Case Report:
Mature Cystic Teratoma of the Ovary Associated with Complete Colonic Wall and Mucinous Cystadenoma

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Abstract. Mature cystic teratomas of the ovary frequently contain intestinal type epithelium, but they are rarely associated with complete intestinal wall. The association of mature cystic teratoma with mucinous cystadenoma is not unusual. However, the pathogenetic relationship between these two lesions remains unanswered. We report a mature cystic teratoma of the ovary in a 16-yr old female that contained a complete colonic wall in continuity with an endocervical–type mucinous cystadenoma. Both the mucinous cystadenoma and the colonic wall showed the typical histopathological and immunohistochemical patterns of classical mucinous cystadenoma (positive for CK7, negative for CK20) and normal colonic wall (positive for CK20, negative for CK7), respectively. The microscopic and immunohistochemical patterns of the epithelium from the transitional zone between colonic wall-like structure and mucinous cystadenoma demonstrated features of both types of epithelium, positive for both CK7 and CK20, and focally positive for a neuroendocrine marker, chromogranin, which is normally present in colonic mucosa. These results suggest that the mucinous cystadenoma originated from the colonic epithelium of the mature cystic teratoma.

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Introduction

Mature cystic teratomas of the ovary are among the common benign ovarian neoplasms derived from germ cells; they commonly occur in younger patients [1,2]. Histologically, they are composed of variable proportions of tissue originating from the ectoderm, mesoderm, and endoderm [3]. Although gastrointestinal epithelium is occasionally seen in these tumors [4,5], the presence of a complete intestinal wall in this tumor is rare [6]. One report described the entire gastrointestinal tract from esophagus to colon in a benign cystic teratoma [7]. We report a mature cystic teratoma of the ovary with complete colonic wall that was associated with mucinous cystadenoma of the endocervical type.

A 16-yr old African-American female presented to the emergency department with a recurrent yeast infection. On physical examination, a large mass was noted in the pelvis and abdomen, which was approximately the size of a 22-wk gestational uterus. Computed tomography (CT) scan with contrast showed a mass (19 x 16 x 9 cm) arising from the pelvis. The mass was multiloculated, containing fat and calcification, consistent with the diagnosis of a dermoid cyst. There was an associated mass effect on the adjacent uterus and urinary bladder. Other abdominal organs, including the liver, pancreas, kidneys, adrenals, and GI tract, appeared normal. A sonogram also showed a cyst (3 x 2.5 x 1 cm) in the right ovary.

The patient had negative cytological findings on a vaginal/cervical smear. Her serum CA125 level was 89 unit/ml (reference range, 0-35 unit/ml). After
proper preparation, the patient underwent an exploratory laparotomy with left salpingo-oophorectomy. The patient’s post-operative course was uneventful and she was discharged from the hospital on day 5 after surgery. The patient is currently free of recurrent disease.

The left salpingo-oophorectomy specimen measured 18 x 12 x 9 cm and weighed 1344 grams. The fallopian tube measured 6 x 0.6 cm and was grossly unremarkable. The outer surface of the ovarian mass was tan and smooth. The cut surface showed multiloculated cysts filled with cheese-like material, hair, and mucin, with a tan smooth inner lining (resembling a mucosal surface) and focal tan shiny areas (Fig. 1). The specimen was examined by light microscopy with hematoxylin-eosin stain and by immunohistochemical stains with the Strept-Biotin-Avidin-System using the Nexes Instrument and pre-diluted antibodies, including CK7, CK20, and chromogranin from Ventana (Tucson, AR).

On histopathologic examination, the mass contained areas of mature cystic teratoma with skin and subcutaneous tissue, including sebaceous glands and hair, areas of typical mucinous cystadenoma of the endocervical type, a complete colonic wall-like structure, and a transitional zone between the intestinal wall-like area and mucinous cystadenoma (Fig. 2A). The intestinal wall-like structure resembled a complete colonic wall, including mucosa, muscularis mucosa, submucosa with loose connective tissue, and two layers (circumferential and longitudinal) of muscularis propria with both submucosal (Meissner) and myenteric (Auerbach) plexus (Fig. 2B-1).

