Clinical Case Report

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Primary malignant mixed Müllerian tumors of the fallopian tube with cervix metastasis

A rare case report and literature review

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Abstract

Rationale: Primary malignant mixed mullerian tumors of the fallopian tube is very rare and has only 1 case in the current literature with cervix metastasis.

Patient concerns: We reported a 49-year-old woman sufferring from primary malignant mixed mullerian tumors of the fallopian tube with cervix metastasis, and the imaging examination found a strip of solid mass in the right fallopian tube and a nodular mass in cervical canal,which were both hyperintense on T_2 weighted image (T_2WI) and diffusion weighted image (DWI) and continuous moderate enhancement on dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI).

Diagnoses: The diagnosis was confirmed according to the specific anatomical location and pathological examination which was proved as primary malignant mixed mullerian tumors of the fallopian tube with cervix metastasis.

Interventions: The patient underwent radical hysterctomy, bilateral adnexectomy, pelvic lymph node dissection, omentum majus excision and intravenous chemotherapy.

Outcomes: Her posttreatment condition was good.

Lessons: Primary malignant mixed mullerian tumors of the fallopian tube can be located by magnetic resonance image examination, which may also offer several diagnostic tips according to changes in signal and enhancement. When combined with pathological findings, qualitative diagnosis can be determined. Surgery and adjuvant chemotherapy are considered as effective methods. Our paper discussed its epidemiology, clinical symptoms, pathologic characters, therapeutic method as well as magnetic resonance imaging findings suggesting the diagnosis and differential diagnosis, including precontrast scan, contrast scan and diffusion weighted image and provided magnetic resonance imaging characteristics of primary malignant mixed mullerian tumors of the fallopian tube described in other literatures.

Abbreviations: AFP = alpha fetal protein, CA125 = cancer antigen 125, CA19-9 = cancer antigen 19-9, CEA = carcino embryonie antigen, DCE-MRI = dynamic contrast-enhanced magnetic resonance imaging, DWI = diffusion weighted image, HE4 = human epididymis protein 4, MMMTs = malignant Müllerian mixed tumors, MRI = magnetic resonance imaging, SCC = squamous cell carcinoma antigen, T_1WI = T_1 weighted image, T_2WI = T_2 weighted image.

Keywords: cervix metastasis, fallopian tube, magnetic resonance imaging (MRI), malignant mixed Müllerian tumors (MMMTs)

1. Introduction

Malignant Müllerian mixed tumors (MMMTs) are rare and highly malignant in the female genital tract. It has been widely recognized that the common primary sites of MMMTs are uterus, cervix and ovary, and it is extremely rare for MMMTs to occur in the fallopian tube which may only account for 0.1% to 0.5% among all gynecologic malignancies.[1–3] The common clinical symptoms are abdominal pain with atypical vaginal bleeding and abdominal distension. It is easy to metastasize and may plant and spread along the abdominal peritoneum and pelvic organs. Nearly 60% of primary MMMTs of the fallopian tube can transfer to pelvic and abdominal organs (including uterus, cervix, ovary, contralateral appendages) and para-aortic lymph nodes, and 8% of them may be accompanied by liver, lung, bone, and other distant metastasis.[3–10] But as far as we know, only one case of primary MMMTs of the fallopian tube with cervical metastasis was reported in the pathology department.[8] It is confused to preoperatively diagnose primary MMMTs of fallopian tube by imaging because the features are similar to those of hydrosalpinx, tuboovarian abscess, and ovarian neoplasms.[11] We reported a rare case of MMMTs of the fallopian

