International Journal of Reproduction, Contraception, Obstetrics and Gynecology
*Gheewala NM et al. Int J Reprod Contracept Obstet Gynecol. 2024 Nov;13(11):3307-3310*
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20243195

**Case Series**

# Illuminating the obvious - radiological signs for differentiating exophytic subserosal leiomyomas from juxtauterine pelvic masses: a case series

**Naval Mayur Gheewala[1], Amit Shrivastava[1]*, Gunjan Jindal[1], Preeti Garg[2], Smriti Deswal[1]**

[1]Department of Radiology, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Haryana, India
[2]Department of Oral Medicine and Radiology, Maharishi Markandeshwar Institute of Dental Sciences and Research, Mullana, Haryana, India

**Received:** 05 September 2024
**Accepted:** 08 October 2024

***Correspondence:**
Dr. Amit Shrivastava,
E-mail: dr.amitsrivastava@gmail.com



## ABSTRACT

The most frequent uterine neoplasms are leiomyomas, which are tumours of the smooth muscles of uterus. Although leiomyomas are usually asymptomatic, they can manifest with symptoms such as pain, dysmenorrhea or infertility. They are classified on the basis of their anatomic location and morphology. Although exophytic fibroids are generally easy to identify, certain cases can mimic other adnexal disorders, making accurate diagnosis more challenging and necessitating careful differentiation. In this article, we will review and discuss various MRI signs that help distinguish exophytic subserosal fibroids from other juxtauterine pathologies. Understanding these signs is crucial for achieving an accurate diagnosis and guiding the selection options.

**Keywords:** Uterine leiomyomas, Exophytic subserosal leiomyomas, Juxtauterine pelvic masses, Bridging vessel sign and claw sign

## INTRODUCTION

Uterine leiomyomas are the commonest uterine neoplasms, while benign they cause a great deal of morbidity and are the most common reason for surgical intervention. Leiomyomas are classified as submucosal, intramural, or subserosal; the latter can develop pedunculation and mimic ovarian tumors. Distinguishing the large subserosal myoma from other juxtrauterine masses is challenging. Juxtauterine masses include exophytic subserosal myomas, adnexal masses, bowel masses, and other pelvic lesions. Differentiation of these masses on the basis of imaging findings depends on the imaging characteristics of the mass, such as its composition and architecture, and the relation of the uterine serosa to the mass.[1] Solid ovarian masses, such as fibromas, granulosa cell tumors, germ cell tumors , metastatic tumors, and lymphomas, may be mistaken with subserous myomas owing to their comparable imaging findings.[2] Ultrasound is the primary modality of choice to assess the presence of fibroids in symptomatic patients.[3] However, the most precise imaging method for detecting, localizing and characterizing leiomyomas is magnetic resonance (MR) imaging, which can also be used as problem solving tool to distinguish subserosal fibroids from its mimics. In this article we are discussing valuable MRI signs such as claw sign, peduncle and bridging vessel sign that can assist to distinguish an exophytic uterine leiomyoma from other masses that arise in the adnexal region. The presence or absence of normal visible ovaries are also one of the useful indicators in determine the origin of a pelvic mass.[4]

Understanding these radiological signs for differentiating exophytic subserosal leiomyomas from other juxtauterine masses are crucial for early diagnosis and strategic treatment planning. This article illustrates the salient features of these signs on MRI with case example and enable the clinician provide their diagnosis with greater certainty.

## CASE SERIES

### *Case 1*

A 36-year-old female patient came for ultrasound with chief complaint of abnormal uterine bleeding for past 3 years. Transabdominal ultrasound (TAS) reveals large heterogeneously hypoechoic abdomino-pelvic mass with suboptimal visualization of uterus and non-visualization of both ovaries. Origin of the mass couldn't be determined on ultrasound with certanity. Patient denied for transvaginal ultrasound (TVS) examination. Decision was made to do further investigation with MRI.

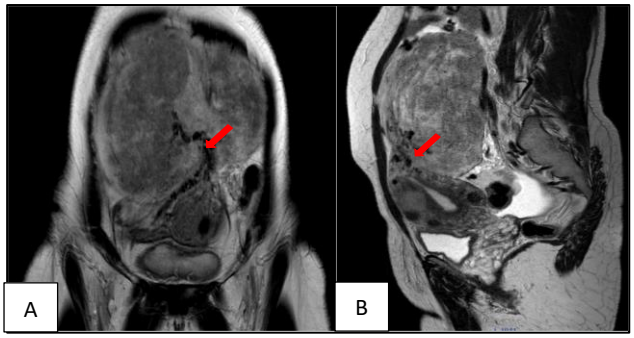


**Figure 1 (A and B): T2W coronal and sagittal images shows a large heterogeneously hypointense abdomino-pelvic mass depicting bridging vessel sign (arrow).**

