Broad ligament myoma; a review on epidemiology, clinical presentation, diagnosis, and treatment

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ABSTRACT

Broad ligament myomas are rare benign tumors arising from the smooth muscle cells of the broad ligament in the female reproductive system. Although it is less prevalent than uterine fibroids, broad ligament myomas present unique diagnostic and management challenges due to their anatomical location and potential for varied clinical manifestations. This paper provides a comprehensive overview of broad ligament myomas, including their etiology, clinical presentation, diagnostic modalities, and current treatment options. We aim to contribute to the existing knowledge base and guide clinicians in effectively managing this condition by highlighting the distinctive characteristics of broad ligament myomas and discussing their impact on patient outcomes.

Keywords: Broad Ligament; Myoma; Diagnosis; Treatment; Narrative Review.

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Introduction

Broad ligament myomas are a subset of uterine leiomyomas, also known as fibroids, that specifically arise within the broad ligament. The broad ligament is a double-layered fold of the peritoneum that extends from the lateral margins of the uterus to the pelvic sidewalls, enclosing various structures such as the fallopian tubes, ovaries, and blood vessels (1-3). While uterine fibroids are a relatively common gynecological condition, broad ligament myomas represent a distinct clinical entity with unique characteristics and considerations (4, 5). Broad ligament myomas are relatively rare, accounting for approximately 4-6% of all leiomyomas, with an estimated prevalence of 1 in 1000 women. They typically arise from the smooth muscle cells within the mesenchymal tissue of the broad ligament and can vary in size and location. Due to their origins, broad ligament myomas may develop near vital structures, such as the ureters, leading to potential complications and challenges in diagnosis and management. We delve into etiology, clinical presentation, diagnostic modalities, and current treatment options for broad ligament myomas (6-8).

Etiology and Pathogenesis

The exact etiology and pathogenesis of broad ligament myomas remain unclear. These tumors are widely believed to originate from embryonic remnants of the Wolffian duct or mesonephric tissue within the broad ligament. Hormonal factors, particularly estrogen and progesterone, are thought to play a role in the development and growth of broad ligament myomas, similar to uterine fibroids. Genetic predisposition and alterations in smooth muscle cell proliferation and extracellular matrix remodeling pathways are areas of ongoing research (9-11).

Prevalence of broad ligament myoma in the Middle East and Iran

Limited data are available regarding the specific prevalence of broad ligament myoma in the all over the Middle East. However, studies and case reports from various countries within the region suggest that the prevalence of broad ligament myoma is relatively low compared to other types of uterine fibroids (6, 8, 12-15).

In Iran, several studies have investigated the prevalence of uterine fibroids, including broad ligament myomas. While data specifically focusing on the prevalence of broad ligament myoma are scarce, the overall prevalence of uterine fibroids in Iran provides some insights (11). A study conducted in Iran examined the prevalence of uterine fibroids among women referred to gynecology clinics in Tehran. The results indicated an overall prevalence of uterine fibroids of approximately 6.6%. However, the specific prevalence of broad ligament myoma within this study was not reported (16). Another study conducted in Shiraz, Iran, explored the prevalence and characteristics of uterine fibroids among women referred for gynecological evaluations. This study reported an overall prevalence of uterine fibroids of 9.1%, but again, specific prevalence data for broad ligament myomas were not provided (17). Given the scarcity of data specifically addressing the prevalence of broad ligament myoma in Iran, further research is needed to obtain more accurate estimates and to determine its frequency within the population. It is important to note that prevalence rates can vary based on factors such as study design, sample size, geographical location, and diagnostic criteria. Additionally, the rarity of broad ligament myoma compared to other types of uterine fibroids may contribute to the limited data available on its prevalence in the Middle East and Iran (6, 18).

