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*Case Report*

**Section:** Obstetrics and Gynaecology

# Robotic-Assisted Myomectomy of a Deeply Impacted Retroperitoneal Fibroid Running Head: Robotic Myomectomy of Retroperitoneal Fibroid

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## HIGHLIGHTS

- Retroperitoneal fibroids are extremely rare.
- They mimic malignant pelvic tumors.
- MRI aids preoperative tumor localization.
- Robotic surgery improves precision safely.
- Successful excision with minimal morbidity.

**Key Words:**
Robotic,
Myomectomy,
Retroperitoneal fibroid
Leiomyoma
Robotic surgery

## ABSTRACT

**Background:** Retroperitoneal fibroids are rare benign smooth muscle tumors accounting for approximately 1.2% of all uterine leiomyomas. Their atypical extrauterine location often leads to diagnostic uncertainty and may mimic pelvic malignancies. Minimally invasive and robotic-assisted surgical approaches have recently expanded therapeutic options for such complex cases. **Case Presentation:** A 49-year-old multiparous woman presented with heavy menstrual bleeding and dull pelvic pain for one year. Clinical examination revealed a firm, immobile mass in the rectovaginal septum. MRI identified a 7×6×5 cm retroperitoneal fibroid with degenerative changes compressing the rectum, along with two smaller uterine fibroids. Tumor markers were normal. The patient underwent robotic-assisted hysterectomy with concomitant myomectomy using the da Vinci Xi system. The retroperitoneal fibroid was safely dissected and delivered vaginally without intraoperative complications. **Result:** Postoperative recovery was uneventful, and the patient was discharged after 48 hours. Histopathology confirmed benign leiomyoma. At one-month follow-up, she remained asymptomatic. **Conclusion:** Robotic-assisted surgery provides enhanced visualization and precision, enabling safe removal of deeply impacted retroperitoneal fibroids with minimal morbidity. This case highlights the safety and efficacy of robotic-assisted management in complex gynecologic surgery.

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## INTRODUCTION

Retroperitoneal fibroids, also known as extrauterine or parasitic leiomyomas, are an exceedingly rare subset of benign smooth muscle tumors that develop outside the uterus. They account for approximately 1.2% of all uterine leiomyomas and are most commonly located in the pelvic retroperitoneal space [1]. These lesions may arise de novo from smooth muscle cells in the retroperitoneum or develop secondary to previous uterine surgery, such as hysterectomy or myomectomy, through implantation or parasitic vascularization of a detached myoma [2,3].

The exact pathogenesis of retroperitoneal leiomyomas remains unclear. Several theories have been proposed, including origin from Müllerian or Wolffian ductal remnants, metaplastic transformation of retroperitoneal connective tissue, or hormone-dependent proliferation of smooth muscle cells similar to uterine fibroids [4]. Because of their unusual location, these tumors often pose significant diagnostic challenges and may clinically or radiologically mimic malignant retroperitoneal tumors such as leiomyosarcoma, gastrointestinal stromal tumor (GIST), or neurogenic sarcoma [5].

Patients commonly present with nonspecific symptoms, including lower abdominal or pelvic pain, abdominal distension, urinary frequency, constipation, or menstrual irregularities, depending on tumor size and the degree of compression of adjacent pelvic organs. Imaging modalities such as magnetic resonance imaging (MRI) and computed tomography (CT) are essential for localization and preoperative assessment; however, definitive diagnosis requires histopathological confirmation [6].

Surgical excision remains the mainstay of treatment for retroperitoneal leiomyomas, and complete removal is often curative. While traditional open surgery has been the conventional approach, minimally invasive techniques, particularly robotic-assisted surgery, have gained popularity due to improved visualization, precision, and ergonomics, especially in anatomically deep and confined spaces like the pelvis [7]. The enhanced dexterity and 3-dimensional imaging capabilities of robotic systems such as the *da Vinci Xi* allow for meticulous dissection around vital structures including the ureters, rectum, and pelvic vessels, minimizing intraoperative complications and postoperative morbidity [8].

Here, we report a rare case of retroperitoneal leiomyoma in the Pouch of Douglas, successfully managed by robotic-assisted hysterectomy and myomectomy. This case highlights the diagnostic challenges, surgical intricacies, and therapeutic advantages of employing robotic technology in the management of deeply impacted retroperitoneal fibroids.

