Perinatology
pISSN 2508-4887 • eISSN 2508-4895

Case report
Perinatology Vol. 34, No. 4, December, 2023
https://doi.org/10.14734/PN.2023.34.4.196

Cystic Degeneration of Uterine Fibroid Mimicking Heterotopic Pregnancy with Interstitial Pregnancy: A Case Report

Hanna Moon, MD, Soo Min Hong, MD, Yong Jae Lee, MD, PhD, JoonHo Lee, MD, PhD

Department of Obstetrics and Gynecology, Institute of Women's Life Medical Science, Yonsei University College of Medicine, Seoul, Korea

Heterotopic pregnancy with interstitial pregnancy is a rare condition with fatal consequences if diagnosis is delayed. Hence, previous reports have focused on criteria and tools that can expedite obstetricians' diagnosis. While early diagnosis is important, other differentials should also be kept in mind. Herein, we report a case of a patient who underwent resectoscopy and diagnostic laparoscopy with cornual mass resection under the diagnosis of heterotopic pregnancy (missed abortion of intrauterine pregnancy with interstitial pregnancy). Histopathologic examination revealed that suspected interstitial mass was leiomyoma that underwent cystic change. We hope this case will emphasize the importance of considering benign uterine mass with cystic formation for differential diagnosis of interstitial pregnancy.

Key Words: Heterotopic pregnancy, Interstitial pregnancy, Cystic degeneration of uterine fibroid

Introduction

Heterotopic pregnancy is defined as the coexistence of gestational sacs (G-Sac) in both intrauterine cavity and extrauterine space.[1] It is very rare with the incidence of approximately 1 in 30,000, but the advancement in assisted reproductive technologies have played a role in increasing the prevalence up to 1 in 100.[2] Other risk factors for heterotopic pregnancy include pelvic inflammatory disease, pelvic surgery, and previous fallopian tube damage or pathology.[3]

Central to diagnosing heterotopic pregnancy is the identification of an ectopic G-Sac as well as the intrauterine G-Sac. Among various subtypes of ectopic pregnancy, interstitial type is a rare form with a prevalence of 2.4% of all ectopic pregnancy. It is defined as the presence of G-Sac in the intramural or interstitial portion of the fallopian tube, and is considered to be nonviable.[2] It's important to differentiate interstitial pregnancy from angular pregnancy, which is located in one of the cornual regions, but is considered to be viable; interstitial pregnancy has myometrium surrounding the conceptual tissue, making it much easier to expand prior to rupture.[4] Such an anatomic difference explains the significantly high mortality rate of interstitial pregnancy at 2.5%, which is 7 times greater than that of overall ectopic pregnancy.[5,6]

Owing to rarity of each condition, there is a distinct lack of literature reporting heterotopic pregnancy with interstitial ectopic subtype.[2,7] The literature we were able to find proposed various medical and surgical interventions, but all highlighted the importance

Received: 30 October 2023
Revised: 3 November 2023
Accepted: 5 November 2023

Correspondence to
JoonHo Lee, MD, PhD
Department of Obstetrics and Gynecology, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Korea
Tel: +82-2-2228-2234
Fax: +82-2-313-8350
E-mail: jleemd@yuhs.ac

of early diagnosis for prompt treatment. First-line imaging modality is traditional 2-dimensional ultrasonography, but other imaging studies such as 3-dimensional (3D) ultrasonography and pelvis magnetic resonance imaging (MRI) have been proposed.[6,8] Although prompt and precise diagnosis of heterotopic pregnancy with interstitial pregnancy is very important, obstetricians should also consider various differentials prior to making the diagnosis.

Herein, we report a case of a patient who underwent resectoscopy and diagnostic laparoscopy with cornual mass resection under the impression of heterotopic pregnancy (missed abortion of intrauterine pregnancy with interstitial pregnancy) and was diagnosed with missed abortion of intrauterine pregnancy and leiomyoma that underwent cystic change in histopathologic examination.

