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Application of a hybrid robotic and transanal total mesorectal excision approach to resect a bulky low rectal gastrointestinal stromal tumour

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Title Page – Hybrid robotic and taTME approach

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Title of paper

Application of a hybrid robotic and transanal total mesorectal excision approach to resect a bulky low rectal gastrointestinal stromal tumour

Running Head

Hybrid robotic and taTME approach

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Colorectal Gastrointestinal Stromal tumours (GIST) are rare tumours, accounting for about 5% of all GISTs. Robotic resection of upper gastrointestinal GISTs has been described[1], but there is a paucity of data on the application of this approach to rectal GISTs. In rectal adenocarcinoma, transanal total mesorectal excision (taTME) has been described as having potential technical advantages in the resection of bulky low T4 tumours [2]. This case demonstrates the application of a hybrid robotic and taTME approach to a bulky rectal GIST with intact excision of the tumour.

A 77-year-old initially presented to the emergency department with epigastric pain and was found to have an incidental GIST on abdominal CT. Magnetic resonance imaging (MRI) of the pelvis revealed a 43mm x 49mm x 46mm submucosal soft tissue exophytic mass centering at the left lateral wall of the rectum indenting onto the prostate and left seminal vesicle. MRI features favoured a GIST with a hypointense T2 outer rim, a good tissue plane between the rectal mass and the prostate, contrast enhancement with gadolinium and a lack of nodal enlargement.

Staging computed tomography and positive emission tomography confirmed presence of the 49mm rounded exophytic mass and revealed no evidence of distant metastasis (Figure 1). A colonoscopy confirmed that the mass was submucosal.

The patient underwent a simultaneous, two-team robotic-assisted ultralow anterior resection and transanal total mesorectal excision of the rectal mass (Figure 2). The transabdominal component which involved a full mobilization of the splenic flexure and high ligation of the inferior mesenteric vessels was undertaken robotically. The pelvic dissection was performed in a combined effort, transabdominally and transanally by utilising a GelPoint Path and conventional laparoscopic equipment (Figure 3). At the end of the procedure a covering loop ileostomy was fashioned and a closed suction drain was left in the pelvis. Total operative time was 7 hours with an estimated 500mL blood loss. The patient had an uncomplicated 7-day hospital stay and was discharged home with

district nursing services for stoma care. An unplanned readmission occurred on the 15th post-operative day due to a pelvic collection which was subsequently managed with percutaneous drainage and antibiotics. A flexible sigmoidoscopy performed during that same admission which confirmed an intact anastomosis. The patient was then discharged home after the drain was removed, on antibiotics. On follow-up 4 weeks after the episode, sepsis had resolved.

Histopathology confirmed a diagnosis of gastrointestinal stromal tumour (GIST) composed of intersecting fascicles of spindle cells arising from the lamina propria with a low rate of mitoses. The resection margins were clear, and zero of the thirteen lymph nodes dissected showed malignancy.

GISTs represent the most common mesenchymal neoplasm of the alimentary tract, despite being relatively rare overall. They most frequently occur in the stomach and small bowel, with only 10% being found in the colon or rectum. They largely cause non-specific gastro-intestinal symptoms such as early satiety and bloating and are thus most often diagnosed incidentally by computed tomography or endoscopy [3-5,8]. The metastatic pattern of GISTs usually involves the liver or other sites within the abdomen, with extra-abdominal or lymph node metastases being rare [3-5].

Surgical resection remains the mainstay of treatment due to the resistance of gastrointestinal stromal tumours to chemotherapy and radiotherapy. The goal of surgery is complete resection of the tumour with preservation of the intact pseudocapsule as rupture of the capsule confers a high risk of intra-abdominal dissemination [3-8]. Imatinib, a tyrosine kinase inhibitor, can be used in the treatment of irresectable or metastatic GISTs. Up to 90% of GISTs show response to imatinib which works by inhibiting the gain of function mutation in KIT, a tyrosine kinase mutation responsible for tumour cell proliferation which is commonly found in GISTs [5-7, 9].

