RESEARCH PAPER

"Mucinous Cystadenofibroma Coexisting with Mature Cystic Teratoma: Expanding the Spectrum of Ovarian Collision Tumors"

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Abstract

Ovarian collision tumors are rare lesions composed of two histologically distinct neoplasms within the same ovary. The coexistence of mature cystic teratoma (MCT) and mucinous cystadenofibroma is exceptionally uncommon.A 47-year-old woman presented with abdominal distension, pain, and urinary symptoms. Imaging revealed a large multiloculated ovarian cystic mass with elevated CA 19-9 levels. Histopathological examination following surgery showed mucinous cystadenofibroma with focal mature teratomatous elements, including squamous epithelium, adnexal structures, and adipose tissue. No borderline, malignant, or immature components were identified.Thorough gross examination and extensive sampling are crucial for accurate diagnosis and exclusion of malignancy in these rare tumors.

Keywords: Ovarian collision tumor, Mature cystic teratoma, Mucinous cystadenofibroma, Ovary, Benign ovarian neoplasm

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Introduction

Ovarian neoplasms comprise a heterogeneous group of tumors arising from surface epithelial, germ cell, and sex cord–stromal elements, often presenting with overlapping clinical and radiological features.[1] Mature cystic teratoma (MCT) is the most common benign ovarian germ cell tumor, whereas mucinous cystadenofibroma is a rare benign epithelial neoplasm characterized by mucinous glands within a prominent fibrous stroma.[2]

The coexistence of two histologically distinct tumors within the same ovary, known as a collision tumor, is an uncommon phenomenon.[1] Among ovarian collision tumors, the combination of MCT and mucinous epithelial tumors is most frequently reported, usually involving mucinous cystadenoma.[3,4] However, the association of MCT with mucinous cystadenofibroma is exceedingly rare, with only a few cases described in the literature.

We report a rare ovarian collision tumor composed of mucinous cystadenofibroma and mature cystic teratoma, highlighting its clinicopathological features and the importance of careful histopathological evaluation for accurate diagnosis.[5]

Case Report

A 47-year-old multiparous woman (para 3, live 2) presented with lower abdominal pain, progressive abdominal distension, urinary incontinence, and generalized edema for three months. Menstrual history was unremarkable, and she had no significant medical comorbidities. Examination revealed a mobile, non-tender abdominopelvic mass corresponding to a 32-week gravid uterus. Pap smear was negative for intraepithelial lesion or malignancy.

Pelvic ultrasonography demonstrated a large multiloculated cystic ovarian mass suggestive of mucinous cystadenoma. Magnetic resonance imaging revealed a 30 × 23 × 16.7 cm multiloculated left adnexal cystic lesion with thin septations, variable signal intensities, and no enhancing solid component. Small papillary projections with focal calcifications were present. No lymphadenopathy, peritoneal deposits, or distant metastases were identified. The right ovary was normal, and an 8-cm cervical fibroid was noted. Serum CA 19-9 was >1000 U/mL, while LDH, β-hCG, CEA, and CA-125 were within normal limits.

The patient underwent laparoscopic hysterectomy with bilateral salpingo-oophorectomy. Frozen section of the left ovarian mass suggested mucinous cystadenoma with mature cystic teratoma, and peritoneal fluid cytology was negative for malignancy, allowing conservative surgical management.

Gross examination showed a 22 × 19 × 2 cm solid-cystic ovarian mass containing multiple mucin-filled cysts with a grey-yellow firm nodule measuring 2 × 2 × 2 cm. The attached fallopian tube measured 6 cm. [Image 1A]

Microscopically, the cysts were lined by benign mucinous epithelium overlying abundant fibrous stroma containing scattered mucinous glands and foamy histiocytes. Goblet cells were identified within the epithelial lining. [Image 2] The nodular area showed mature teratomatous elements comprising keratinized stratified squamous epithelium with pilosebaceous units, hair follicles, and adipose tissue. [Image 1B–D] No epithelial stratification, significant atypia, stromal invasion, or immature elements were identified. **The mucinous cystadenofibroma and mature cystic teratoma were grossly and microscopically distinct without transitional areas.**A final diagnosis of mucinous cystadenofibroma coexisting with mature cystic teratoma was established. The postoperative course was uneventful; however, the patient was lost to follow-up.