Case

A 39-year-old multigravida was referred to the Yonsei University Severance Hospital at 6 weeks of gestation for further evaluation and proper management under the suspicion of right interstitial pregnancy in the ultrasound examination performed at local healthcare center at 5 weeks of gestation. She had a bad obstetrical history of second-trimester abortion at 15 weeks due to preterm premature rupture of membranes.

Our first transvaginal ultrasound revealed intrauterine G-Sac with mean sac diameter (MSD) of 1.41cm, appropriate for the estimated gestational age (Fig. 1A, B). It also revealed another G-Sac-like structure in right *cornus* with similar MSD of 1.21 cm, which was located less than 1 cm from the lateral edge of uterine cavity, with 3 mm myometrial layer surrounding the lesion (Fig. 1C, D). Yolk sac was not visible in either G-Sacs. Both ovaries were normal. Our impression was heterotopic pregnancy with right interstitial pregnancy (early intrauterine pregnancy with right interstitial pregnancy). Follow-up transvaginal ultrasound did not demonstrate any increase in size of either G-Sacs. Yolk sac and fetal pole continued to be not visible. Serum beta human chorionic gonadotropin (β-hCG) was 9,562 mIU/mL on her first visit, 10,902 mIU/mL after 2

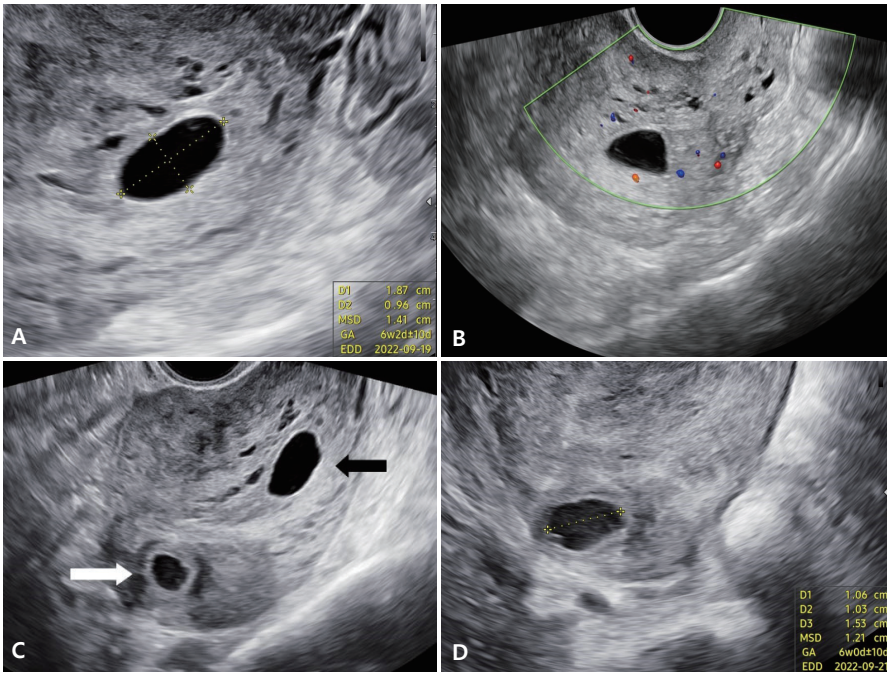

Fig. 1. Transvaginal ultrasound at gestational age of 6 weeks and 0 days. (A) Intrauterine G-Sac, later progressed to blighted ovum (corresponding to the black arrow in Fig. 1C). (B) Color Doppler image of intrauterine G-Sac (corresponding to the black arrow in Fig. 1C). (C) Gestational sacs (G-Sac; black arrow), r/o interstitial pregnancy (white arrow). (D) Suspected right interstitial pregnancy, later diagnosed as cystic degeneration of myoma (corresponding to the white arrow in Fig. 1C). MSD, mean sac diameter; GA, gestational age; EDD, estimated delivery date.

days, and 14,757 mIU/mL after 1 week.

