

Imaging Findings and Differential Diagnosis of Prolapsed Pedunculated Sub Mucosal Fibroids: Experience at a Tertiary Care Hospital

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Abstract

Objectives: The purpose of this study is to describe the imaging findings and differential diagnosis of prolapsed pedunculated sub mucosal fibroids with the aim to clarify the preoperative diagnostic accuracy of this entity.

Design: Cross sectional, descriptive study

Place and Duration of Study: Conducted in the Radiology department of Aga Khan University hospital from January 2016 to July 2018

Methodology: The institutional ethics review committee granted exemption for the study. Patients who had undergone surgery for prolapsed submucosal fibroids with preoperative imaging and histopathology of surgical specimen done at AKUH were included. Patients with no imaging, histopathology or follow up were excluded.

Results: A total of five patients with proven prolapsed sub mucosal fibroids were included with age ranging from 25 to 39 years. Two of the five patients were married and presented in the postpartum period. On ultrasound, the fibroid was hypoechoic in 4 cases and appeared hyperechoic in one. On MRI, the stalk of the prolapsed fibroid was delineated. The prolapsed fibroids were predominantly isointense on T1WI. On T2WI, these were hyper intense except in one case which was hypo intense with multiple flow voids. Moderate to intense post contrast enhancement was observed in all cases except in case 1 and case 5 which showed non enhancing areas due to necrosis and infarction.

Conclusion: The imaging appearance and differentials of the prolapsed sub mucosal fibroids as described in the present study aim to guide correct preoperative diagnosis of this entity with resultant appropriate treatment options for the patient.

Keywords: Prolapsed Fibroid; Magnetic Resonance Imaging (MRI); Ultrasound (US)

Introduction

The commonest tumors of the uterus are fibroids/ leiomyomas and by the age of 50 years these are found in 70% to 80% of women [1,2]. A number of factors such as hormonal, genetic, growth and molecular have been identified that initiate the formation of fibroids, however, the exact etiology is not known. The classification of fibroids is based on their relation to the uterine layers as sub mucosal that

project in the endometrial cavity, intramural that lie within the myometrium and subserosal which are located underneath the serosa. This classification has clinical implication as the patient's presentation and management vary amongst the different subtypes of fibroids [3].

Of all the uterine fibroids, the prevalence of sub mucosal type is approximately 5% but in comparison to the other types, these are more associated with menorrhagia and other symptoms like urinary retention, pelvic pain, etc [4]. These may protrude into the endometrial cavity and may also become pedunculated and hence gets prolapsed in the cervix, vagina and when large, into the perineum as well [5,6]. The pedicle of the fibroid can get twisted and this can lead to impairment of the blood supply, resulting in necrosis and infection [7,8].

Among the imaging modalities, ultrasound (US) and magnetic resonance imaging (MRI) plays an important role in the diagnosis of fibroids. MRI is considered as the imaging modality of choice for the detection, localization and clear demonstration of fibroids. Only a few case reports have been published for prolapsed sub mucosal fibroid as this is an uncommon entity. In the present study, the clinical presentations, imaging features and differential diagnosis of prolapsed pedunculated sub mucosal fibroids are described with the aim to clarify the preoperative diagnostic accuracy of this entity.

Methodology

We conducted this cross sectional, descriptive study in the radiology department of Aga Khan University hospital (AKUH). The institutional ethics review committee approved and granted exemption for the study. The medical records of patients who underwent surgery for fibroids from January 2016 to July 2018 were reviewed. Patients who had surgical diagnosis of prolapsed pedunculated submucosal fibroid during this time period, with imaging i.e. ultrasound and MRI, and histopathology done at our institution were included.

Patients with no surgical diagnosis of prolapsed pedunculated submucosal fibroid were excluded. The patients with no imaging studies, histopathology or follow up at AKUH were also excluded.

Imaging and analysis

The ultrasound was performed by transvaginal approach in case one and per abdominally in the other cases. Grey scale and Doppler images were obtained by two radiologists, a faculty member with minimum of five years of experience in women imaging and a senior year III/ year IV resident.

