Case Report

Mucinous borderline tumor involving fallopian tube: case report and review of the literature

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Abstract: We report the case of a 74-year-old woman with a primary mucinous borderline tumor of the fallopian tube coexisting with an ovarian mucinous borderline tumor. Data were obtained through histopathologic study of the excised surgical specimen. p53, estrogen receptor (ER) and PAX8 expression were evaluated by immunohistochemistry on the available right fallopian tube and ovary. Both the ovarian and fallopian tube borderline ovarian tumors were negative for p53, ER and PAX8. However, the staining pattern highlighted the transition from a normal ciliated cell to neoplastic epithelia in the fallopian tube fimbria. This is the first report to indicate that mucinous borderline tumors may arise from the ciliated cells at the fallopian tube fimbrial epithelia. ER and PAX8 are useful markers in identifying the transition and origination of these tumors.

Keywords: Fallopian tube ciliated cells, primary mucinous borderline tumor, immunohistochemistry

Introduction

Primary ovarian mucinous tumors account for 10-15% of epithelial ovarian cancers [1]. About 80% ovarian mucinous tumors are benign, 10% are borderline and 10% are malignant, but the origin of ovarian mucinous tumors remains unclear. Some published reports suggest that high-grade serous carcinomas may originate in primary fallopian tube epithelial cells. Expression of the p53 mutation has played a key role in identifying tumors that originate in tubal fimbria [2, 3]. Genetic transformation also has proved valuable in determining the cellular origin of these tumors. Previously, we provide the first experimental evidence that fimbrial epithelial cells of the fallopian tube could be a potential source of ovarian mucinous adenocarcinoma [4]. Our report presents a case of primary mucinous borderline tumor of the fallopian tube coexisting with an ovarian mucinous borderline tumor. To our knowledge, this is the first report in the medical literature to document this coexistence.

Case report

We report the case of a 74-year-old woman with a primary mucinous borderline tumor of the fallopian tube coexisting with an ovarian mucinous borderline tumor. Data were obtained through histopathologic study of the excised surgical specimen. Microscopically, the normal epithelium of secretory, ciliated and intercalated cell types was present in some areas. However, the fimbria of the right fallopian tube was partially replaced by a mucinous borderline tumor (Figure 1). Further evaluation revealed that the borderline tumor was primarily present on the surface of the fimbria and contained areas of transition from normal ciliated cell epithelium to neoplastic epithelium. More important, under high-power magnification we observed that some transitional borderline tumor cells had obvious cilia (Figure 2). While some other transition between secretory epithelial cells and borderline tumor cells, p53, estrogen receptor (ER) and PAX8 expression were evaluated by immunohistochemical staining of tumor.
sections from the available right fallopian tube and right ovary (Figure 3). Both borderline tumors were negative for ER, PAX8 and p53. However, the ER and PAX8 staining patterns highlighted a transition from normal ciliated cells to neoplastic epithelia in fallopian tube fimbria (Figure 1). No evidence of invasion was found.

Discussion

All the major types of carcinoma known to occur in the ovary have also been found in the fallopian tube. The most common carcinoma type occurring in the ovary is serous tumor, followed by endometrioid tumor. Fallopian tubal mucinous borderline neoplasms are less prevalent...
Primary mucinous borderline tumor of the fallopian tube

Figure 2. The borderline tumor mostly lines the fimbrial surface with areas of transition from normal ciliated cell epithelium to neoplastic epithelium (A and B: hematoxylin-eosin, 40x).

Figure 3. The borderline tumor mostly lines the fimbrial surface with areas of transition from normal ciliated cell epithelium to neoplastic epithelium (A: hematoxylin-eosin, 40x; B: estrogen receptor immunohistochemical staining, 40x; C: Pax-8, 40x).

than serous tumors. Traditionally, a carcinoma that extensively involves both the ovary and fallopian tube was believed to be of ovarian origin, but these assumptions are being challenged.

Accumulating evidence suggests that tumors conventionally diagnosed as ovarian high-grade serous adenocarcinomas originate in the fallopian tube epithelium [5-7]. Histologic examination of the entire fallopian tube has shown that fallopian tubal intraepithelial carcinomas often coexist with ovarian and peritoneal high-grade serous adenocarcinomas [8, 9]. In most of the reported cases of anatomically discontinuous endometrioid carcinomas involving both the fallopian tube and uterus simultaneously; the fallopian tubal tumors were unilateral and located at the fimbrial end.

In the current report, we examined the coexistence of a mucinous borderline tumor of the fallopian tube and ovary. Microscopically, we found that the fimbria of the right fallopian tube was partially replaced by this mucinous borderline tumor. Further evaluation revealed that the mucinous borderline tumor had transitioned from normal tubal ciliated cells. Interestingly, some borderline tumor cells were in transition with normal epithelial cilia, whereas others had lost their cilia and presented as a type of secretory cell. We considered this to be morphologic evidence that mucinous borderline tumors originate with fallopian tube ciliated cells.

Immunostaining results supported our morphologic observations. The ER and PAX8 immunostaining pattern demonstrated that the borderline tumor’s transition from normal ciliated cell epithelium to neoplastic epithelium locates mostly at the fimbria. The infundibulum of the fallopian tube, with its trumpet-shaped ending, is believed to be fringed by the fimbria, which attached the tube to ovarian surface.
These fallopian tube fimbria rather than the conventionally acknowledged ovarian surface epithelium, might be the cells of origin by which tumor cells in the fallopian tube spread into the ovary, and thus, these fimbrial epithelial cells may be the origin of high-grade serious carcinomas. Our previous study provided the first experimental evidence that fimbrial epithelial cells of the fallopian tube could be a potential source of ovarian mucinous adenocarcinoma. “p53 signature” is a secretory cell outgrowth in the distal fallopian tube that shares characteristics with ovarian serous carcinoma- including p53 mutations—and is a putative serous cancer precursor [10], while the expression of P53 was negative in both fallopian tube ciliated cells and borderline mucinous tumor in the current reported case.

All these findings demonstrate that some tumors arise in the fimbriated ciliated cells, indicate that prophylactic oophorectomy in patients with these tumors should be accompanied by removal of the fallopian tubes, and emphasize the need for thorough evaluation of the specimens at the microscopic level.

Conflicts of interest statement

The authors have no potential conflicts of interest.

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