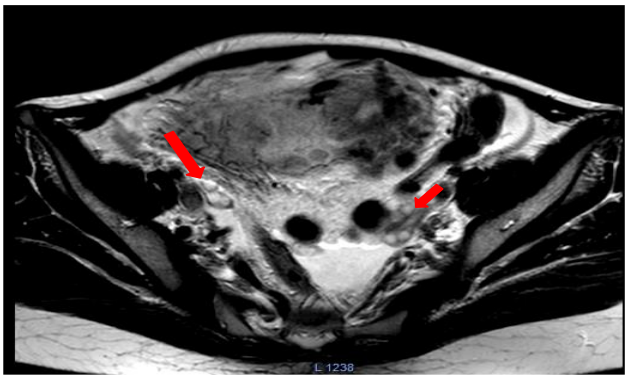

**Figure 2: T2w axial section image demonstrates bilateral ovaries (arrow) distinct from the mass.**

MRI reveals a large heterogeneous predominant hypointense mass lesion on T1/T2W images (Figure 1 and 2) in abdomino-pelvic region, extending from fundus of the uterus to the supraumblical region, epicentered in right adnexa. The lesion shows heterogenous post contrast enhancement. The bridging vessels are observed supplying the lesion and traversing the myometrium as flow void signals. These vessels extend from the uterus to the adjacent exophytic pelvic mass, confirming that confirming the uterine origin of the lesion (Arrow). Furthermore, both ovaries are visualized separately excluding the possibility of ovarian origin of mass.***Case 2***

A 26-year-old female patient is being assessed for secondary infertility, accompanied by symptoms of pelvic pain, a feeling of heaviness in the pelvic region, and irregular menstrual cycles. TAS was done and shows a large heterogeneously hypoechoic mass in the pelvis predominately in the right adnexal region with uterus appear pushed on left side and right ovary was not visualized separately. MRI was performed for further characterization and shows a well-defined heterogeneously T1/T2W hypointense mass in right adnexa along right lateral wall of uterus and attached to the uterine serosa via peduncle (arrow), determining the uterine origin of the lesion (Figure 3 and 4). The lesion was diagnosed as FIGO category 7 fibroid.

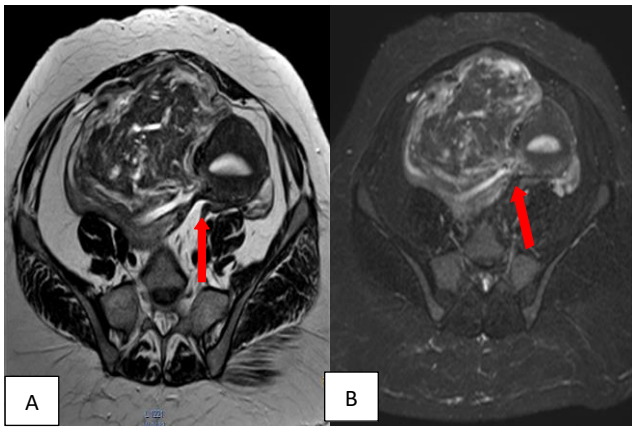


**Figure 3 (A and B): T2W and T1W STIR axial sections shows a large mass in right adnexa along the right lateral wall of uterus by peduncle (red arrow).**

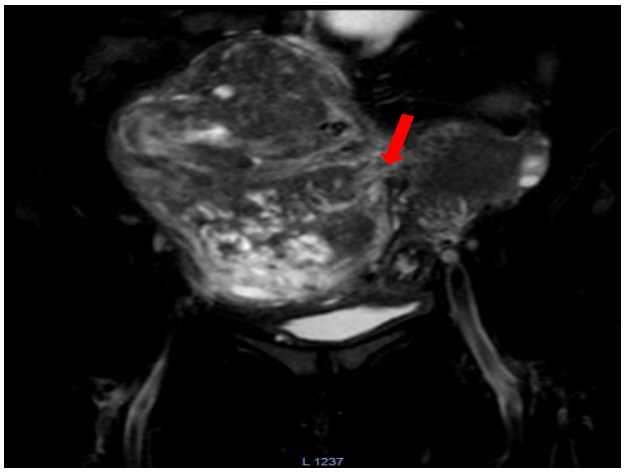

**Figure 4: T1W (short TI inversion recovery) STIR coronal post contrast images shows right adnexal lesion attached to the uterus via small peduncle.**

***Case 3***

A 45-year-old female presented for an ultrasound due to heavy menstrual bleeding and pelvic pain persisting for the past 8 months. On USG, a large hypoechoic lesion was noted in the posterior myometrium abutting the endometrial cavity suggestive of fibroid. MRI was performed for the FIGO staging and strategy for the treatment. MRI demonstrates a well-defined T1/T2 hypointense lesion in posterior myometrium, limited by serosa of uterus, confirming as organ embedded lesion, arising from uterus and myometrium is surrounding the lesion like a claw (Arrow). The lesion shows heterogenous post contrast enhancement and it is classified as FIGO category 3 fibroid (Figure 5 and 6).

