International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Broad Ligament Leiomyoma Mimicking a Benign Ovarian Tumor: A Case Report and Literature Review

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Abstract

Background: Broad ligament leiomyomas are rare extrauterine benign smooth muscle tumors, accounting for less than 1% of all uterine leiomyomas. Their close anatomical relationship with the adnexa and nonspecific clinical presentation frequently lead to preoperative misdiagnosis as ovarian neoplasms, posing significant diagnostic and surgical challenges.

Case Presentation: We report the case of a 39-year-old nulligravid, nulliparous woman who presented with a four-month history of chronic pelvic pain. Pelvic ultrasonography demonstrated an 11-cm well-circumscribed hypoechoic left latero-uterine mass, classified as benign according to the International Ovarian Tumor Analysis (IOTA) criteria. Pelvic magnetic resonance imaging suggested a 108-mm benign left ovarian fibroma without radiological features of malignancy. Serum tumor markers, including CA-125, CA19-9, HE4, and the Risk of Ovarian Malignancy Algorithm (ROMA) score, were all within normal limits. Because of persistent symptoms, an exploratory laparotomy was performed. Intraoperatively, the mass was found to originate from the left broad ligament, with complete independence from the uterus and both ovaries. Conservative myomectomy was successfully achieved through intracapsular dissection while preserving the uterus and adnexa. Histopathological examination, supported by immunohistochemical staining positive for desmin, smooth muscle actin, and h-caldesmon with a low Ki-67 proliferation index, confirmed the diagnosis of a benign broad ligament leiomyoma.

Conclusion: Broad ligament leiomyoma is an uncommon entity that may closely mimic an ovarian tumor despite comprehensive imaging and reassuring tumor marker profiles. Although magnetic resonance imaging remains the imaging modality of choice for characterizing complex pelvic masses, definitive diagnosis often relies on surgical exploration and histopathological examination. Awareness of this rare condition and meticulous preoperative planning are essential to avoid diagnostic pitfalls and minimize the risk of ureteral and vascular injuries during surgery.

Keywords: Broad ligament leiomyoma; Extrauterine leiomyoma; Ovarian fibroma; Pelvic mass; Diagnostic challenge; Case report.

Introduction

Uterine leiomyomas are the most common benign tumors of the female genital tract, affecting up to 70–80% of women by the age of 50 years [1]. Although the vast majority originate from the myometrium, extrauterine leiomyomas are uncommon and may arise in several anatomical locations, including the broad ligament, round ligament, ovaries, vulva, urinary bladder, and retroperitoneum [2]. Broad ligament leiomyomas represent the most common type of extrauterine leiomyoma; however, they account for less than 1% of all uterine leiomyomas, making them a rare clinical entity [3]. They are classified as either true broad ligament leiomyomas, which arise from the smooth muscle fibers within the broad ligament, or false broad ligament leiomyomas, which develop from a subserosal uterine leiomyoma that extends laterally into the broad ligament [4].

Because of their uncommon location and close anatomical relationship with the adnexa, broad ligament leiomyomas often represent a significant diagnostic challenge [5]. Their clinical presentation is usually nonspecific and largely depends on tumor size and the degree of compression exerted on adjacent pelvic structures. Patients may present with chronic pelvic pain, pelvic pressure, abdominal distension, urinary frequency, constipation, or remain asymptomatic until the lesion reaches a considerable size [5].

Preoperative diagnosis remains challenging. Ultrasonography is the first-line imaging modality for the evaluation of pelvic masses; however, distinguishing a broad ligament leiomyoma from an ovarian neoplasm may be difficult, particularly in the presence of large tumors or degenerative changes [6]. Magnetic resonance imaging (MRI) provides superior soft-tissue characterization and accurately delineates the anatomical relationship between the mass, uterus, ovaries, ureters, and pelvic vessels, making it the imaging modality of choice for complex pelvic masses [7]. Nevertheless, even MRI may fail to determine the exact origin of these lesions, and the definitive diagnosis is frequently established only during surgery and subsequently confirmed by histopathological and immunohistochemical examination [8].

