Case Study

A Rare Case Report: The Unusual Combination of Dermoid Cyst and Cystadenoma in Ovarian Collision Tumors

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Abstract

Collision tumors, the coexistence of two distinct neoplasms in the same tissue without histological admixture, are rare, particularly in the ovary. This report documents an unusual case of a 50-year-old postmenopausal woman who presented with a 4-month history of lower abdominal pain and distention. Imaging and surgical findings revealed a large right ovarian mass, which histopathology identified as a mucinous cystadenoma coexisting with a benign cystic teratoma. This rare combination underscores the importance of considering collision tumors in differential diagnoses of ovarian masses. Molecular studies suggest a potential clonal relationship, with shared genetic changes supporting a teratomatous origin for mucinous tumors. This case contributes to the limited literature on ovarian collision tumors, emphasizing the need for awareness and accurate diagnosis of these rare entities to guide appropriate treatment strategies.

Keywords: Ovary, Collision tumor, Teratoma, Mucinous cystadenoma

Introduction

Collision tumors occur when two distinct tumors coexist in the same tissue without any transition zone or mixing interface. These tumors have been described in various organs, such as the liver, bone, kidney, brain, and lung. However, ovarian collision tumors are sporadic.[1]Ovarian teratomas, particularly benign mature cystic teratomas or dermoid cysts, represent 12-15% of ovarian tumors. Ovarian mucinous cystadenomas account for approximately 80% of ovarian mucinous neoplasms and 20-25% of all benign ovarian tumors. These cystadenomas are typically larger than serous cystadenomas. Only 2-10% of teratomas are associated with mucinous cystadenomas.[2] This report highlights the exceptional occurrence of a dermoid cyst and mucinous cystadenoma collision tumor in the ovary, contributing to the limited literature on this rare phenomenon.

Case Report

A 50-year-old postmenopausal woman presented to the gynecology department with a 4-month history of lower abdominal pain and distention. Clinical

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examination revealed a mobile lower abdominal mass measuring approximately 20x15x20 cm. On per vaginal examination, the same mass was palpable, distinct from a normal-sized uterus, with bilateral forniceal fullness noted.

Contrast-enhanced magnetic resonance imaging (CEMRI) identified a large, lobulated, hypodense cystic lesion with thin septations, measuring about 22x21x13.5 cm, originating from the right ovary; the left ovary appeared normal, and other abdominal organs were unremarkable. Tumor markers CA125, CEA, and CA19.9 were within normal limits.The clinical diagnosis of right ovarian mass likely benign was made.The patient underwent an exploratory laparotomy followed by a total abdominal hysterectomy with bilateral salpingo-oophorectomy, along with multiple omental and peritoneal biopsies. Intraoperative findings included a right ovarian mass measuring 28x21x14 cm, with a normal-appearing left ovary and uterus (**Figure 1**). The patient tolerated the procedure well and had a normal postoperative recovery.

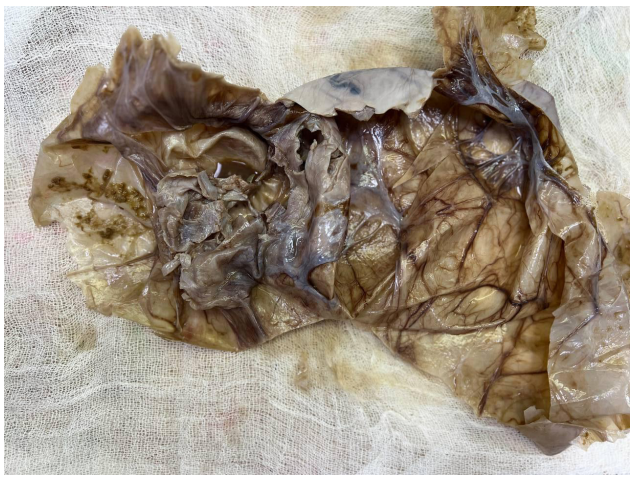

Figure 1: Multiloculated cyst with pultaceous material and few hair without any solid area or Papillary excrescences

The final histopathology report indicated a mucinous cystadenoma coexisting with a benign cystic teratoma, confirming the diagnosis of an ovarian collision tumor (**Figure 2,3**).

