Case Report

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Extremely Rare CT and MRI Findings of Peritoneal Leiomyoma Mimicking Hepatic Mass: A Case Report

매우 드문 간종괴로 오인된 복막 평활근종의 CT 및 MRI 소견: 증례 보고

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Leiomyoma is a common benign tumor from smooth muscle cells, mostly in the uterus. Peritoneal leiomyomas (PLs) are extremely rare and mostly reported as disseminated peritoneal leiomyomatosis. However, to the best of out knowledge, radiologic findings of isolated PL are not reported in English literature. Herein, we introduce the radiologic findings of PL mimicking hepatic mass in a 34-year-old female. CT showed a mass with curvilinear heterogeneous enhancement at the liver's peripheral area. On MRI, the mass showed gradual and heterogeneous enhancement on gadoxetic acid-enhanced MRI and diffusion restriction. The radiologic diagnosis was a benign hepatic tumor, such as degenerated hemangioma, adenoma, and inflammatory myofibroblastic tumor; however, the mass was diagnosed as PL pathologically.

Index terms Magnetic Resonance Imaging; Tomography, X-Ray Computed; Leiomyoma; Peritoneum; Liver

INTRODUCTION

Leiomyoma is a common benign tumor that arises from smooth muscle cells and is found

in 20% of female of reproductive ages, mostly in the uterus (1). Extrauterine leiomyomas are very rare, and leiomyomas in the peritoneum are mostly caused by seeding following surgical resection of uterine leiomyomas. Most reported peritoneal leiomyomas were disseminated peritoneal leiomyomatosis, and isolated leiomyomas are extremely rare. There was a case report of isolated perihepatic peritoneal leiomyoma (2), but its radiologic findings were overlooked. Herein, we introduce the radiologic findings of peritoneal leiomyoma that mimicked a hepatic mass in a 34-year-old female who underwent surgical resection of the liver for pathologic confirmation.

CASE REPORT

A 34-year-old female was referred to our hospital for a hepatic mass. She did not present any clinical symptoms. Laboratory tests including alpha-fetoprotein, complete blood count, electrolytes, aspartate aminotransferase, and alanine aminotransferase were within normal limits. Also, the hepatitis virus serological tests were normal.

Contrast-enhanced CT revealed an approximately 5.3-cm-sized soft tissue density mass at S6 of the liver, or perihepatic space. The mass showed thick peripheral enhancement with a curvilinear pattern, and the rest showed minimal enhancement (Fig. 1A). We considered heterogeneously enhancing hepatic tumor such as degnerated hemangioma, adenoma, or inflammatory myofibroblastic tumor on CT, and recommended MRI for further differential diagnosis. On MRI, the mass showed heterogeneously high signal intensity (SI) on T2-weighted images (WIs) and low SI relative to the liver on T1-WIs, with rim-enhancement on the arterial and portal phase of gadoxetic acid-enhanced MRI and gradual homogeneous dynamic enhancement. On diffusion-weighted imaging with a b-value of 800 s/mm^2, the mass showed high SI and low apparent diffusion coefficient (ADC) value on the ADC map, indicating diffusion restriction (Fig. 1B). There were triangular-shaped areas showing low-density on CT and high SI on T2-WIs at the end point where the mass and liver parenchyma met, which would be a gap between the mass and adjacent liver parenchyma, implying the possibility of extrahepatic mass on retrospective review (arrows on Fig. 1A, B). At the time of MR evaluation, we considered the same differential diagnosis as CT, but could not exclude malignancy completely due to diffusion restriction. The patient wanted surgical resection of the mass, and the surgeon performed laparoscopic right hemihepatectomy considering surgical accessibility as the volume of the patient's remnant left hepatic lobe was sufficient (35%). Pathologic examination revealed an ovoid solid mass in the peritoneum abutting the liver. Histology of the mass showed intersecting fascicles of slender-tapered spindle cells. Immunohistochemical stain for desmin was positive in the tumor cells, consistent with leiomyoma. Based on these findings, the mass was diagnosed as peritoneal leiomyoma (Fig. 1C). Although it was informed later, the patient had a history of myomectomy for uterine myoma.

This study was approved by the Institutional Review Board of our hospital, and the requirement for informed consent was waived (IRB No. 2021-11-006).

