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Compare the outcomes between Robotic vs Laparoscopic surgery in rectal cancer within an ERAS protocol

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Back ground

➢Robotic rectal surgery has been reported with some benefits compared to laparoscopic rectal surgery.
➢Several trials had reported that Enhanced Recovery After Surgery(ERAS) had benefit when combined with laparoscopic rectal surgery.
➢Robotic rectal surgery in our Hospital were almost routinely followed with ERAS protocol.
➢This study aim to analyze the benefit of Robotic rectal surgery within ERAS compared to Laparoscopic rectal surgery.

Method

➢This retrospective review in Taichung Veterans General Hospital, Taiwan.
➢Rectal cancer with Laparoscopic or Robotic surgery, from June, 2019 to December, 2022,
➢Patients' characteristics, operative and post-operative data were collected.
➢IBM SPSS software was used for Statistical Analysis.
➢Category variable were assessed by Fisher's exact test and continuous variable were assessed by Mann-Whitney U test
➢P-value < 0.05 was considered statistically significant.

Result

➢Evaluated 116 patients, 22 patients in Laparoscopic group and another 94 patients in Robotic group .
➢PCA use rate was significant higher in Robotic surgery group(97.9%, p=0.012)
➢In Robotic group, the operative duration was longer(321.9±83.5minutes) than Laparoscopic group, but the minimal blood loss rate(n=79, 84%, p=0.040) was higher and the Drainage tube placement rate(n=23, 24.5%, p<0.001) was lower.
➢Patient who received Robotic surgery had shorter Length of hospital stay,
➢It had lower rate of Clavien-Dindo 3-4 complications(n=4, 4.3%, p=0.041) in Robotic group.
➢Rate of ileus, surgical site infection and anemia need transfusion had no significant difference between two groups, but it had significant lower rate in Robotic group when comparing the Anastomosis leakage rate(2.1% vs 18.2%, p=0.012)
➢Each ERAS protocol item had more than 80% achieve rate except "Foley catheter removal within two days" in Laparoscopic surgery group(68.2%).
➢It is statistically significant that patient receiving Robotic surgery could tolerate water intake at POD-1 better(n=92, 97.9%, p=0.046)

Table 1. Demographic analysis of patient groups

Parameters	Laparoscopic	Robotic	P valu
Numbers, n	22	94	
Age, mean±SD	62.9±11.1	57.4±14.6	0.100
BMI, mean±SD	24.4±3.4	24.5±4.6	0.704
Male, n(%)	16(72.7%)	53(56.4%)	0.244
ASA classification, n(%)			0.593
I	4(18.2%)	11(11.7%)	
II	13(59.1%)	64(68.1%)	
III	5(22.7%)	19(20.2%)	
Smoker, n(%)	5(22.7%)	8(8.5%)	0.070
Any comorbidity, n(%)	11(50%)	61(64.9%)	0.293
DM	4(18.2%)	18(19.1%)	1.000
HTN	9(40.9%)	35(37.2%)	0.940
Cardiovascular disease	2(9.1%)	9(9.6%)	1.000
Lung disease	2(9.1%)	2(2.1%)	0.162
Liver disease	2(9.1%)	10(10.6%)	1.000
Renal disease	1(4.5%)	8(8.5%)	1.000
Other primary cancer, n(%)	2(9.1%)	6(6.4%)	0.646
Previous abdominopelvic surgery, n(%)	5(22.7%)	30(31.9%)	0.557
Neoadjuvant CCRT, n(%)	8(36.4%)	36(38.3%)	1.000
PCA use, n(%)	18(81.8%)	92(97.9%)	0.012

SD: Standard Deviation ASA: American Society of Anesthesiologists HTN: Hypertension PCA: Patient Controlled Analgesia
BMI: Body Mass Index DM: Diabetes Mellitus CCRT: Concurrent Chemoradiotherapy