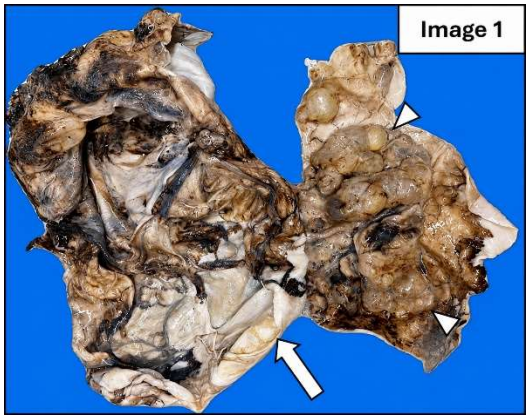

Image 1:**Gross Morphology.**Cut section through the post fixation specimen shows multiple cysts (arrowhead) filled with mucinous fluid and a grey-yellow firm area (arrow).

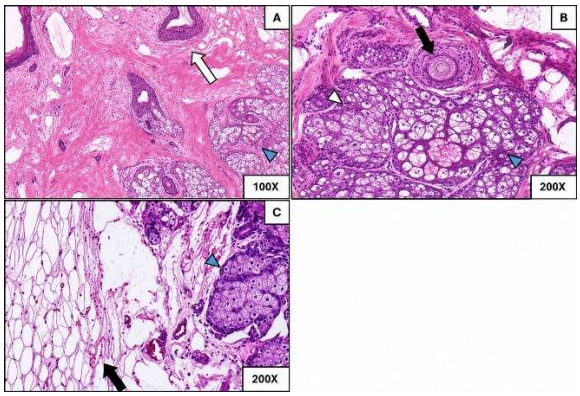

Image 2:Mature teratoma component. Tumor includes keratinized stratified squamous epithelium (arrow) with pilosebaceous unit (Arrowhead), hair follicles (black arrow) (Frozen section 100x and 200x) and adipose tissue (Black arrow) (H&E, 200x).

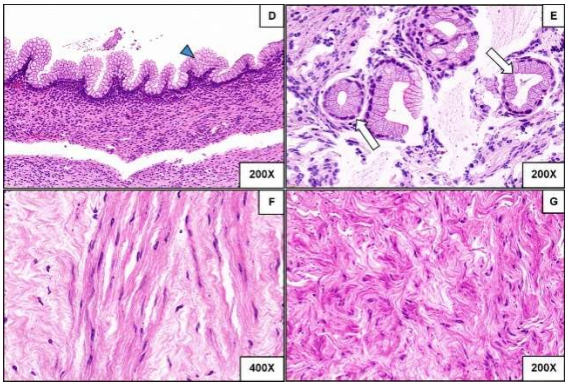

Image 3:Mucinous cystadenofibroma. Tumor includes mucinous epitheliumwith basely located nuclei (arrowhead)(D) and sub epithelium shows variably cellular fibrous stroma(F & G) with glands (Arrow)(E) (H&E, 200x and 400X).

Discussion

Mature cystic teratoma (MCT) is a common benign ovarian germ cell tumor characterized by differentiation into tissues derived from all three germ layers. Its association with mucinous epithelial tumors is uncommon but well recognized and may occur either as a true collision tumor or as a neoplasm arising from teratomatous elements.

