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A Giant Leiomyoma with Massive Cystic Hydropic Degeneration Mimicking an Aggressive Neoplasm: A Challenging Case with a Literature Review

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABE 1 **Khalid Akkour**
ABEF 1 **Mais Alhulwah**
BCD 2 **Nayef Alqahtani**
BDEF 3 **Maria A. Arafah**

1 Department of Obstetrics and Gynecology, College of Medicine, King Saud University, Riyadh, Saudi Arabia
2 Department of Radiology, College of Medicine, King Saud University, Riyadh, Saudi Arabia
3 Department of Pathology, College of Medicine, King Saud University, Riyadh, Saudi Arabia

Corresponding Author: Maria A. Arafah, e-mail: marafah83@gmail.com

Conflict of interest: None declared

Patient: Female, 32-year-old
Final Diagnosis: Leiomyoma with massive cystic hydropic degeneration
Symptoms: Abdominal distension • abdominopelvic mass • pelvic pain • urinary frequency
Medication: —
Clinical Procedure: Surgery
Specialty: Obstetrics and Gynecology • Pathology • Surgery

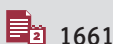
Objective: Rare disease
Background: Leiomyomas are the most frequent benign tumors of the uterus. They often exhibit degenerative changes (hyaline, myxoid, hemorrhagic, hydropic, and cystic), which lead to varying and sometimes challenging clinical, radiological, and histopathological features. We present this case to highlight the importance of recognizing these variants and their differential diagnosis since they resemble forms of uterine sarcomas with a potential for misdiagnosis.

Case Report: A 32-year-old single woman presented with large pelviabdominal masses mimicking, clinically and radiologically, an aggressive uterine or ovarian tumor. The masses collectively measured 33×24×15 cm, and a definite intraoperative diagnosis could not be made. Resection showed a giant leiomyoma with massive cystic hydropic degeneration. The patient underwent myomectomies with transposition of the ovaries into the lateral abdominal wall. Although the surgery was complicated by a massive hemorrhage with an approximate blood loss of 6 liters requiring blood transfusion and bilateral internal iliac artery ligation, the patient was discharged home on the fourth day after surgery, with an uneventful 16-month follow-up.

Conclusions: Few leiomyomas showing this marked degree of hydropic degeneration have been reported in the literature. The differential diagnosis includes uncommon variants of leiomyomas (eg, intravenous leiomyomatosis), as well as uterine sarcomas (eg, low-grade endometrial stromal sarcoma) and ovarian carcinomas. Therefore, appropriate evaluation of the clinicopathological features is vital to ensure appropriate management and not to erroneously diagnose a benign leiomyoma as a more aggressive type of tumor.

Keywords: Diagnosis, Differential • Leiomyoma • Uterine Neoplasms

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Background

Leiomyomas are the most frequent benign mesenchymal neoplasms of the female genital tract, with an incidence of 4-11% and reaching up to 40% during the fifth decade [1]. Over the years, several histopathological subtypes and secondary changes have been described, encompassing hyaline degeneration, hydropic degeneration, myxoid changes, and calcifications. These changes are important due to their resemblance to some forms of uterine sarcomas (eg, myxoid leiomyosarcoma and endometrial stromal sarcoma) or ovarian neoplasms, with the apparent potential for misdiagnosis. Diffuse hydropic degeneration with secondary cystic changes is a rare subtype of leiomyoma with a limited number of cases in the English literature [2-16]. We describe a leiomyoma case showing massive cystic hydropic degeneration and masquerading as an aggressive neoplasm in a young woman. We discuss the imaging and histopathological features as well as the challenging differential diagnosis.