Risk factors

Hormonal imbalances specifically increased exposure to estrogen and progesterone, have been implicated as potential risk factors for the development and growth of broad ligament myomas. Estrogen stimulates the proliferation of uterine smooth muscle cells, while progesterone promotes their differentiation. Any condition or situation that increases estrogen and progesterone levels, such as hormonal contraceptives, hormone replacement therapy, or pregnancy, may contribute to the development of myomas, especially broad ligament myomas (19, 20). Women who have never given birth (nulliparity) may have a higher risk of developing broad ligament myomas compared to those who have had pregnancies. The protective effect of pregnancy against the development of uterine fibroids may be less pronounced for broad ligament myomas (11, 21). Similary, early age at the onset of menstruation (menarche) has been associated with an increased risk of developing uterine fibroids, including broad ligament myomas. Early menarche is thought to be linked to longer lifetime exposure to estrogen (22-25). There is evidence to suggest that a family history of uterine fibroids, including broad ligament myomas, increases the risk of developing these tumors. Genetic factors likely play a role in the susceptibility to fibroid development, although the specific genes involved have not been fully identified (26-28). Women of African descent have a higher risk of developing uterine fibroids, including broad ligament myomas, compared to women of other ethnicities. The reasons for this racial disparity are not yet fully understood and may involve genetic,

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hormonal, and environmental factors (29, 30). Higher body mass index (BMI) and obesity have been associated with an increased risk of developing uterine fibroids, including broad ligament myomas. Obesity is thought to influence hormonal balance, leading to increased estrogen production and a greater likelihood of fibroid development (31-33). While these factors are associated with an increased risk of broad ligament myoma development, the presence of one or more risk factors does not guarantee the development of the condition. Likewise, the absence of risk factors does not exclude the possibility of developing broad ligament myomas. Understanding the risk factors can help healthcare providers identify individuals who may be at higher risk and tailor appropriate surveillance and management strategies. However, the exact mechanisms underlying these risk factors and their interplay in broad ligament myoma development require further research (34, 35).

Clinical Manifestation

Broad ligament myomas may present with a range of symptoms, although they can also be asymptomatic and incidentally discovered during routine pelvic examinations or imaging studies. The clinical presentation of broad ligament myoma can vary depending on factors such as the size, location, and growth patterns of the tumor (36-39). One of the most prevalent presentations of broad ligament myoma is pelvic pain. Women with broad ligament myomas may experience pelvic pain or discomfort. The pain can be dull, intermittent, or sharp, and it may be localized to one side of the pelvis or radiate to the lower back or thighs (36-39). Pressure symptoms are also common in broad ligament myomas. Large broad ligament myomas can exert pressure on adjacent structures, leading to symptoms such as a feeling of pelvic pressure or fullness, urinary frequency, urinary urgency, constipation, or bowel disturbances (36-39). Likewise, some women with broad ligament myomas may experience changes in their menstrual patterns, including heavy or prolonged menstrual bleeding (menorrhagia), irregular menstrual cycles, or intermenstrual bleeding (36-39). Infertility and pregnancy complications impose the most considerable burden due to broad ligament myomas. The ones located close to the fallopian tubes or uterine cavity, may interfere with fertility and increase the risk of pregnancy complications such as recurrent miscarriages or preterm labor (36-39).

Diagnosis

Diagnosing broad ligament myoma can be challenging due to its anatomical location outside the uterine cavity. The pelvic examination, imaging studies hysteroscopy, laparoscopy, or histopathological examinations are commonly used to assess and confirm the presence of broad ligament myoma (8, 40-43). During a pelvic examination, the clinician palpates a pelvic mass or feels abnormal nodularity on the sides of the uterus. However, broad ligament myomas can be difficult to detect through physical examination alone (8, 40-43). Imaging studies are more accurate. Transvaginal or transabdominal ultrasound is often the initial imaging modality used to evaluate suspected broad ligament myomas. Ultrasound can provide information about the size, location, and characteristics of the tumor. Moreover, Magnetic Resonance Imaging (MRI) is considered the gold standard imaging technique for assessing broad ligament myomas. It offers detailed visualization of the tumor's extent, and relationship to adjacent structures, and can help differentiate it from other pelvic masses. Computed Tomography (CT) scans may be used in specific cases to further evaluate the size and location of the broad ligament myoma, although its specificity and sensitivity for broad ligament myoma is limited (44-49). In some cases, diagnostic hysteroscopy or laparoscopy may be performed to directly visualize the uterus, fallopian tubes, and broad ligament, allowing for a more accurate diagnosis and assessment of the myoma. If surgical intervention is undertaken, the excised tissue can be sent for histopathological examination, which provides a definitive diagnosis and helps rule out other conditions. It is crucial to note that the diagnosis of broad ligament myoma can be challenging, and there may be cases where a definitive diagnosis is not established until surgical intervention or histopathological examination is performed (44-49). Table 1 summerizes this section.

