



Retroperitoneal Ectopic Pregnancy Detected by CT: A Case Report

CT에서 발견된 후복막 자궁외 임신: 증례 보고

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Retroperitoneal ectopic pregnancy is a rare form of ectopic pregnancy. Owing to its rarity and non-specific symptoms, diagnosing retroperitoneal ectopic pregnancy at the initial presentation poses a significant challenge. Typically, the diagnosis relies on non-radiation imaging modalities, such as ultrasonography and MRI, whereas CT is infrequently used. Herein, we report a rare case of a retroperitoneal ectopic pregnancy, which was diagnosed using CT.

Index terms Pregnancy; Ectopic; Retroperitoneal

INTRODUCTION

Ectopic pregnancy involves the implantation of a fertilized ovum outside the uterine cavity. It is frequently observed in the fallopian tubes (95%) and less commonly in the abdominal cavity (< 1%) (1). Retroperitoneal ectopic pregnancy is particularly rare (2). It can be fatal because of the risk of life-threatening hemorrhages that can occur if diagnosis and treatment are delayed (3). Herein, we describe a rare case of retroperitoneal ectopic pregnancy diagnosed using CT, which was initially misdiagnosed as tubal ectopic pregnancy.

CASE REPORT

A 28-year-old female presented to a hospital with a history of abdominal pain and amenorrhea for 7 weeks, prompting a suspicion of ectopic pregnancy. She underwent a dilation and

curettage procedure, accompanied by methotrexate treatment, and subsequently followed by laparoscopic bilateral salpingectomy. Despite these interventions, no ectopic gestational sac was identified through any of the tests or surgeries performed. Her beta-human chorionic gonadotropin (b-hCG) levels continued to increase, and she was referred to our hospital for further treatment. Her vital signs remained stable; however, laboratory investigations revealed a hemoglobin level of 9.7 g/dL, indicating mild anemia. The urine pregnancy test yielded positive results, with a b-hCG level elevated at 33996 mIU/mL.

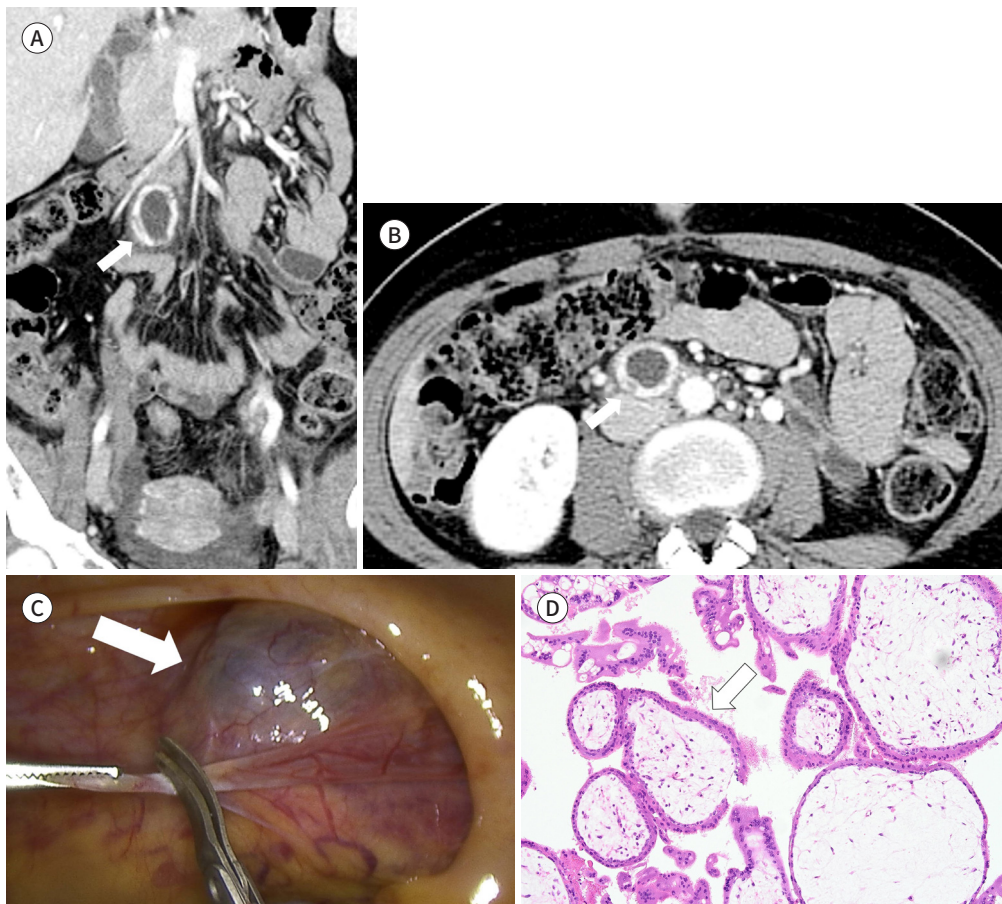
Abdominopelvic CT was performed to accurately locate the ectopic pregnancy, revealing a 3.3 cm cystic mass in the precaval area beneath the third segment of the duodenum, characterized by thick and intense peripheral enhancement (Fig. 1A, B). The mass was identified an ectopic gestational sac, and no other focal lesion suspected of being a gestational sac was observed in the pelvic cavity (including the uterus and adnexa). A small amount of ascites with fat infiltration in the pelvic cavity, indicative of normal postoperative changes, was noted.