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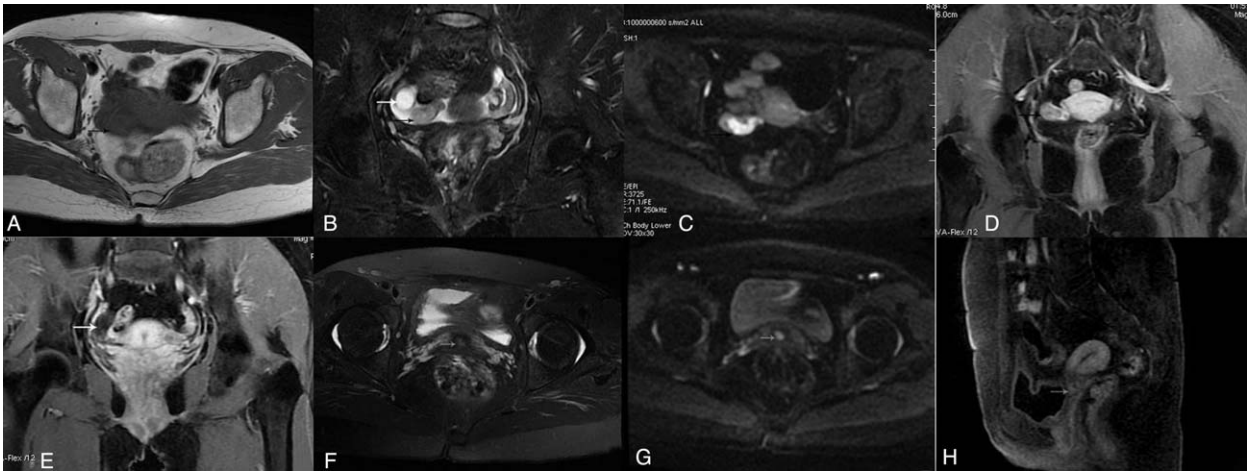

Figure 1. Tumor tissues of the fallopian tube (black arrow) were hypointense on T_1WI (A), hyperintense on T_2WI (B), and DWI (C), and it had a moderate enhancement on coronal LAVA-FLEX+C on delayed phase (D), and the degree of enhancement was lower than that of uterus myometrium. Middle and distal fallopian tube dilatation (white arrow) on the right side of the lesion also was revealed, and it was hyperintense on the T_2WI (B), which was similar to the free water. But it had not enhancement on coronal LAVA-FLEX+C on delayed phase (E).The tumor tissues of the cervical canal (gray arrow)were hyperintense on T_2WI (F) and DWI (G), and it also had a moderate enhancement on sagittal LAVA-FLEX+C on delayed phase (H).

tube with cervix metastasis and briefly reviewed the literatures concerning imaging findings.

2. Case report

2.1. Clinical findings

A 49-year-old woman experienced lower abdominal pain for half a year and colporrhagia for several days. Pelvic color Doppler ultrasound showed a right ovarian tumor in other hospital. Meanwhile, anti-inflammation therapy was applied, but there was no obvious improvement in symptoms. Neoplasm was found in the internal ostium of the cervix when she underwent the gynecology examination, and then adenosquamous carcinoma was diagnosed by biopsy of the cervix tissue. Thereupon, she was admitted to our hospital for further treatment. Acystic-solid mass measuring 40 mm × 37 mm × 29 mm was scanned below the right ovary and the liquid density in uterine cavity was also detected by pelvic color ultrasound in our hospital. So a mass at right pelvic cavity and hydrohystera were diagnosed. Since the onset of the disease, lower abdominal pain was not relieved; meanwhile there was a little bleeding from the vaginal. Weight did not lighten obviously. Results of various laboratory tests, such as tumor markers (including CEA, AFP, CA125, CA19-9, HE4, and SCC), biochemical tests and the routine blood parameters, had no obvious abnormality. The patient was treated with cervical erosion by physiotherapy 6 years ago and underwent sterilization 28 years ago. Also she was in stable condition without deterioration until follow-up.