Case Report

A 32-year-old single and nulliparous woman presented to the clinic with a huge abdominopelvic mass that was gradually increasing in size and was associated with urinary frequency, abdominal distension, and chronic pelvic pain. The patient gave a history of regular menstrual cycles despite weight loss and a decrease in appetite. She had no chronic medical illnesses, previous surgeries, or a family history of gynecological malignancies. Clinically, the patient looked emaciated but with stable vital signs. Abdominal examination revealed a large irregular, painless, and fixed mass occupying the entire abdominal cavity. No palpable lymph nodes were found. The patient was admitted for further investigations, and all her laboratory hematological and biochemical tests were within normal limits, including tumor markers (CEA, CA-125, AFP, CA15-3, and CA19.9). Computed tomography scans of the chest, abdomen, and pelvis (CT-CAP) showed large complex masses occupying the abdomen and pelvis with cystic areas and enhancing solid components causing mass effect on the adjacent abdominal structures and compressing the inferior vena cava without obstructing it. Bibasilar atelectatic changes were seen in the lungs secondary to the intra-abdominal mass effect with no evidence of intra-thoracic metastases. Magnetic resonance imaging of the pelvis (MRI-pelvis) showed huge abdominopelvic complex masses comprising solid parts and large cystic components with thick septations. The masses had intermediate-to-low T_2 signal intensity and avid contrast enhancement. They extended from the pelvis up to the diaphragm, displacing the rectum and uterus, collectively measuring 33×24×15 cm (Figure 1). The uterus was enlarged, with intramural fibroids. The left ovary was not seen; however, the cervix and right ovary were unremarkable. The differential diagnosis based on

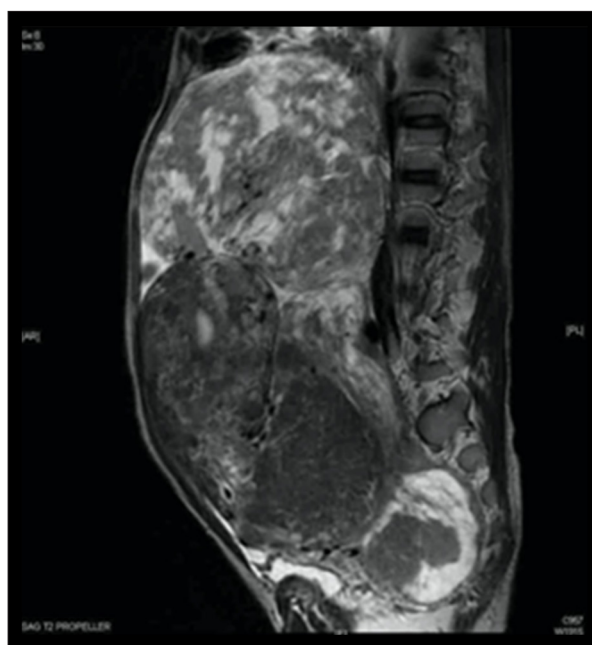


Figure 1. A sagittal T_2 magnetic resonance image showing the same mass extending from the pelvis up to the subdiaphragmatic area displacing the uterus anteriorly.

imaging included a primary uterine sarcoma versus a primary left ovarian carcinoma. Metastasis (especially Krukenberg tumor from the gastrointestinal tract) was also suggested in the differential diagnosis. The case was discussed in a multidisciplinary tumor board, and the consensus was to perform surgery with an intraoperative consultation.

Few masses were encountered intra-operatively, all of which were connected to the uterus by large thick pedicles, distorting the uterine anatomy (Figure 2A, 2B). The largest mass was sent for frozen section analysis, and the histopathological diagnosis was a smooth muscle neoplasm. The definitive classification was deferred to permanent sections. To excise the masses, the surgeon had to resect the utero-ovarian ligaments bilaterally and subsequently transpose the ovaries laterally to the pelviabdominal wall. The rationale was to avoid possible ovarian torsions and to distance the ovaries from the surgical field to spare them massive adhesions or total removal if the tumor recurs. The surgery was complicated by a massive hemorrhage from the thick uterine pedicles, with an estimated blood loss of 6 liters. The patient required massive blood transfusion of 9 units of packed red blood cells, 4 units of platelets, 10 units of fresh frozen plasma, and 10 units of cryoprecipitates. Bilateral internal iliac artery ligation was also done to help reduce the pelvic blood supply. Due to the rapid management and hemoconcentration, the lowest recorded hemoglobin level was 9.0 gm/dl with 30% hematocrit. The bleeding was controlled, 2 abdominal drains were inserted, and the patient was admitted to the surgical intensive care unit for 1 day.