MRI was performed in a 1.5 Tesla scanner using a torso phased array coil with patient lying supine. The following sequences were included in the MRI scan: T1WI (T1 weighted imaging) axial and coronal, T2WI (T2 weighted imaging) - axial, coronal and sagittal, diffusion weighted imaging (DWI) and apparent diffusion coefficient (ADC) and post contrast T1 in axial, coronal and sagittal planes. Gadopentetate dimeglumine was administered as intravenous (IV) contrast at a dose of 0.1 mmol/kg of body weight and at a rate of 2 ml/second. The MRI images were reviewed independently and final report was formulated with consensus from two independent radiologists with an expertise in women imaging for more than five years. The pathology reports of the specimens sent after surgery were reviewed through the institution's electronic records of the patients. Details of the patient's follow up at one month were also recorded.

Results

A total of five cases were included in the study.

The clinical features, imaging features on ultrasound and MRI, and outcome of each case are detailed in tables I and II. Images of ultrasound and MRI of the cases presented in Figures 1 to 5.

The patients' ages ranged from 25 to 39 years. Two of the five patients were married and presented in the postpartum period. One patient presented with primary postpartum hemorrhage (PPH) after C-section which was performed due to fetal distress. The other patient presented to ER two weeks after her C-section that was done due to previous scar. Her presenting complaint was lower abdominal pain and foul smelling vaginal discharge. The three unmarried patients presented with symptoms commonly associated with fibroid uterus like menorrhagia, lower abdominal pain, dysmenorrhea, and urinary retention. Two of the five patients had fibroid uterus detected on prior ultrasounds. On per abdominal examination, the uterus was noted to be enlarged in three patients. On ultrasound, the fibroid was hypoechoic in four cases and appeared hyperechoic in one (Figure 1A). On MRI, the stalk of the prolapsed fibroid was delineated and originated from the anterior wall in three cases (Figure 2C, 4C, 5C), from the posterior wall in one case (Figure 1C), and from the uterine fundus in another (Figure 3C). The prolapsed fibroids were predominantly isointense on T1WI. On T2WI, these were hyper intense except in one case which was hypo intense with multiple flow voids (Figure 5D). Moderate to intense post contrast enhancement was observed in all cases except in case 5 that showed some enhancement of the stalk however there was no enhancement of the fibroid (Figure 5C). Case 1 also showed non enhancing areas due to necrosis and infarction. No diffusion restriction, pelvic lymphadenopathy or free fluid was noted in any case. The three unmarried patients were treated with vaginal myomectomy while one of the two married patients was treated with laparotomy and myomectomy, and the other with subtotal abdominal hysterectomy. Histopathology of the all surgical specimens revealed leiomyomas. Degenerative changes, infarction and necrosis were noted in the specimen from the two married women i.e. case 1 and 5.