Fig. 1. Retroperitoneal ectopic pregnancy in a 28-year-old female.

A, B. Coronal reformatted (**A**) and axial (**B**) contrast-enhanced CT images reveal a well-defined cystic mass with thick and intense peripheral enhancement in the precaval area (arrows).

C. The intra-operative image displays a purplish-blue cystic mass on the surface of the inferior vena cava (arrow).

D. Pathologic examination reveals the presence of chorionic villi in the dissected tissue (hematoxylin and eosin stain, $\times 200$, arrow).



Based on these findings, we established a diagnosis of retroperitoneal ectopic pregnancy.

The patient underwent laparoscopic removal of the ectopic gestational sac. Upon accessing the abdominopelvic cavity, the site at which bilateral salpingectomy was performed became apparent, and a gestational sac was evident in the precaval area covered by the peritoneum (Fig. 1C). Subsequent pathological examination confirmed that the cystic mass consisted of chorionic villi (Fig. 1D). After the surgery, the patient's b-hCG level gradually decreased, and she was discharged without post-surgical complications. Her symptoms improved within a month, and her b-hCG level dropped to 6.7 mIU/mL.

The Institutional Review Board of Hanyang University Hospital approved this case report and the requirement for informed consent was waived due to its retrospective nature (IRB No. HYUH 2023-06-004).

DISCUSSION

Ectopic retroperitoneal pregnancy is a rare condition. It occurs mainly near great vessels, such as the inferior vena cava, abdominal aorta, and iliac vessels (4). The mechanisms underlying the occurrence of such pregnancy remain poorly understood. Several possible hypotheses have been proposed, including fistulous tract formation resulting from iatrogenic uterine perforation and lymphatic migration of the fertilized ovum (2).

Retroperitoneal ectopic pregnancy presents with a wide spectrum of symptoms ranging from asymptomatic instances to hemorrhagic shock, including amenorrhea, abdominal pain, and vaginal bleeding. Accurate diagnosis is often challenging because of nonspecific symptoms and a low incidence rate. Consequently, a notable prevalence of initial misdiagnosis as ectopic pregnancy exceeds 75% (2).

Important clues for the diagnosis of ectopic pregnancy include a persistent increase in b-hCG, absence of normal intrauterine pregnancy on ultrasonography, and confirmation of an extrauterine gestational sac (5). Diagnostic imaging modalities include ultrasonography, CT, and MRI (4). Ultrasonography can identify tubal ring signs, yolk sacs, and fetal heartbeats (4, 6). The "tubal ring sign" is a thick peripheral wall lined by the trophoblast, which forms the outer layer of the blastocyst (7). The trophoblast exhibits increased blood flow, occasionally leading to a strong signal on color Doppler ultrasonography, referred to as the "ring of fire" (7).

