European Journal of Clinical Pharmacy

Print ISSN: 2385-409X **Online ISSN**: 3105-0409

Website: https://farmclin.com/

Case Report

Leiomyomas Beyond the Uterus: A Case Series of Extrauterine Leiomyomas

Article History:

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Received: *10/08/2025*

Revised: *15/11/2025*

Accepted:*30/12/2025*

Published: *31/12/2025*

Abstract:

Importance: Extrauterine leiomyomas are rare benign smooth muscle tumors that occur outside the uterus, including the ovary, cervix, and vagina. Their rarity often leads to diagnostic challenges and potential misdiagnosis as cystic lesions. Understanding their clinical presentation and management is essential for appropriate patient care. **Objective:** To describe the clinical presentation, diagnostic approach, surgical management, and outcomes of three rare cases of extrauterine leiomyomas involving the ovary, cervix, and anterior vaginal wall. **Evidence Acquisition:** A retrospective case series was conducted at Chettinad Hospital and Research Institute, Kelambakkam, Tamil Nadu, India. Three patients presenting with abdominal pain, distension, or vaginal discomfort were evaluated using detailed clinical history, physical examination, and imaging studies including ultrasonography and magnetic resonance imaging (MRI). Surgical management was individualized: total abdominal hysterectomy with bilateral salpingo-oophorectomy for ovarian and cervical leiomyomas, and local excision for the anterior vaginal wall leiomyoma. Histopathological examination confirmed the diagnosis in all cases, **Results:** All three patients underwent successful surgical management without major intraoperative or postoperative complications. The ovarian leiomyoma measured 16×12 cm, the cervical leiomyoma measured 6×6 cm, and the anterior vaginal wall leiomyoma measured 5×4 cm. Histopathological examination confirmed leiomyoma in each case with characteristic features of interlacing bundles of smooth muscle cells. Postoperative recovery was uncomplicated, and follow-up visits demonstrated complete wound healing and high patient satisfaction. **Conclusion and Relevance:** Extrauterine leiomyomas are rare but important differential diagnoses for pelvic masses. Thorough clinical evaluation, appropriate imaging, and histopathological confirmation are essential for accurate diagnosis. Surgical excision remains the definitive treatment with excellent outcomes when appropriately managed. This case series contributes to the limited literature on extrauterine leiomyomas and emphasizes the importance of considering these rare entities in clinical practice.

Keywords: Extrauterine leiomyoma, ovarian leiomyoma, cervical leiomyoma, vaginal leiomyoma, pelvic mass

INTRODUCTION

Leiomyomas, also called fibroids or myomas, are the most common benign tumors in the female reproductive system (5,6). These smooth muscle growths affect approximately 20-30% of women during their reproductive years, with the highest incidence between ages 30 and 50 (20). By age 50, the lifetime risk of developing uterine leiomyomas approaches 70-80%, making them one of the leading indications for gynecological surgery worldwide (6,7). The majority of leiomyomas arise from the smooth muscle of the uterine myometrium; however, a small subset develops in extrauterine locations. These extrauterine fibroids present unique diagnostic and therapeutic challenges that remain inadequately documented in the medical literature (1,18).

Uterine leiomyomas are well-characterized entities with established clinical patterns, risk factors, and management strategies. Hormonal influences, particularly estrogen and progesterone, play a significant role in their growth (6). These tumors typically proliferate during reproductive years and may regress following menopause (20). The pathophysiology involves clonal proliferation of smooth muscle cells with variable amounts of fibrous connective tissue, resulting in well-circumscribed masses ranging from microscopic seedlings to large tumors weighing several kilograms. Clinically, leiomyomas may be asymptomatic or present with symptoms including abnormal uterine bleeding, pelvic pressure or pain, urinary frequency, constipation, and reproductive complications such as infertility and pregnancy-related issues (6,7,12).

