



Original contribution

Endometrial cysts within the liver: a rare entity and its differential diagnosis with mucinous cystic neoplasms of the liver[☆]

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Summary Endometrial cysts within the liver are rare but can present as diagnostic challenges on small biopsies or frozen sections and may mimic mucinous cystic neoplasms (MCN) of the liver. Five cases of endometrial cysts and 6 cases of MCNs within the liver were collected. The clinicopathological, imaging, and immunohistochemical features were systematically reviewed and compared. The average size of the endometrial cysts was 8.3 cm. Four patients had a prior pelvic operation and coexisting endometriosis at other sites. All 5 cases of endometrial cysts had positive ER staining within both the epithelium and the stroma. PR was also positive in both epithelial and stromal cells in 4 cases. Four cases had additional immunostains performed, which all showed cytokeratin 19 and cytokeratin 7 positivity (only in epithelium) and CD10 positivity (only in stroma). α -Inhibin and calretinin were negative for both the epithelium and the stroma in all 4 cases. All 6 MCN cases (mean size, 11.1 cm) had positive ER, PR, and α -inhibin staining only in the stroma. ER and PR were positive in both the epithelium and stromal cells in endometrial cysts, whereas they were positive only in the stromal cells of MCNs. The stromal cells were CD10 positive and α -inhibin negative in endometrial cysts as opposed to the opposite staining pattern in MCNs. Awareness of this distinct staining pattern and the possibility of endometrial cysts in the liver can lead to accurate diagnoses and appropriate treatment modalities.

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Abbreviations: MCN, mucinous cystic neoplasm; ER, estrogen receptor; PR, progesterone receptor.

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1. Introduction

Endometriosis is a common condition predominately affecting pelvic sites but has been reported to occur in a wide range of rare and unusual sites such as scar sites, skin, lung, pleura, diaphragm, bladder, ureter, pancreas, and brain [1–7].

Liver involvement is also extremely rare with only 21 case reports in the literature to date [7-25]. Rarely hepatic endometrial cysts may produce mass-forming lesions and raise the concern for a primary hepatic tumor, echinococcal cyst, or metastatic disease [8,10,11,13,14,18].

In particular, endometrial cysts of the liver can have overlapping radiologic and histologic features with a MCN of the liver [8,10,11,13,14,18]. Distinguishing these 2 entities, especially on small biopsies or frozen sections, may be very challenging given the similar morphologic features of a cystic lesion lined by bland-appearing epithelium with underlying stroma and hemorrhage. The diagnostic pitfall is an important one to recognize given the divergent treatment and pathological behavior of the 2 lesions. We report our findings in 5 cases of hepatic endometrial cysts and 6 cases of MCNs and provide a systematic clinicopathological and immunohistochemical assessment of the 2 entities.

2. Methods

We retrospectively collected 5 cases of hepatic endometrial cysts from our institutions. We then reviewed all available hematoxylin and eosin (H&E) slides and clinical and imaging records. Immunohistochemical stains including cytokeratin 19 (CK19), cytokeratin 7 (CK7), calretinin, α -smooth muscle actin (α -SMA), vimentin, α -inhibin, thyroid transcription factor-1 (TTF-1), ER, PR, and CD10 were also analyzed in 4 cases, where tissue remained.

For comparison, we also collected 6 cases of MCN from our database and reviewed H&E slides and clinical and imaging data. ER, PR, α -inhibin, and CD10 immunohistochemical stains were performed on these cases. In brief, formalin-fixed, deparaffinized 5- μ m sections were incubated with the following panel of monoclonal and/or polyclonal antibodies: ER (clone 1D5, dilution 1:250; Immunotech/Coulter, Miami, FL), PR (PR88, dilution 1:250; BioGenex Laboratories, San Ramon, CA), α -inhibin (Inhibin Alpha; dilution 1:10; Serotec, Raleigh NC), and CD10 (clone 56C6, dilution 1:100; Novocastra/Leica, NewCastle, United Kingdom). Heat-induced epitope retrieval was achieved for all target antigens by heating sections in 0.1 mol/L of citrate buffer (pH 6.0) in a commercial microwave oven. Localization was via avidin biotin or streptavidin biotin immunoperoxidase method using 3,3'-diaminobenzadine-4HCl as the chromogen. Appropriate positive and negative control experiments were performed.

For ER, PR, and TTF-1 immunohistochemical stains, staining was considered positive if more than 25% of the nuclei stained positive. For CK19, CK7, α -SMA, vimentin, α -inhibin, calretinin, and CD10 immunohistochemical stains, staining was considered positive if there was more than 25% cytoplasmic staining. Staining was separately evaluated in both stromal and epithelial components in each type of lesion.

3. Results

3.1. Hepatic endometrial cysts

The mean age of patients with endometrial cysts was 47 years (range, 30-73 years). The clinical, imaging, treatment, and follow-up data are summarized in Table 1. The average size of the endometrial cysts was 8.3 cm (range, 2-17 cm). Three cases were located in the right hepatic lobe, and the other 2 cases were located in the left hepatic lobe. Three patients presented with abdominal pain, and the other 2 cysts were found as incidental lesions on imaging. Four patients had prior pelvic operations, and 4 patients had coexisting endometriosis.

Four of the 5 patients were treated with a partial hepatectomy or removal of the lesion (case 5). The remaining (case 1) did not undergo resection because the cystic mass was an incidental asymptomatic lesion and the biopsy was diagnostic for endometriotic cyst. Two patients were lost to follow-up (cases 4 and 5), and the remaining 3 patients had follow-up with imaging for an average of 101 months (3-276 months). One patient (case 3) had initial partial removal of the hepatic endometrial cyst and then, 3 years later, removal of the remainder of the cyst. The patient had recurrent vaginal and pelvic endometriosis 18 years later but no recurrence of the hepatic endometrial cyst after 23 years from her initial presentation. The other 2 patients (cases 1 and 2) had no clinical or radiologic recurrence on follow-up.

Imaging studies varied from cystic to solid masses. Likewise, grossly, of the 4 resected endometrial cysts, they were all solitary lesions and varied from solid to complex multilocular solid and cystic lesions with variable amounts of cyst contents, one of which had "chocolate" cyst contents with accumulation of menstruation-like hemorrhagic blood in the cyst. Three cases on imaging involved the capsule or were predominately located extracapsular or subcapsular to the liver (cases 1, 2, and 5).

Histologically, all cases showed the diagnostic features of endometriosis consisting of both stromal and glandular components. The glandular components varied from flat cuboidal nonmucinous glands (Fig. 1) to more typical proliferative-type endometrioid glandular epithelium (Fig. 2). Ciliated or squamous metaplasia was also focally noted in the superficial lining epithelium (Fig. 2). No atypia, mucin, or papillary projections were seen in the epithelial cells. The stromal component also varied from hypocellular fibrotic areas (Fig. 1) to the classic endometrial stroma characterized by bland spindle cells with admixed small vessels and variable foci of hemorrhage (Fig. 2).

Immunohistochemical results for the 5 hepatic endometrial cysts are summarized in Table 2, with representative images in Fig. 1. All 5 cases of endometrial cysts had positive ER and vimentin staining within both the epithelium and the underlying stroma. Four cases also had positive PR staining within both the epithelium and the stroma, and 1 case had PR-positive staining only in the stroma. Four cases

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