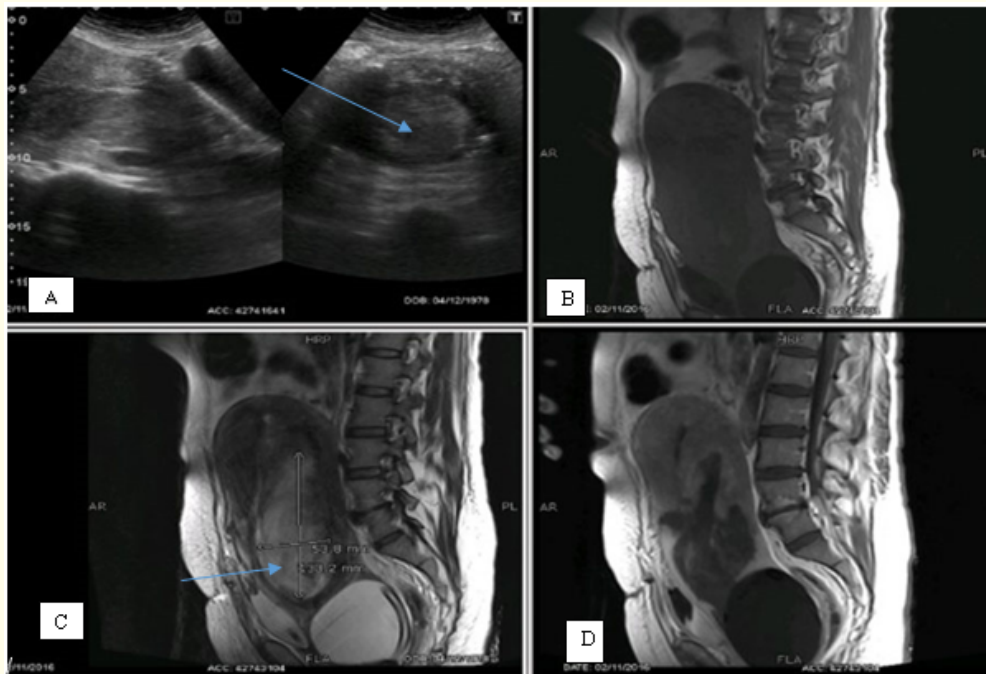


Figure 1: Case One: US (A) shows bulky uterus in keeping with postpartum status. Posterior wall fibroid is extending into upper vagina (arrow). MRI (B, C, D) shows postpartum bulky uterus with tamponade balloon and packing identified within the vagina. Abnormal signal intensity soft tissue lesion arising from posterior wall of the uterus and hanging into the endometrial cavity and upper vagina (arrow). The signals of this soft tissue are suggestive of acute hemorrhage and necrosis within it. The appearances represent a large degenerating sub mucosal prolapsed fibroid arising from posterior wall of the uterus.

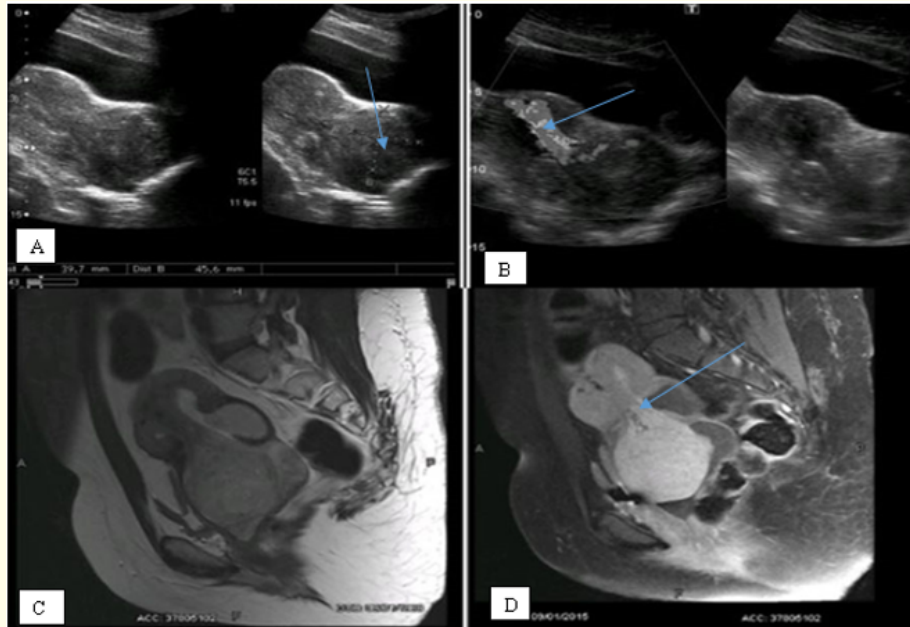


Figure 2: Case Two, Ultrasound (A, B) shows a well-defined lobulated lesion in upper vagina showing vascular pedicle (arrows). MRI (C, D) shows a well-defined, lobulated abnormal signal intensity mass lesion with significant vascularity and surrounding hemorrhagic fluid distending the cervical canal and upper part of the vagina. It has a well-defined stalk arising from anterior myometrium (arrow).