In contrast, extrauterine leiomyomas represent a distinct and poorly understood clinical entity (1,18). These tumors can develop in virtually any anatomical location containing smooth muscle tissue, though certain sites are more frequently reported. Documented locations include the ovary, cervix, vagina, vulva, broad ligament, round ligament, urinary bladder, urethra, and even more distant sites such as the gastrointestinal tract, retroperitoneum, and extremities (1). The term "parasitic leiomyoma" refers to fibroids that have detached from the uterus and established an independent blood supply from adjacent structures. "Benign metastasizing leiomyoma" describes histologically benign-appearing smooth muscle tumors found in distant sites, most commonly the lungs (1). Each variant presents unique pathophysiological considerations and clinical presentations and implications.

The rarity of extrauterine leiomyomas contributes to diagnostic uncertainty and frequent misdiagnosis (13). Clinicians may not consider these tumors in the differential diagnosis of pelvic or extragenital masses, potentially leading to inappropriate management or delayed diagnosis. The clinical presentation varies widely depending on tumor location, size, and relationship to adjacent structures (8,15). Many extrauterine leiomyomas are discovered incidentally during imaging studies or surgical procedures performed for other indications. Symptomatic cases may present with mass-related symptoms, pain, or organ-specific dysfunction.

Ovarian Leiomyomas

Ovarian leiomyomas are exceedingly rare, accounting for less than 1% of all benign ovarian tumors and only 0.5-1% of all ovarian neoplasms (2,16). Since Spiegelberg first reported a case in 1895, fewer than 200 cases have been documented in the English medical literature. The pathogenesis remains uncertain, with several theories proposed regarding their origin. The most widely accepted hypothesis suggests derivation from smooth muscle cells in ovarian vessels, particularly within the ovarian ligament and its vasculature (2). Alternative theories propose origin from smooth muscle in vessel walls within the ovary itself or from embryonic smooth muscle cell remnants. Some investigators suggest that certain ovarian leiomyomas may represent parasitic uterine fibroids that have attached to the ovary and developed an independent blood supply, though this concept remains controversial (16).

Diagnosis of ovarian leiomyoma requires specific criteria originally proposed by Spiegelberg and subsequently modified (2): the tumor must be located within the ovary, connected to the ovary by the utero-ovarian ligament or infundibulopelvic ligament, must demonstrate histological features of leiomyoma with smooth muscle proliferation, and must contain normal ovarian tissue within the tumor wall. These stringent criteria help differentiate primary ovarian leiomyomas from subserosal or broad ligament uterine fibroids, as well as from other ovarian smooth muscle tumors (2,16).

Cervical Leiomyomas

Cervical leiomyomas account for approximately 2.6 to 8% of all uterine leiomyomas, depending on the series reported (3). These tumors arise from the smooth muscle of the cervix and can be classified based on their growth pattern as anterior, posterior, lateral, or circumferential. Unlike their uterine counterparts, cervical leiomyomas present unique management challenges due to their proximity to critical structures including the bladder, ureters, rectum, and major pelvic blood vessels (10,19). As they enlarge, cervical fibroids can displace and distort normal pelvic anatomy, potentially compromising urinary and bowel function.

The clinical presentation of cervical leiomyomas differs from typical uterine fibroids. Patients may experience urinary symptoms including frequency, urgency, retention, or hydronephrosis secondary to ureteral compression (19). Large posterior cervical fibroids may cause bowel symptoms such as constipation or tenesmus. Dyspareunia and vaginal discharge are also commonly reported (3). On examination, cervical leiomyomas typically present as firm, smooth masses that may be difficult to distinguish from the cervix itself, particularly with large tumors. The uterine corpus may be displaced superiorly and may be difficult to palpate separately from the cervical mass.