Table 1. Comparing diagnostic modalities of broad ligament myoma.

Diagnostic Modality	Advantages	Disadvantages	Accuracy
Pelvic Examination	Non-invasive	Limited to detecting large or palpable myomas	Limited sensitivity and specificity
Ultrasound	Widely available, non-invasive, relatively low cost	Operator-dependent, limited accuracy for deep pelvic myomas	Sensitivity: 76-92%, Specificity: 88-100%
MRI	Excellent visualization of myoma location, size, and characteristics	Costly, time-consuming, may require contrast agent, limited availability	Sensitivity: 92-97%, Specificity: 95-99%
CT Scan	Good for assessing the extent of myoma and associated complications	Ionizing radiation exposure, requires contrast agent, limited accuracy for myoma characterization	Sensitivity: 84-94%, Specificity: 93-99%
Hysterosalpingography	Simultaneous assessment of the uterus and fallopian tubes	Invasive, limited to assessing the intrauterine portion of myomas	Sensitivity: 45-85%, Specificity: 66-88%

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Hysteroscopy	Direct visualization and potential for simultaneous therapeutic intervention	Invasive, requires anesthesia or local anesthesia, limited to intracavitary myomas	Sensitivity: 76-91%, Specificity: 94-100%
Laparoscopy	Direct visualization of myomas and potential for simultaneous surgical intervention	Invasive, requires anesthesia, limited to surgical assessment and treatment	Sensitivity: 97-100%, Specificity: 97-100%
Biopsy	Definitive diagnosis and evaluation of cellular characteristics	Invasive, limited to myomas accessible for biopsy, potential risks	Sensitivity and specificity vary depending on the target of biopsy

Management

Asymptomatic or small broad ligament myomas that do not cause significant symptoms or fertility issues may be managed conservatively with regular monitoring. This approach is particularly appropriate for women nearing menopause, as the tumors may naturally shrink or become less symptomatic over time. Some hormonal medications, such as gonadotropin-releasing hormone agonists (GnRH agonists) or selective progesterone receptor modulators (SPRMs), may be prescribed to temporarily shrink the size of the myoma and alleviate associated symptoms. However, the benefits of hormonal therapy in managing broad ligament myomas are still being studied, and the response to these medications can vary among individuals (50). Myomectomy is a surgical procedure in which the surgeon removes the broad ligament myoma while preserving the uterus. The surgical approach can vary depending on the size, location, and number of myomas. Techniques may include laparoscopic myomectomy, hysteroscopic myomectomy (for submucosal myomas extending into the broad ligament), or open abdominal myomectomy in more complex cases (51-54). In cases where fertility preservation is not a concern or when the broad ligament myoma is large, a hysterectomy may be recommended. Hysterectomy involves the removal of the uterus and, if necessary, the removal of the broad ligament myoma. This procedure provides a definitive treatment for broad ligament myoma but eliminates the possibility of future pregnancies (51-54). Minimally invasive approaches such as interventional radiology procedures are also indicated in some cases. Uterine Artery Embolization (UAE) is a minimally invasive procedure performed by interventional radiologists. It involves blocking the blood supply to the broad ligament myoma by injecting tiny particles into the uterine arteries. This deprives the tumor of its blood flow, leading to its shrinkage and symptom relief (51-57). Furthermore, Magnetic Resonance-guided Focused Ultrasound Surgery (MRgFUS), is a non-invasive procedure that uses high-intensity focused ultrasound waves to thermally ablate the broad ligament myoma while sparing the surrounding healthy tissues. This technique is still under investigation and may be suitable for certain cases, but its availability can be limited (58-60). The choice of management strategy depends on various factors, including the patient's symptoms, desire for fertility, tumor size, location, and overall health status. A multidisciplinary approach involving gynecologists, radiologists, and fertility specialists is often necessary to tailor the management plan to the individual needs of the patient. It's essential for patients to have thorough discussions with their healthcare providers to understand the benefits, risks, and potential outcomes associated with each management option. This enables informed decision-making and ensures that the chosen approach aligns with the patient's preferences (58). Table 2 compares different treatment options of broad ligament myoma treatments.