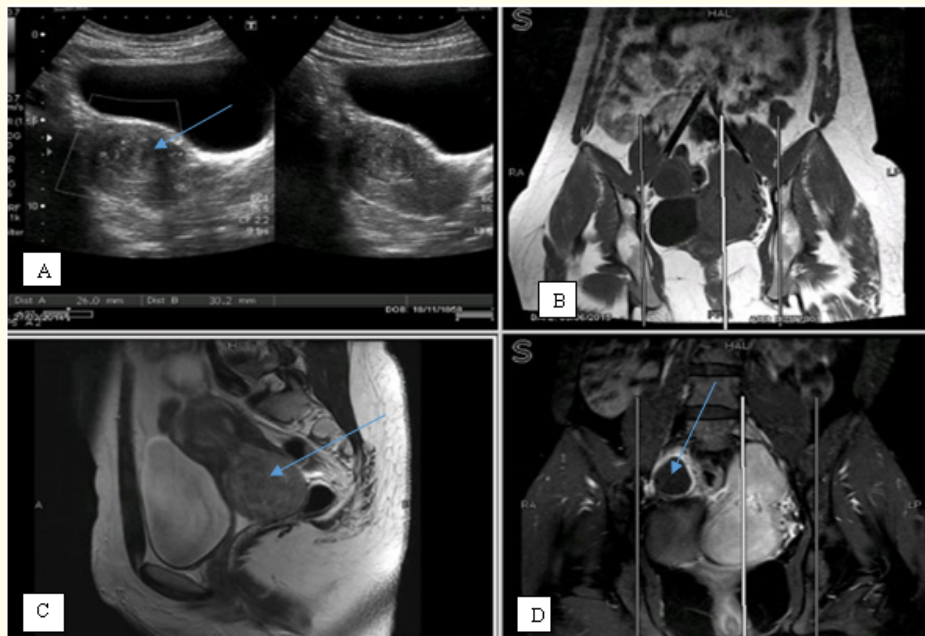


Figure 3: Case Three, US (A) done six months earlier showed an intracavitary fibroid (arrow). MRI (B, C, D) shows a large well-defined abnormal signal intensity lesion arising within the endometrial cavity from the left anterior wall near the fundal region with a large stalk, prolapsing into the lower uterine segment extending through the cervix into the upper vagina, representing a prolapsed pedunculated sub mucosal fibroid and right simple ovarian cyst (arrows).

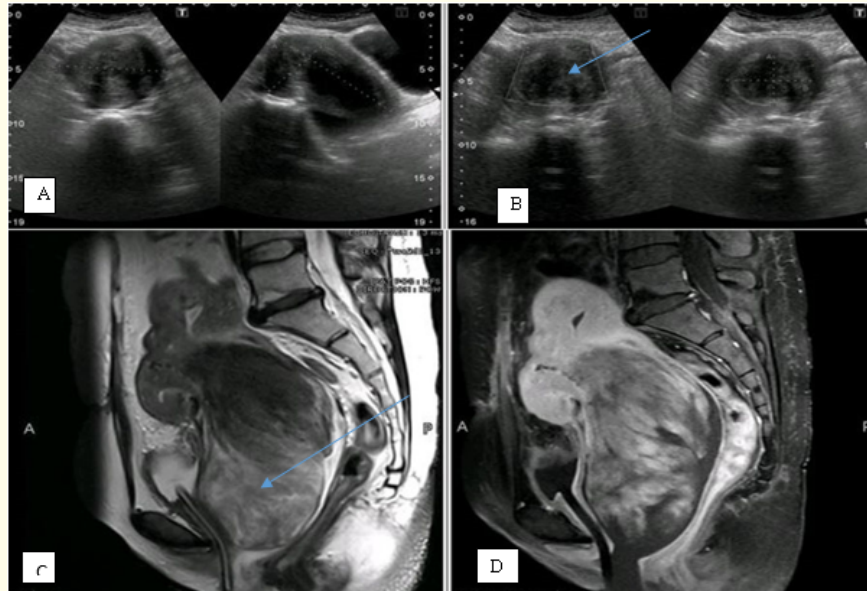


Figure 4: Case Four, US (A, B) done two months earlier showed a submucosal fibroid (arrow). MRI (C, D) shows a large well-defined abnormal signal intensity lesion arising within the endometrial cavity from the anterior wall of the body with a stalk, prolapsing through the uterus and cervix into the vagina, representing a prolapsed pedunculated sub mucosal fibroid (arrow). This shows significant interval increase in size.