Our unit, as well as a small number of units internationally, has described the benefits of taTME in enhancing visualization and dissection in advanced rectal tumours [10]. Furthermore, the enhanced visualization, angulation and precision of the robot are advantageous in navigating around a bulky

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tumour transabdominally, in this case allowing for a resection with preservation of nerves and seminal vesicles.

In summary, GISTs are rare tumours requiring careful surgical resection. This case highlights the ability to obtain clear resection margins in a bulky low rectal tumour by combining novel minimally invasive approaches with a good short-term outcome.

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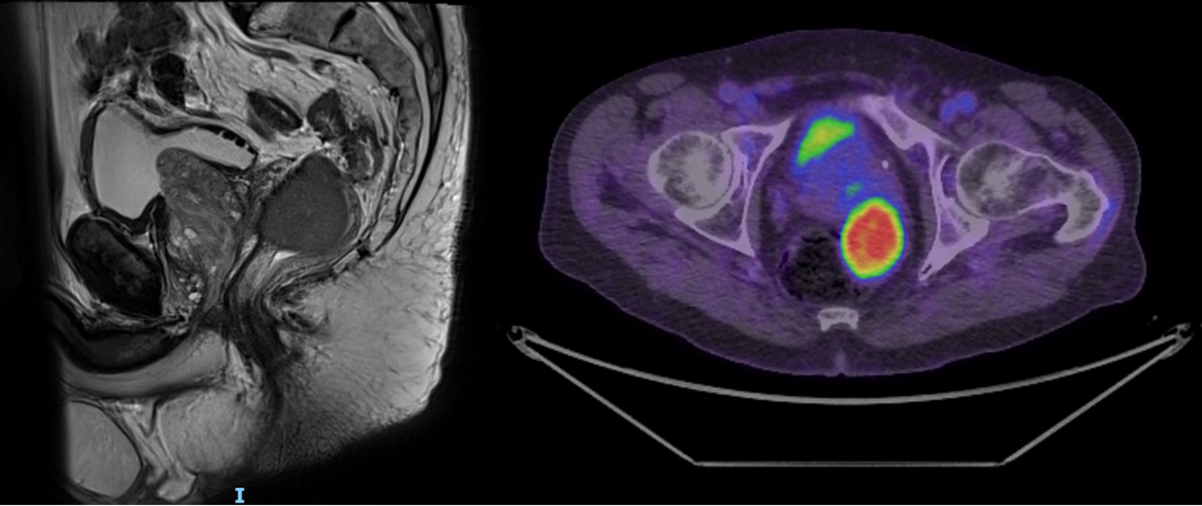
Figure Legend

Figure 1. MRI and PET showing the tumour arising from the left lateral wall

Figure 2. Intraoperative images of pelvic dissection showing robotic intra-abdominal (left) and transanal components (right)