CASE PRESENTATIONS

Case 1: Ovarian Leiomyoma

A 42-year-old woman, para 2 with 2 living children, presented with complaints of abdominal distension and pain for 6 months. Her menstrual history was unremarkable. Per abdominal examination revealed a large, firm, mobile abdominal mass extending from the pelvis to the umbilicus. Ultrasonography demonstrated a large solid mass measuring approximately 16×12 cm arising from the left adnexa, separate from the uterus. Magnetic resonance imaging (MRI) confirmed a well-defined heterogeneous mass with features suggestive of a solid ovarian neoplasm.
Laboratory investigations including tumor markers (carcinoembryonic antigen [CEA- 0.89], cancer antigen 125 [CA-125-32.1]) were within normal limits. Following comprehensive counseling regarding diagnosis, treatment options, and potential complications, the patient provided informed consent for surgical management. She underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy. Intraoperative findings revealed a large, well-encapsulated mass arising from the left ovary, measuring 16×12 cm (Fig.2). The uterus and right adnexa appeared normal. The tumor was successfully excised without complications.
Histopathological examination confirmed the diagnosis of ovarian leiomyoma. Microscopic examination revealed interlacing bundles of smooth muscle cells with elongated, blunt-ended nuclei and eosinophilic cytoplasm (Fig.6). No nuclear atypia, mitotic activity, or necrosis was identified. Normal ovarian tissue was identified within the tumor capsule, fulfilling the diagnostic criteria for primary ovarian leiomyoma. The patient's postoperative course was uncomplicated. She was discharged on postoperative day 5 and remained asymptomatic at 6-month follow-up.

Vaginal Leiomyomas

Vaginal leiomyomas are among the rarest of extrauterine leiomyomas, with fewer than 300 cases reported in the literature since the first description in 1733 (4,17). These tumors arise from the smooth muscle of the vaginal wall and most commonly occur in the anterior wall (approximately 60% of cases), followed by the lateral walls (20%) and posterior wall (20%) (4). The pathogenesis likely involves proliferation of smooth muscle cells from the muscularis layer of the vaginal wall or from smooth muscle in periurethral tissue (14).

Clinical presentation varies depending on tumor size and location. Small lesions may be asymptomatic and discovered incidentally during routine pelvic examination. Larger tumors may cause symptoms including pelvic pressure or fullness, dyspareunia, vaginal bleeding or discharge, urinary symptoms (particularly retention or frequency with anterior wall lesions), and bowel symptoms with posterior wall involvement (4,14,17). On examination, vaginal leiomyomas present as firm, smooth, well-

circumscribed masses that may be pedunculated or sessile. The overlying vaginal mucosa is typically intact and mobile over the tumor.

Case 2: Cervical Leiomyoma

A 48-year-old woman, Para 2 with 2 living children, presented with complaints of lower abdominal pain,