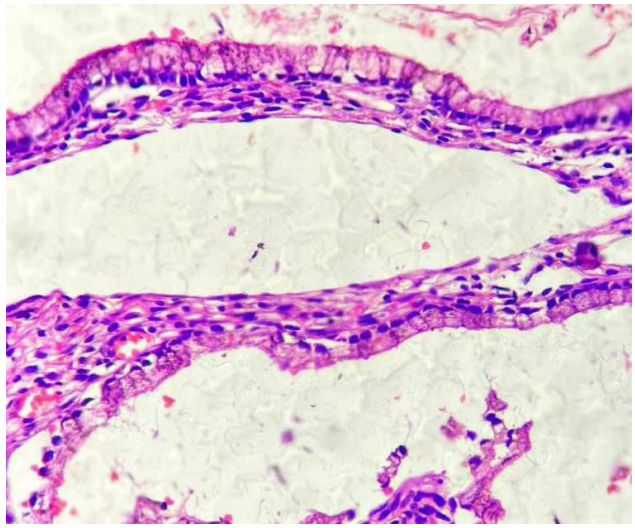

Figure 2: Mucinous lining on the fibrocollagenous wall suggestive of Mucinous Cystadenoma

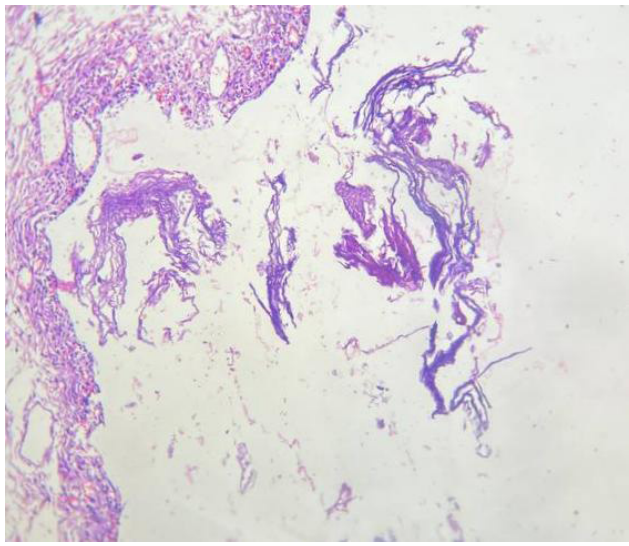

Figure 3: Teratoma component showing Keratin flakes

Discussion

The origin of teratomas is widely debated, with the most accepted theory being their derivation from primordial germ cells. Diagnosis of a collision tumor is made when normal tissue intervenes between two distinct tumors with no histological admixture at the interface. A transition zone between the tumors complicates differentiation between colliding tumors and true mixed tumors.[3,4]In our case normal

tissue intervenes between teratoma and mucinous cystadenoma.

The histogenesis of ovarian mucinous cystadenomas remains unclear. They are hypothesized to originate from surface epithelial metaplasia or teratomatous origins. Ultrastructure and mucin histochemical studies support the surface epithelial metaplasia theory, while the frequent coexistence of mature cystic teratoma and mucinous cystadenoma supports the teratoma theory. Germ cell tumors make up approximately 30% of primary ovarian tumors, with 95% being mature cystic teratomas. The most common histological combination of ovarian collision tumors involves teratomas and mucinous tumors.[5]

A key differentiating feature between a collision tumor and a teratoma with a cystadenoma component is the presence of a distinct collar of normal ovarian parenchyma separating the components in the former, while the latter shows intermixture of both histological components.[5]

Several hypotheses explain the existence of ovarian collision tumors. One suggests that the first tumor alters the tissue microenvironment, promoting the development of a second tumor. Another posit that the occurrence of two primary tumors is coincidental. This theory is supported by Vang et al., who demonstrated morphological and immunophenotypic diversity in ovarian mucinous tumors associated with mature cystic teratomas.[6] A third theory proposes a common stem cell origin for both primary tumors.[7]

Molecular analyses can provide evidence of a clonal relationship by demonstrating shared genetic changes in both the mucinous tumor and adjacent teratomatous elements, supporting the theory of a teratomatous origin for these mucinous tumors.

A study by Fuji et al. found that mucinous tumors arising alongside mature cystic teratomas exhibited homozygous genetic patterns similar to those of the teratomatous components. This suggests that these mucinous tumors may develop from pre-existing mature cystic teratomas. Although not all mucinous tumors are of germ-cell origin, mucinous elements in dermoid cysts are likely of teratomatous origin, often showing intestinal rather than Mullerian differentiation.[8]

Another study reported significant allelic imbalance for microsatellite markers in some ovarian mucinous cystadenomas associated with mature cystic teratomas, indicating a germ cell origin. Okada et al. demonstrated a potential association between dermoid cysts and multiseptated cysts containing fatty tissue foci, highlighting the importance of recognizing the potential coexistence of these neoplasms in the same ovary for accurate diagnosis.[9]

Adequate excision and meticulous histopathological examination are crucial for accurately identifying the various components of collision tumors. This approach is essential to prevent misdiagnosis as malignancy, ensuring appropriate and effective patient management.

Conclusion

Ovarian collision tumors, though rare, require thorough excision and meticulous histopathological examination to avoid misdiagnosis as malignancy. This case of a dermoid cyst and mucinous cystadenoma underscores the importance of recognizing these unique neoplasms for accurate diagnosis and appropriate management. Molecular analyses supporting a teratomatous origin for mucinous tumors further enhance understanding and diagnostic accuracy.

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Conflict of Interest: Nil

Informed consent was taken from the patient for publishing.

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