Figure 3. Total mesorectal excision demonstrating the GIST



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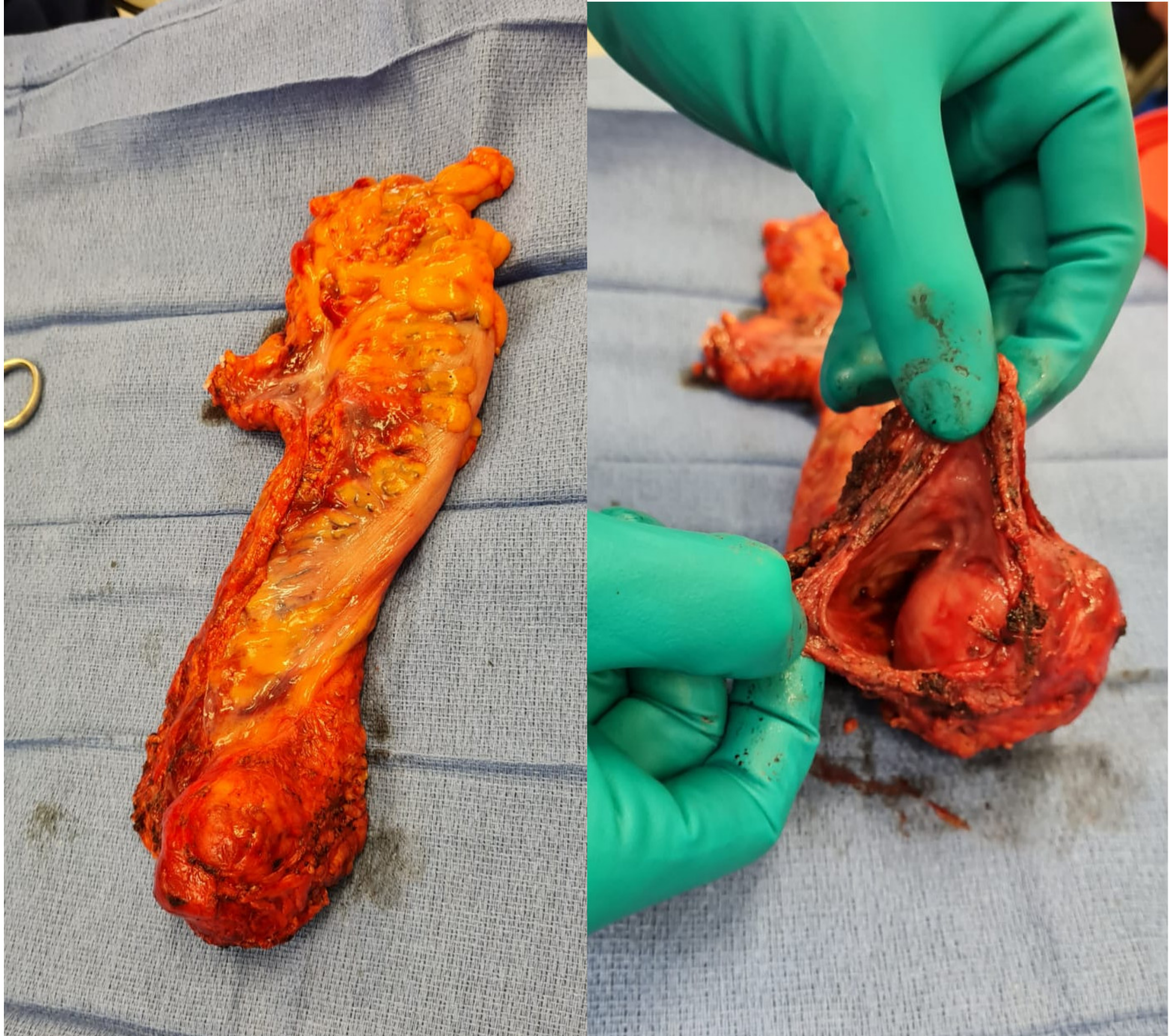