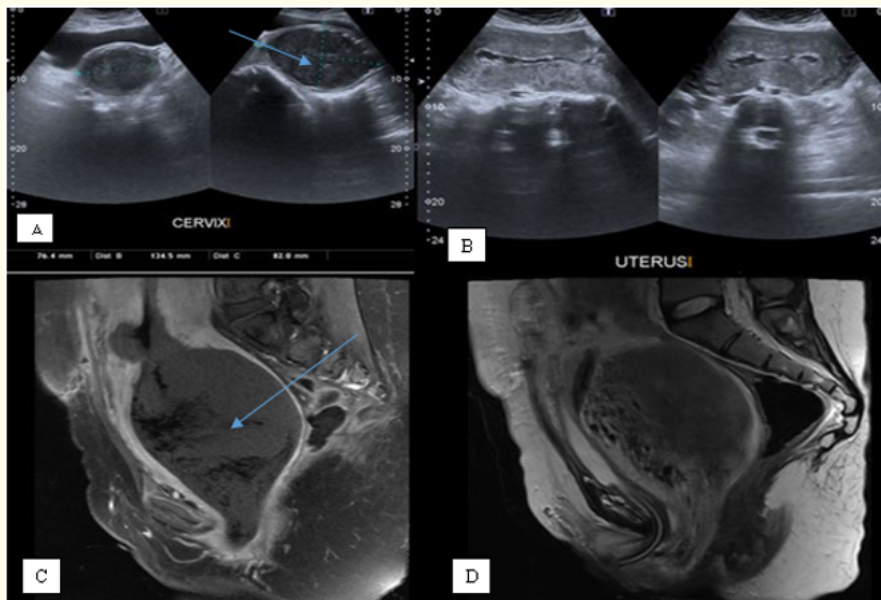


Figure 5: Case Five, US (A, B) shows postpartum bulky uterus with small amount of fluid within the endometrial cavity. Large hypoechoic mass without vascularity protruding into the vagina (arrow). MRI (C, D) shows postpartum bulky uterus, abnormal signal intensity lesion arising from anterior wall of the cervix and hanging into the upper half of the vagina. It is hypo intense on T2WI and shows no post contrast enhancement (arrow). The appearances represent a large degenerating sub mucosal fibroid with prolapse into the vagina.

Case number	Age in years	Marital status	Presenting complaints	Type of surgery	Histopathology
01	37	Married Para 1+0	Primary Post-partum hemorrhage (PPH)	Laparotomy and Myomectomy	Leiomyoma with degenerative changes and hemorrhagic infarction
02	29	Unmarried	Urinary retention, lower abdominal pain and menorrhagia	Vaginal myomectomy of sub mucosal fibroid	Leiomyoma
03	25	unmarried	Inter menstrual spotting, dysmenorrhea	Vaginal myomectomy of sub mucosal fibroid	Leiomyoma
04	37	Unmarried	lower abdominal pain	Vaginal myomectomy of sub mucosal fibroid	Leiomyoma
05	39	Married Para 10+	lower abdominal pain since C-section	Subtotal abdominal hysterectomy and bilateral salpingectomy	Leiomyoma with areas of infarction and necrosis

Table 1: Patients demographics and outcome.

Case	Ultrasound	MRI
01 (Figure 1)	A well-defined hyperechoic lesion in cervix and upper vagina	Size in mm: 133x54 Extension in: Upper vagina Stalk arising from: Posterior wall of body of uterus T1WI: Iso to hypo intense T2WI: Heterogenous hyper intense Post contrast: Heterogeneous enhancement
02 (Figure 2)	A well-defined hypo to isoechoic lesion in vagina	Size in mm: 68x48 Extension in: Upper two third of vagina Stalk arising from: Anterior wall close to fundus T1WI: Iso to slightly hyperintense T2WI: Hyper intense Post contrast: Severe homogenous enhancement
03 (Figure 3)	(US done six months before the MRI) A well-defined hypoechoic lesion within the endometrium in the body of uterus	Size in mm: 49x47 Extension in: Upper one third of vagina Stalk arising from: fundus T1WI: Isointense T2WI: Hyper intense Post contrast: moderate homogenous enhancement

<p>04 (Figure 4)</p>	<p>(US done two months before the MRI) A well-defined hypoechoic lesion</p>	<p>Size in mm: 130x82 Extension in: Whole of vagina Stalk arising from: Anterior wall of the body of uterus T1WI: Isointense T2WI: Heterogeneous hypo and hyper intense Post contrast: moderate homogenous enhancement</p>
<p>05 (Figure 5)</p>	<p>Postpartum bulky uterus Large hypoechoic mass without vascularity distending cervical canal and vagina</p>	<p>Size in mm: 100x83 Extension in: upper half of vagina Stalk arising from: Anterior wall of the cervix T1WI: Isointense T2WI: Hypo intense with multiple flow voids Post contrast: No enhancement of the prolapsed fibroid, slight enhancement of stalk</p>

Table 2: Imaging Findings.

Discussion

A variety of symptoms have been associated with fibroids that can affect the quality of life and may even result in mortality, these include abnormal uterine bleeding, non-cyclical pelvic pain, dysmenorrhea, dyspareunia and urinary symptoms such as retention, as was also noted in the present study [3].

During pregnancy, the reported incidence of fibroids ranges from 0.1 % to 12.5% [9].