2.2. Imaging findings

A strip of solid mass measuring 26 mm × 17 mm was scanned in the right fallopian tube with clear margin by pelvic magnetic

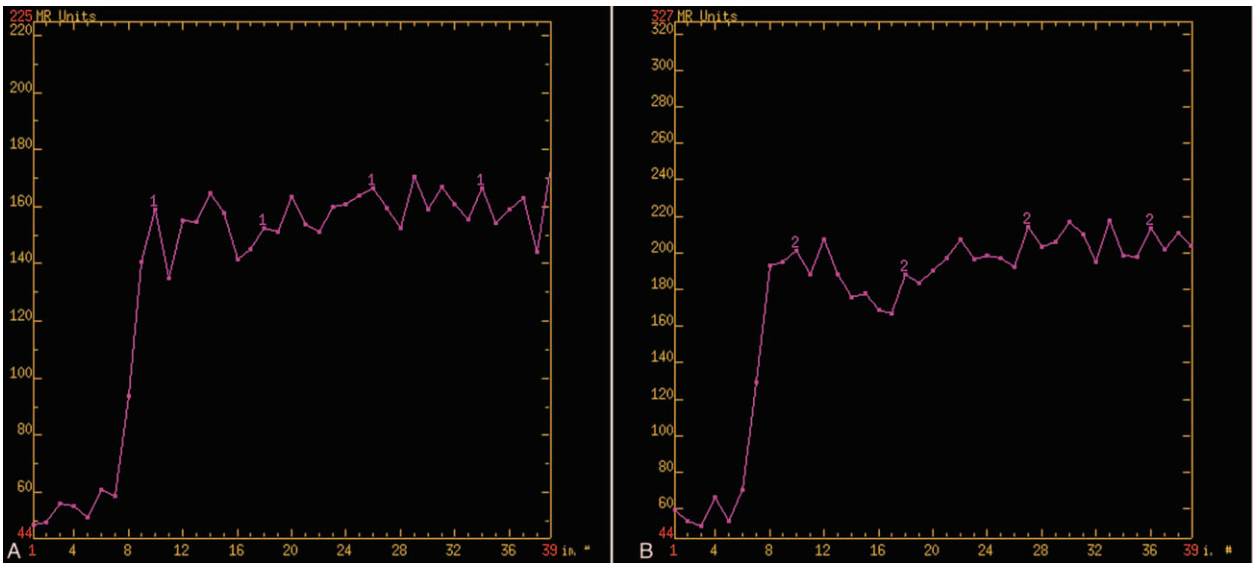

Figure 2. According to time-signal cure on DCE-MRI of tumor tissues of the fallopian tube (A) and the cervical canal (B), they both had a continuous enhancement.

resonance imaging (MRI). Its signals were heterogenous, which was hypointense on T_1 weighted image (T_1WI), hyperintense on T_2 weighted image (T_2WI), and diffusion weighted image (DWI). It had a continuous moderate enhancement on dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI), and the degree of enhancement was lower than that of uterus myometrium. On the right side of the lesion, middle and distal fallopian tube dilatation was observed and showed "free water" like signals which exhibited hypointense on the T_1WI, hyperintense on the T_2WI and DWI, nonenhancement on the DCE-MRI. In cervical canal, we observed a nodular mass measuring 10 mm with incomplete matrix ring and abnormal MRI signal (iso-signal on T_1WI, hyperintense on T_2WI and DWI, and continuous moderate enhancement on DCE-MRI) (Figs. 1 and 2). So, a mass at right adnexa (originating from the fallopian tube), the right hydrosalpinx, cervical nodule and pelvic effusion were diagnosed.

2.3. Therapeutic process

The patient underwent radical hysterctomy, bilateral adnexectomy, pelvic lymph node dissection, and omentum majus excision. The patient was placed in the supine, and an incision measuring 150 mm was carried out on the middle of the lower abdomen wound around the left side of the umbilicus. At laparotomy, a faint yellow mixed mass with a size of 60 mm × 30 mm × 30 mm in right fallopian tube was showed, which capsule was completed. The patient was treated with intravenous chemotherapy consisting of 500 mg carboplatin and 270 mg paclitaxel at 3 week intervals for 6 cycles. During chemotherapy, the results of varied laboratory tests, such as tumor markers (including CEA, AFP, CA125, CA19-9, HE4, and SCC), biochemical tests and the routine blood parameters, were all normal and there were no nausea, vomiting, chest tightness, shortness of breath, etc. Periodical follow-up was recommended when she got out of the hospital.