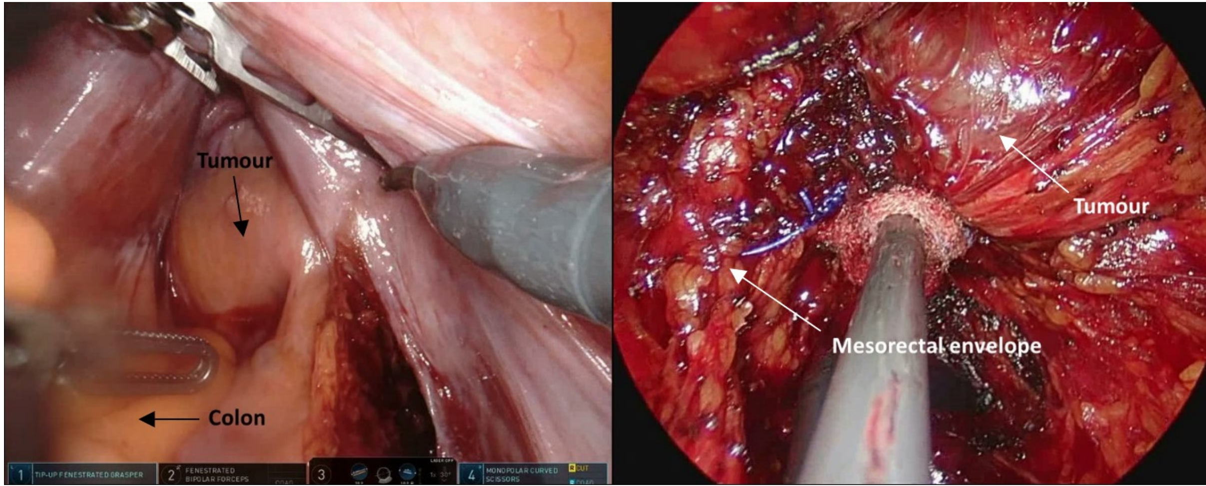

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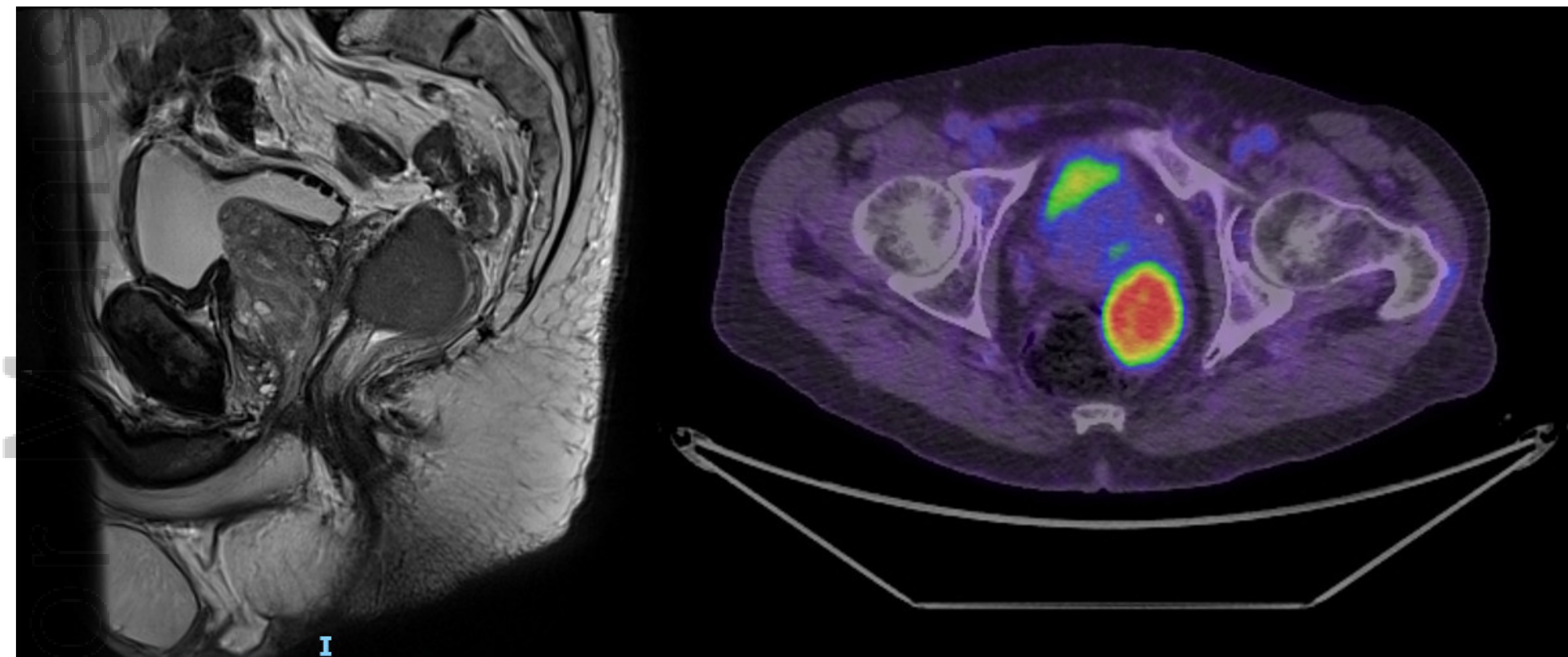