Given their rarity and their ability to mimic ovarian tumors both clinically and radiologically, broad ligament leiomyomas should be considered in the differential diagnosis of solid adnexal masses . We report the case of a 39-year-old nulligravid woman whose broad ligament leiomyoma was initially misdiagnosed as a benign ovarian fibroma despite comprehensive imaging assessment and normal serum tumor markers. This case highlights the diagnostic pitfalls associated with this rare entity and emphasizes the importance of careful surgical planning and histopathological confirmation. A review of the recent literature is also presented.

Case Presentation

A 39-year-old nulligravid and nulliparous woman with a history of congenital deafness presented to our department with a four-month history of chronic pelvic pain described as a sensation of pelvic heaviness of moderate intensity, without radiation or associated gastrointestinal or urinary symptoms. She had regular menstrual cycles and no previous history of gynecological surgery or hormonal treatment.

On abdominal examination, no palpable mass or tenderness was detected. Because the patient was virgo intacta, speculum examination and vaginal examination were not performed. Digital rectal examination revealed a mobile, tender left latero-uterine mass, while the rectovaginal septum was free of abnormalities. Transabdominal pelvic ultrasonography demonstrated a normal anteverted uterus with homogeneous myometrial echotexture and a thin endometrium. A well-defined homogeneous hypoechoic left latero-uterine solid mass measuring approximately 11 cm was identified, with no detectable internal

vascularization on Doppler examination. The lesion was classified as benign according to the International Ovarian Tumor Analysis (IOTA) criteria. The right ovary appeared normal, and no pelvic free fluid was observed.

Pelvic magnetic resonance imaging (MRI) revealed a well-circumscribed left adnexal mass measuring 108 × 79 × 102 mm, displaying heterogeneous low signal intensity on T2-weighted images and isointense signal on T1-weighted images. The mass exerted a compressive effect on the small bowel anteriorly, the sigmoid colon posteriorly, and displaced the uterus and urinary bladder to the right. The right ovary appeared normal, and only a minimal amount of fluid was present in the pouch of Douglas. No pelvic lymphadenopathy or abnormalities involving the bladder, rectosigmoid wall, or pelvic bones were detected. Based on these findings, MRI suggested the diagnosis of a benign left ovarian fibroma **(Figure 1).**

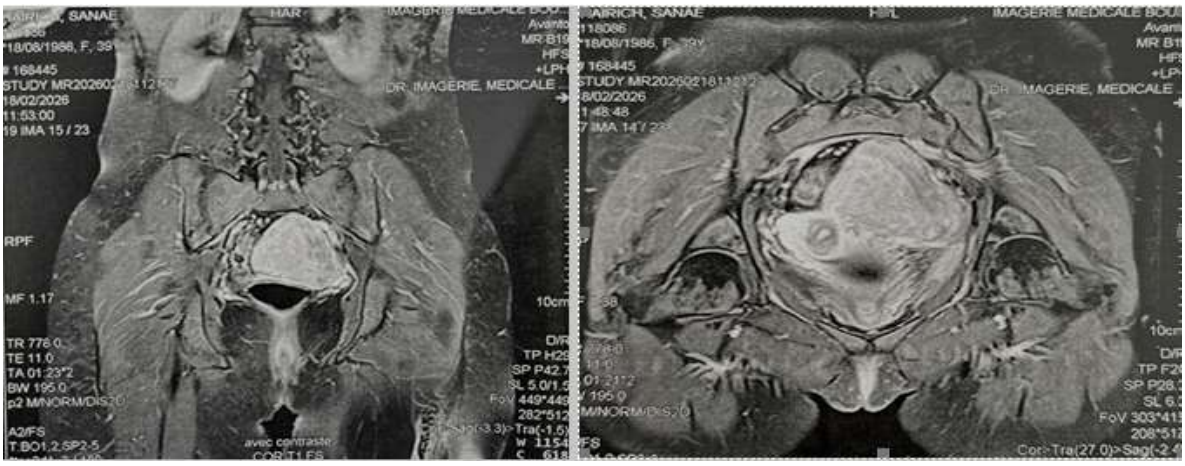

Figure 1. **Pelvic magnetic resonance imaging demonstrating a well-circumscribed left adnexal solid mass measuring 108 × 79 × 102 mm, initially interpreted as a benign ovarian fibroma.**

Serum tumor markers were all within normal limits, including CA-125 (10.62 U/mL), CA19-9 (9.03 U/mL), HE4 (32.57 pmol/L), and the Risk of Ovarian Malignancy Algorithm (ROMA) score (2.76%), supporting the presumed benign nature of the lesion.