urinary frequency, and occasional vaginal spotting for

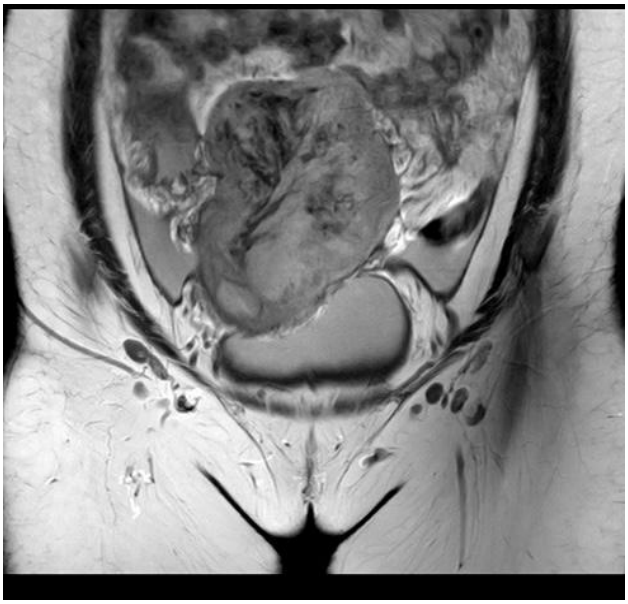


Fig 1: Ovarian leiomyoma MRI

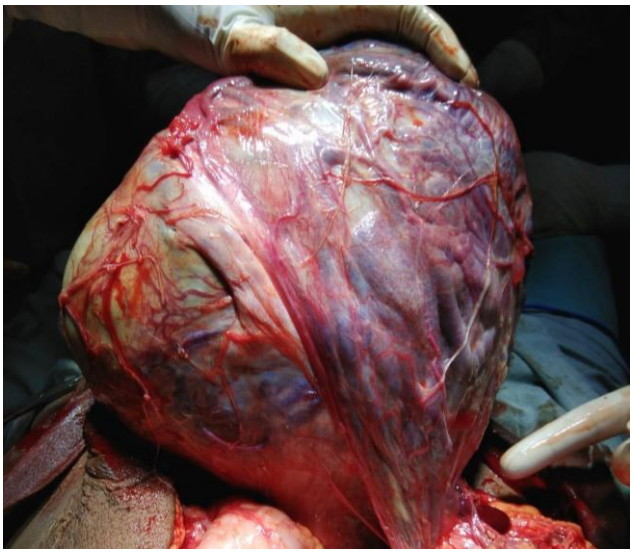


Fig 2: Ovarian leiomyoma Gross image

3 months. She had attained menopause 2 years prior.

On bimanual examination, a firm, non-tender mass was palpated in the lower pelvis, appearing to arise from the cervix. The uterine corpus could not be clearly distinguished from the cervical mass. mass arising from the cervix, with the uterine corpus displaced superiorly. MRI demonstrated a well-defined mass arising from the posterior cervix, with displacement of the bladder anteriorly and rectum posteriorly (Fig.3). The ureters appeared normal with no evidence of hydronephrosis. Based on clinical and imaging findings, a diagnosis of cervical leiomyoma was suspected.

After informed consent, the patient underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy. Intraoperatively, a 6×6 cm firm mass was identified arising from the posterior cervix. Careful dissection was performed to preserve the ureters and major blood vessels. The surgery was completed without complications. Histopathological examination confirmed cervical leiomyoma with typical features of smooth muscle proliferation and no malignant features (Fig.7). The patient recovered well postoperatively and was asymptomatic at 3-month follow-up.

