Robot-assisted laparoscopic excision of a pelvic extragastrointestinal stromal tumor: a case report and literature review

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A 61-year-old male presented with long standing urinary frequency and the sensation of incomplete emptying. Computed tomography (CT) revealed a 9.5 cm x 7.9 cm x 6.9 cm pelvic mass behind the bladder and abutting the rectum. The mass was excised using a robotic-assisted laparoscopic approach. Pathologic examination of the mass demonstrated an extragastrointestinal stromal tumor (EGIST), an extremely rare entity. To the best of our knowledge, this is the first EGIST to be found in the rectovesicular pouch of a male and the first to be resected robotically. Our case adds to the understanding of EGISTs and their possible origin and demonstrates that robotic-assisted resection of large pelvic masses can be safe and potentially curative.

Key Words: extragastrointestinal stromal tumor, robotics, laparoscopy, pelvic mass

Case presentation

A 61-year-old Caucasian male presented with long standing lower urinary tract symptoms including urinary frequency and the sensation of incomplete emptying. He had been diagnosed with benign prostatic enlargement and had undergone a cystolithalopaxy approximately 1 year prior to presentation. On digital rectal exam, he had a firm, immobile mass anterior to the rectum, just cephalad to the anal sphincter. The physical exam was otherwise unremarkable. His family history was negative for prostate cancer and was otherwise non-contributory. He underwent an elective sigmoidoscopy which did not demonstrate any intrinsic colon abnormalities.

Computed tomography (CT) of the pelvis revealed a 9.5 cm x 7.9 cm x 6.9 cm partially calcified pelvic mass located between the prostate and rectum, Figure 1. The referring urologist ordered a CT-guided needle biopsy of the pelvic mass, the pathology of which was suggestive of a leiomyoma. Based on the benign pathology, the patient opted for surveillance. However, due to worsening voiding and defecating symptoms, he was ultimately referred to our institution for possible surgical resection of the mass. We performed a magnetic resonance imaging (MRI) study which confirmed the previous findings on CT and showed negligible interval growth of the mass.

An office cystoscopy revealed a normal urethra distal to the external sphincter. However, there was extreme dorsal angulation of the urethra immediately proximal to the sphincter due to what appeared to be mass effect. There was bilobar prostatic hypertrophy, and a normal appearing bladder mucosa. The ureteral orifices could not be visualized due to the mass. Due to persistent symptoms and after informed consent, he elected for robotic extirpation. He was counseled concerning the possible need for a radical prostatectomy and was informed of the risk for rectal injury and risk of open conversion.

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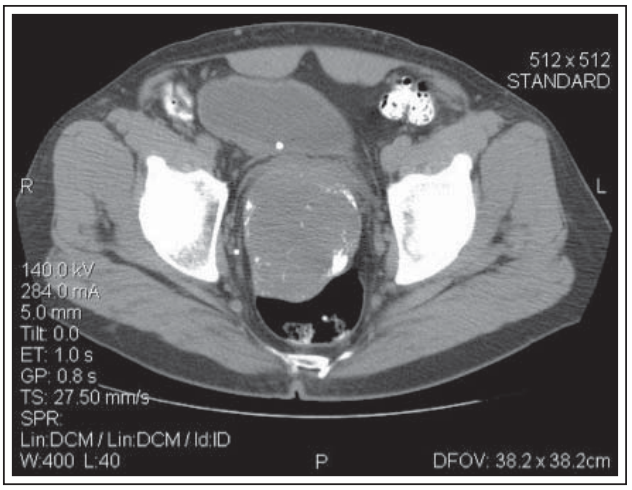

Figure 1. Computed tomography scan showing a 9.5 cm x 7.9 cm x 6.9 cm pelvic mass posterior to the bladder, between the prostate and rectum. The mass closely abuts the rectum over a wide area.

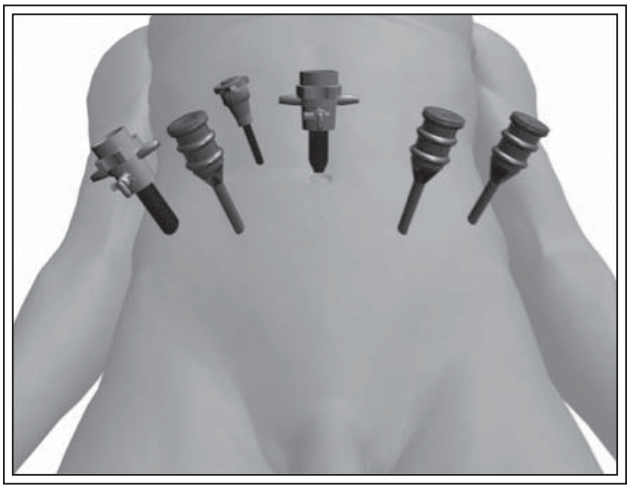

Figure 2. Port placement for robotic extirpation of a large mass in the rectovesical pouch is in a similar configuration to that of a robotic prostatectomy.