The WHO recognizes several proposed mechanisms include neoplastic transformation of teratomatous epithelium (most widely accepted), collision tumor, and surface epithelial origin.[6]

According to the WHO Classification of Tumours (5th edition), mucinous tumors associated with mature cystic teratomas are thought to arise predominantly from endodermal gastrointestinal-type epithelium within the teratoma.[6] Alternative mechanisms include a collision tumor or independent development from the ovarian surface epithelium; however, the presence of intestinal-type mucinous epithelium and molecular evidence in many cases support a teratomatous origin.[7]

Roy et al. and Chahkandi et al. described coexistence of MCT with mucinous cystadenocarcinoma, highlighting the diagnostic challenge of determining tumor origin and excluding metastatic disease.[2,3]Rare reports of malignant transformation within teratomatous components further emphasize the importance of thorough gross examination and extensive histopathological sampling.

The concept of ovarian collision tumors, defined as the coexistence of two histologically distinct neoplasms without histological admixture, provides an explanation for these associations. Alayed et al. and Kalonia et al. reported cases of MCT coexisting with mucinous cystadenoma, supporting the hypothesis that these tumors may arise independently or share a common histogenetic pathway.[1]

Additional reports further illustrate the diversity of combined ovarian tumors. Abduljabbar et al.[4] documented MCT with malignant degeneration and an incidental epithelial tumor, while Kumar et al.[5] described cystadenofibroma associated with contralateral collision lesions, underscoring the rarity and complexity of such neoplasms.

The overlapping clinical, radiological, and pathological features of ovarian mucinous neoplasms necessitate careful differential diagnosis for accurate diagnosis and appropriate management.**[Table 1]**

Table 1: Differential Diagnosis of Ovarian Mucinous Cystadenofibroma[1,3,5,6,8–10]

Differential Diagnosis	**Key Histopathological Features**	**Distinguishing Features from Mucinous Cystadenofibroma**
Mucinous Cystadenoma	Benign mucinous epithelial lining with cystic architecture	Lacks the prominent fibrous stromal component characteristic of cystadenofibroma
Mucinous Borderline Tumor	Epithelial stratification, tufting, papillary formations, and mild-to-moderate cytologic atypia	Shows epithelial proliferation and atypia absent in benign mucinous cystadenofibroma
Mucinous Cystadenocarcinoma	Marked cytologic atypia, complex architecture, and stromal invasion	Presence of invasive growth distinguishes it from the benign nature of cystadenofibroma
Fibroma/Thecoma with Cystic Change	Predominantly stromal tumor with cystic degeneration	Lacks a true mucinous epithelial lining and is composed mainly of fibrous or thecal cells
Metastatic Mucinous Tumors	Infiltrative growth pattern, often with signet-ring cells; commonly bilateral and smaller in size	Bilaterality, infiltrative pattern, and clinical history favor metastatic disease over a primary ovarian mucinous cystadenofibroma
Seromucinous cystadenofibrom	Dense fibrous stroma lined by	Contains mixed müllerian

Differential Diagnosis	Key Histopathological Features	Distinguishing Features from Mucinous Cystadenofibroma
a	mixed müllerian epithelium including serous, endocervical-type mucinous, ciliated, and endometrioid cells.	epithelial differentiation rather than a purely mucinous epithelial lining.
Brenner tumor	Nests of benign transitional (urothelial)-type epithelium embedded within dense fibrous stroma; may coexist with mucinous cystic tumors	Presence of characteristic urothelial nests with longitudinal nuclear grooves distinguishes it from mucinous cystadenofibroma.
Mature cystic teratoma with mucinous epithelial component	Mature tissues derived from one or more germ layers, frequently containing gastrointestinal-type mucinous epithelium	Identification of skin adnexal structures, respiratory epithelium, cartilage, neural tissue, or other mature teratomatous elements confirms germ cell origin.

Accurate diagnosis is essential to avoid overtreatment of benign lesions and undertreatment of malignant or metastatic tumors. Careful histopathological evaluation remains the cornerstone for appropriate management of these rare ovarian neoplasms.[8]

Conclusion

Overall, these findings reinforce that mucinous neoplasms associated with MCT represent a clinicopathological continuum, ranging from benign to malignant lesions. Accurate diagnosis requires thorough grossing, extensive sampling, and careful microscopic examination to identify all components, exclude invasive malignancy, and guide appropriate clinical management.

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