The size of approximately 20% of fibroids may increase with the greatest change occurring during the first trimester. Furthermore, in pregnancy, the presence of fibroids may be associated with complications such as threatened miscarriage/ preterm delivery, abruptio placenta, fetal malpresentation and labour dystocia. There may be increased risk of caesarian section and post-partum hemorrhage as was also noted in the present study [10]. The fibroid can also prolapse into vagina in the post-partum period, as was also noted in case one and five of the present study [11].

The sub mucosal fibroids are more associated with the clinical presentation of menorrhagia that may lead to anemia [12]. The prolapse of the pedunculated submucosal fibroid itself or twisting around the pedicle may compromise the blood supply and can result in necrosis and infection. Cases one and five in the present study, in which the size of the fibroids was large, had evidence of necrosis and infarction on histopathology. Another important complication of prolapsed sub mucosal fibroids is uterine inversion. This finding was not observed in any of the cases in the present study. However, it has been reported in African women [6].

Gynecological/per vaginal (PV) examination is helpful in the diagnosis of prolapsed sub mucosal fibroids as it can detect a mass in cervix, vagina or perineum, as was seen with cases one and five, where a mass was noted on PV examination. Cases two, three and four of the present study were unmarried/sexually inactive and therefore PV examination was deferred due to cultural reservations.

Imaging i.e. ultrasound and MRI plays a vital role in the diagnosis and characterization of fibroids as it accurately assesses the number, size and location with respect to the myometrium layers. The stalk of sub mucosal pedunculated fibroids and its uterine attachment can also be delineated which helps the gynecologist to plan the surgical approach [4]. Furthermore, it aids in exclusion of differentials like endometrial polyp and malignancy.

Ultrasound is more frequently employed using the trans abdominal/transvaginal approach as it is accessible and relatively cheaper but it is operator dependent and has lesser reproducibility [13].

3-D ultrasound has been coming up a cost effective and accurate technique for the fibroids mapping prior to laparoscopic/hysteroscopic myomectomy but it underestimates the total number, in cases with more than four fibroids [14]. MRI is more expensive but has been considered as the most sensitive modality for the evaluation of fibroids especially the smaller ones of even less than one centimeter. Additionally, fibroids may cause alteration of the uterine contour and the uterus may also get bulky as was also observed in the present study.

Ultrasound (US) aids in differentiating fibroids from other pelvic pathologies. On US, the fibroids mostly appear as well defined hypo echoic masses, with whorled appearance and variable vascularity that is predominantly circumferential [2]. With cystic degeneration these appear anechoic and may appear hyper echoic due to presence of foci of calcification or hemorrhage. Heterogeneous appearance of fibroid may be seen with combination of above findings. The absence of Doppler flow suggests the presence of degeneration and infarction as was seen in the present cases. Differentiation of sub mucosal fibroid from endometrial polyp may be difficult on Transvaginal ultrasound (TVUS), but the two pathologies may be differentiated with the technique of sonohysterography [3].

A close differential of fibroids on ultrasound is adenomyosis, for which MRI has high sensitivity and specificity of 64% and 88% respectively [15]. The sensitivity and specificity of MRI for the detection of sub mucosal fibroids is 100% and 91% respectively [16]. Sagittal T2-weighted images show the prolapsed fibroid, its stalk and its uterine connection. MRI may show heterogeneous signal with torsion and hemorrhage in the fibroid and there may be no enhancement in post contrast images [3]. Kim., *et al.* described “broccoli sign” i.e. a bulky lobulated mass at the perineum that connects to the endometrial cavity by the stalk. This was not seen in the present study as the prolapse of sub mucosal fibroid was confined to the vagina and extension into the perineum was not seen in any case [7]. The stalk of the prolapsed fibroid shows multiple linear structures representing smooth muscle fibers and was also seen in the present reported cases [10].

Other differentials for the masses extending to the cervix or vagina are carcinoma of the endometrium and cervix. However, the common imaging feature of leiomyoma on MRI, that is well defined margin and low signal on T2WI are not seen in the above malignancies [11].

In the present study, the prolapsed fibroids showed heterogeneous hyper and hypo intense signal on T2WI likely related to the degeneration and compromised blood flow due to prolapse. These were however differentiated from a malignant process on account of well circumscribed margins and there was no associated lymphadenopathy, free fluid in pelvis or bony involvement.

Endometrial polyps usually presents as pedunculated endometrial masses. However, the overlying intact endometrial stripe helps in differentiating it from sub mucosal fibroids [3]. On MRI, endometrial polyp appear as hyper intense mass with a low signal intensity core on T2WI (T2 weighted image) and show enhancement on post gadolinium images [17].