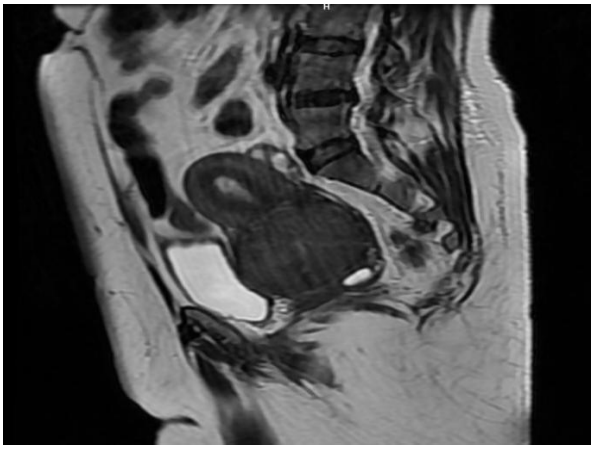


Fig 3: Cervical leiomyoma MRI

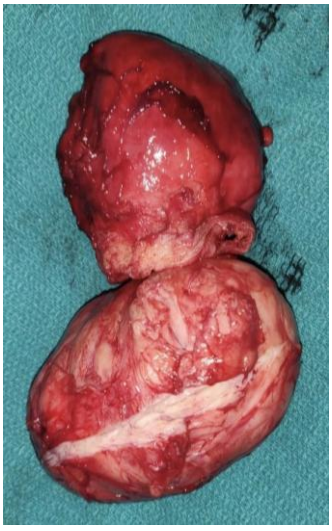


Fig 4. Cervical leiomyoma Gross

Case 3: Anterior Vaginal Wall Leiomyoma

A 35-year-old woman para 1, living child 1, presented with complaints of vaginal discomfort and a sensation of vaginal fullness for 4 months. She also reported mild dyspareunia. Menstrual history was unremarkable. On speculum examination, a firm, smooth, well-circumscribed mass was visible in the anterior vaginal wall, approximately 3 cm from the introitus. The overlying vaginal mucosa appeared normal. On bimanual examination, a 5×4 cm firm, mobile mass was palpated in the anterior vaginal wall, distinct from the cervix and uterus.

Ultrasonography confirmed a well-defined hypoechoic mass within the anterior vaginal wall measuring 5×4 cm. MRI demonstrated a homogeneous mass with signal characteristics consistent with smooth muscle tissue. No connection to the uterus or cervix was identified. Following counseling and informed consent, the patient underwent local excision of the vaginal mass under regional anesthesia.

A transverse incision was made in the vaginal mucosa overlying the mass. The tumor was carefully dissected from surrounding tissues and completely excised. The vaginal mucosa was closed with absorbable sutures. Histopathological examination revealed typical features of leiomyoma with fascicles of smooth muscle cells showing no atypia or malignant features (Fig.5). The patient's postoperative recovery was uneventful. At 6-month follow-up, the surgical site was well-healed, and the patient reported complete resolution of symptoms with normal sexual function.

DISCUSSION

This case series presents three rare manifestations of extrauterine leiomyomas, highlighting the diagnostic challenges and successful surgical management of these uncommon entities (1,18). Despite the rarity of these tumors, they represent important differential diagnoses that clinicians must consider when evaluating pelvic masses. The diversity of presentations in our cases—ranging from a large ovarian mass to a cervical tumor with urinary symptoms to a symptomatic vaginal wall lesion—underscores the variable clinical manifestations of extrauterine leiomyomas.

The pathophysiology of extrauterine leiomyomas remains incompletely understood (1). Several mechanisms have been proposed to explain their development in locations outside the uterus. For ovarian leiomyomas, the most accepted theory suggests origin from smooth muscle cells within ovarian blood vessels or the ovarian ligament (2). Alternative hypotheses include derivation from embryonic smooth muscle remnants or transformation of ovarian stromal cells under hormonal influence (16). The strict diagnostic criteria established by Spiegelberg—requiring the tumor to be within the ovary, attached by appropriate ligaments, demonstrating smooth muscle histology, and containing normal ovarian tissue—help distinguish primary ovarian leiomyomas from other entities (2).

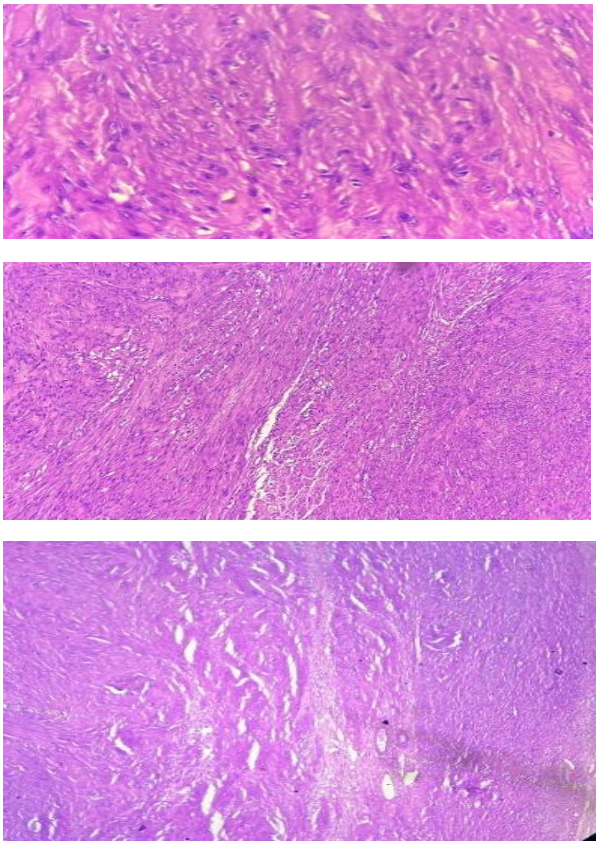
Cervical leiomyomas arise from the smooth muscle of the cervical stroma (3). Their growth patterns and anatomical relationships differ significantly from corpus uterine fibroids. The proximity to critical structures including the ureters, bladder, rectum, and major blood vessels necessitates careful surgical planning and meticulous technique during excision (10,19). Our case demonstrated typical features including urinary symptoms and displacement of pelvic organs, consistent with previously reported series (3,19).