2.4. Pathological findings

Macroscopically, a mass with gray cut surface measuring 25 mm × 25 mm × 15 mm was seen in the intracavitary of the right fallopian tube, which texture was fragile, and muscle layer was invaded. The fimbria of fallopian tube was opened. In the cervical canal, there was a gray depression with a size of 9 mm × 5 mm, and the invasion depth of the entire layer was <1/2, but the cervical mucosa was still smooth.

Microscopically, for tumor tissues of the fallopian tube and the cervical canal, atypical cells were observed with sheet, nidulant, and infiltrated growth pattern. Moreover, the size of nucleus was enlarged and stain was deep, and karyoplasmic ratio was increased. But for tumor tissues of the fallopian tube, spindle cells were seen and atypia was obvious, and the nuclear fission was more common and it was also accompanied by inflammatory cell infiltrating locally (Fig. 3). Immunohistochemical stain of the fallopian tube tumor tissue: CD56 (NK-1): (epithelial and mesenchymal components +), CK: (+), CK5/6: (individual cells +), EMA: (local+), P53: (epithelial and mesenchymal components +), P63: (scattered cells+), PAX-8: (epithelial components+), PR: (local+), Vimentin (mesenchymal components+), WT-1: (epithelial and mesenchymal tissues+), Ki-67: (+95%), CEA (partial epithelial+). Immunohistochemical stain of the cervical tube tumor tissue: ER (local+), P16: (+), P53: (+), PAX-8: (+), PR: (local +), WT-1: (+). Primary MMMTs of the right fallopian tube and cervical canal metastasis were diagnosed by pathology, and the metastatic component was proved as poorly differentiated adenocarcinoma.

3. Discussion

MMMTs are a kind of biphasic neoplasms with 2 components of malignant epithelium and mesenchyma, which are possessed of high invasiveness and poor prognosis. However, the standard diagnosis and treatment strategy of primary MMMTs of the fallopian tube has not been established in the clinic due to its extremely low incidence.[1,2] For primary MMMTs of the fallopian tube, at present, the surgical treatment is the main method. Satisfactory cytoreductive surgery and adjuvant chemotherapy are considered as effective methods.[10–12] The mean age of onset is 57.5 years old.[2] The common symptoms are lower abdominal pain followed by atypical bleeding and nonspecific abdominal distention.

We have had a detailed literature search, and it was found that primary MMMTs of the fallopian tube have been reported about 90 cases on global,[3–5] and most of them were pathological or clinical reports, and only 2 cases of them were reported by radiologists.[6,7]

Kawakami et al[6] reported a case of primary MMMTs of the fallopian tube firstly. MRI revealed that a solid mass measuring 50 mm × 30 mm was showed in the right adnexa, which was hypointense on T_1WI, hyperintense on T_2WI and the signals were heterogenous. The hyperintense on T_2WI was higher than that of muscle, and equivalent to the myometrium of uterus. Peng et al[13] also reported a case, and MRI revealed that a circular mass with a size of 57 mm × 62 mm was found at the right pelvic cavity, which was low, moderate, slightly high and mixed signal on T_1WI and low, high and mixed signal on T_2WI. Arioz et al[5]

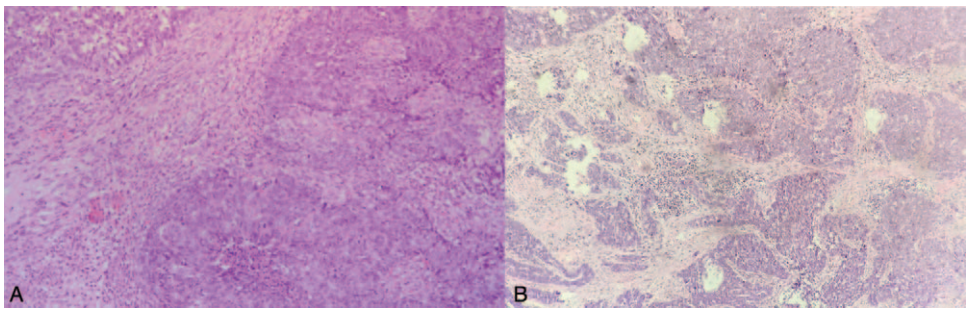

Figure 3. Microscopic observations: for tumor tissues of the fallopian tube (A) and the cervical canal (B), the epithelial component was poorly differentiated adenocarcinoma and for tumor tissues of the fallopian tube, the mesenchymal component was fibrosarcoma.