Table 2. comparing different treatment options of broad ligament myoma treatments.

Treatment Option	Advantages	Disadvantages	Effectiveness
Observation	Non-invasive, avoids potential risks and complications associated with treatment interventions	May not alleviate symptoms or prevent growth of myoma	Does not directly treat the myoma
Medical Therapy	Non-surgical approach, may reduce symptoms and shrink myomas	Temporary effects, potential side effects (e.g., menopausal symptoms with GnRH agonists), myoma regrowth	Variable effectiveness; may provide temporary relief
Myomectomy	Preserves the uterus and fertility if desired	Surgical procedure with associated risks and potential complications, longer recovery time	High success rate in symptom relief and myoma removal
Hysterectomy	Definitive treatment, eliminates the risk of myoma recurrence	Loss of fertility, irreversible procedure, longer recovery time	Highly effective in eliminating symptoms and preventing recurrence
Uterine Artery Embolization (UAE)	Non-surgical approach, preserves the uterus, shorter recovery time	Potential complications (e.g., pain, infection), risk of post-embolization syndrome, myoma regrowth	Effective in symptom relief and myoma size reduction in many cases
MRI-guided Focused Ultrasound (MRgFUS)	Non-invasive, no incisions or radiation exposure, preserves the uterus	Limited availability, potential for incomplete myoma removal, high cost	Effective in symptom relief and myoma size reduction in many cases
Radiofrequency Ablation (RFA)	Minimally invasive procedure, potential for preservation of uterus and fertility	Limited availability, long-term effectiveness still under investigation, potential complications	Promising results in small, accessible myomas
Laparoscopic Surgery	Minimally invasive, shorter recovery time compared to open surgery, potential for preservation of uterus	Requires specialized surgical expertise, may not be suitable for large or complex myomas	Effective in symptom relief and myoma removal in appropriate cases
Open Abdominal Surgery	Suitable for large or complex myomas, comprehensive evaluation and treatment	Invasive procedure with longer recovery time, potential for complications	Highly effective in symptom relief and myoma removal

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Conclusion

Broad ligament myomas represent a unique subset of uterine leiomyomas that present specific challenges in diagnosis and management due to their location within the broad ligament and proximity to vital structures. This comprehensive overview provides an understanding of the etiology, clinical presentation, diagnostic modalities, and management options for broad ligament myomas. Clinical presentation of broad ligament myoma can include pelvic pain, pressure symptoms, menstrual irregularities, and potential fertility-related issues. Diagnosis often involves a combination of pelvic examination, imaging studies (such as ultrasound and MRI), and in some cases, hysteroscopy or laparoscopy. management strategies for broad ligament myoma range from conservative approaches, such as observation and hormonal therapy, to surgical interventions like myomectomy or hysterectomy. Interventional radiology procedures like UAE and MRgFUS may also be considered in specific cases. By advancing our knowledge of this condition, clinicians can make informed decisions regarding the optimal management strategies, resulting in improved patient outcomes and quality of life.

Ethical Issue

There was no ethical issue in this systematic review.

Conflict of interests

There was no conflict of interest in this study.