The patient was taken to the operating room and after induction of anesthesia, he was placed in the dorsal lithotomy position with his arms secured to his sides, and in steep Trendelenburg. Port selection was similar to robotic prostatectomy, with a 12 mm camera port 1.5 cm cephalad to the umbilicus, three 8 mm robot ports, and two assistant ports (5 mm and 10 mm) as shown in Figure 2.

The da Vinci S Surgical System was docked in the usual manner. Upon laparoscopic inspection of the abdomen, a large mass was visualized under the peritoneum between the prostate and the rectum. The peritoneum overlying the mass was incised posterior to the prostate. The ureters were identified coursing lateral to the mass and dissected free of surrounding tissues to avoid inadvertent injury. The right vas deferens, identified superomedial to its normal location, was followed to the junction of the seminal vesicle. There was a good tissue plane posterior to the prostate and the anterior aspect of the mass was dissected free down to the prostate apex. The dissection of the mass off the rectum was more difficult as there was limited space within the pelvis to give sufficient anterior retraction. Thus, working from side to side, the rectum was carefully dissected off the mass. The mass was placed into a 15 mm endo-catch bag and was removed through a slightly extended camera port incision. The patient's postoperative course was uneventful, and he was discharged home on postoperative day #2. At the 1 month postoperative follow up visit, he reported much improvement with his voiding and defecation.

Gross pathology demonstrated a well-circumscribed 8.5 cm x 8 cm mass with tan to pink surface and areas of congestion, Figure 3. Serial sectioning revealed tan homogenous parenchyma with areas of calcification measuring 2 cm x 1 cm x 2 cm with some additional calcification also identified at the periphery of the mass. No areas of hemorrhage or necrosis were identified.

Microscopic examination of the pelvic mass revealed extensive dystrophic calcification with spindle cell proliferation into fascicles and mimicking smooth muscle proliferation. No brisk mitosis, significant pleomorphism, or tumor necrosis was noted. The tumor was classified as an EGIST with low risk for malignancy, a finding supported by positive staining for c-kit, CD34, and smooth muscle actin and negative staining for S-100 and pan-cytokeratin, Figure 4.

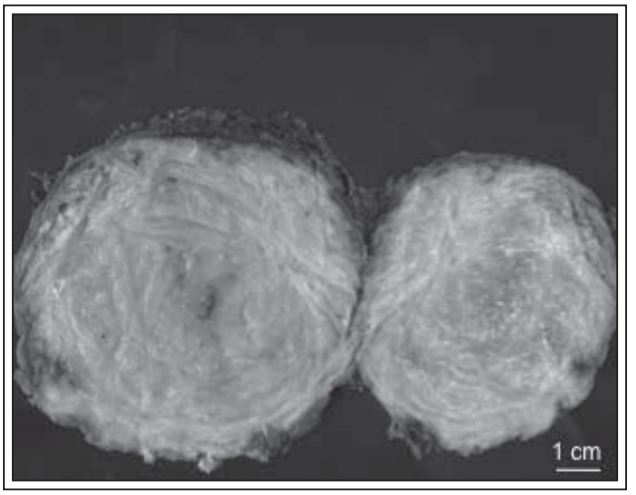

Figure 3. Macroscopic examination of mass.