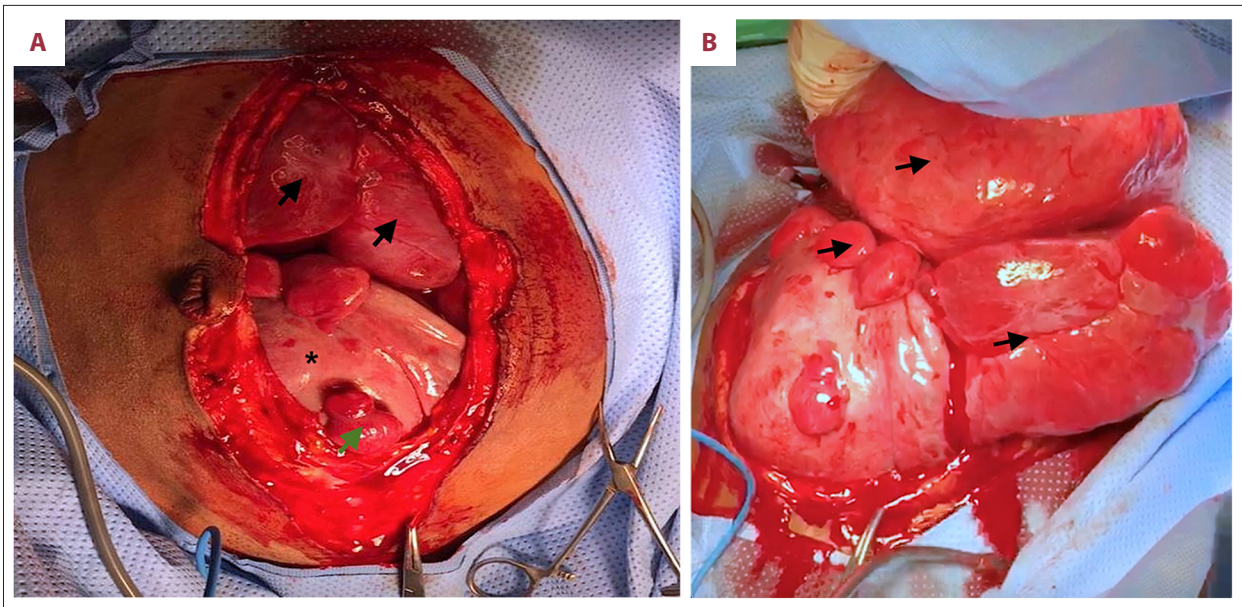


Figure 2. (A) Upon opening, the uterus is seen (asterix) with 2 large leiomyomas (black arrows) attached to its posterior wall with thick pedicles. A smaller leiomyoma is also noted on the anterior uterine wall (green arrow). (B) Another macroscopic image of the leiomyomas (arrows) during their removal.

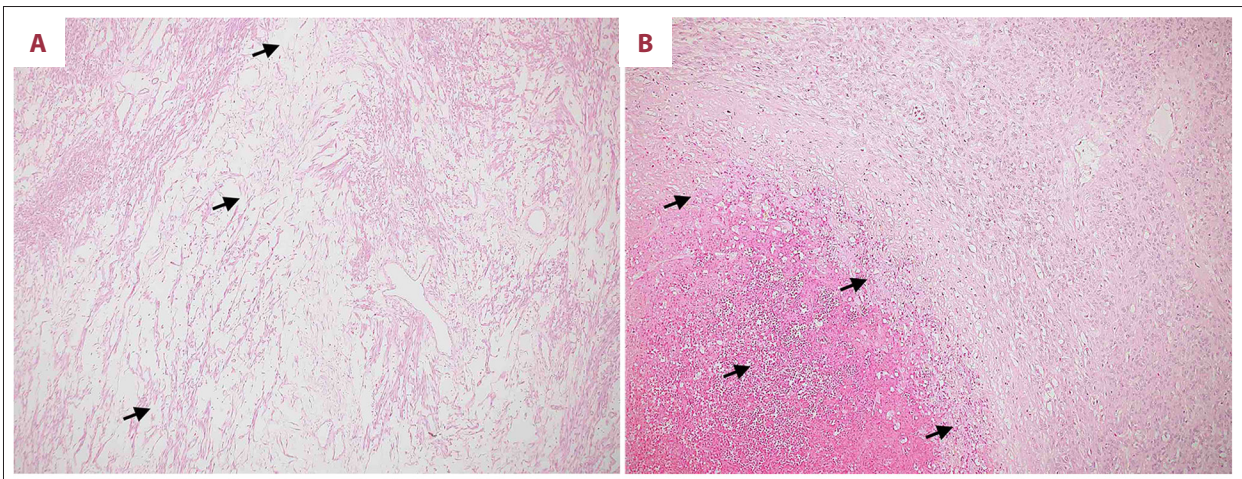


Figure 3. (A) A section from the largest fibroid showing areas of cystic hydropic degeneration (arrows) (H&E stain, $\times 40$). (B) Foci of infarct-type necrosis with a rim of hyalinization (arrows). Note the absence of nuclear atypia (H&E stain, $\times 100$).

