Title: Robotic Transanal Minimally Invasive Surgery (rTAMIS): Large Tubulovillous Adenoma

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INTRODUCTION

- Transanal Endoscopic Microsurgery (TEM) and the subsequent development of Transanal Minimally Invasive Surgery (TAMIS) approaches addressed most of the limitations of the conventional transanal surgical approach for rectal pathologies
- However, persistent inherent limitations still exist, including retraction, exposure, suturing, assistant positioning, range of motion restriction by straight laparoscopic instruments, ergonomics, and steep learning curve resulting in limited adoption of these techniques
- Robotic technology has been introduced as a potential solution to the many obstacles encountered in laparoscopic surgery
- The improved visualization, enhanced dexterity, and ergonomic advantages of the robotic platform applied to transanal surgery allow for a more precise intervention compared to traditional TAMIS

PATIENT PRESENTATION

- Case of a 48-year-old female with a large symptomatic rectal polyp
- The polyp was discovered during a colonoscopy after several rectal bleeding episodes
- Endoscopically, the mass was described as large, fungating, and partially obstructing, located 6 cm proximal to the anal verge
- Biopsies were consistent with tubulovillous adenoma without evidence of dysplasia or malignancy.
- Due to inability to completely remove the polyp endoscopically, the patient was scheduled for excisional robotic TAMIS (rTAMIS)

Figure 1. Single-port Transanal Platform

Figure 2. Docked Da Vinci Xi system

PROCEDURE

- The patient was placed in a prone jackknife position
- A digital rectal examination confirmed the location and distance from the anal verge
- The TAMIS platform (Figure 1) was inserted into the anal canal and sutured in place
- Three TAMIS platform ports and an AirSeal (CONMED Corporation, Utica, NY, USA) access port were used to access and maintain the pneumorectum
- Pneumorectum was created up to a pressure of 20 mm Hg with the AirSeal® system
- The robotic trocars were placed through the TAMIS ports, and the robotic camera was inserted
- The DaVinci Xi® robot was docked in standard fashion (Figure 2)
- Normal appearing mucosa surrounding the polyp was scored using monopolar scissors
- A submucosal dissection was performed lateral to and on the distal sides first, again using monopolar scissors
- Once a significant portion of the lateral and distal submucosal dissection has been performed, the proximal part of the lesion was unable to be visualized as it was on the proximal aspect of a Valve of Houston
- The Da Vinci Xi robotic system was undocked and a small residual stalk was transected in standard transanal fashion (Figure 3)
- The pneumorectum was restored, and hemostasis was confirmed
- The resection defect was then closed using a running 2-0 absorbable barbed suture
- The patient was discharged home on the day of the procedure, and there were no post-operative complications
- Final pathology confirmed tubulovillous adenoma without dysplasia or malignancy and negative margins

DISCUSSION

- rTAMIS has been proven feasible and safe in clinical reports
- The superior 3D view, increased instrument degrees of freedom, and improved ergonomics set the stage for theoretically enhanced surgical outcomes and/or increased adoption of TAMIS techniques
- This could translate to shorter hospital LOS and decreased morbidity when compared to LAR, which would otherwise be necessary for the complete removal of mid-low rectal lesions
- Access to lesions regardless of the quadrant it is located is another benefit
- Appealing for complex rectal lesions
- Pearls:
  - Prone jackknife position
  - Place the mass in the inferior screen
  - Crossing operating arms
- Limited availability on literature comparing rTAMIS with other transanal platforms
  - No significant differenced in a comparative study except for total cost

Figure 3. Resected large rectal mass

The robotic platform's versatility may allow lesions unsuitable for laparoscopic TAMIS to be managed by local excision