From the above findings, the patient was diagnosed with heterotopic pregnancy with interstitial pregnancy (intrauterine blighted ovum with right interstitial pregnancy). After the patient was counseled on the treatment options including medical and surgical methods, she was planned for diagnostic hysteroscopy 2 weeks after the initial visit. She and her husband were forewarned of possibility of conversion to diagnostic laparoscopy should hysteroscopy fail.

After preoperative vaginal insertion of prostaglandin E1 tablets (misoprostol), the conceptual tissue was spontaneously expelled on the operative table. Subsequent hysteroscopy revealed no residual intrauterine conceptual tissues. However, as right interstitial pregnancy was not visualized via hysteroscopic approach, conversion to diagnostic laparoscopy was done. Bulging mass on posterior right *cornus* was visualized on laparoscopy (Fig. 2A). With simultaneous intra-operative transvaginal ultrasonography, suspected interstitial conceptual mass was located. Uterine incision was made on the right cornual portion and mass excision was done (Fig. 2B). Upon gross visualization, the excised mass resembled leiomyoma. The patient was discharged uneventfully on postoperative day 2.

The patient came to the outpatient clinic for the routine follow-up on postoperative day 10 and was confirmed to be fully recovered without any complications. The report of the histopathologic examination was as follows: (1) intrauterine conceptual tissue was the product of conception; (2) the cystic mass removed through laparoscopy was consistent with leiomyoma. She was advised to deliver by cesarean section in future pregnancy.

Discussion

Heterotopic pregnancy is defined as concurrent existence of G-Sacs or embryos in intrauterine cavity and elsewhere, which can be treated in various ways depending on the location of the extrauterine G-Sac. If tubal pregnancy accompanies intrauterine pregnancy, surgical excision of ectopic mass is commonly performed.[9] In case of interstitial pregnancy, which is defined as embryo in intramural or interstitial portion of the fallopian tube, decision for surgical removal may be difficult due to the concern of potential adverse effects on the normal intrauterine pregnancy.[2] Previous literature recommended clinicians to choose among surgical, medical, and expectant management based on patient condition and clinical presentation.[2] Surgical treatment options include laparoscopy or laparotomy for surgical resection of interstitial pregnancy. However, the existence of viable intrauterine pregnancy puts severe restriction on surgical techniques i.e., intrauterine manipulator, local vasopressin injection, and coagulation techniques.[2] Although surgery is the treatment of choice in cornual rupture or hemodynamically unstable

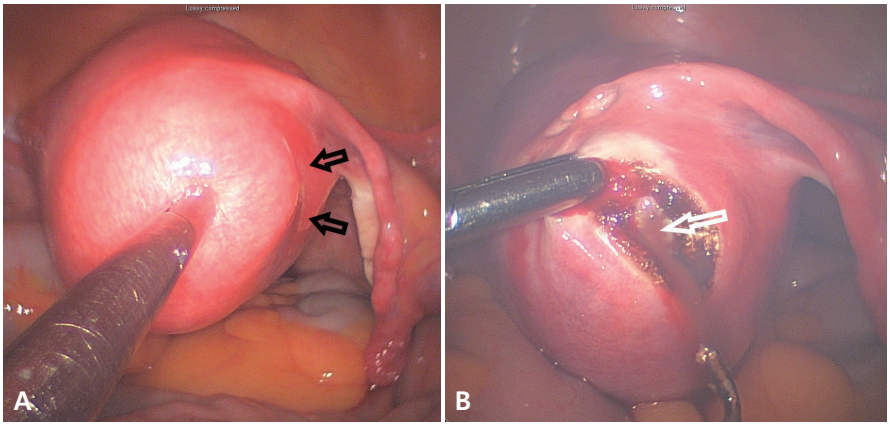

Fig. 2. Laparoscopic image taken during surgery.(A) Bulging mass of posterior right *cornus* on laparoscopy was noted (black arrows). (B) Incision on uterus revealed intramural myoma (white arrow). Written informed consent was obtained for publication of this case report and accompanying images.