The options for the treatment of sub mucosal fibroid include myomectomy and hysterectomy [18]. Myomectomy can be done hysteroscopically or via laparotomy as was done in the cases of the present study.

Conclusion

The imaging appearance and differentials of the prolapsed sub mucosal fibroids as described in the present study aim to guide prompt and correct preoperative diagnosis of this entity with resultant appropriate treatment option for the patient.

Conflict of Interest

None to declare.

Disclosure

None. Nonmonetary disclosures regarding being part of a thesis or dissertation, a pilot project or an ongoing study should be made explicitly at the time of submission.

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Bibliography

1. Doherty Leo., *et al.* "Uterine fibroids: clinical manifestations and contemporary management". *Reproductive Sciences* 21.9 (2014): 1067-1092.
2. Parker William H. "Etiology, symptomatology, and diagnosis of uterine myomas". *Fertility and Sterility* 87.4 (2007): 725-736.
3. Sue Wilde and Scott-Barrett Sarah. "Radiological appearances of uterine fibroids". *The Indian Journal of Radiology and Imaging* 19.3 (2009): 222-231.
4. Fiaschetti V., *et al.* "MRI in the assessment of prolapsed pedunculated submucous leiomyomas: two case reports". *Clinical and Experimental Obstetrics and Gynecology* 42.6 (2015): 827-832.
5. Matytsina-Quinlan Lyubov and Laura Matytsina. "Submucosal uterine fibroid prolapsed into vagina in a symptomatic patient with IUS". *BMJ Case Reports* (2014): bcr2014203877.
6. Teimoori Batool and Arezoo Esmailzadeh. "A large uterine leiomyoma leading to non-puerperal uterine inversion: A case report". *International Journal of Reproductive BioMedicine* 15.1 (2017): 55.
7. Kim Jin Woo., *et al.* "Spontaneous prolapse of pedunculated uterine submucosal leiomyoma: usefulness of broccoli sign on CT and MR imaging". *Clinical Imaging* 32.3 (2008): 233-235.
8. Testa Antonia Carla., *et al.* "Imaging techniques for evaluation of uterine myomas". *Best Practice and Research Clinical Obstetrics and Gynaecology* 34 (2016): 37-53.
9. Cooper Natalie Paloma and Stanley Okolo. "Fibroids in pregnancy-common but poorly understood". *Obstetrical and Gynecological Survey* 60.2 (2005): 132-138.
10. Parazzini Fabio., *et al.* "Pregnancy outcome and uterine fibroids". *Best Practice and Research Clinical Obstetrics and Gynaecology* 34 (2016): 74-84.
11. Khan Erum Saleem and Reeta Chander Parkash. "Prolapsed degenerating postpartum uterine fibroid: A case report". *JPMA: The Journal of the Pakistan Medical Association* 68.3 (2018): 474-476.
12. Lumsden Mary Ann., *et al.* "Fibroids: diagnosis and management". *British Medical Journal* 351 (2015): h4887.
13. Levens Eric D., *et al.* "Magnetic resonance imaging and transvaginal ultrasound for determining fibroid burden: implications for research and clinical care". *American Journal of Obstetrics and Gynecology* 200.5 (2009): 537.e1-e7.

14. Stadtmayer L. "The accuracy of 3D ultrasound and MRI in predicting the number of fibroids removed with robot assisted laparoscopic myomectomy". *Fertility and Sterility* 108.3 (2017): e261-e262.
15. Graziano Angela., *et al.* "Diagnostic findings in adenomyosis: a pictorial review on the major concerns". *European Review for Medical and Pharmacological Sciences* 19.7 (2015): 1146-1154.
16. Dueholm Margit., *et al.* "Imaging techniques for evaluation of the uterine cavity and endometrium in premenopausal patients before minimally invasive surgery". *Obstetrical and Gynecological Survey* 57.6 (2002): 389-403.
17. Leursen Gustavo., *et al.* "Magnetic resonance imaging of benign and malignant uterine neoplasms". *Seminars in Ultrasound, CT and MRI* 36.4 (2015): 348-360.
18. Obara Mikitaka., *et al.* "Vaginal myomectomy for semipedunculated cervical myoma during pregnancy". *American Journal of Perinatology Reports* 4.1 (2014): 37-40.

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