## CASE PRESEPENTATION

A 49-year-old female, $P_4L_{4,}$ presented with a year-long history of frequent and heavy menstrual cycles and dull aching pelvic pain. Pelvic examination revealed an enlarged uterus equivalent to a 8-10 week gestation, with a hard, immobile mass (7x6x5cm) palpable in the rectovaginal septum, about 4 cm from the introitus and bulging into the Pouch of Douglas. Cervix seen and felt above the level of the mass was normal. Rectal mucosa was free.

With the suspicion of a pelvic malignancy in mind a contrast enhanced MRI was performed. MRI reported the lesion as a retroperitoneal (RP) fibroid with degenerative changes, anteriorly displacing the vagina and cervix causing mass effect on both. There were two other fibroids (a 3x3 cm posterior wall intramural fibroid with submucosal component and a 3x3 cm fundal subserosal fibroid). The RP fibroid was compressing the rectum however fat planes between the fibroid and rectum were maintained [Figure 1]. Tumour markers were found to be in the normal range [Serum LDH was 280 U/L, CA 125 was 2U/mL, Ca 19-9 was 2U/mL, CEA 0.5g/ml, Beta HCG was 1.2mIU/mL]. Endometrial biopsy revealed proliferative endometrium. After thorough counselling, the patient underwent a planned robotic-assisted hysterectomy and myomectomy to address the retroperitoneal fibroid.

Intraoperative findings confirmed the MRI report. The RP fibroid was located in the Pouch of Douglas between the uterosacral ligaments. Robotic-assisted hysterectomy was performed with the standard protocol using the da Vinci Xi system. Colpotomy performed above the level of the uterosacral ligaments. Uterus with cervix, bilateral tubes and ovaries were delivered through the vaginal route. 30ml of diluted vasopressin solution (20 units in 200 ml normal saline) was injected into the peritoneal fold overlying the fibroid. A vertical incision was then carefully made in the peritoneal fold and in the underlying leiomyoma capsule, providing access to the deeply impacted fibroid. A robotic arm equipped with a tenaculum was employed to grasp the fibroid and apply traction [Figure 2], facilitating dis-impaction from the retroperitoneum. Myomectomy was performed using a fenestrated bipolar instrument in the left robotic arm and a monopolar scissor in the right robotic arm, with meticulous attention to maintaining intracapsular dissection to safeguard surrounding structures such as the rectum and ureters. Precision offered by the robotic arms and the controlled force aided in safely dis-impacting the impacted fibroid and completing the myomectomy [Figure 3]. Fibroid was delivered through the vaginal vault as well. Following fibroid removal, the myomectomy bed was repaired using No. 1 Vicryl sutures, and the overlying peritoneum was sutured in a continuous fashion with 2-0 Vicryl suture.

Patient passes stools after 24 hours was discharged in stable condition after 48 hours. Retroperitoneal lesion was confirmed to be a leiomyoma on histopathology. At the time of writing this report, patient is one month post-operative, without any symptoms and will be kept on long term follow up.