patients,[2] medical treatment can also be done using various pharmaceutical agents for local injection (i.e., methotrexate or potassium chloride in G-Sac or fetal heart). Such medical treatment can be applied in early detected, small, and unruptured heterotopic pregnancy. Unfortunately, treatment monitoring is difficult as serial β-hCG will normally rise due to viable intrauterine pregnancy. Comparatively high failure rate and increased rate of spontaneous abortion are some of the drawbacks of medical treatment.[2,10,11] Lastly, in stable patients with small interstitial pregnancy who does not want any kinds of potential adverse effects on intrauterine G-Sac, obstetricians could choose to wait and see.[2] In this case, intrauterine G-Sac was deemed to be nonviable through the follow-up observation. Therefore, resectoscopic approach was chosen for its minimal invasion under the impression of missed abortion. As the G-Sac like lesion suspicious of interstitial pregnancy in the right *cornus* could not be assessed directly by the resectoscopic approach, the immediate conversion to laparoscopy was done.

Our initial impression of heterotopic pregnancy with right interstitial pregnancy (early intrauterine pregnancy with right interstitial pregnancy) is a rare circumstance with potentially fatal outcome. In interstitial pregnancy, the surrounding myometrium is able to withstand much more tension than tubal pregnancy, which leads to possibility of increased expansion, delayed diagnosis, and massive hemorrhage at rupture.[12,13] Unfortunately, it's usually not a simple matter to differentiate interstitial pregnancy from angular or cornual pregnancy, which is considered as a viable pregnancy. For the precise diagnosis of interstitial pregnancy, the following criteria has been proposed for interstitial pregnancy: (1) an empty uterine cavity, (2) a chronic sac separating (<1 cm) from the lateral edge of uterine cavity, and (3) a thin (<5 mm) myometrial layer surrounding the chorionic sac.[14] Recently, other imaging studies such as 3D ultrasonography and pelvis MRI have been proposed to expedite diagnostic process.[6,8,14] In our case, intrauterine blighted ovum made it much more difficult for us to identify the right cornual G-Sac like lesion. If the intrauterine pregnancy had developed embryo normally according to the advancing gestational age, it would have been distinguished from cystic degeneration of leiomyoma mimicking interstitial pregnancy.

Uterine fibroids are the most common benign tumors found in women of childbearing age. In ultrasonography, which is the diagnostic tool of choice, uterine fibroids generally appear to be hypoechoic solid mass with distal acoustic shadowing. However, uterine fibroids larger than 3 cm in diameter may outgrow their blood supply which leads to various degenerations (i.e., hyaline, myxoid, cystic, and hemorrhage). Therefore, degenerated leiomyomas may appear as edematous cystic spaces, hyperechoic hemorrhagic areas and calcification clusters.[15] Although intramyometrial cysts excluding cystic degeneration of leiomyomas are very rare, some reports with uterine fibroids mimicking other pelvic structures have been published.[16-18] Protopapas et al.[19] have reported the differential diagnosis of cystic uterine tumors including cystic degeneration of leiomyomas, cystic adenomyoma, congenital and acquired cysts, and uterine abnormalities. Therefore, considering various cystic uterine tumors as a differential diagnosis should reduce misdiagnosis and also aid in proper management. In this case, the G-Sac like lesion in the right *cornus* (intramyometrial cyst), which was preoperatively diagnosed as interstitial pregnancy, turned out to be cystic degeneration of leiomyoma.

In the diagnosis of heterotopic pregnancy with interstitial pregnancy, benign uterine masses with cystic formation including degenerated uterine fibroids should also be considered as possible differential diagnosis.

ORCID

Hanna Moon, https://orcid.org/0000-0002-2279-3115
Soo Min Hong, https://orcid.org/0009-0006-5138-4819
Yong Jae Lee, https://orcid.org/0000-0003-0297-3116
JoonHo Lee, https://orcid.org/0000-0001-5911-7690

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Authors' Contributions

Conceptualization: all authors; Data curation: HM, SMH; Formal analysis: HM; Methodology: all authors; Project administration: YJL, JHL; Resources: all authors; Supervision: YJL, JHL; Validation: YJL, JHL; Writing–original draft: HM, SMH, YJL; Writing–review & editing: all authors.