Vaginal leiomyomas likely develop from smooth muscle cells in the muscularis layer of the vaginal wall or from periurethral smooth muscle tissue (4,14). The anterior wall predilection observed in our case aligns with published literature (4,17). These tumors present unique diagnostic challenges as they may be mistaken for other vaginal masses including cysts, polyps, or malignant lesions. The characteristic firm, smooth, well-circumscribed nature on palpation, combined with imaging features showing homogeneous smooth muscle tissue, helps establish the preoperative diagnosis (8,15).

Imaging plays a crucial role in the diagnosis and preoperative planning for extrauterine leiomyomas (8,15). Ultrasonography typically demonstrates well-defined, hypoechoic masses with posterior acoustic shadowing, similar to uterine fibroids (8). However, the extrauterine location and apparent separation from the uterus may cause diagnostic confusion (13). MRI provides superior tissue characterization and anatomical detail, demonstrating low signal intensity on T1-weighted images and intermediate to low signal on T2-weighted images, consistent with smooth muscle tissue (9,11,15). MRI is particularly valuable

in delineating the relationship of the tumor to adjacent structures, which is essential for surgical planning (15).

The differential diagnosis for extrauterine smooth muscle tumors must include several important entities. For ovarian masses, considerations include ovarian fibroma, thecoma, Brenner tumor, and smooth muscle tumors of uncertain malignant potential (9,13). Pedunculated subserosal uterine fibroids with secondary attachment to adnexal structures can mimic primary ovarian leiomyomas (16). For cervical masses, differential diagnoses include cervical polyps, endocervical cysts, and malignant processes (3,19). Vaginal masses require differentiation from vaginal cysts (Bartholin cyst, Gartner duct cyst), endometriosis, and malignant lesions including sarcoma or metastatic disease (4).
Histopathological examination remains the gold standard for definitive diagnosis (1,9). Characteristic features include interlacing bundles of spindle-shaped smooth muscle cells with elongated, blunt-ended nuclei, eosinophilic cytoplasm, and minimal mitotic activity. The absence of nuclear atypia, coagulative necrosis, and increased mitotic activity helps distinguish benign leiomyomas from their malignant counterparts (leiomyosarcomas) (9). Immunohistochemical markers including smooth muscle actin, desmin, and h-caldesmon confirm smooth muscle origin when morphological features are equivocal (1,13).



