Section: Obstetrics and Gynecology

Original Research Article

BEYOND A BENIGN DERMOID: SQUAMOUS CELL CARCINOMA ARISING IN MATURE CYSTIC TERATOMA OF THE OVARY

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ABSTRACT

Mature Cystic Teratoma is one of the most common benign ovarian germ cell tumors; however, malignant transformation is a rare complication occurring in less than 2% of cases. Squamous cell carcinoma arising from the ectodermal component is the most frequently reported histological subtype and is usually seen in postmenopausal women. We report a rare case of malignant transformation of mature cystic teratoma into squamous cell carcinoma in a 40-year-old perimenopausal woman.

The patient presented with abdominal mass and dull aching abdominal pain of long duration. Clinical examination revealed a large abdominopelvic mass. Ultrasonography and CT scan showed a complex right adnexal mass suggestive of dermoid cyst. Tumor markers demonstrated mildly elevated CA-125 and CA19-9 levels, while AFP and β-hCG were within normal limits. Exploratory laparotomy with right salpingo-oophorectomy was performed, and frozen section examination revealed mature cystic teratoma with focal malignant transformation. Comprehensive staging surgery was subsequently carried out. Histopathological examination confirmed squamous cell carcinoma arising in mature cystic teratoma with omental and peritoneal metastasis corresponding to FIGO stage IIIC disease. The patient had an uneventful postoperative recovery and was referred for adjuvant chemotherapy. This case highlights the importance of considering malignant transformation in large or suspicious ovarian dermoid cysts, even in perimenopausal women.

Keywords: Mature cystic teratoma, Squamous cell carcinoma, malignant transformation, dermoid cyst, perimenopause

INTRODUCTION

Mature cystic teratoma (MCT), commonly referred to as a dermoid cyst, is one of the most frequently encountered benign ovarian germ cell tumors and represents nearly 10–20% of ovarian neoplasms.[1,2] These tumors are predominantly seen in women during the reproductive age group. Since they originate from totipotent germ cells, they possess the ability to differentiate into tissues derived from ectoderm, mesoderm, and endoderm. Although MCTs are generally benign, malignant transformation can rarely occur from any of these tissue components. Such transformation is reported in fewer than 2% of cases and contributes to approximately 2.9% of malignant ovarian germ cell tumors.[3] Among the various histological types, squamous cell carcinoma arising from the ectodermal component is the most commonly reported malignancy. This complication is usually observed in postmenopausal women.

We present a rare case of squamous cell carcinoma developing within a mature cystic teratoma in a perimenopausal woman, managed surgically with subsequent referral for adjuvant chemotherapy.

Case Presentation

A 40-year-old perimenopausal woman, para 2 with two living children, presented with complaints of progressive increasing abdominal mass for the past one year along with intermittent dull aching

abdominal pain for four months. She did not report any menstrual disturbances, gastrointestinal symptoms, or urinary complaints. There was no relevant past medical, surgical, or family history.

General physical examination was unremarkable. Abdominal examination revealed a firm, mobile, non-tender abdominopelvic mass measuring approximately 10 × 12 cm, extending from the pelvis into the right iliac, lumbar, and hypogastric regions. On pelvic examination, the uterus could not be palpated separately from the mass, and fullness was appreciated in the pouch of Douglas and right fornix. Pelvic ultrasonography demonstrated a normal-sized uterus with endometrial thickness of 4.8 mm. A large right adnexal hyperechoic lesion measuring 8.3 × 11.4 × 10.8 cm with multiple calcific areas causing posterior acoustic shadowing was noted, suggestive of a dermoid cyst. CT scan further revealed a complex solid-cystic ovarian mass [Fig. 1].

Serum tumor marker analysis showed mildly raised CA-125 (55.4 U/mL) and CA19-9 (56.2 U/mL), whereas CEA, AFP, and β-hCG levels were within normal limits. The calculated Risk of Malignancy Index (RMI) was 55.4 that is suggestive of benign lesion.