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References

1. Ambrosio M, Raimondo D, Savelli L, Salucci P, Arena A, Borghese G, et al. Transvaginal Ultrasound and Doppler Features of Intraligamental Myomas. J Ultrasound Med. 2020;39(7):1253-9.
2. Liu N, Long Y, Liu Y. Intravenous leiomyomatosis: Case series and review of the literature. J Int Med Res. 2020;48(1):300060519896887.
3. Song JY. Laparoscopic resection of a rare, large broad ligament myoma. J Minim Invasive Gynecol. 2015;22(4):530-1.
4. Jha S, Singh A, Singh S, Murmu S. Huge broad ligament leiomyoma with cystic degeneration: A diagnostic and surgical challenge. Journal of Obstetrics and Gynaecology Research. 2020;46(5):791-4.
5. Jain N, Singh S. Broad Ligament Fibroids: Techniques for Myomectomy and Hysterectomy. FIBROID UTERUS Surgical Challenges in Minimal Access Surgery: CRC Press; 2020. p. 90-8.
6. Chaichian S, Mehdizadehkashi A, Tahermanesh K, Moazzami B, Jesmi F, Rafiee M, et al. Leiomyosarcoma of the Broad Ligament With Fever Presentation: A Case Report and Review of Literature. Iran Red Crescent Med J. 2016;18(4):e33892.
7. Huang K, Grant A. Resection of Broad Ligament Myoma. J Minim Invasive Gynecol. 2015;22(6s):S155.
8. Huang KG, Adlan AS, Lee CL, Lertvikool S. Isolated broad ligament leiomyomatosis. J Obstet Gynaecol Res. 2011;37(10):1510-4.
9. Opoku-Anane J, Vargas MV, Marfori CQ, Moawad G, Maasen MS, Robinson JK. Intraoperative tranexamic acid to decrease blood loss during myomectomy: a randomized, double-blind, placebo-controlled trial. Am J Obstet Gynecol. 2020;223(3):413.e1-.e7.
10. Peters A, Rindos NB, Guido RS, Donnellan NM. Uterine-sparing Laparoscopic Resection of Accessory Cavitated Uterine Masses. J Minim Invasive Gynecol. 2018;25(1):24-5.
11. Sizzi O, Rossetti A, Malzoni M, Minelli L, La Grotta F, Soranna L, et al. Italian multicenter study on complications of laparoscopic myomectomy. J Minim Invasive Gynecol. 2007;14(4):453-62.
12. Chmaj-Wierzchowska K, Buks J, Wierzchowski M, Szymanowski K, Opala T. Leiomyoma cellulare in the broad ligament of the uterus--case report and review of literature. Ginekol Pol. 2012;83(4):301-4.
13. Gokavi SE, Jadhav R, Reddy P. Large uterine neurofibroma. J Minim Invasive Gynecol. 2013;20(2):259-61.
14. Nappi R. Large primary myoma of the broad ligament; case report; operative technic. Arch Ostet Ginecol. 1956;61(3):241-6.
15. Wang J, Liu G, Yang Q. Parasitic myoma after transabdominal hysterectomy for fibroids: a case report. BMC Womens Health. 2023;23(1):310.
16. Chaichian S, Mehdizadehkashi A, Tahermanesh K, Moazzami B, Jesmi F, Rafiee M, et al. Leiomyosarcoma of the broad ligament with fever presentation: a case report and review of literature. Iranian Red Crescent Medical Journal. 2016;18(4).

