Endometrial carcinoma with peritoneal keratin granulomas mimicking peritoneal carcinomatosis: a case report and imaging diagnosis

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Abstract We report the case of a 71-year-old woman diagnosed as having endometrioid adenocarcinoma with squamous differentiation (adenoacanthoma, grade 1) and peritoneal keratin granuloma. Preoperative diagnostic imaging showed a uterine cavity filled with a large mass, many peritoneal nodules, and free fluid in the Douglas pouch, indicating a peritoneal carcinomatosis. Endometrial biopsy revealed grade 1 endometrioid adenocarcinoma. Eventually, postoperative histopathological examination led to the diagnosis. Although peritoneal keratin granulomas mimicking peritoneal carcinomatosis are due to endometrial carcinomas containing squamous elements, gynecological oncologists should keep in mind such situations. The combination of contrast-enhanced T1-weighted and diffusion-weighted magnetic resonance imaging is helpful for preoperative differential diagnosis.

Keywords Peritoneal keratin granuloma · Endometrial adenoacanthoma · Peritoneal carcinomatosis · Diffusion-weighted image · Contrast-enhanced T1-weighted image

Background

Peritoneal keratin granuloma was described in cases of endometrioid adenocarcinoma with squamous differentiation of the uterus and ovary by Chen et al. [1] for the first time in 1978. It is important to recognize keratin granulomas because they macroscopically resemble peritoneal tumor implants or other granulomatous lesions. Here we report a case of endometrioid adenocarcinoma of the uterine corpus with peritoneal keratin granulomas resembling cancerous peritonitis, and describe its diagnostic imaging characteristics during differentiation of peritoneal carcinomatosis.

Case presentation

A 71-year-old woman (gravida 4, para 2) complained of abnormal vaginal bleeding and abdominal distention. On pelvic examination, the uterine body was mobile and enlarged to the size of a goose egg. The posterior vaginal fornix was distended due to ascites. Ultrasound imaging showed a uterine cavity filled with a large mass, many peritoneal nodules (measuring ≤ 2 cm), and echo-free space in the Douglas pouch, indicating a peritoneal carcinomatosis. Endometrial biopsy revealed grade 1 endometrioid adenocarcinoma, whereas cytology of ascites obtained from the Douglas pouch showed only reactive mesothelial cells. Her serum CA125 and CA19-9 levels were elevated to 567 U/ml and 2100 U/ml, respectively. Pelvic magnetic resonance imaging (MRI) revealed an endometrial tumor with myometrial invasion, free fluid in the Douglas pouch, and many peritoneal nodules. These nodules showed low intensity on both T1- and T2-weighted imaging (WI) (Fig. 1a) and no enhancement on contrast-enhanced (CE)

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Fig. 1 **a** Peritoneal nodules show low intensity (*arrow*) on T2-WI. **b** No enhancement (*arrowhead*) on contrast-enhanced T1-WI

Fig. 2 Peritoneal nodules show low intensity (*arrows*) by axial high-*b*-value DWI

T1-WI (Fig. 1b). Furthermore, the low intensity was confirmed by axial high-*b*-value diffusion-weighted imaging (DWI) (Fig. 2). Computed tomography (CT) revealed a thickened peritoneum with ascites and peritoneal nodules without enhancement. There was no lymphadenopathy or distant metastasis. Total abdominal hysterectomy, bilateral salpingo-oophorectomy, lymph node dissection, and greater omentum biopsy were performed. There were 300 ml of yellow clear ascites with no malignant cells, and dark brownish, pigmented nodules (measuring ≤ 2 cm) spreading to the vesicouterine fold and Douglas pouch, which were non-invasive and easily removable. Macroscopically, the uterine cavity was occupied by tumor, and histopathological findings showed a well-differentiated adenocarcinoma with squamous differentiation (Fig. 3a). The nodules from the vesicouterine fold and Douglas pouch consisted of keratin granulomas showing eosinophilic

deposits of keratin surrounded by reactive histiocytes, foreign body giant cells, and fibrosis (Fig. 3b, c). A diagnosis of endometrioid adenocarcinoma with squamous differentiation (adenocanthoma, grade 1) and peritoneal keratin granuloma was made. Cytology of ascites showed reactive mesothelial cells without malignant cells. Thus the patient was finally diagnosed as having the International Federation of Gynecology and Obstetrics (FIGO 2008) stage IA endometrial cancer G1, and received no additional treatment. She has been free from recurrence for 11 months.

Discussion

Peritoneal keratin granulomas are an unusual complication of endometrial adenocarcinoma with squamous differentiation and have been reported in cases of endometrioid adenocarcinoma with squamous differentiation of the uterus, ovary, and atypical polypoid adenomyoma [1, 2]. It is postulated that keratin from the squamous element of the endometrial tumor refluxes through the fallopian tubes toward the peritoneum where it initiates a foreign body granulomatous response [1], and includes frequent association with cervical stenosis, corneal location of the primary tumor, presence of keratin clumps within the lumen of the tube, and superficial location of squamous differentiation with death of squamous cells in the endometrial carcinoma [2]. In the present case, the uterine cavity was filled with a primary well-differentiated adenocarcinoma with squamous differentiation that covered a corneal part of the uterine corpus. The tumor cells spread through the tubes to the peritoneum, leading to a florid peritoneal reaction to keratin associated with an acute inflammatory response and free fluid in the Douglas pouch.

Fig. 3 Primary uterine well-differentiated adenocarcinoma with squamous differentiation (HE, $\times 200$). **b** Keratin granuloma (HE, $\times 40$). **c** Eosinophilic deposits of keratin surrounded by reactive histiocytes, foreign body giant cells, and fibrosis (HE, $\times 200$)

At surgery, peritoneal keratin granulomas may resemble metastatic carcinoma. However, as in our case, peritoneal keratin granulomas are non-invasive and easily resectable compared to invasive disseminated tumors. Microscopic findings also resembled peritoneal tumor implants, because reactive mesothelial cells near keratin granulomas may proliferate to form papillary or glandular structures [1, 2]. In general, no definitive viable adenocarcinoma cells are found in association with keratin granulomas, and thus, prognosis is not affected by the presence of peritoneal keratin granulomas. In our case, no atypical cells could be identified in keratin granulomas and ascites. However, some cases in the literature have reported viable adenocarcinoma cells accompanying keratin granulomas [2, 3]. These lesions were regarded as disseminated metastatic foci and treated with radiotherapy and/or chemotherapy. The effects of these treatments on keratin granulomas have not been studied in detail and the prognostic significance has not been confirmed because of short follow-up periods.

To date, 28 cases of endometrial adenoacanthoma with keratin granuloma have been reported in the English-language literature [1–9], but none has described diagnostic imaging. In our case, ultrasonography, CT, and MRI all depicted free fluid and several peritoneal nodules in the Douglas pouch, mimicking peritoneal carcinomatosis. Usually, peritoneal disseminated tumors are depicted as enhanced lesions in CE T1-WI and high-intensity lesions in high-*b*-value DWI [10]. However, the peritoneal nodules in our patient were smaller than 1 cm, not enhanced by contrast media in CE T1-WI, and depicted as low-intensity

lesions in high-*b*-value DWI, probably indicating their histopathology. This is crucial during differentiation of peritoneal carcinomatosis from peritoneal keratin granulomas. Although peritoneal keratin granulomas are due to endometrial carcinomas containing squamous elements, gynecological oncologists should keep in mind such situations. The combination of CE T1-WI and DWI is helpful for preoperative differential diagnosis.

Conflict of interest We have no conflict of interest as to this article.

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