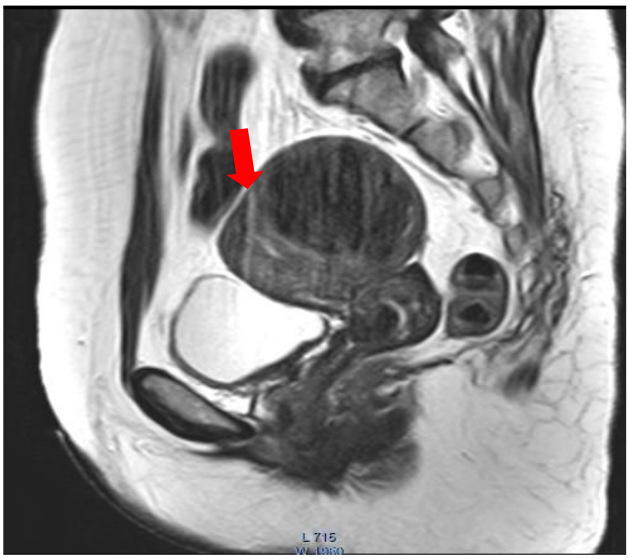

**Figure 5: T2W sagittal image showing intramural fibroid with endometrial contact and claw sign of surrounding myometrium (arrow).**

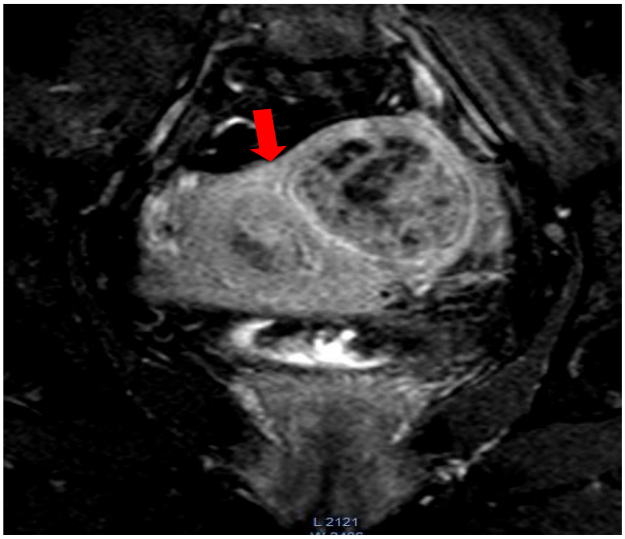

**Figure 6: T1 spectral presaturation with inversion recovery coronal image showing heterogeneously enhancing lesion in posterior myometrium (arrow).**

## DISCUSSION

Leiomyomas are the most prevalent uterine neoplasm; Although they are usually asymptomatic, but sometimes they can manifest with symptoms such as pain, abnormal uterine bleeding, abdominal distension and even infertility.[5] Ultrasound is the first line of diagnostic modality in most of the cases, and can be easily diagnosed with confidence in most of the cases. MRI is however superior to ultrasound for selected complex cases to conform the USG findings and planning the treatment strategy as problem solving tool. Uterine fibroids have a characteristic appearance on MRI; they are well circumscribed and typically demonstrate homogeneously low signal intensity on T1 and T2-weighted imaging compared to the myometrium.[6] Enhancement is variable characteristic that should be taken into account particularly when planning uterine fibroid embolization (UFE).[7] Fibroids may undergo hyaline, cystic, fatty, myxoid or hemorrhagic degeneration. The sensitivity of MRI examination in uterine fibroid ranges from 88% to 93%, with a specificity of 66% to 91%.

The FIGO classification system is utilized for categorizing uterine fibroids and subdivides fibroids into submucosal, intramural, subserosal, and hybrid types. Classifying uterine fibroids is crucial as it allows treating physician to decide the appropriate treatment plan for the patient, be it hysteroscopy, laparoscopy/laparotomy, or uterine artery embolization.[8] An exophytic subserosal fibroid is classified as a FIGO category 7 fibroid, characterized by being pedunculated with no intramural component and possessing a vascular stalk. Patients with these fibroids are usually asymptomatic until the fibroids grow large enough to exert pressure on adjacent structures. Due to their vascular stalk, type 7 fibroids are also at risk of torsion or detaching or migrating in the pelvis.[9] Pedunculated subserosal fibroids, project exophytically into the abdomen or pelvis may be confused with ovarian tumors, demonstrating the vascular pedicle on MRI or USG is an important clue to come to the diagnosis. A pelvic mass that is attached to the round ligament of the uterus has a high probability to be a uterine leiomyoma rather than an adnexal mass. It is sometimes difficult to differentiate these large subserosal myomas from other pelvic masses which arise from the ovaries, bowel, and other pelvic organs. One of the most important signs to differentiate is bridging vessel sign. The feeding vessels, which are branches of uterine artery, are located at the interface between the uterus and subserous myoma. Intervening vessels are defined as those which run parallel to the interface, crossing vessels are those which cross the interface, and mixed vessels have both intervening and crossing appearances. Subserosal myomas, larger than 3 cm, shows characteristic appearances of the above mentioned three types of vessels. The bridging vessels appears as enhancing tubular structures on contrast T1 imaging or as flow voids on T2 fast spin-echo sequence. In comparison, Doppler US shows the vessel as a signal flowing from the uterus to the pelvic mass.[10] According to