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DISCUSSION

We report a case of an incidentally found peritoneal leiomyoma that mimicked hepatic mass on imaging findings. Extrauterine leiomyomas are histologically benign tumors, but

Fig. 1. A 34-year-old female with a peritoneal leiomyoma mimicked hepatic mass.
A. Precontrast axial CT image shows a low attenuated mass in the extrahepatic area of liver segment six. On contrast-enhanced axial and coronal images in the portal phase, the mass shows rim and irregular enhancement and a suspicious gap (arrows) between it and the liver parenchyma.
B. Axial non-enhanced T2-weighted MRI reveals a mass abutting liver segment six with signal intensity higher than that of the liver. Coronal T2-weighted MRI shows a suspicious gap (arrows) between the mass and hepatic parenchyma. In precontrast T1-weighted MRI, the mass shows lower signal intensity relative to that of the liver. Contrast-enhanced arterial, portal, and transitional phases show gradual incomplete mass rim enhancement. The mass shows homogeneous low signal intensity at the hepatobiliary phase and high signal intensity on DWI (b = 800 s/mm^2) and low ADC value on the ADC map.
ADC = apparent diffusion coefficient, DWI = diffusion-weighted imaging, WI = weighted image

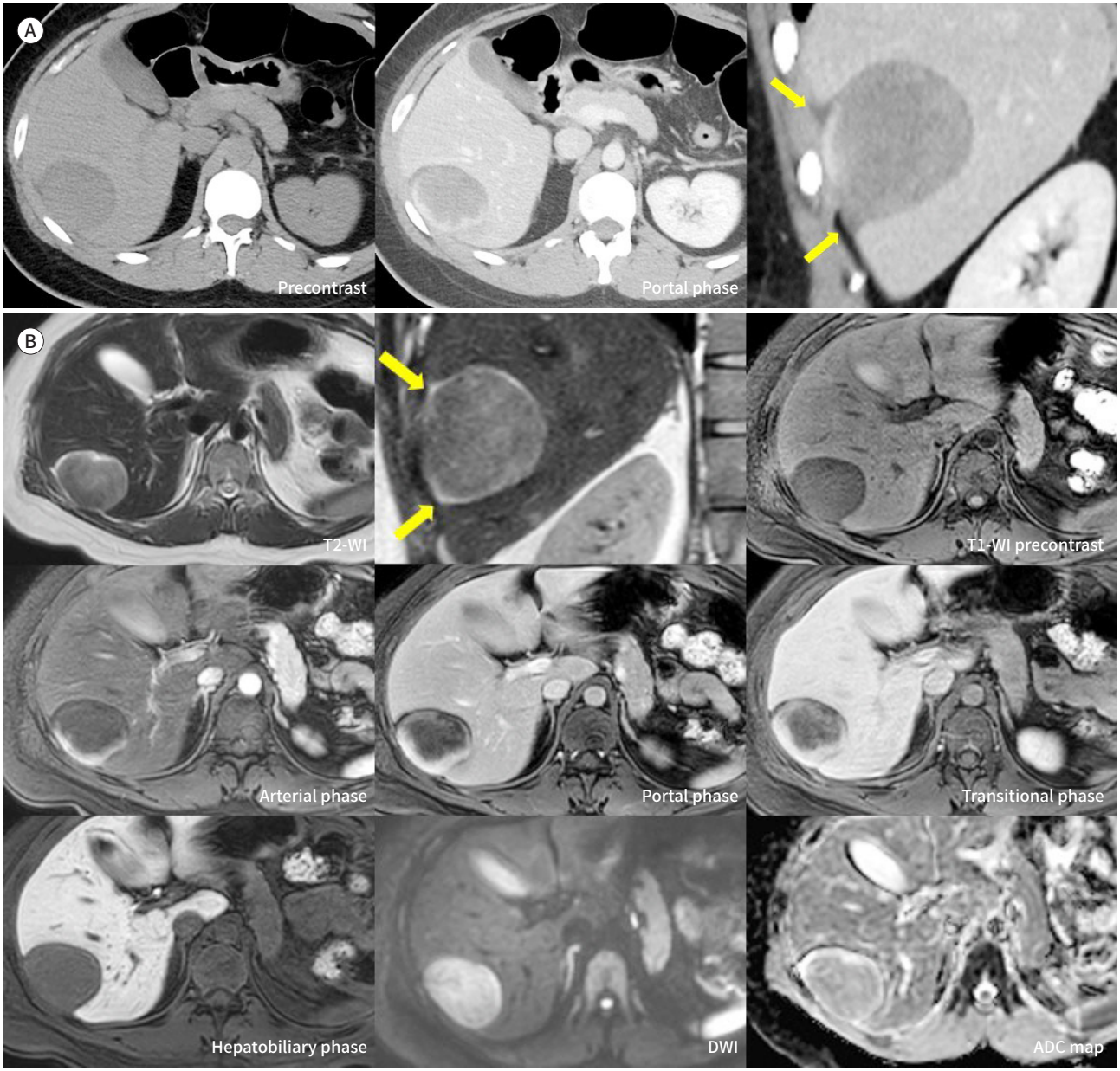
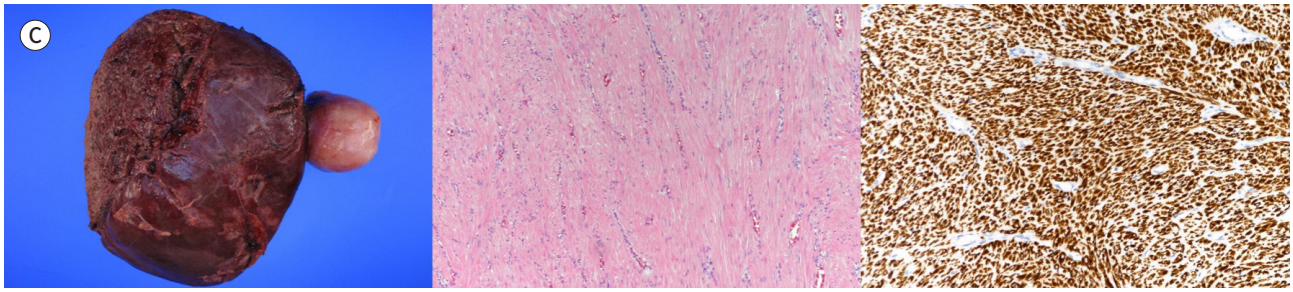