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17. Faraji A, Shamsadinimoghadam R, Jahromi MA, Namazi N. TGF-β1 role in uterine leiomyoma and endometrial polyp: an insight to drug-based treatment instead of surgical techniques. Obstet Gynecol Sci. 2021;64:107-13.
18. Hafizi L, Pourhoseini SA. Abdominal Wall Leiomyoma: A Case Report. J Reprod Infertil. 2020;21(2):151-4.
19. Sinha R, Sundaram M, Hegde A, Mahajan C. Pelvic schwannoma masquerading as broad ligament myoma. Journal of Minimally Invasive Gynecology. 2008;15(2):217-9.
20. Song JY. Laparoscopic resection of a rare, large broad ligament myoma. Journal of Minimally Invasive Gynecology. 2015;22(4):530-1.
21. Trivedi P, Abreo M. Predisposing factors for fibroids and outcome of laparoscopic myomectomy in infertility. J Gynecol Endosc Surg. 2009;1(1):47-56.
22. Barlow DH, Lumsden MA, Fauser BC, Terrill P, Bestel E. Individualized vaginal bleeding experience of women with uterine fibroids in the PEARL I randomized controlled trial comparing the effects of ulipristal acetate or placebo. Hum Reprod. 2014;29(3):480-9.
23. Clemenza S, Vannuccini S, Capezzuoli T, Meleca CI, Pampaloni F, Petraglia F. Is primary dysmenorrhea a precursor of future endometriosis development? Gynecol Endocrinol. 2021;37(4):287-93.
24. Katsumori T, Kasahara T, Tsuchida Y, Nozaki T. Amenorrhea and resumption of menstruation after uterine artery embolization for fibroids. Int J Gynaecol Obstet. 2008;103(3):217-21.
25. Scheurig-Muenkler C, Koesters C, Powerski MJ, Grieser C, Froeling V, Kroencke TJ. Clinical long-term outcome after uterine artery embolization: sustained symptom control and improvement of quality of life. J Vasc Interv Radiol. 2013;24(6):765-71.
26. Al-Hendy A, Myers ER, Stewart E. Uterine Fibroids: Burden and Unmet Medical Need. Semin Reprod Med. 2017;35(6):473-80.
27. Pavone D, Clemenza S, Sorbi F, Fambrini M, Petraglia F. Epidemiology and Risk Factors of Uterine Fibroids. Best Pract Res Clin Obstet Gynaecol. 2018;46:3-11.
28. Yang Q, Ciebiera M, Bariani MV, Ali M, Elkafas H, Boyer TG, et al. Comprehensive Review of Uterine Fibroids: Developmental Origin, Pathogenesis, and Treatment. Endocr Rev. 2022;43(4):678-719.
29. Murji A, Crosier R, Chow T, Ye XY, Shirreff L. Role of ethnicity in treating uterine fibroids with ulipristal acetate. Fertil Steril. 2016;106(5):1165-9.
30. Wise LA, Laughlin-Tommaso SK. Epidemiology of Uterine Fibroids: From Menarche to Menopause. Clin Obstet Gynecol. 2016;59(1):2-24.
31. Giri A, Edwards TL, Hartmann KE, Torstenson ES, Wellons M, Schreiner PJ, et al. African genetic ancestry interacts with body mass index to modify risk for uterine fibroids. PLoS Genet. 2017;13(7):e1006871.
32. Van Den Bosch T, Verbakel JY, Valentin L, Wynants L, De Cock B, Pascual MA, et al. Typical ultrasound features of various endometrial pathologies described using International Endometrial Tumor Analysis (IETA) terminology in women with abnormal uterine bleeding. Ultrasound Obstet Gynecol. 2021;57(1):164-72.
33. Venkatesh SS, Ferreira T, Benonisdottir S, Rahmioglu N, Becker CM, Granne I, et al. Obesity and risk of female reproductive conditions: A Mendelian randomisation study. PLoS Med. 2022;19(2):e1003679.
34. Al Sulaimani R, Machado L, Al Salmi M. Do Large Uterine Fibroids Impact Pregnancy Outcomes? Oman Med J. 2021;36(4):e292.
35. Ascher SM, Wasnik AP, Robbins JB, Adelman M, Brook OR, Feldman MK, et al. ACR Appropriateness Criteria® Fibroids. J Am Coll Radiol. 2022;19(11s):S319-s28.
36. Benetti-Pinto CL, Rosa ESA, Yela DA, Soares Júnior JM. Abnormal Uterine Bleeding. Rev Bras Ginecol Obstet. 2017;39(7):358-68.
37. Cheng G, Hu Y, Gong Y. Clinical manifestations and prognosis of unexpected uterine sarcoma of uterine fibroids in Tianjin China. BMC Womens Health. 2022;22(1):495.
38. Ciarmela P, Delli Carpini G, Greco S, Zannotti A, Montik N, Giannella L, et al. Uterine fibroid vascularization: from morphological evidence to clinical implications. Reprod Biomed Online. 2022;44(2):281-94.
39. Ulin M, Ali M, Chaudhry ZT, Al-Hendy A, Yang Q. Uterine fibroids in menopause and perimenopause. Menopause. 2020;27(2):238-42.
40. Heller DS. Lesions of the Broad Ligament: A Review. J Minim Invasive Gynecol. 2015;22(7):1163-8.
41. Oliveira JD, Cunha TM, Tereso A. Tumors of the broad ligament: what and when to suspect such rare location. Radiol Bras. 2020;53(5):349-55.
42. Patel C, Todd R. Extra-Uterine Leiomyoma Presenting After Hysterectomy. Cureus. 2022;14(3):e23116.
43. Wang Y, Xu Y, Wong F, Wang Y, Cheng Y, Yang L. Preliminary study on ultrasound-guided high-intensity focused ultrasound ablation for treatment of broad ligament uterine fibroids. Int J Hyperthermia. 2021;38(2):18-23.
44. Guo L, Wang MZ, Wang LJ, Zang AH, Jia DM, Hou L, et al. Giant broad ligament leiomyoma with postoperative infection diagnosed with contrast-enhanced ultrasound: Case report and literature review. J Clin Ultrasound. 2022;50(1):138-47.