References

1) Cerniauskaite M, Vaigauskaite B, Ramasauskaite D, Silkunas M. Spontaneous heterotopic pregnancy: case report and literature review. Medicina (Kaunas) 2020;56:365.
2) Dendas W, Schobbens JC, Mestdagh G, Meylaerts L, Verswijvel G, Van Holsbeke C. Management and outcome of heterotopic interstitial pregnancy: case report and review of literature. Ultrasound 2017;25:134-42.
3) Santos LT, Oliveira SC, Rocha LG, Sousa ND, Figueiredo RS. Interstitial pregnancy: case report of atypical ectopic pregnancy. Cureus 2020;12:e8081.
4) Moawad NS, Mahajan ST, Moniz MH, Taylor SE, Hurd WW. Current diagnosis and treatment of interstitial pregnancy. Am J Obstet Gynecol 2010;202:15-29.
5) Dagar M, Srivastava M, Ganguli I, Bhardwaj P, Sharma N, Chawla D. Interstitial and cornual ectopic pregnancy: conservative surgical and medical management. J ObstetGynaecol India 2018;68:471-6.
6) Gao F, Sun MH, Fu L. The role of three-dimensional MRI in the differentiation between angular pregnancy and interstitial pregnancy. BMC Pregnancy Childbirth 2022;22:133.
7) Ayyash M, Shaman M, Craig B, Khangura R. Expectant management of a heterotopic interstitial pregnancy - a case report. Case Rep Womens Health 2022;34:e00414.
8) Lin TY, Chueh HY, Chang SD, Yang CY. Interstitial ectopic pregnancy: a more confident diagnosis with three-dimensional sonography. Taiwan J ObstetGynecol2021;60:173-6.
9) Li J, Luo X, Yang J, Chen S. Treatment of tubal heterotopic pregnancy with viable intrauterine pregnancy: analysis of 81 cases from one tertiary care center. Eur J ObstetGynecolReprod Biol 2020;252:56-61.
10) Savelli L, Fabbri F, Di Donato N, De Meis L. Heterotopic interstitial pregnancy successfully treated with ultrasound-guided potassium chloride injection in the ectopic embryo. J Obstet Gynaecol 2014;34:276-7.
11) Kwon B, Kang S, Lee HJ, Kim M, Lee YH, Im J, et al. Non-surgical management and obstetric outcomes of heterotopic interstitial pregnancies. Minim Invasive Ther Allied Technol 2020;29:375-9.
12) Cucinella G, Calagna G, Rotolo S, Granese R, Saitta S, Tonni G, et al. Interstitial pregnancy: a 'road map' of surgical treatment based on a systematic review of the literature. GynecolObstet Invest 2014;78:141-9.
13) Stabile G, Romano F, Zinicola G, Topouzova GA, Di Lorenzo G, Mangino FP, et al. Interstitial ectopic pregnancy: the role of mifepristone in the medical treatment. Int J Environ Res Public Health 2021;18:9781.
14) Arleo EK, DeFilippis EM. Cornual, interstitial, and angular pregnancies: clarifying the terms and a review of the literature. Clin Imaging 2014;38:763-70.
15) Mary EN, Leslie MS, Vickie AF. Ultrasound evaluation of the uterus. In: Callen PW, Norton ME, Scoutt LM, Feldstein VA, editors. Callen's ultrasonography in obstetrics and gynecology. 6th ed. Philadelphia: Elsevier; 2017. p. 846-82
16) Carlan SJ, O'Brien WF, Holbrook J, Mastrogiannis D, Vaughn V. Cystic degeneration of a leiomyoma masquerading as a postoperative abscess. Am J Perinatol1992;9:175-8.
17) Aydin C, Eris S, Yalcin Y, Sen Selim H. A giant cystic leiomyoma mimicking an ovarian malignancy. Int J Surg Case Rep 2013;4:1010-2.
18) 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.
19) Protopapas A, Milingos S, Markaki S, Loutradis D, Haidopoulos D, Sotiropoulou M, et al. Cystic uterine tumors. GynecolObstet Invest 2008;65:275-80.