reported a similar case, which was a solid mass measuring the diameter of 60 mm. It was iso-signal on both T_1WI and T_2WI, and obvious enhanced was observed. The degree of enhancement was lower than that of the myometrium of uterus, meanwhile, this case was accompanied by hematosalpinx and hematometra. The signals on T_1WI and T_2WI of our case were similar to those of the cases reported by Kawakami and Peng Ziyue, and reasons why they were different from the case reprted by Arioz may be caused by various elements, but the imaging findings of the enhancement were similar. Compared with previous cases, our case was primary MMMTs of the fallopian tube with cervix metastasis, which has not yet been reported in terms of imaging performance. The patient was admitted to the hospital with lower abdominal pain and colporrhagia. It is easy to miss the diagnosis of MMMTs of the fallopian tube, and only cervical tumor is diagnosed according to the doctor's diagnosis routine. DWI sequence was used in this case, and it reduced the rate of misdiagnosis due to the significantly abnormal hyperintense was found on DWI.

Preoperative imaging diagnosis of primary MMMTs of the fallopian tube is difficult and usually easily misdiagnosed as ovarian neoplasms. So it is necessary to identify them with the following diseases: *Ovarian cancer*: It shows that a lobulated cystic-solid mass is located in unilateral or bilateral adnexa, which is hypointense on T_1WI and hyperintense on T_2WI, and the signals are heterogeneous. The post-contrast MRI shows that solid component is obviously inhomogeneously enhanced and the degree of enhancement is equal to the uterus, and most of the ovarian cancer are accompanied by ascites.[14,15] Primary MMMTs of fallopian tube are generally solid masses, and degree of enhancement is slightly lower than that of the uterus, and it is generally not accompanied by ascites, which are helpful for the differential diagnosis. *Fallopian tube cancer*: Fallopian tube cancer is very rare in the female reproductive cancer and the mean age of onset is 55 years old, and symptom of the fallopian tube cancer is mainly vaginal discharge.[13] MRI reveals that a sausage-shaped, solid or solid-cystic mass, which is homogeneous hypointense or equisignal on T_1WI and homogeneous equisignal or hyperintense on T_2WI. It's often accompanied by hydrosalpinx. The solid part is lightly-to-moderately enhanced, and the cystic part is not enhanced on the post contrast MRI.[16–18] Kawakami et al[6] think that the signals of MMMTs of fallopian tube are more inhomogeneous than that of the fallopian tube carcinoma, which is helpful for differential diagnosis.

4. Conclusions

In conclusion, primary MMMTs of fallopian tube are with low incidence, high malignancy, metastatic and progressive potential, and poor prognosis. The early diagnosis is difficult. Most of them are diagnosed by pathology. The primary MMMTs of fallopian tube with cervical metastasis is very rare. If a patient is hospitalized with colporrhagia and lower abdominal pain, and the MRI reveals a solid mass in the fallopian tube. Its signals are heterogenous, which were hypointense or iso-signal on T_1WI, hyperintense or iso-signal on T_2WI and hyperintense on DWI. It had a continuous moderate enhancement on contrast MRI, and the degree of enhancement was lower than that of uterus myometrium. At this point, we should be on the alert for the possibility of primary MMMTs of fallopian tube. And we should be more vigilant that the lesion on cervix may be just metastasis. Sometimes, the lesions are so small that it's difficult to be observed on T_1WI and T_2WI in the absence of enhanced images. If necessary, we should add DWI sequence in order to identify the primary lesion to avoid misdiagnosis.

Author contributions

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Writing – original draft: Qinhe Zhang.
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