A total of 7 well-circumscribed masses were sent to the Pathology Department. The largest mass measured 32 \times 25 \times 15 cm. Serial slicing showed a heterogeneous cut surface with solid white tan whorly areas, foci of hemorrhage, and cystic areas filled with a pale gelatinous material. Microscopically, sections showed a leiomyoma with marked cystic hydropic degeneration (Figure 3A), foci of infarct-type necrosis (Figure 3B), and focal moderate nuclear atypia. The mitotic rate was <5 in 10 high-power fields. The other smaller masses showed conventional leiomyomas.

The patient was discharged on the fourth day after surgery, and her follow-up for the past 16 months was uneventful. She

regained her appetite and reported a complete resolution of her gastrointestinal and genitourinary symptoms. A written informed consent for patient information and images to be published was obtained from the patient.

Discussion

Uterine leiomyomas frequently undergo degenerative changes, with 10% of all leiomyomas being histopathological variants or showing different forms of degeneration [17]. The main variants of degeneration are hyaline (in 60% of cases), myxoid,

hemorrhagic, hydropic, and cystic [9,10,17,18]. Hydropic degeneration, resulting from the accumulation of watery edema within the tumor, can be seen focally in up to 50% of leiomyomas [19]. However, 2 rare types of extreme hydropic degeneration can also occur: diffuse hydropic cystic degeneration [2-18] and perinodular hydropic degeneration [17,18,20]. These extreme forms can result in enormous tumors obscuring the organ of primary involvement, altering the clinical and radiological picture, and posing a diagnostic challenge. Clement et al were the first to present a series of 10 cases of uterine leiomyomas with hydropic changes creating diagnostic problems [18]. The patients in this original series had an age range of 41 to 51 years and presented with symptoms similar to those of typical leiomyomas. Several reports followed, describing cases in patients as young as 16 years and as old as 58 years [7,16]. Some of these cases were encountered in pregnant women [2,6], and others were associated with elevated CA-125 levels or pseudo-Meigs syndrome [21-24]. Although typical leiomyomas have characteristic radiological appearances, a leiomyoma with degenerative changes may be perplexing to differentiate from its malignant counterparts. A large multicenter study by Ludovisi et al described the ultrasound characteristics of uterine sarcomas [25]. They found that most sarcomas were solid (79.5%); however, cystic areas were noted in 44.6% of cases, and color Doppler examination showed moderate-to-rich vascularity in more than half of the cases (67.9%) [25]. They also concluded that the criteria suggestive of malignancy are the presence of a large symptomatic uterine tumor with inhomogeneous echogenicity, internal irregular cystic areas, and the absence of shadows and calcifications. CT can demonstrate calcifications, which are often found in benign leiomyomas, but it has a limited role in the initial diagnosis or local staging. MRI may be necessary in cases where the adnexa is not visualized or when the tumor's origin cannot be determined using sonography [9]. On T_1 -weighted imaging, a non-degenerate fibroid has a signal intensity similar to normal myometrium and low intensity on T_2 -weighted sequences [26]. On the other hand, unspecific areas of increased T_2 signal are seen in degenerative fibroids on MRI [26]. Our case, however, showed masses with intermediate-to-low T_2 signal intensity and avid contrast enhancement. Criteria suggestive of malignancy on MRI include necrosis and irregular margins [27]. Diffusion-weighted imaging (DWI) can be used to differentiate malignant lesions, as they appear hyperintense with excellent tissue contrast and can also provide quantitative measurements of apparent diffusion coefficient [27]. Thomassin-Naggara et al showed that a combined analysis of b1000 images, T_2 signal intensity, and the apparent diffusion coefficient map has 92.4% accuracy in distinguishing between benign and malignant uterine tumors [28]. The definitive diagnosis is usually reached by evaluating the histopathological features. Microscopically, the accumulation of watery edema fluid, often associated with hyalinized blood