Exploratory laparotomy was planned, and right salpingo-oophorectomy was initially performed. [Fig. 2] Frozen section analysis of the ovarian mass revealed mature cystic teratoma with focal malignant transformation. Following this intraoperative diagnosis, complete staging surgery was undertaken, including total abdominal hysterectomy, left salpingo-oophorectomy, infracolic omentectomy, abdominal wall peritonectomy, and bilateral pelvic lymph node sampling and appendectomy. Surgical staging was FIGO stage IIIC disease.

On gross examination, the ovarian mass measured 12 × 8 cm and contained sebaceous material along with hair. Microscopic examination showed infiltrating nests and sheets of malignant squamous cells invading the surrounding stroma. Metastatic deposits were identified in the omentum, peritoneum, and appendiceal tip, while sampled pelvic lymph nodes were free of tumor involvement. [Fig.3] A final diagnosis of squamous cell carcinoma arising in mature cystic teratoma of the right ovary was made. The pathological stage was pT3N0M1,

The patient had an uneventful postoperative recovery. In view of advanced-stage disease, adjuvant chemotherapy was advised. As medical oncology services were unavailable at our institution, the patient was referred to a higher center for further management.

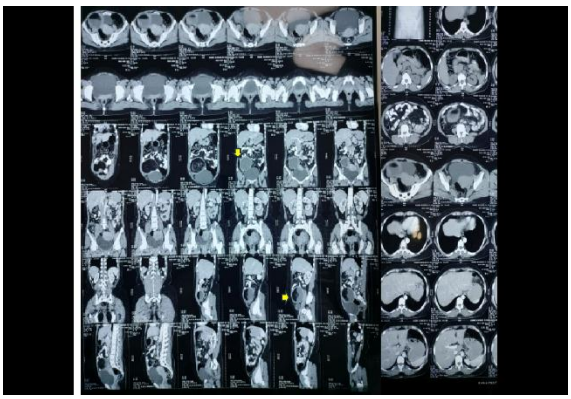

Figure 1: CT scan coronal and sagittal sections showing adnexal mass with normal uterus (mass is indicated with yellow arrow)

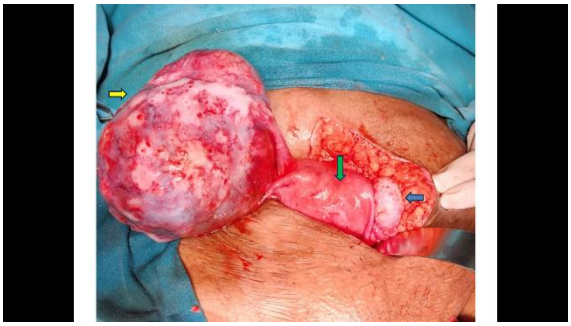

Figure 2: Per -operative picture showing right ovarian mass with carcinomatous deposits on surface of mass (yellow arrow), normal uterus (green arrow), normal appearing left ovary (blue arrow)

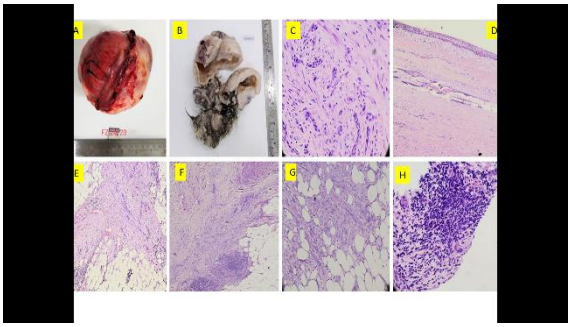

Figure 3: Histopathological findings A. macroscopic picture of mass, B. cut section showing tuft of hair and cheesy material, C. cyst wall show cords and sheets of tumour cells infiltrating into the surrounding stroma, D. Section from cyst wall lined by flattened lining epithelium E-G. Sections from omentum, peritoneum and tip of appendix showing tumour deposits, H. Sections from ovarian mass showing immature tissue.

DISCUSSION

Malignant transformation in mature cystic teratoma (MCT) is a rare event occurring in less than 2% of cases, with squamous cell carcinoma being the most common histopathological subtype arising from ectodermal elements. Most studies have reported that malignant transformation occurs predominantly in postmenopausal women, usually in the fifth or sixth decade of life.[1,2,3]

In the present case, the patient was a 40-year-old perimenopausal woman, which is comparatively younger than the median age reported in previous studies. Li Y et al., in their 30-year experience involving 22 cases, observed that the median age of patients with malignant transformation was above 50 years and most patients were postmenopausal. Similarly, Gadducci A et al. also emphasized advanced age as an important risk factor for malignant transformation.[2,3] Therefore, our case highlights that although uncommon, malignant transformation can also occur in perimenopausal women and should not be overlooked in younger age groups.