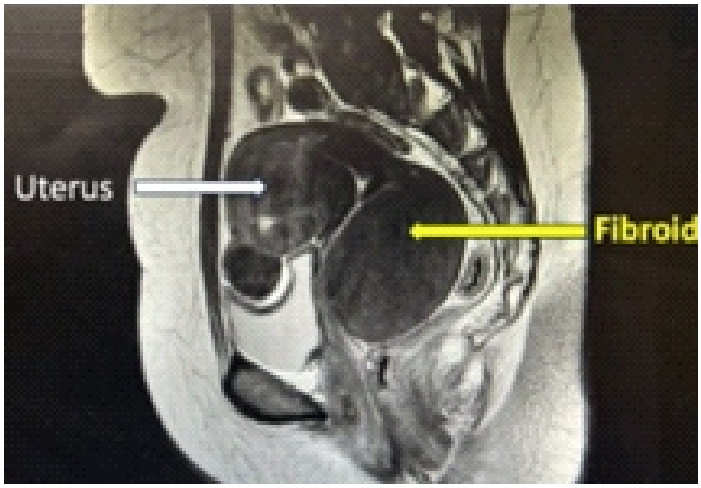


**Figure 1: MRI showing a retroperitoneal fibroid.**

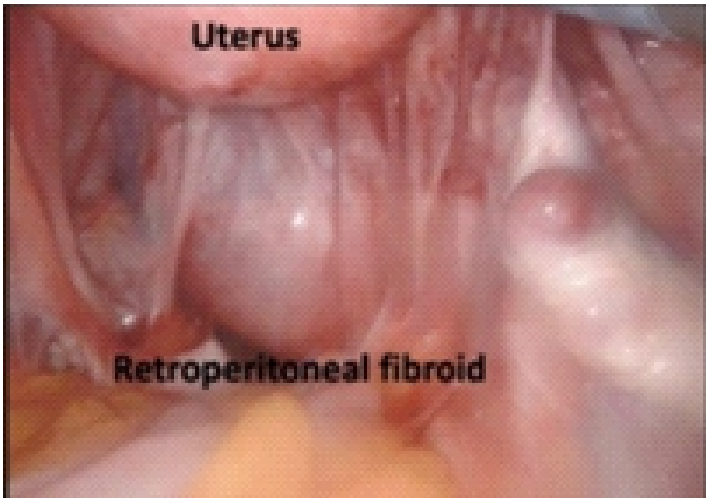


**Figure 2: Retroperitoneal fibroid in pouch of Douglas.**

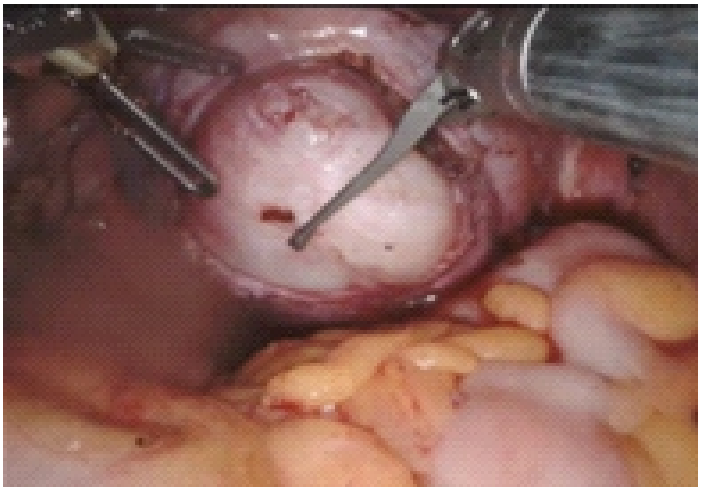

**Figure 3: Still captured during robotic assisted myomectomy; myoma being held by robotic tenaculum.**

## DISCUSSION

Majority (73%) of retroperitoneal fibroids develop in the pelvic region, remaining may however develop in the upper portion of the retroperitoneum as well [1]. Approximately 40% of these cases are linked with synchronous or previously managed uterine myomas however retroperitoneal leiomyomas may also develop in women who have undergone hysterectomy in the past [2]. The exact aetiology of retroperitoneal fibroids remains unclear; hormonal factors, genetic predisposition, and aberrant smooth muscle cell proliferation are thought to play a role in their development. Additionally embryonal remnants of Müllerian or Wolffian tubes could potentially contribute to the development of retroperitoneal leiomyomas [3,4].

The clinical presentation of retroperitoneal fibroids can vary widely and may include symptoms such as pelvic pain, urinary frequency or retention, constipation, and lower extremity oedema. The presence of large retroperitoneal fibroids may also lead to compressive symptoms, such as hydronephrosis or venous congestion. Differential diagnosis includes spindle cell tumors, including leiomyosarcomas, stromal tumors and rare conditions such as malignant peripheral nerve sheath tumor, inflammatory myofibroblastic tumor, and pleomorphic sarcoma [5].

Diagnosis of retroperitoneal fibroids often relies on a combination of clinical evaluation, imaging studies, and histopathological examination. Transabdominal and transvaginal ultrasound, magnetic resonance imaging (MRI), and computed tomography (CT) scans are commonly used to visualize the size, location, and characteristics of retroperitoneal fibroids. MRI may be useful in differentiating leiomyoma from a leiomyosarcoma. In cases where the diagnosis is uncertain or a malignancy is suspected, a preoperative biopsy or histopathological examination may be necessary to confirm the diagnosis [6,7].

Literature on management of retroperitoneal fibroids using minimally invasive techniques is rare. Kondo et al successfully removed a 14 x10 x 10 cm retroperitoneal benign leiomyoma by laparoscopy [8]. Another recent case report describes management of a 11 x 8 cm retroperitoneal leiomyoma by robotic assisted surgery [9]. Integration of robotic-assisted systems for performing myomectomy is a notable advancement in the field of minimally invasive gynaecology. By leveraging the precision and dexterity of robotic arms controlled by skilled surgeons, this approach offers several advantages over laparoscopy [10]. The three-dimensional visualization provided by the robotic system aids in accurately identifying the fibroid's location and its relationship with surrounding structures, such as the ureter, bladder, and major blood vessels, minimizing the risk of inadvertent injury. Treatment followed standard protocols, starting with intravenous antibiotics, and progressing to percutaneous aspiration, catheter drainage, or open surgical drainage based on abscess size, complications, and response to initial treatment. Additionally, the articulating instruments afford enhanced manoeuvrability in deep spaces like the Pouch of Douglas, allowing for meticulous dissection and excision of the fibroid while preserving surrounding tissues. Compared to traditional open or laparoscopic approaches, robotic-assisted myomectomy typically results in shorter hospital stays, reduced bleeding, reduced postoperative pain, and faster recovery, thereby improving patient outcomes and satisfaction [11].