Fig. 1. A 34-year-old female with a peritoneal leiomyoma mimicked hepatic mass.
C. An ovoid solid mass is present in the peritoneum near the liver, measuring 5.8 cm × 4.7 cm × 3.7 cm (left) and its histology showed intersecting fascicles of slender-tapered spindle cells (middle, hematoxyling & eosin stain, × 100). Immunohistochemical stain for desmin revealed positivity in the tumor cells, consistent with leiomyoma (right, × 200).



some of them can mimic malignancy and are challenging to diagnose preoperatively. Thus, radiologists should be aware of characteristics and imaging findings of leiomyomas to help clinicians achieve appropriate management.

Extrauterine myomas can occur anywhere smooth muscle cells exist, including broad ligament, retroperitoneum, ovary, urinary bladder, and peritoneum (3). Radiologic findings of extrauterine leiomyoma are similar to those of uterine leiomyomas. CT findings of leiomyomas show a uniformly solid consistency with similar attenuation to the uterus, whose attenuation is lower than that of the liver. However, CT is not appropriate for characterization of leiomyomas (4, 5). Thus, MRI is the preferred modality for characterization of leiomyomas. On T2-WI, leiomyomas show hypo-intensity similar to muscle due to their predominancy of smooth muscle components. Degenerated leiomyomas have variable imaging features on T1-WI, T2-WI, and contrast-enhanced images. Smooth muscle components may show homogeneous enhancement. On the other hand, cystic or myxoid degenerated portions do not enhance (6). Our case exhibited hyperintensity on T2-WI and showed gradual rim-enhancement and diffusion restriction, which were not consistent with typical findings of leiomyomas. This made it more difficult to consider extrauterine leiomyoma as a differential diagnosis. On pathology, the mass showed several hemorrhagic foci and minimal fatty changes, showing discrepancy with imaging findings. Similar case of perihepatic leiomyoma was reported by Guerra et al. (2), which showed heterogeneous enhancement on MRI and uniform spindly cells on histopathologic examination.