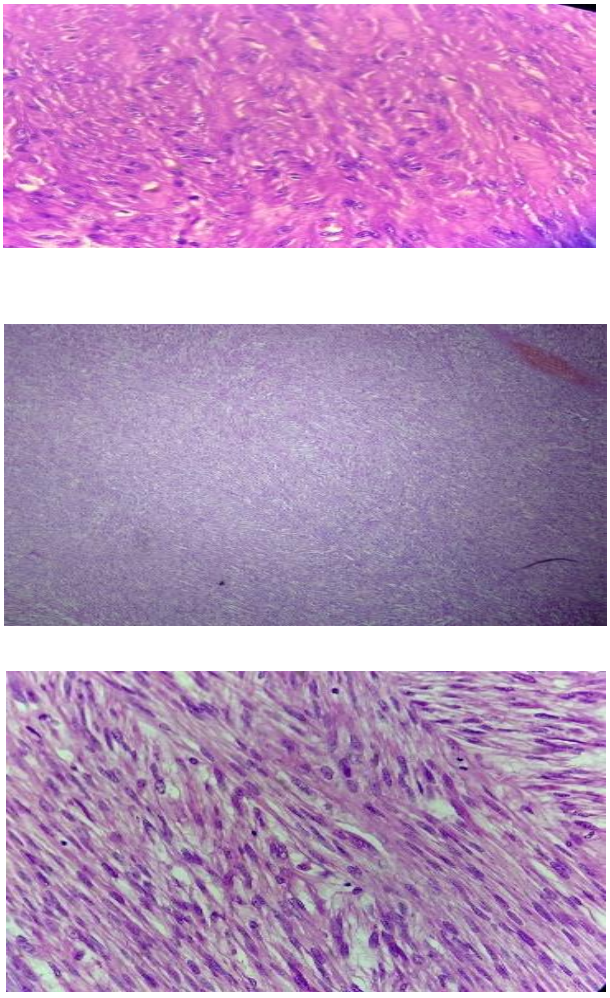


Fig 5: Histopathological Images of Vaginal Leiomyoma

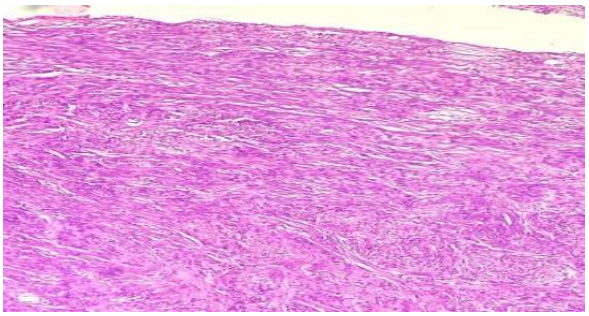


Fig 6 : Histopathological Images of Ovarian Leiomyoma

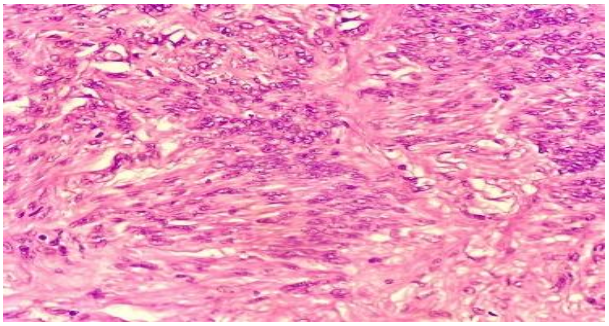


Fig 7: Histopathological Images of Cervical Leiomyoma

Histopathological examination reveals leiomyomas characterized by intersecting fascicles of uniform spindle-shaped smooth muscle cells with eosinophilic cytoplasm and elongated nuclei. The tumors demonstrate typical features including whorled architecture, interlacing bundles, and well-circumscribed borders without cellular atypia. Various magnifications show the characteristic fascicular growth pattern, scattered vascular channels, and in submucosal locations, overlying epithelium (hematoxylin and eosin [H&E] stain) (1).

Gross specimens showing bisected leiomyomas with firm, whorled cut surfaces. Large leiomyoma gross specimen demonstrating characteristic whorled appearance on cut section, typical of smooth muscle tumors with interlacing fascicular architecture.