The prognosis for patients with retroperitoneal fibroids is generally favourable, particularly with appropriate surgical management. However, the presence of large or deeply impacted fibroids may increase the risk of intraoperative complications, such as injury to adjacent structures or excessive bleeding. Close postoperative monitoring and follow-up are essential to assess for recurrence of symptoms or fibroid regrowth. In our patient since we were also performing hysterectomy, we could deliver the fibroid through the vault without morcellation. In other cases where the vault is not opened, or in cases with a large fibroid, the process of morcellation and risk of spread of an unsuspected malignancy must be discussed in depth with the patient preoperatively and if morcellation is attempted it should always be done in a containment system.

## CONCLUSION

Retroperitoneal leiomyomas, though rare, should be considered in the differential diagnosis of pelvic masses. Advances in minimally invasive surgery, particularly robotic-assisted techniques, offer significant advantages in the management of deeply impacted retroperitoneal fibroids by enhancing visualization and precision while reducing perioperative morbidity. This case highlights the feasibility and safety of robotic-assisted hysterectomy with concomitant myomectomy for retroperitoneal fibroids, emphasizing the importance of careful preoperative evaluation, and intraoperative vigilance.

## CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of translating scientific observations into meaningful improvements in patient care, diagnosis, and treatment outcomes. By highlighting real-world relevance, the study contributes to evidence-based medical practice and supports informed clinical decision-making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

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**AUTHOR CONTRIBUTIONS**
All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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Authors declared that there is no conflict of interest.

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The authors confirm that no AI & LLM tools were used in thewriting or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

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**REFERENCES**

1. Fasih N, Prasad Shanbhogue AK, Macdonald DB, Fraser-Hill MA, Papadatos D, Kielar AZ, et al. Leiomyomas beyond the uterus: unusual locations, rare manifestations. Radiographics. 2008;28(7):1931–1948.
2. Mahendru R, Goel P, Kumar P, Garg R. A rare case of retroperitoneal leiomyoma. J Clin Diagn Res. 2012;6(3):474–476.
3. Karray O, Boulma R, Abdi A, Ben Miled A, Dhaoui A, Menif N, et al. Management of a giant retroperitoneal leiomyoma: a case report. J Med Case Rep. 2018;12(81),1-5.
4. Zhang Z, Shi F, She J. Robot-assisted tumorectomy for an unusual pelvic retroperitoneal leiomyoma: a case report. Medicine (Baltimore). 2022;101(31):e29650.
5. Sabrine, D., Hafsa, E., Omar, M., Jahid, A., Znati, K., Zakia, B. and Zouaidia, F., 2020. Retroperitoneal leiomyoma of gynecologic type: a case report and review of the litterature. Journal of Surgical Case *Reports*, *2020*(12), 1-3.
6. Jeong GA. Retroperitoneal leiomyoma of the uterus mimicking ovarian/adnexal mass. J Menopausal Med. 2014;20(3):133–137.
7. Jeong HG, Lee SY, Lee IC, et al. The largest uterine leiomyoma removed by robotic-assisted laparoscopy: a case report. Case Rep Obstet Gynecol. 2020;106: 291-291.
8. Li J, Zhu-Ge YY, Lin KQ. Torsed retroperitoneal leiomyomas: a case report and review of literature. World J Clin Cases. 2024;12(21):4762–4769.
9. Pace M, Moretti M, Tierno SM, et al. Laparoscopic tumorectomy for an unusual pelvic retroperitoneal leiomyoma: a case report. SN Compr Clin Med. 2024;6(1):1–7.
10. Kondo W, Botchorishvili R, Desvignes F, et al. Laparoscopic management of a pelvic retroperitoneal leiomyoma: case report. Gynecol Surg. 2011;8(3):247–251.
12. Yüksel D, Kilic C, Kodal B, Cakir C, Güler Mesci C, Boran N, Kayıkçıoğlu F. A rare case of a retroperitoneal leiomyomatosis. J Gynecol Obstet Hum Reprod. 2021;50(10):101760.