Clinical presentation in our patient was consistent with previously reported literature. The patient presented with abdominal mass and dull aching abdominal pain, which are among the most common symptoms described in studies by Mahtate M et al. and Tehranian A et al. However, unlike many benign dermoid cysts that remain asymptomatic, malignant transformation is often associated with rapidly increasing abdominal size, pain, or pressure symptoms because of aggressive growth and local spread.[1,4]

Tumor size in the present case was approximately 12 cm, which correlates with findings from previous studies suggesting that larger tumor size increases the likelihood of malignant transformation. Li et al. reported that tumors associated with malignant transformation are usually larger than benign MCTs, frequently exceeding 10 cm in diameter. Similarly, Gadducci et al. identified large tumor size and postmenopausal status as important predictive factors for malignancy.[2,3]

Preoperative diagnosis remains difficult because imaging findings often overlap with those of benign dermoid cysts. In our patient, ultrasonography and CT scan suggested a dermoid cyst with calcific foci and mixed solid-cystic components. Comparable radiological findings were reported by Mahtate et al. and Tehranian et al., where definitive diagnosis was established only after histopathological examination. Presence of solid areas, transmural invasion, or irregular soft tissue components on imaging may raise suspicion for malignancy, although none are pathognomonic.[1,4]

Tumor markers in our patient showed mildly elevated CA-125 and CA19-9 levels, while AFP and β-hCG were normal. Similar nonspecific elevations have been described in previous studies. Li et al. observed that CA-125, CA19-9, SCC antigen, and CEA may be elevated in malignant transformation, but no single marker has sufficient diagnostic sensitivity. The normal AFP and β-hCG levels in our case also helped exclude other malignant germ cell tumors.

Histopathology in the present case revealed squamous cell carcinoma arising in MCT with omental and peritoneal deposits. This finding is in agreement with previous literature reporting squamous cell carcinoma as the most common histological subtype of malignant transformation. Gadducci et al. noted that approximately 80% of malignant transformations in MCT are squamous cell carcinomas. Additionally, Shi Z et al. discussed the possible role of Human Papillomavirus Infection in the development of squamous cell carcinoma within teratomas, although HPV testing was not performed in our patient.[3,5]

Management in our patient included exploratory laparotomy followed by complete staging surgery after frozen section diagnosis. Similar aggressive surgical management has been recommended in advanced-stage disease by Li et al. and Gadducci et al., who emphasized the importance of optimal cytoreduction for improved survival.[2,3] Our patient had stage IIIC disease with peritoneal metastasis, which is associated with poorer prognosis compared with early-stage disease. Due to advanced stage, adjuvant platinum-based chemotherapy was advised, consistent with treatment protocols followed in previously reported cases.

Overall, this case correlates well with available literature regarding clinical presentation, tumor size, histopathology, and management, but differs from most reported studies because malignant transformation occurred in a relatively younger perimenopausal woman rather than in a postmenopausal patient. This emphasizes the need for careful evaluation of all large or suspicious dermoid cysts irrespective of age.

CONCLUSION

Mature Cystic Teratoma with malignant transformation is an uncommon but clinically significant condition, most frequently presenting as squamous cell carcinoma. Although it is usually reported in postmenopausal women, the present case demonstrates that malignant transformation can also occur in perimenopausal patients. Preoperative diagnosis remains challenging because clinical presentation and radiological findings often resemble those of benign dermoid cysts. Large tumor size, presence of solid components, and elevated tumor markers should raise suspicion for malignancy. Histopathological examination remains the gold standard for definitive diagnosis. Early surgical intervention with complete staging and optimal cytoreduction, followed by adjuvant chemotherapy in advanced-stage disease, plays an important role in management and prognosis. This case highlights the importance of careful evaluation of long-standing ovarian dermoid cysts irrespective of patient age.

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