Surgical management represents the definitive treatment for symptomatic extrauterine leiomyomas (10). The surgical approach must be individualized based on tumor location, size, patient age, fertility desires, and presence of concurrent pathology. For ovarian leiomyomas, options include oophorectomy, salpingo-oophorectomy, or fertility-sparing tumor enucleation in younger women desiring future childbearing (16). In our case, given the patient's age and completed childbearing, total abdominal hysterectomy with bilateral salpingo-oophorectomy was performed.

Cervical leiomyomas present unique surgical challenges (10,19). Small cervical fibroids may be amenable to myomectomy; however, larger tumors often necessitate hysterectomy due to distortion of cervical anatomy and proximity to vital structures (10). The risk of ureteral injury during dissection of large cervical fibroids is substantial, requiring careful identification and preservation of the ureters throughout the procedure (19).

In selected cases, preoperative ureteral stenting may be considered to facilitate identification and reduce injury risk.

Vaginal leiomyomas are generally amenable to local excision with excellent outcomes (4,14,17). The surgical technique involves incision of the vaginal mucosa overlying the tumor, careful dissection to separate the mass from surrounding tissues, complete excision, and meticulous closure of the vaginal wall (17). Preservation of vaginal length and function is an important consideration, particularly in younger, sexually active women (4). In our case, complete excision was achieved with preservation of normal vaginal anatomy and function.

The outcomes of surgical management for extrauterine leiomyomas are generally excellent when appropriate surgical technique is employed (10,14,17). Recurrence is rare following complete excision. Long-term complications are uncommon. In our series, all three patients had uncomplicated postoperative courses with complete symptom resolution and high satisfaction at follow-up. These outcomes are consistent with published literature on extrauterine leiomyomas (1,4,10,17).

The role of minimally invasive surgical approaches for extrauterine leiomyomas continues to evolve. Laparoscopic management of ovarian leiomyomas has been reported with favorable outcomes in selected cases. Vaginal approach for accessible anterior and posterior vaginal wall leiomyomas offers the advantages of avoiding abdominal incisions and potentially shorter recovery times (14,17). However, the decision regarding surgical approach must consider factors including tumor size, location, surgeon expertise, and available resources.

Several important learning points emerge from this case series. First, extrauterine leiomyomas, though rare, should be included in the differential diagnosis of pelvic masses, particularly solid masses with imaging characteristics suggesting smooth muscle origin

(1,8,15). Second, comprehensive imaging evaluation, particularly with MRI, is invaluable for preoperative planning and counseling (15). Third, histopathological confirmation is essential as clinical and imaging features alone cannot reliably distinguish benign leiomyomas from malignant smooth muscle tumors or other entities (9,13). Fourth, surgical management—individualized based on tumor characteristics, location, patient factors, and fertility

desires—offers excellent outcomes with minimal morbidity when performed by experienced surgeons (10).

This case series contributes to the limited literature on extrauterine leiomyomas and emphasizes the importance of considering these rare entities in the differential diagnosis of pelvic masses (1,18). The successful management of diverse presentations—ovarian, cervical, and vaginal leiomyomas—demonstrates the importance of individualized surgical management tailored to tumor characteristics, anatomical location, patient age, fertility desires, and associated medical conditions. Continued documentation and sharing of such cases through case series and registries will enhance our collective understanding and improve outcomes for patients with these uncommon tumors.

ACKNOWLEDGEMENTS

The authors express their gratitude to the Department of Obstetrics and Gynaecology, Chettinad Hospital and Research Institute, for providing facilities and support for this study; the Department of Pathology for expertise in histopathological examination; the Department of Radiodiagnosis for imaging evaluation; the Department of Urology for collaborative input in patient management; the Department of Vascular Surgery for perioperative anticoagulation guidance; the Department of General Surgery for assistance with adhesiolysis; the anesthesiology team for perioperative care; the nursing staff and operation theater personnel; the medical records department; and most importantly, the patients who consented to documentation of their cases for academic purposes.

Sources of Support: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts Of Interest: The authors declare no conflicts of interest related to this work.

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