual function scores in two groups.. LA=laparoscopic surgery, RO=robotic surgery.

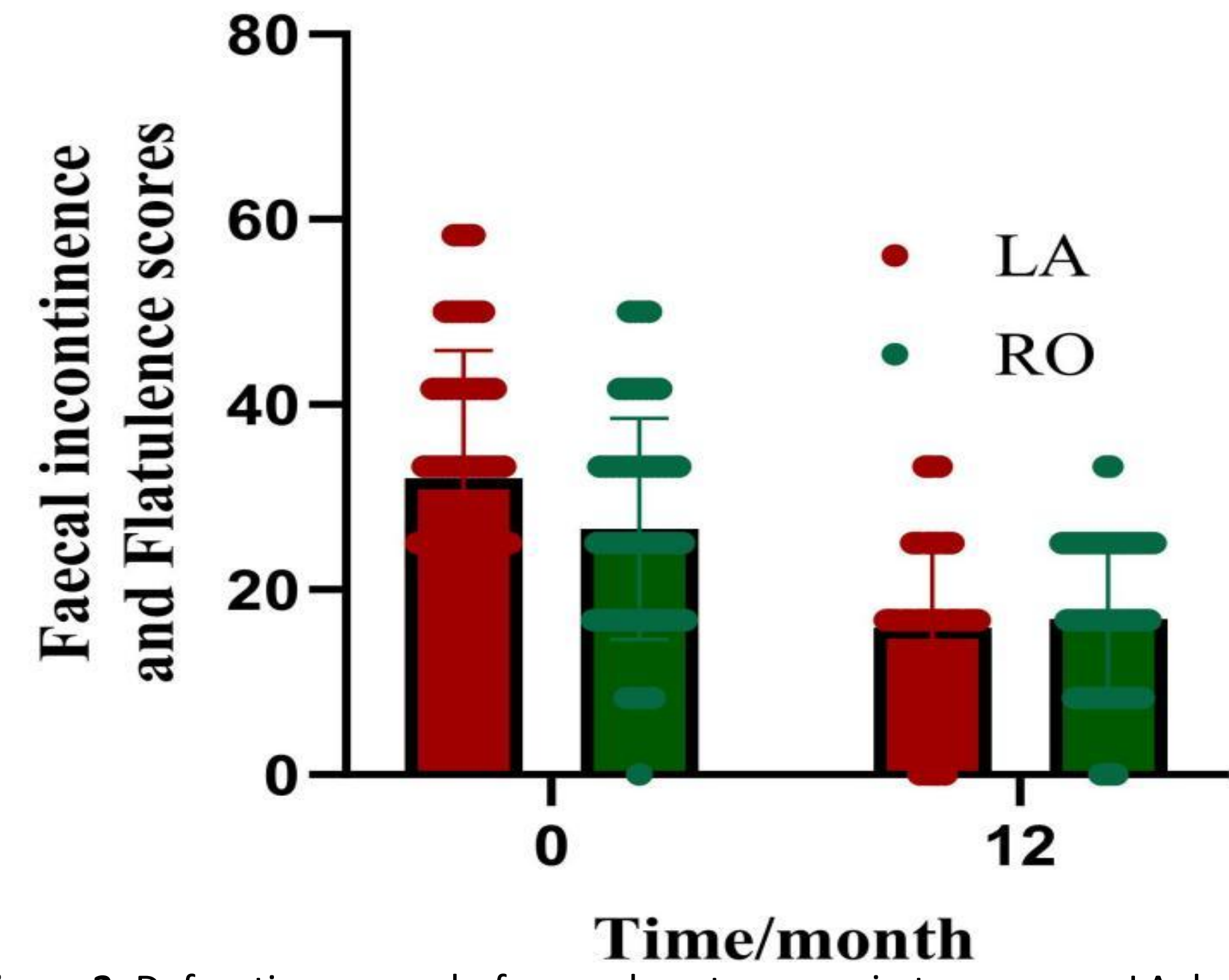


Figure 3. Defecation scores before and post surgery in two groups. LA=laparoscopic surgery, RO=robotic surgery.