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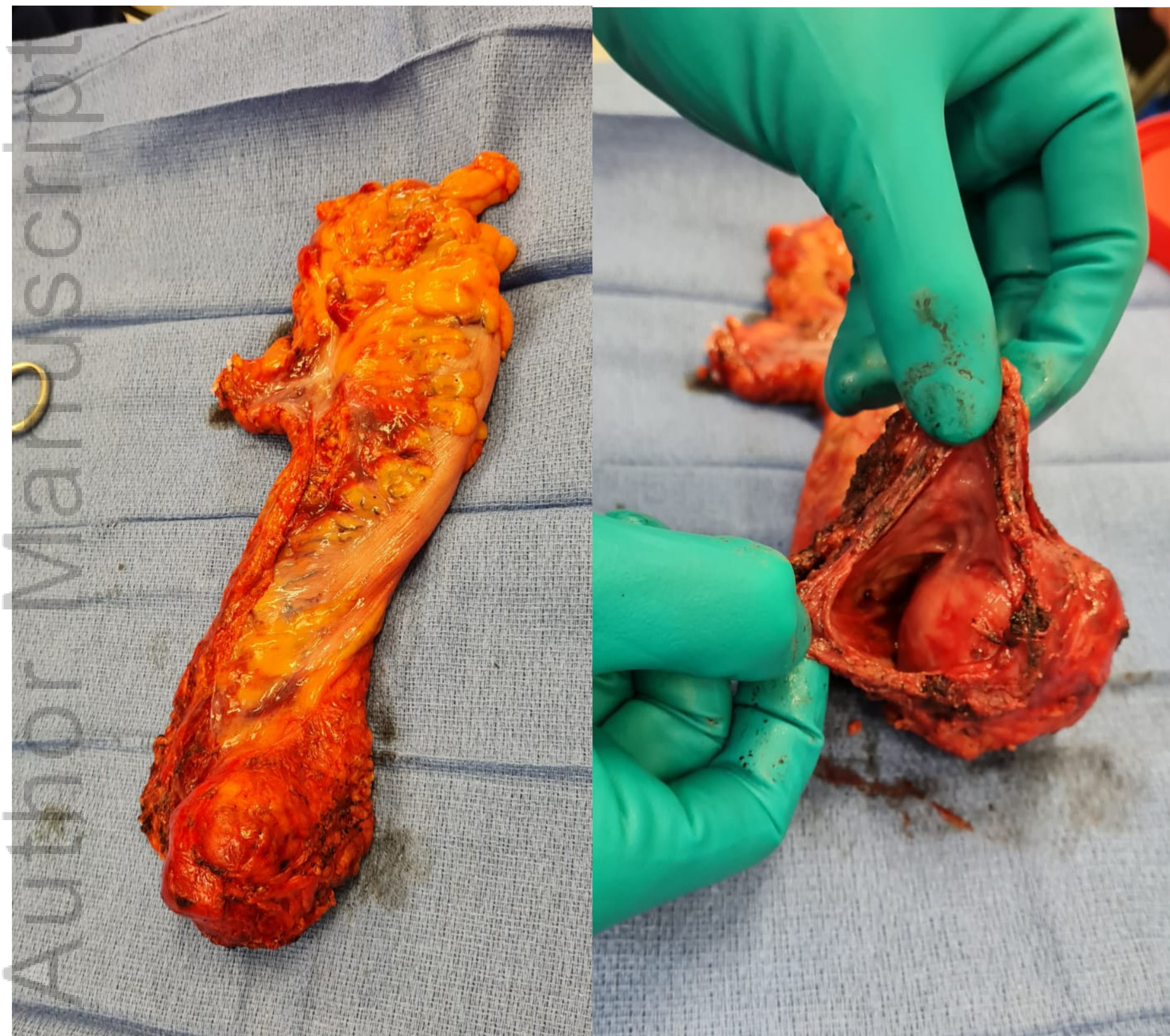
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