A hypothesis of leiomyoma formations in the peritoneum is implantation of myometrium tissues. Implanted myometrial fragments obtain new blood supply from adjacent structures and develop into leiomyoma. This is also called parasitic leiomyoma. Most reported extrauterine leiomyomas were thought to be parasitic leiomyomas after abdominal surgery (7). Chin et al. (8) reported 6 extrauterine fibroids, and 5 out of 6 cases were diagnosed with leiomyoma. 4 of 5 patients diagnosed with extrauterine leiomyoma had history of laparoscopic myomectomy. There were some case reports of histologically variable extrauterine myomas in perihepatic space, and our case showed similar subcapsular location in spite of different histology, suggesting typical location of parasitic myomas (Supplementary Table 1 in the online-only Data Supplement). Another hypothesis suggests that metaplasia of mesenchymal cells of the peritoneum might cause peritoneal leiomyomas. Estrogen exposure might pro-

mote development of mesenchymal stem cells into smooth muscle cells (9). In the present case, the patient had a history of myomectomy 9 years prior, which was not known at the time of diagnosis. If we had known the history of myomectomy, it would have been easier to consider parasitic peritoneal leiomyoma as a differential diagnosis of the mass.

In conclusion, peritoneal leiomyoma is a rare but possible diagnosis for hepatic masses with unusual enhancement patterns including curvilinear rim enhancement on CT and MRI and hyperintensity on T2-WI. Due to its benign entity, radiologic diagnosis of peritoneal leiomyoma can prevent unnecessary surgical resection. Radiologists should consider peritoneal leiomyoma as a possible diagnosis when the mass is located in the upper abdomen including the perihepatic region, especially if the patient has a history of surgical resection of uterine myoma.

Supplementary Materials

The online-only Data Supplement is available with this article at http://doi.org/10.3348/jksr.2022.0032.

Author Contributions

Conceptualization, C.S.; data curation, all authors; formal analysis, C.S.; investigation, W.J., C.S.; methodology, W.J., C.S.; project administration, C.S.; resources, all authors; supervision, C.S.; validation, all authors; visualization, all authors; writing—original draft, W.J.; and writing—review & editing, C.S., K.H.K., L.J.E., L.M.H., L.S.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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REFERENCES

1. Stewart EA. Uterine fibroids. *Lancet* 2001;357:293-298
2. Guerra F, Giuliani G, Coratti A. Perihepatic parasitic leiomyoma. *Surgery* 2022;171:e13-e14
3. Fasih N, Prasad Shanbhogue AK, Macdonald DB, Fraser-Hill MA, Papadatos D, Kielar AZ, et al. Leiomyomas beyond the uterus: unusual locations, rare manifestations. *Radiographics* 2008;28:1931-1948
4. Casillas J, Joseph RC, Guerra JJ Jr. CT appearance of uterine leiomyomas. *Radiographics* 1990;10:999-1007
5. Wilde S, Scott-Barrett S. Radiological appearances of uterine fibroids. *Indian J Radiol Imaging* 2009;19:222-231
6. Deshmukh SP, Gonsalves CF, Guglielmo FF, Mitchell DG. Role of MR imaging of uterine leiomyomas before and after embolization. *Radiographics* 2012;32:E251-E281
7. Salih AM, Kakamad FH, A H D, J Habibullah I, M Rauf G, Najar KA. Parasitic leiomyoma: a case report with literature review. *Int J Surg Case Rep* 2017;41:33-35
8. Chin H, Ong XH, Yam PK, Chern BS. Extrauterine fibroids: a diagnostic challenge and a long-term battle. *BMJ Case Rep* 2014;2014:bcr2014204928
9. Yang L, Liu N, Liu Y. Leiomyomatosis peritonealis disseminata: three case reports. *Medicine (Baltimore)* 2020;99:e22633

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매우 드문 간종괴로 오인된 복막 평활근종의 CT 및 MRI 소견: 증례 보고

우종훈[1] · 최서연[1*] · 김희경[2] · 이지은[1] · 이민희[1] · 임상혁[1]

평활근종은 평활근세포에서 발생할 수 있는 흔한 양성종양으로, 주로 자궁에서 발생한다. 복막평활근종은 매우 드물며 대부분 복막성 평활근증으로 보고되었다. 저자들이 아는한 단일 복막평활근종의 영상의학적 소견은 영문으로 아직까지 보고된 바가 없다. 전산화단층촬영에서 비균질한 조영증강, 자기공명영상에서 점진적 조영증강 및 확산제한을 보여 영상의학적으로 간의 변성된 혈관종, 간선종, 혹은 염증성 근섬유아세포종 등을 감별하였으나 수술 후 병리학적으로 복막평활근종으로 진단된 34세 여성의 증례 및 영상의학적 소견을 보고하고자 한다.

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