In contrast to ultrasonography, which has inherent limitations in terms of field of view, CT and MRI can provide a comprehensive view of the entire abdominopelvic cavity, allowing accurate determination of the location of the gestational sac and its relationship with the surrounding structures (4). On CT and MRI, the gestational sac typically demonstrates strong contrast enhancement and high T2 signal intensity at the periphery where the trophoblast is located (5). In cases of retroperitoneal ectopic pregnancy, typically detected at an advanced gestational stage, a thorough assessment of placental invasion and adherence using ultrasonography and MRI is necessary (8). CT is not usually recommended for pregnant patients because of radiation hazards. However, it can be used when the vital signs are unstable or normal intrauterine pregnancy is definitively ruled out, as in our case. Surgical intervention is the primary treatment for ectopic retroperitoneal pregnancy (9). Other available treatment options include methotrexate and ultrasound-guided local injections of methotrexate into

the gestational sac (9).

In conclusion, in cases where ectopic pregnancy is suspected and a definitive tubal pregnancy is not evident on ultrasonography, the possibility of ectopic pregnancy occurring at unusual locations, including the retroperitoneal area, should be considered. Radiologists should be familiar with the image findings of the extrauterine gestational sac, as this knowledge is required for timely diagnosis and appropriate treatment decisions.

Author Contributions

Conceptualization, R.S., L.C., K.B.; supervision, L.C.; writing—original draft, R.S., L.C.; and writing—review & editing, L.C., K.B., K.M.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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REFERENCES

1. Poole A, Haas D, Magann EF. Early abdominal ectopic pregnancies: a systematic review of the literature. *Gynecol Obstet Invest* 2012;74:249-260
2. Xu H, Cheng D, Yang Q, Wang D. Multidisciplinary treatment of retroperitoneal ectopic pregnancy: a case report and literature review. *BMC Pregnancy Childbirth* 2022;22:472
3. Munzar Z, Afridi KD, Amin F, Habib F. Retroperitoneal ectopic pregnancy presenting as a massive retroperitoneal hematoma. *J Coll Physicians Surg Pak* 2022;32:415-416
4. OuYang Z, Wei S, Wu J, Wan Z, Zhang M, Zhong B. Retroperitoneal ectopic pregnancy: a literature review of reported cases. *Eur J Obstet Gynecol Reprod Biol* 2021;259:113-118
5. Kao LY, Scheinfeld MH, Chernyak V, Rozenblit AM, Oh S, Dym RJ. Beyond ultrasound: CT and MRI of ectopic pregnancy. *AJR Am J Roentgenol* 2014;202:904-911
6. Ren J, Shi J, Zhang G, Wang J. A retroperitoneal perivascular ectopic pregnancy case: diagnosis and possible lymphatic migration. *J Minim Invasive Gynecol* 2022;29:1203-1207
7. Levine D. Ectopic pregnancy. *Radiology* 2007;245:385-397
8. Nagayama M, Watanabe Y, Okumura A, Amoh Y, Nakashita S, Dodo Y. Fast MR imaging in obstetrics. *Radiographics* 2002;22:563-580
9. Huang X, Zhong R, Tan X, Zeng L, Jiang K, Mei S, et al. Conservative management of retroperitoneal ectopic pregnancy by computed tomographic-guided methotrexate injection in the gestational sac: 2 case reports and literature review. *J Minim Invasive Gynecol* 2019;26:1187-1192

CT에서 발견된 후복막 자궁외 임신: 증례 보고

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후복막 자궁외 임신은 자궁외 임신 중에서도 매우 드물게 발생한다. 후복막 자궁외 임신은 발생률이 낮고 비특이적 증상을 보여 첫 내원 시 진단이 매우 어렵다. 주로 방사선 위험이 없는 초음파, 자기공명영상을 통해 진단이 이루어지며 전산화단층촬영을 촬영하는 경우는 드물다. 우리는 전산화단층촬영을 통하여 진단된 드문 후복강 자궁외 임신 1예를 보고하고자 한다.

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