Given the persistence of symptoms and the large size of the pelvic mass, exploratory laparotomy was performed. Intraoperatively, the uterus and both adnexa were macroscopically normal. A 12-cm encapsulated solid mass originating from the left broad ligament was identified, completely separate from both the uterus and ovaries, with features suggestive of cystic degeneration **(Figure 2).** Conservative myomectomy was successfully performed by opening the broad ligament and enucleating the tumor through intracapsular dissection while preserving the uterus and both adnexa. Estimated intraoperative blood loss was approximately 150 mL, and the postoperative course was uneventful.

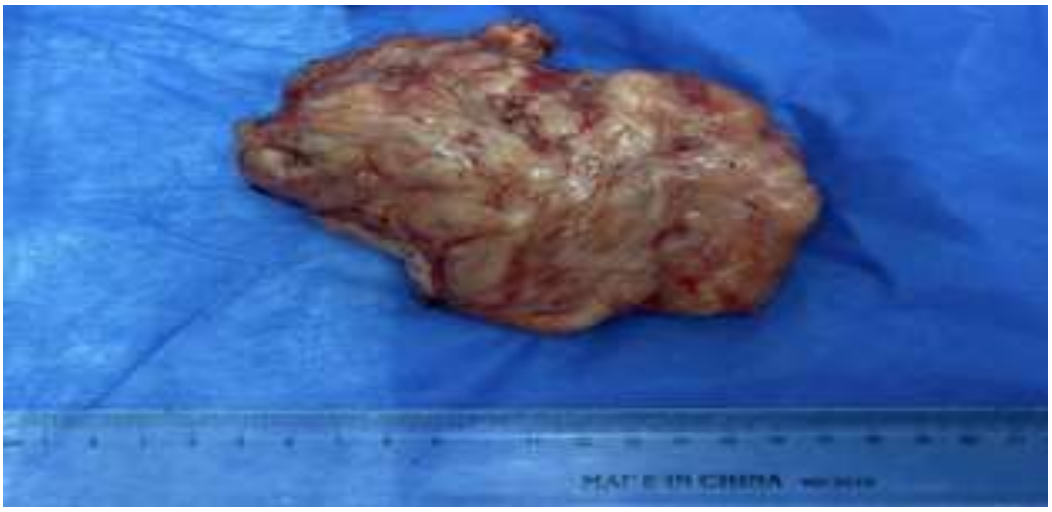

Figure 2. **Intraoperative photograph showing a large leiomyoma arising from the left broad ligament, completely separate from the uterus and both adnexa before excision.**

Gross pathological examination demonstrated a well-circumscribed nodular mass measuring 120 × 80 × 60 mm and weighing 285 g. Histopathological analysis revealed a benign spindle-cell mesenchymal proliferation composed of smooth muscle cells without cytological atypia, coagulative tumor necrosis, or increased mitotic activity. Immunohistochemical examination showed diffuse positivity for desmin, smooth muscle actin (SMA), and h-caldesmon, with a Ki-67 proliferation index of less than 1%, confirming the diagnosis of a benign broad ligament leiomyoma.

Discussion

Broad ligament leiomyomas are uncommon benign smooth muscle tumors that account for less than 1% of all uterine leiomyomas [3]. Depending on their origin, they are classified as **true** broad ligament leiomyomas, arising from the smooth muscle fibers within the broad ligament, or **false** broad ligament leiomyomas, which develop from a subserosal uterine leiomyoma extending laterally into the broad ligament [3]. Their rarity, combined with their close anatomical relationship to the adnexa, often makes preoperative diagnosis challenging and may lead to confusion with ovarian neoplasms or other adnexal masses [9,6].