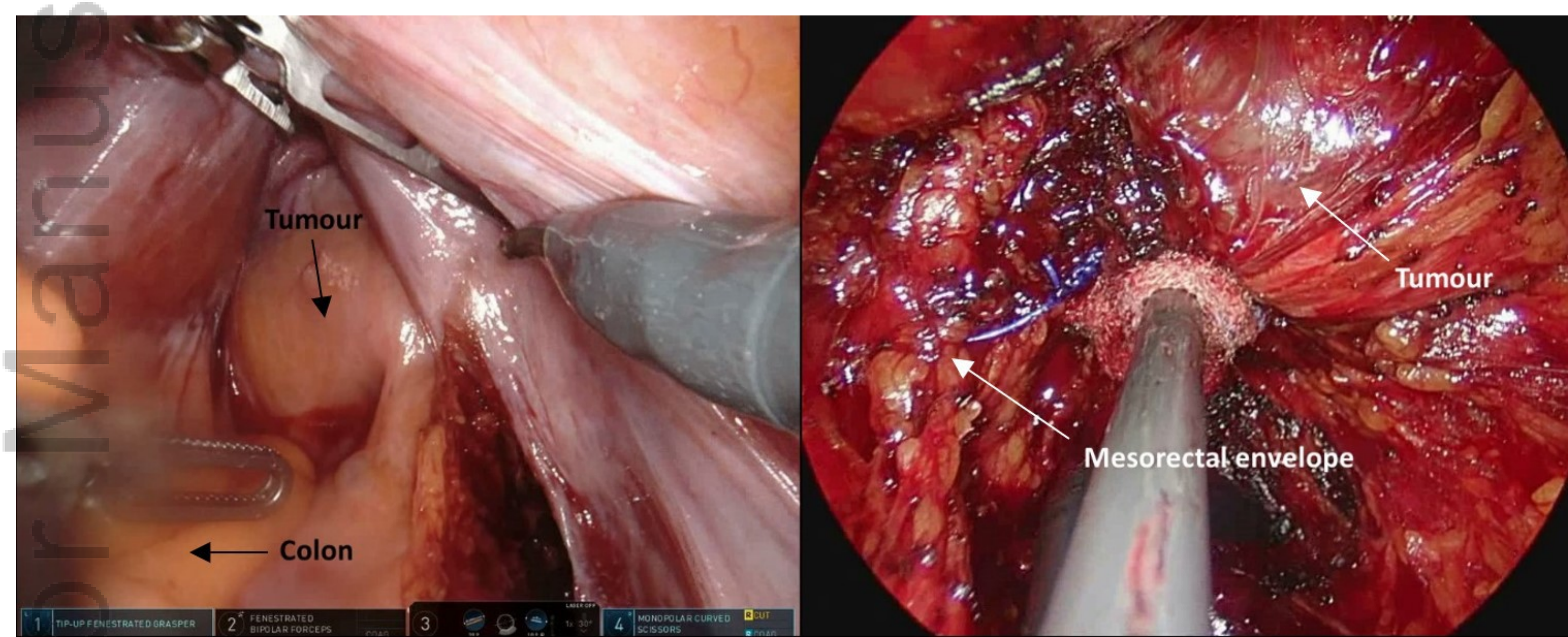

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