Lee et al in their study of 32 leiomyomas, thirty demonstrate the bridging vessel sign. The sensitivity, specificity, accuracy, positive predictive value, and negative predictive value of bridging vessel sign in the diagnosis of subserosal leiomyoma were 93.8%, 99.9%, 91.5%, and 92.3%, respectively. Thus, bridging vessel sign plays a significant role in differentiation of uterine subserosal myomas from other juxtauterine pelvic masses. The "claw sign" of surrounding myometrium is another important sign on cross-sectional imaging of the pelvis, as normal surrounding parenchyma extends some way around the mass. It is useful in determining that a mass arises from a solid structure rather than is located adjacent to it and distorts the outline. On postcontrast MR images, a claw sign with the adjacent uterine tissue should be carefully examined.

The presence or absence of normal visible ovaries is also one of the useful clues in assessing the origin of a pelvic mass, but normal ovaries may not be demonstrable in postmenopausal women.

## CONCLUSION

Uterine fibroids are frequently detected through imaging techniques such as ultrasound, MRI, or CT scans. These imaging methods are essential for visualizing the size, location, and number of fibroids, aiding in diagnosis and guiding treatment planning. In some complex cases, differentiating uterine fibroids from other juxtauterine masses can be challenging but is crucial; recognizing these radiological signs is imperative for the clinician to make a definitive diagnosis.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

## REFERENCES

1. Olson MC, Posniak HV, Tempany CM, Dudiak CM. MR imaging of the female pelvic region. RadioGraphics. 1992;12:445-65.
2. Outwater EK, Wagner BJ, Mannion C, McLarney JK, Kim B. Sex cord stromal and steroid cell tumors of the ovary. RadioGraphics. 1998;18(6):1523-46.
3. McLucas B. Diagnosis, imaging and anatomical classification of uterine fibroids. Best Pract Res Clin Obstet Gynaecol. 2008;22(4):627-42.
4. Kim SH, Sim JS, Seong CK. Interface vessels on color/power Doppler US and MRI: a clue to differentiate subserosal uterine myomas from extrauterine tumors. J Comput Assist Tomogr. 2001;25:36-42.
5. Ross RK, Pike MC, Vessey MP, Bull D, Yeates D, Casagrande JT. Risk factors for uterine fibroids: reduced risk associated with oral contraceptives. Br Med J (Clin Res Ed). 1986;293(6543):359-62.
6. Murase E, Siegelman ES, Outwater EK, Perez-Jaffe LA, Tureck RW. Uterine leiomyomas: histopathologic features, MR imaging findings, differential diagnosis, and treatment. Radiographics. 1999;19(5):1179-97.
7. Pelage JP, Cazejust J, Pluot E, Olivier LD, Alexandre L, James BS, et al. Uterine fibroid vascularization and clinical relevance to uterine fibroid embolization. Radiographics. 2005;25(1):S99-117.
8. Shrivastava A, Jindal G, Kalpdev A, Sethi S, Rastogi E, Aggarwal C, et al. Role of MRI and FIGO Staging in Evaluation of Fibroids - A Pictorial Review. Maedica (Bucur). 2023;18(1):121-6.
9. Ueda H, Togashi K, Konishi I, Kataoka ML, Koyama T, Fujiwara T, et al. Unusual appearances of uterine leiomyomas: MR imaging findings and their histopathologic backgrounds. Radiographics. 1999;19:S131-45.
10. Babacan A, Kizilaslan C, Gun I, Muhcu M, Mungen E, Atay V. CA 125 and other tumor markers in uterine leiomyomas and their association with lesion characteristics. Int J Clin Experiment Med. 2014;7(4):1078-83.

**Cite this article as:** Gheewala NM, Shrivastava A, Jindal G, Garg P, Deswal S. Illuminating the obvious - radiological signs for differentiating exophytic subserosal leiomyomas from juxtauterine pelvic masses: a case series. Int J Reprod Contracept Obstet Gynecol 2024;13:3307-10.