Clinical manifestations are highly variable and largely depend on tumor size, location, and the degree of compression exerted on adjacent pelvic organs. Although many lesions remain asymptomatic, patients may present with chronic pelvic pain, pelvic pressure, abdominal distension, urinary frequency, constipation, or, in rare cases, hydronephrosis secondary to ureteric compression [9,6,8]. Our patient presented with chronic pelvic pain despite the absence of urinary or gastrointestinal symptoms, illustrating the nonspecific clinical presentation of this rare entity.

Accurate preoperative diagnosis remains difficult despite advances in imaging techniques. Ultrasonography is the initial imaging modality for the evaluation of pelvic masses; however, determining the exact origin of a large solid pelvic mass may be challenging, particularly when degenerative changes are present [10,11]. MRI is considered the imaging modality of choice because of its superior soft-tissue contrast and its ability to define the anatomical relationship between the lesion and surrounding pelvic structures [11]. Nevertheless, as demonstrated in our case, MRI may still incorrectly identify a broad ligament leiomyoma as a benign ovarian tumor. Similar diagnostic pitfalls have been reported in several

recent case reports, emphasizing that definitive diagnosis frequently relies on intraoperative findings and subsequent histopathological examination [10].

Normal serum tumor markers, including CA-125, HE4, CA19-9, and the Risk of Ovarian Malignancy Algorithm (ROMA) score, further supported the benign nature of the lesion in our patient. However, these biomarkers are unable to determine the anatomical origin of a pelvic mass and should therefore be interpreted alongside clinical and radiological findings rather than used as standalone diagnostic tools [3].

To better contextualize our findings, we compared our case with recently published reports of broad ligament leiomyomas (Table 1). Similar to previous studies, our patient was initially diagnosed with an ovarian tumor despite comprehensive imaging evaluation [4,5,8–10]. These reports consistently demonstrate that broad ligament leiomyomas frequently mimic adnexal tumors, highlighting the persistent diagnostic challenges associated with this uncommon condition.

Surgical excision remains the treatment of choice for symptomatic broad ligament leiomyomas [2,7]. Careful preoperative planning and meticulous surgical dissection are essential because of the close proximity of the ureter, uterine vessels, and iliac vessels. Identification of the ureter before enucleation and dissection within the pseudocapsular plane are critical steps to minimize the risks of hemorrhage and ureteral injury. In our patient, conservative myomectomy was successfully performed with preservation of the uterus and both adnexa, resulting in minimal blood loss and an uneventful postoperative recovery.

Histopathological examination remains the gold standard for diagnosis. Typical microscopic findings include intersecting fascicles of benign spindle-shaped smooth muscle cells without significant cytological atypia, coagulative tumor necrosis, or increased mitotic activity [2]. Immunohistochemical positivity for smooth muscle actin (SMA), desmin, and h-caldesmon, together with a very low Ki-67 proliferation index, confirms smooth muscle differentiation and helps exclude malignant mesenchymal tumors or other spindle-cell neoplasms [9,11].

This case highlights that broad ligament leiomyoma should always be included in the differential diagnosis of a solid adnexal mass, even when MRI findings strongly suggest an ovarian neoplasm and serum tumor markers are within normal limits. Increased awareness of this rare entity may improve preoperative planning, facilitate appropriate surgical management, and reduce the risk of intraoperative complications.

Conclusion

Broad ligament leiomyoma is a rare extrauterine manifestation of uterine leiomyoma that may closely mimic an ovarian neoplasm because of its nonspecific clinical presentation and overlapping imaging features. As illustrated by our case, even magnetic resonance imaging and normal serum tumor markers may fail to establish the correct preoperative diagnosis. Consequently, broad ligament leiomyoma should be included in the differential diagnosis of any solid adnexal mass, particularly in women with reassuring biological findings.

Definitive diagnosis relies on surgical exploration and histopathological examination. Careful preoperative assessment, thorough knowledge of pelvic anatomy, and meticulous surgical technique are essential to minimize the risk of ureteral and vascular injury while preserving reproductive organs whenever feasible. Reporting additional cases will contribute to improving clinicians' awareness of this uncommon entity and may facilitate earlier recognition and optimal surgical management.

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