vessels and collagen deposition in leiomyomas with massive hydropic degeneration, may simulate intravenous leiomyomatosis or myxoid leiomyosarcoma. Rather than thick fascicles, a delicate filigree pattern is present in leiomyomas with hydropic degeneration, and the extracellular material is edema fluid rather than mucopolysaccharides [17]. Myxoid leiomyosarcomas have a diffusely gelatinous gross appearance and an obviously infiltrative border on microscopic examination. They also show greater degrees of nuclear pleomorphism and mitotic activity, which are inconsistent with a hydropic leiomyoma. Intravenous leiomyomatosis is a rare uterine tumor characterized by the presence of intravenous extensions of benign-appearing smooth muscle fibers outside the confines or in the absence of a leiomyoma [17,18]. Although the features may resemble leiomyomas with perinodular hydropic degeneration, an intravascular growth is typically absent in the latter tumors [17,18]. In several cases of the original series by Clement et al, extensive hyalinization and numerous thick-walled blood vessels were noted, raising the possibility of a vascular tumor [18]. However, the awareness of these changes and the presence of foci of recognizable leiomyoma helped in reaching the diagnosis. In addition to the common smooth muscle immunohistochemical markers (eg, muscle-specific actin, desmin, smooth muscle actin, smooth muscle myosin heavy chain), Griffin et al found that 18 out of 24 cases of hydropic leiomyomas also showed overexpression of HMGA2. The study also demonstrated that 6 out of 19 cases harbored HMGA2 rearrangement detected by fluorescence in situ hybridization, and, in contrast to conventional leiomyomas, none of the cases showed MED12 mutations [29]. The management of hydropic leiomyomas has varied in the literature between myomectomy vs hysterectomy. In our case, the patient was young and wished to preserve her fertility; thus, resection of all masses was performed with no evidence of recurrence 16 months after surgery. The clinical course of leiomyomas with hydropic degeneration has been uneventful in patients with available follow-up in the series by Clement et al and in the few case reports that followed [2-18].

Conclusions

The differential diagnosis of complex uterine or adnexal masses should include degenerating leiomyomas. More importantly, these cases should be thoroughly examined macroscopically and microscopically to ensure appropriate management regimens and not to erroneously diagnose a benign leiomyoma as a more aggressive type of tumor.

Conflict of Interests

None.

References:

1. Khyade R, More RM, Shedge R. A study of symptomatology and hisopathology in uterine fibromyomas. *Andrology & Gynecology: Current Research*. 2017;5:1000156
2. Moore L, Wilson S, Rosen B. Giant hydropic uterine leiomyoma in pregnancy: Unusual sonographic and Doppler appearance. *J Ultrasound Med*. 1994;13:416-18
3. Coard K, Plummer J. Massive multilocular cystic leiomyoma of the uterus: An extreme example of hydropic degeneration. *South Med J*. 2007;100:309-12
4. Protopapas A, Milingos S, Markaki S, et al. Cystic uterine tumors. *Gynecol Obstet Invest*. 2008;65:275-80
5. Dancz CE, Macdonald HR. Massive cystic degeneration of a pedunculated leiomyoma. *Fertil Steril*. 2008;90:1180-81
6. Heffernan E, Köbel M, Spielmann A. Case report: Hydropic leiomyoma of the uterus presenting in pregnancy: Imaging features. *Br J Radiol*. 2009;82:e164-67
7. Aydın C, Eriş S, Yağın Y, et al. A giant cystic leiomyoma mimicking an ovarian malignancy. *Int J Surg Case Rep*. 2013;4:1010-12
8. Funaki K, Fukunishi H, Tsuji Y, et al. Giant cystic leiomyoma of the uterus occupying the retroperitoneal space. *J Radiol Case Rep*. 2013;7:35-40
9. Horta M, Cunha TM, Oliveira R, et al. Hydropic leiomyoma of the uterus presenting as a giant abdominal mass. *BMJ Case Rep*. 2015;2015:bcr2015211929
10. Awad EE, El-agwani AS, Elhabashy AM, et al. A giant uterine myometrium cyst mimicking an ovarian cyst in pregnancy: An uncommon presentation of hydropic degeneration of uterine fibroid. *Egypt J Radiol Nucl Med*. 2015;46:529-34
11. Raga F, Llinares C, Cholvi S, et al. HDlive imaging of cystic uterine leiomyoma degeneration. *Ultrasound Obstet Gynecol*. 2016;47:655-56
12. Hatirnaz S, Colak S, Reis A. Cystic endometriosis in a huge degenerated-subserous leiomyoma mimicking bilateral multicystic endometriomas in an infertile woman with diminished ovarian reserve: A rare endometriotic implantation. *Case Rep Obstet Gynecol*. 2016;2016:2713943
13. DiPoce J, Liu-Jarin X, Newhouse J. Case 225: Leiomyoma. *Radiology*. 2016;278(1):297-301
14. Patil AR, Nandikoor S, Padilu R. Hydropic degeneration of leiomyoma in nongravid uterus: The "split fiber" sign on magnetic resonance imaging. *Indian J Radiol Imaging*. 2018;28:182-86
15. Asuzu IM, Ugwa E, Ezike KN. Hydropic degeneration of uterine leiomyoma mimicking a huge ovarian cyst. *Int J Case Rep Images*. 2019;10:1010022011A2019
16. Grapsa D, Smymiotis V, Hasiakos D, et al. A giant uterine leiomyoma simulating an ovarian mass in a 16-year-old girl: A case report and review of the literature. *Eur J Gynaecol Oncol*. 2006;27:294-96
17. Rosai J. *Rosai and Ackerman's surgical pathology*. 10 ed. Philadelphia (PA): Mosby Elsevier; 2011
18. Clement PB, Young RH, Scully RE. Diffuse, perinodular, and other patterns of hydropic degeneration within and adjacent to uterine leiomyomas. Problems in differential diagnosis. *Am J Surg Pathol*. 1992;16:26-32
19. Zaloudek CJ, Hendrickson MR, Soslow RA. *Mesenchymal tumors of the uterus*. In: Kurman RJ, Ellenson LH, Ronnett BM, editors. *Blaustein's pathology of the female genital tract*. 6th ed. New York: Springer; 2011
20. Coad JE, Sulaiman RA, Das K, et al. Perinodular hydropic degeneration of a uterine leiomyoma: A diagnostic challenge. *Hum Pathol*. 1997;28:249-51
21. Dunn JS Jr, Anderson CD, Method MW, et al. Hydropic degenerating leiomyoma presenting as pseudo-Meigs syndrome with elevated CA 125. *Obstet Gynecol*. 1998;92:648-49
22. Amant F, Gabriel C, Timmerman D, et al. Pseudo-Meigs' syndrome caused by a hydropic degenerating uterine leiomyoma with elevated CA 125. *Gynecol Oncol*. 2001;83:153-57
23. Oguma T, Yamasaki N, Nakanishi K, et al. Pseudo-Meigs' syndrome associated with hydropic degenerating uterine leiomyoma: A case report. *J Obstet Gynaecol Res*. 2014;40:1137-40
24. Pauls M, MacKenzie H, Ramjeesingh R. Hydropic leiomyoma presenting as a rare condition of pseudo-Meigs syndrome: Literature review and a case of a pseudo-Meigs syndrome mimicking ovarian carcinoma with elevated CA125. *BMJ Case Rep*. 2019;12(1):bcr-2018-226454.
25. Ludovisi M, Moro F, Pasciuto T, et al. Imaging in gynecological disease (15): Clinical and ultrasound characteristics of uterine sarcoma. *Ultrasound Obstet Gynecol*. 2019;54:676-87
26. Yamashita Y, Torashima M, Takahashi M, et al. Hyperintense uterine leiomyoma at T2-weighted MR imaging: Differentiation with dynamic enhanced MR imaging and clinical implications. *Radiology*. 1993;189:721-25
27. Santos P, Cunha TM. Uterine sarcomas: clinical presentation and MRI features. *Diagn Interv Radiol*. 2015;21:4-9
28. Thomassin-Naggara I, Dechoux S, Bonneau C, et al. How to differentiate benign from malignant myometrial tumours using MR imaging. *Eur Radiol*. 2013;23:2306-14
29. Griffin BB, Ban Y, Lu X, et al. Hydropic leiomyoma: A distinct variant of leiomyoma closely related to HMGA2 overexpression. *Hum Pathol*. 2019;84:164-72