The involvement of the ovaries by lymphomatous or leukemic disease is well-known and occurs in 7-26% of hematologic malignancies (1-3). In such cases, the ovarian disease is either an early manifestation of the systemic disease or a late complication.

Primary malignant lymphoma of the ovary, as an extranodal disease, is a rare phenomenon, the very criteria for which are somewhat controversial. Only a few cases have been reported and the diagnosis can be sustained only by the histological examination of the ovarian mass and long-term follow-up with no manifestation of a systemic lymphomatous disease (4-8). The imaging findings of primary ovarian lymphoma have not been reported, and we therefore describe the MRI (magnetic resonance imaging) findings of one case of this disease.

Case Report

A 27-year-old nulliparous female patient was admitted to our gynecologic clinic because of a palpable abdominal mass. On physical examination, the only abnormal finding was a huge pelvic mass measuring approximately 10 cm in its longest diameter. Transvaginal ultrasonography (US) revealed a normal retroverted postpubertal uterus and bilateral lobulated solid masses with heterogeneous signal intensity and central feeding vessels.

The imaging findings of primary ovarian lymphoma have not been reported, and we therefore describe the MRI (magnetic resonance imaging) findings of one case of this disease.

Index words: Ovary, neoplasms
Ovary, MR
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A Case Report

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many of which had a conspicuous large, eosinophilic nucleolus. The lymphomatous infiltrate was surrounded by heavy lymphocytes admixed with plasma cells and eosinophils. The immunostaining using LCA (leukocyte common antigen) was strongly and diffusely positive, but cytokeratin, EMA (epithelial membrane antigen) and PAS (periodic acid-schiff) staining were negative.

Follow-up CT one and nine months after surgery revealed no evidence of local recurrence of a tumor or other lymphomatous lesion in other organs.

Discussion

In women with malignant lymphoma, lymphomatous involvement of the ovary is frequent, being found on autopsy in about 39% of cases (5). However, primary involvement of the ovary by lymphoma is very rare (1-8). In a review of 9500 cases of lymphomas by Chorlton et al. (1), in only 19 patients was there initial manifestation in the ovary. In another series of 1269 cases of ovarian tumor studied by Rotmensch et al. (9), only one case of primary ovarian lymphoma was found. Because of its rarity, similar clinical presentations, age-related factors and sometimes closely related pathological features, primary ovarian lymphoma is commonly misdiagnosed as one or other ovarian tumors. Common misdiagnoses are dysgerminomas and granulosa cell tumors (3), in which the treatment differs totally from that of lymphoma. Successful treatment of lymphoma depends on the institution of early chemotherapy. Like other ovarian tumors, lymphoma usually presents as a abdominal or pelvic mass and/or abdominal pain. Peripheral lymphadenopathy and B symptoms are rare. On laparotomy, bilateral ovarian involvement and the presence of

![Fig. 1. Primary ovarian lymphoma in a 27-year-old nulliparous female](image)

A. T1-weighted sagittal image shows a relatively homogeneous hypointense mass with feeding vessels (arrows) in the pelvis superior to the uterus (u) and the urinary bladder (b).

B. T2-weighted axial images show well-defined lobulated bilateral pelvic masses, which demonstrates heterogeneous hyperintense signal with feeding vessels (arrow).

C. Enhanced sagittal MR image with Gd-DTPA shows a well-enhancing adnexal mass with feeding vessels (arrows) compressing the uterus (U).

D. The gross specimen of a right adnexal mass shows a huge yellowish lobulated mass with multifocal hemorrhagic degeneration.
enlarged regional lymph nodes may give a clue to diagnosis, but these features are not specific for lymphoma (5). The differential diagnosis of ovarian lymphoma is problematic, leading to possible therapeutic inadequacies and adverse prognostic implications.

The imaging findings of ovarian lymphoma have not been reported. In any homogeneously hypoechoic organ, lymphoma generally presents as a homogeneous solid mass (10), and US reveals posterior sonic enhancement. The mass is seen as homogeneously hypointense on T1- and of variable intensity on T2-weighted MR images, hemorrhagic degeneration was confirmed (Fig. 1B). This is also occasionally observed in dysgerminoma and granulosa cell tumor of the ovary (14, 15), a fibrovascular bundle was not found, but small feeding vessels were seen in the form of a small round signal void on T1WI, T2WI and enhanced MR images. In some areas, demonstrated as high signal intensity on T2-weighted MR images, hemorrhagic degeneration was confirmed (Fig. 1B). This is also occasionally observed in dysgerminoma and granulosa cell tumor of the ovary (14, 15). The other area of intermediate high signal intensity was attributable to the large amount of free water and relatively small proteinous portion of lymphoma cells, condition similar to those found in cases of uterine lymphoma (17, 18). Like uterine lymphoma (18), this ovarian lymphoma showed clear enhancement.

In conclusion, we describe a case of primary ovarian lymphoma which was seen on MRI as clearly enhanced bilateral lobulated solid masses with heterogeneous signal intensity and central feeding vessels.

References
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