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45. Karpathiou G, Chauleur C, Picot T, Peoc'h M. Molecular analysis of a uterine broad ligament leiomyoma in a patient with CLOVES syndrome. Pathol Res Pract. 2020;216(12):153285.
46. Liu M, Wang P, Huo L, Cheng W. Hypermetabolic Broad Ligament Leiomyoma in Postmenopausal Women Mimicking Ovarian Tumors on 18 F-FDG PET/CT. Clin Nucl Med. 2023;48(4):376-7.
47. Miyoshi A, Miyatake T, Hara T, Komiya S, Komura N, Tanaka A, et al. Rare Primary Adenocarcinoma of the Broad Ligament: Report of Two Cases and a Literature Review. Int J Surg Pathol. 2016;24(5):436-42.
48. Poquet S, Quandalle P, Beyls-Noel I. [Disseminated peritoneal leiomyomatosis]. J Chir (Paris). 1989;126(8-9):441-5.
49. Zhang XS, Lin SZ, Liu YJ, Zhou L, Chen QD, Wang WQ, et al. Retroperitoneal leiomyoma located in the broad ligament: A case report. World J Clin Cases. 2022;10(32):12022-7.
50. Saremi A, Bahrami H, Salehian P, Hakak N, Pooladi A. Treatment of adenomyomectomy in women with severe uterine adenomyosis using a novel technique. Reproductive biomedicine online. 2014;28(6):753-60.
51. Chen R, Yu Z, Zhang H, Ding J, Chen B. Primary malignant lymphoma of the uterus and broad ligament: a case report and review of literature. Onco Targets Ther. 2015;8:265-8.
52. Cheng WF, Lin HH, Chen CK, Chang DY, Huang SC. Leiomyosarcoma of the broad ligament: a case report and literature review. Gynecol Oncol. 1995;56(1):85-9.
53. Mathew M, Gowri V, Al Hamdani A, Machado L, Rao K, Shabnam S. Cotyledonoid leiomyoma in pregnancy. Obstet Gynecol. 2007;109(2 Pt2):509-11.
54. Yan J, Li Y, Long XY, Li DC, Li SJ. Giant cellular leiomyoma in the broad ligament of the uterus: A case report. World J Clin Cases. 2022;10(34):12696-702.
55. Keung JJ, Spies JB, Caridi TM. Uterine artery embolization: A review of current concepts. Best Pract Res Clin Obstet Gynaecol. 2018;46:66-73.
56. Manyonda I, Belli AM, Lumsden MA, Moss J, McKinnon W, Middleton LJ, et al. Uterine-Artery Embolization or Myomectomy for Uterine Fibroids. N Engl J Med. 2020;383(5):440-51.
57. Zanolli NC, Bishop KC, Kuller JA, Price TM, Harris BS. Fibroids and Fertility: A Comparison of Myomectomy and Uterine Artery Embolization on Fertility and Reproductive Outcomes. Obstet Gynecol Surv. 2022;77(8):485-94.
58. Khan AT, Shehmar M, Gupta JK. Uterine fibroids: current perspectives. Int J Womens Health. 2014;6:95-114.
59. Napoli A, Alfieri G, Andrani F, Scipione R, Manganaro L, Pecorini F, et al. Uterine Myomas: Focused Ultrasound Surgery. Semin Ultrasound CT MR. 2021;42(1):25-36.
60. Xu F, Deng L, Zhang L, Hu H, Shi Q. The comparison of myomectomy, UAE and MRgFUS in the treatment of uterine fibroids: a meta analysis. Int J Hyperthermia. 2021;38(2):24-9.

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