

Comparison of Single-Port and Multi-Port Robotic Transanal Minimally Invasive Surgery (R-TAMIS)



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INTRODUCTION

- Single-port R-TAMIS (spR-TAMIS) represents an innovative transanal approach for resection of low-risk rectal tumors
- spR-TAMIS offers improved docking and more flexibility within the rectum with the addition of a third arm, flexible camera, and double-jointed instrumentation
- These benefits allow for improved access to more proximal lesions as compared to the conventional (mp-)R-TAMIS
- spR-TAMIS also has limitations with restricted movements within the first 10 cm of deployment making lower rectal lesions more challenging
- While prior studies have shown spR-TAMIS to be safe and feasible, there is a lack of literature comparing the two approaches. This study aimed to compare the surgical outcomes between spR-TAMIS and mpR-TAMIS

METHODS

- Study design: Single-institutional retrospective review
- Study population: All patients aged ≥ 18 years old who underwent R-TAMIS for endoscopically unresectable benign rectal polyps and early-stage rectal cancers
- Study period: January 2019 - December 2023
- Study variables: Patients’ demographics, tumor characteristics, operative data, and surgical outcomes
- Data Analysis: Chi-squared and Fisher exact for categorical variables, Mann-Whitney U test for continuous variables

RESULTS

- 68 patients underwent R-TAMIS: 31 spR-TAMIS and 37 mpR-TAMIS
  - Mean age 62±12, 63.2% males, 52.9% and 42.6% were ASA class 2 and 3
  - No differences in baseline demographics
- Surgical outcomes were comparable
  - 13.2% of patients experienced complications, with rectal bleeding being the most common
  - Most patients (85.3%) were discharged on the same day, with a readmission rate of 7.4%.
- The median follow-up was 12 months, and the local recurrence rate for malignant tumors was 7.4%