Table 3. Clinical outcomes

Parameters	Laparoscopic	Robotic	P valu
Numbers, n	22	94	
LOS(day), mean±SD	8.2±3.7	5.9±4.7	0.016
Stool passage(POD), mean±SD	2.3±2.0	1.5±0.9	0.304
IV fluid discontinuation(POD), mean±SD	4.7±3.5	4.0±4.8	0.120
Drain duration(day), mean±SD	6.6±2.8	6.2±7.2	0.095
Any complication, n(%)	9(40.9%)	29(30.9%)	0.514
ClavienDindo 1-2, n(%)	6(27.3%)	27(28.7%)	1.000
ClavienDindo 3-4, n(%)	4(18.2%)	4(4.3%)	0.041
Ileus, n(%)	4(18.2%)	12(12.8%)	0.501
Anemia need transfusion, n(%)	1(4.5%)	9(9.6%)	0.685
Pneumonia, n(%)	0(0.0%)	0(0.0%)	-
Surgical site infection, n(%)	0(0.0%)	1(1.1%)	1.000
Anastomosis leakage, n(%)	4(18.2%)	2(2.1%)	0.012
Fascia dehiscence, n(%)	0(0.0%)	0(0.0%)	-
Intraabdominal abscess, n(%)	1(4.5%)	1(1.1%)	0.345
Other complications, n(%)	5(22.7%)	10(10.6%)	0.157
30-day readmission, n(%)	4(18.2%)	8(8.5%)	0.237

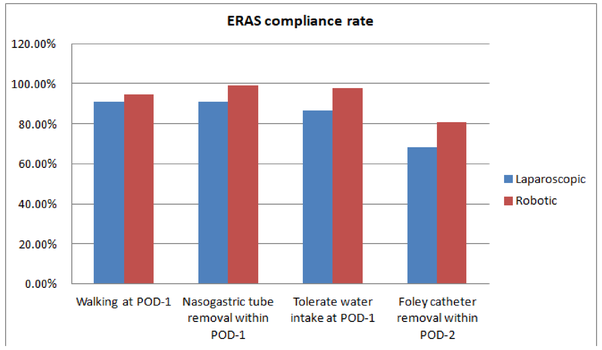
LOS: Length of Stay(after surgery)
IV: Intravenous

Table 2. Perioperative data

Parameters	Laparoscopic	Robotic	P valu
Numbers, n	22	94	
Operative duration(min), mean±SD	250.2±96.4	321.9±83.5	<0.0001
Combine surgery, n(%)	1(4.5%)	7(7.4%)	1.000
T4 lesion, n(%)	2(9.1%)	5(5.3%)	0.616
Metastasis, n(%)	2(9.1%)	8(8.5%)	1.000
M1c, n(%)	0(0.0%)	1(1.1%)	1.000
Minimal blood loss, n(%)	14(63.9%)	79(84.0%)	0.040
Stoma construction, n(%)	9(40.9%)	58(61.7%)	0.124
Drainage tube placement, n(%)	18(81.8%)	23(24.5%)	<0.0001

Table 4. ERAS compliance

Parameters	Laparoscopic	Robotic	P valu
Numbers, n	22	94	
Walking at POD-1, n(%)	20(90.9%)	89(94.7%)	0.616
NG tube removal within POD-1, n(%)	20(90.9%)	93(98.9%)	0.092
Tolerate water intake at POD-1, n(%)	19(86.4%)	92(97.9%)	0.046
Foley catheter removal within POD-2, n(%)	15(68.2%)	76(80.9%)	0.248



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Conclusion

➢In our study, Robotic surgery in rectal cancer within ERAS protocol had benefit of surgical blood loss, drainage tube placement rate, LOS and anastomosis leakage rate compared to Laparoscopic surgery within ERAS group.
➢Patient with rectal cancer receiving Robotic surgery could well achieve ERAS protocol and had better compliance than Laparoscopic surgery group.