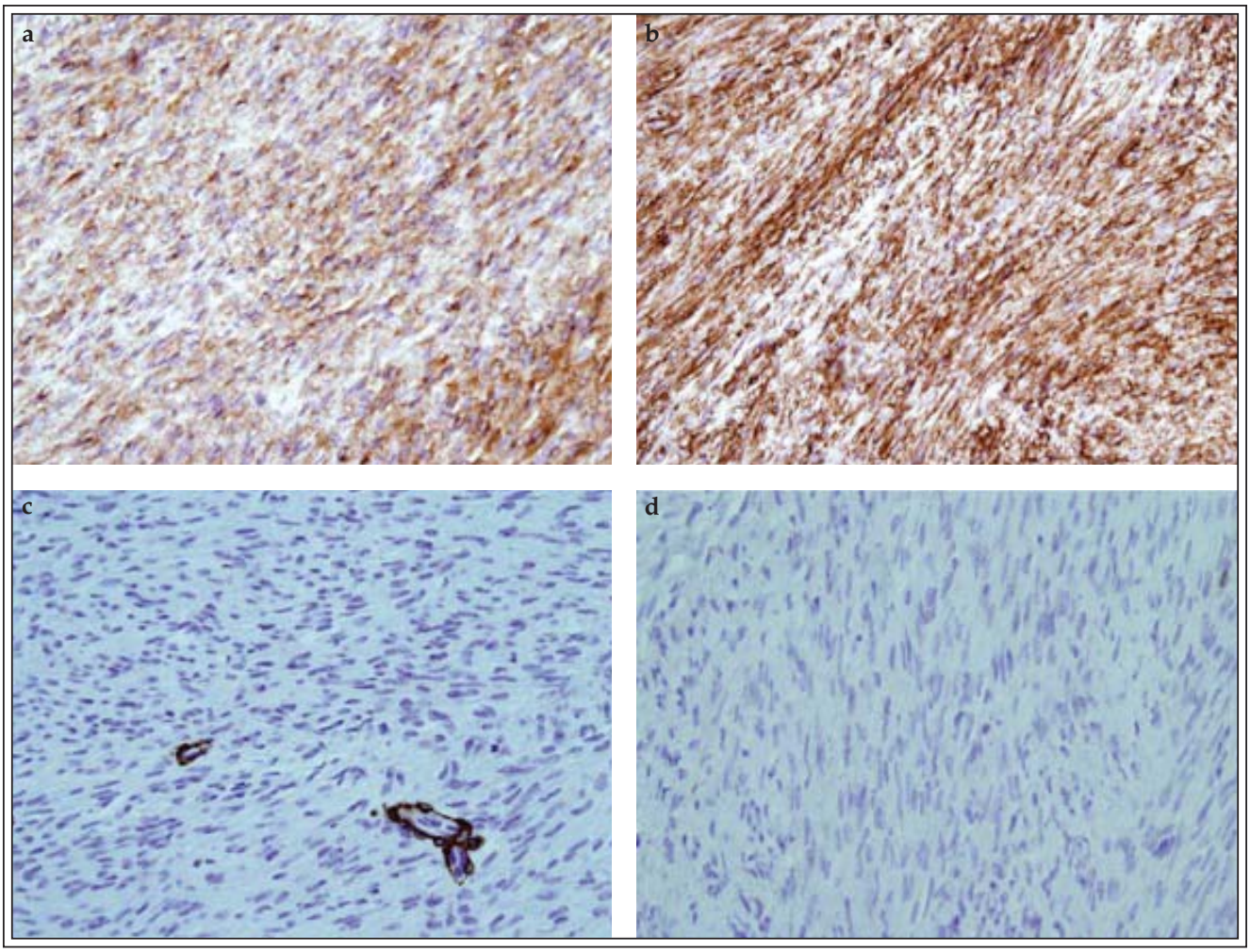

Figure 4. Immunohistochemical staining of mass: with CD117 (a), CD34 (b), SMA (c), and S100 (d).

Discussion of diagnosis

Gastrointestinal stromal tumors (GISTs) are a group of non-epithelial neoplasms that originate from the interstitial cells of cajal (ICC), specialized neural cells that serve a pacemaker function in the muscular layers of the gastrointestinal wall.[1] GISTs can form anywhere along the length of the gastrointestinal tract and stain positive for CD117.[1] Rarely (< 5%), however, neoplasms with identical immunohistochemistry staining can arise outside the gastrointestinal tract.[2] These neoplasms are called extragastrointestinal stromal tumors (EGISTs) and have been described in omentum, mesentery, or retroperitoneum.

Currently only 28 cases of omental EGISTs are cited in literature, and even fewer for EGIST in other locations.[3] Only one other EGIST in the pouch of Douglas has ever been reported, mimicking a uterine tumor in a female patient.[4] To the best of our knowledge, this case is the first EGIST to be reported in the rectovesical pouch of a male patient, and the very first to be resected robotically.

In contrast to that of GISTs – which are most often found in the stomach (60%) and small intestine (35%)[2,5] – EGISTs are very rare tumors. As such, relatively little is known about their pathological and prognostic characteristics compared to GIST, and the cell of origin still remains controversial. Recent work on omental and mesenteric EGISTs yields several possibilities for tumor origin. Studies analyzing omental mesenchymal tumors have suggested ICC-like cells are the cell of origin, based on the presence of CD 117 and CD34 positive staining with negative staining for smooth muscle cell markers.[6,7] Other studies suggests that multipotent mesenchymal stem cells are the origins of EGISTs.[6,8] Still others propose that EGISTs arise from GIST migration from gastrointestinal tract into mesentery and omentum.[9]

In the case of our patient, the position of the tumor underneath the inferior peritoneum, and its distance

from the omentum makes it unlikely that the tumor was derived from omental ICC-like cells. Furthermore, the clear tissue plane between rectum and tumor capsule suggests that the tumor did not migrate from the gastrointestinal tract. Thus, it seems most likely in our patient that the EGIST originated from mesenchymal stem cells.

Conclusions

EGISTs are very rare tumors, the origins of which are poorly understood. They have mainly been described as arising in omentum and mesentery. EGISTs arising in the pelvis are extremely rare and can mimic more common pelvic pathology. Our case is the first reported EGIST in the rectovesical pouch of a male and the first to be resected robotically. This rare case adds to the understanding of EGISTs, their possible origins, and demonstrates that robotic extirpation is a feasible and effective option for the management of large pelvic tumors in difficult locations. □

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