The mucosal layer showed well-formed crypts with hyperplastic muscularis mucosa (Fig. 2B-2). Clusters of ganglion cells of myenteric plexus were present between two layers of muscularis propria (Fig. 2B-3). The areas of mucinous cystadenoma of the endocervical type showed typical tall columnar
Fig. 2. Different histopathologic patterns of the ovarian cystic lesion, stained with H & E. (A) Colon-like structure (a), mucinous cystadenoma (b), and transitional zone (c) between the cystadenoma and the complete colonic wall (x25). (B-1) Complete colonic wall (x50). (B-2) Higher magnification showing well formed colonic mucosa with crypts and hyperplastic muscularis mucosa (x500). (B-3) Clusters of ganglion cells between the two muscle layers (x500). (C) Endocervical-type mucinous cystadenoma lined by tall columnar cells with basal nuclei and abundant intracytoplasmic mucin (x500). (D) Transitional zone with scattered goblet cells and Paneth cells within a background of columnar cells (x500).

cells with basally situated nuclei and abundant intracellular mucin (Fig. 2C). There was a transitional zone between the full thickness colonic wall-like area and the mucinous cystadenoma, which was composed of mucin-producing cells with typical architecture of mucinous cystadenoma with scattered goblet cells and Paneth cells (Fig. 2D).

Immunohistochemical studies and special stains were performed on three components of this ovarian lesion: the colonic wall-like area, mucinous cysta-
Fig. 3. Comparison of the staining patterns of hematoxylin-eosin (column A), CK7 (column B), CK20 (column C), and chromogranin (column D) (x500). Line 1: staining pattern of the normal colon. Line 2: staining pattern of the complete colonic wall of the present case. Line 3: staining pattern of the control ovarian mucinous cystadenoma. Line 4: mucinous cystadenoma of our case. Line 5: transitional zone between mucinous cystadenoma and complete colonic wall of our case.
denoma, and transitional zone area, and on two types of controls: a normal colon (section of a colectomy specimen from a 73-yr-old male with adenocarcinoma of the colon) and a typical mucinous cystadenoma (section of a right salpino-oophorectomy specimen from a 38-yr-old female with ovarian mucinous cystadenoma). The results of these studies are shown in Fig. 3.

Staining patterns of CK7 and CK20 in the mucinous cystadenoma of our case resembled that of typical mucinous cystadenoma in the control case, which were positive for CK7 and negative for CK20. The CK7 and CK20 staining of the colonic wall-like tissue of our case resembled that of normal colonic wall of the control case, which were positive for CK20 and negative for CK7. Areas of the transitional zone showed dual staining for both CK7 and CK20. Chromogranin staining confirmed that neuroendocrine cells were scattered through the colonic wall-like tissue and the transitional zone, but were absent in the areas of mucinous cystadenoma.

Discussion

Complete intestinal wall is a rare finding in mature cystic teratoma. Fujiwara et al [6] reported two cases of mature cystic teratoma containing complete intestinal wall. One case was a 35-yr-old female with a 7 x 5 cm right ovarian mass that on microscopic examination showed areas with the structure of full thickness colonic wall, plus areas of squamous epithelium, bronchial-type epithelium, and intestinal-type mucinous cystadenoma. The other case was a 45-yr-old female with a cystic ovarian mass that on microscopic examination revealed intestinal type epithelium with numerous Paneth cells and focal mucinous adenocarcinoma that invaded deep muscular bundles of bowel-like structure. Respiratory-type mucosa was also present.

The histogenesis of ovarian mucinous cystadenoma has been controversial; an origin from surface epithelial metaplasia or a teratomatous origin have been suggested. The surface epithelial metaplasia theory is supported by ultrastructure studies [8] and by mucin histochemical studies [9]. The teratoma theory is based on the frequent co-existence of mature cystic teratoma and mucinous cystadenoma [10] and on evidence that mucinous cystadenoma can be lined by intestinal epithelium, sometimes with intestinal-specific structures such as goblet cells, Paneth cells, and endocrine cells, possibly due to endodermal overgrowth of teratomas [11-14].

In the present case, the mucinous cystadenoma was associated with a mature cystic teratoma that contained complete colonic wall. Both mucinous cystadenoma and colonic wall showed the typical histopathological and immunohistochemical patterns of classical mucinous cystadenoma (positive for CK7, negative for CK20) and normal colonic wall (positive for CK20, negative for CK7), respectively. The microscopic and immunohistochemical patterns of the transitional zone between colonic wall-like structure and mucinous cystadenoma stained positive for both CK7 and CK20, and were focally positive for chromogranin, suggesting that the mucinous cystadenoma most likely originated from colonic epithelium of the mature cystic teratoma.

References

9. Nomura K: Mucin histochemistry of ovarian mucinous