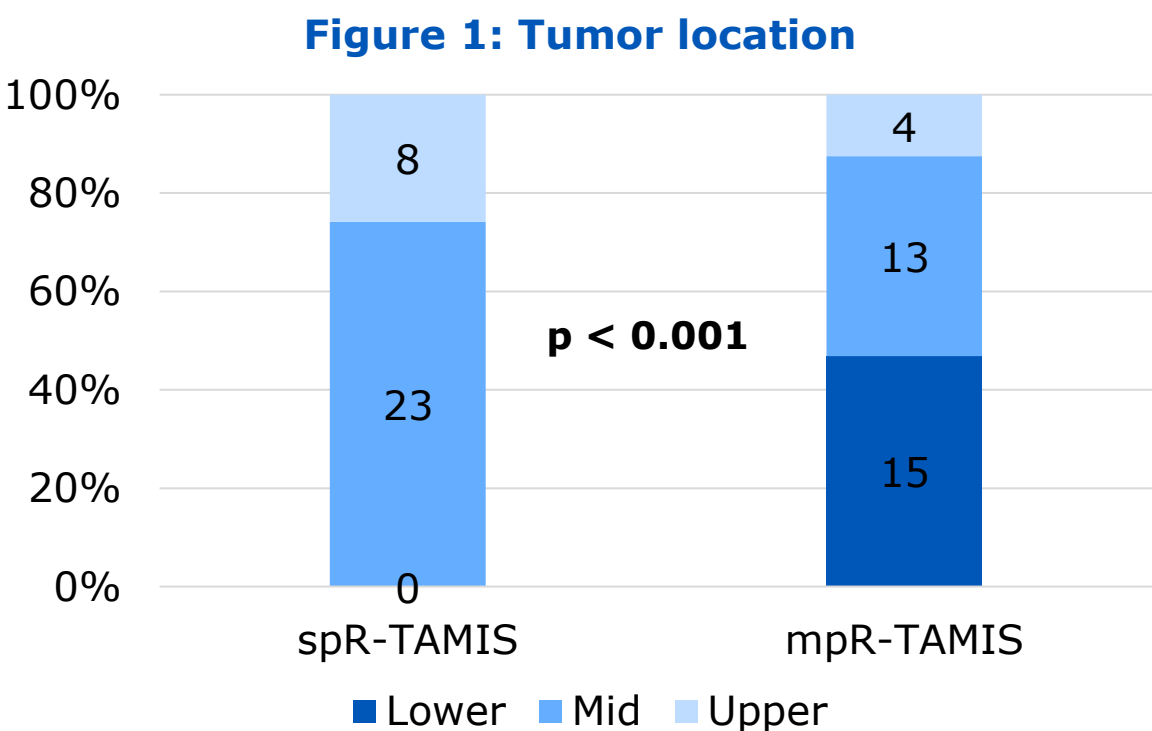


Table 1: Tumor Characteristics and Operative Details

	sp (n=31)	mp (n=37)	p
Tumor distance from anal verge (cm)	9.0 (2.8)	6.0 (6.3)	<0.001
Tumor length (cm)	2.6 (2.0)	3.5 (3.6)	0.080
Area of specimen (cm²)	14.5 (9.3)	14.7 (27.3)	0.786
Tumor type			0.064
Adenoma	13 (41.9)	22 (59.5)	
Adenocarcinoma	16 (51.6)	9 (24.3)	
Scar Tissue	2 (6.5)	4 (10.8)	
Neuroendocrine	0 (0)	2 (5.4)	
Resection			0.652
En-bloc	27 (90.0)	34 (94.4)	
Piecemeal	3 (10.0)	2 (5.6)	
Excision Depth			0.042
Full-Thickness	27 (90.0)	25 (69.4)	
Partial-Thickness	3 (10.0)	11 (30.6)	
Closure			0.442
Yes	28 (93.3)	31 (86.1)	
No	2 (6.7)	5 (13.9)	
Type of Closure			0.020
Running	23 (82.1)	31 (100)	
Interrupted	5 (17.9)	0 (0)	

Table 2: Surgical Outcomes

	sp (n=31)	mp (n=37)	p
Positive surgical margin	0 (0)	1 (2.7)	1.000
Operative time (min)	95 (67)	134 (92)	0.052
Intraoperative blood loss (mL)	10 (25)	20 (40)	0.025
Same Day Discharge	29 (93.5)	29 (78.4)	0.097
Conversion			0.620
Lap-TAMIS/Transanal excision	0 (0)	3 (8.1)	
Transabdominal resection	1 (3.2)	0 (0)	
Complication			
Rectal bleeding	2 (6.5)	4 (10.8)	
Peritoneal entry	1 (3.2)	0 (0)	
Suspected peritonitis	1 (3.2)	0 (0)	
Dehiscence	0 (0)	1 (2.7)	
Readmission	3 (9.7)	2 (5.4)	0.653

Categorical variables were reported as n (%)  
Continuous variables were reported as median (IQR)

DISCUSSION

- The surgical and oncological outcomes of both spR-TAMIS and mpR-TAMIS appear promising
- The spR-TAMIS 25mm robotic arm easily fits into the anal canal allowing for streamlined docking
- spR-TAMIS allows access to more proximal lesions compared to L-TAMIS and mpR-TAMIS, but may increase the risk of entering the peritoneal cavity, as evident in one of the patients

CONCLUSION

- spR-TAMIS and mpR-TAMIS show comparable results with low rates of margin positivity, local recurrence and surgical morbidity
- Patients with more complex proximal lesion likely benefit from spR-TAMIS while mpR-TAMIS is appropriate for lower lesions

REFERENCES

- Liu S, Contreras N, Krezalek MA, et al. Robotic transanal minimally invasive surgery: a single institutional experience. Updates Surg. 2022;74(3):1011-1016. doi:10.1007/s13304-021-01233-x
- Marks JH, Kunkel E, Salem JF, Martin CT, Anderson B, Agarwal S. First Clinical Experience With Single-Port Robotic Transanal Minimally Invasive Surgery: Phase II Trial of the Initial 26 Cases. Dis Colon Rectum. 2021;64(8):1003-1013. doi:10.1097/DCR.0000000000001999
- Baker EJ, Waters PS, Peacock O, et al. Robotic transanal minimally invasive surgery - technical, oncological and patient outcomes from a single institution. Colorectal Dis. 2020;22(10):1422-1428. doi:10.1111/codi.15045
- Liu S, Kelley SR, Behm KT. Single-port robotic transanal minimally invasive surgery (SPR-TAMIS) approach to local excision of rectal tumors. Tech Coloproctol. 2021;25(2):229-234. doi:10.1007/s10151-020-02286-7