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CASE REPORT

Squamous Cell Carcinoma in Mature Cystic Teratoma: A Rare Case Report of Malignant Transformation

Sumedha Gupta[1], Dheer Singh Kalwaniya[2]

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ABSTRACT

Background: Squamous cell carcinoma (SCC) transformation in mature cystic teratoma of the ovary (MCTO) is a rare but aggressive malignancy, occurring in 1.5%–2.3% of primary ovarian cancers. It predominantly affects postmenopausal women and often presents at an advanced stage due to its asymptomatic progression and nonspecific imaging findings. Optimal diagnostic strategies, treatment approaches, and prognostic indicators remain inadequately defined.

Case Description: A 57-year-old postmenopausal woman presented with a two-month history of abdominal pain and distension. Imaging revealed a large, solid-cystic left adnexal mass suspicious for malignant transformation. Staging laparotomy confirmed a 10×9.5×7 cm mature cystic teratoma with SCC transformation, involving the ovarian surface and uterine corpus. The patient underwent total abdominal hysterectomy, bilateral salpingo-oophorectomy, and infracolic omentectomy, achieving R0 resection despite intra operative cyst rupture. She received six cycles of adjuvant paclitaxel-carboplatin chemotherapy and remains in clinical remission 15 months post-treatment.

Literature Review: SCC transformation in MCTO is aggressive with poor prognosis, largely dependent on FIGO stage and complete cytoreduction. Preoperative imaging lacks specificity, making early diagnosis challenging. While chemotherapy is beneficial in advanced cases, no standardized regimen exists.

Clinical Relevance: This case highlights the importance of early detection, surgical resection, and adjuvant therapy in managing SCC-transformed MCTO. Further

AUTHOR'S AFFILIATION:

[1] Senior Resident, Department of Obstetrics and Gynecology, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India.

[2] Assistant Professor, Department of Surgery, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India.

CORRESPONDING AUTHOR:

Dheer Singh Kalwaniya, Assistant Professor, Department of Surgery, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India.

E-mail: drdsk85@gmail.com

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research is needed to establish standardized treatment protocols and improve diagnostic accuracy for this rare malignancy.

KEYWORDS

• Squamous cell carcinoma • Mature cystic teratoma • Ovarian cancer • Malignant transformation • Adjuvant chemotherapy • Surgical resection

INTRODUCTION

Ovarian cancer is the fifth most common cause of cancer-related death in women in the United States and has the highest mortality rate among gynecologic malignancies. While 90% of ovarian cancers are of epithelial origin, the remaining 10% include germ cell tumors, sex cord–stromal tumors, soft tissue tumors not specific to the ovary, unclassified tumors, and metastatic lesions. Teratomas, a subset of germ cell tumors, can contain mature or immature tissue derived from any of the three embryonic germ layers.[1] More than 80% of mature cystic teratomas (MCTs) arise during the reproductive years, and MCTs account for 62% of all ovarian neoplasms in women under the age of 40. Over 80% of malignant transformations (MTs) in teratomas lead to squamous cell carcinoma (SCC) originating from the ectoderm; the remaining MTs typically involve carcinoid tumors or adenocarcinomas. Prolonged exposure to pelvic carcinogens may promote malignant changes in MCTs, and high-risk human papilloma virus (HPV) infection has also been associated with ovarian SCC.[2]

Although SCC arising from MCTs represents only 1.5%–2.3% of all primary ovarian malignancies,[1] its prognosis is generally poor. The rarity of these tumors means their clinicopathologic features, optimal treatment strategies, and prognostic factors remain insufficiently defined. Imaging methods such as gynecologic ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) are effective in detecting calcified elements (e.g., teeth, bone, cartilage), facilitating the preoperative identification of MCTs. However, early recognition of MT to SCC remains challenging in both the preoperative and intra operative settings, highlighting the need to further characterize the clinicopathologic factors of SCC originating from MCTs.[3]

CASE REPORT

A 57-year-old postmenopausal multiparous woman (P6L6) presented with a two-month history of progressive abdominal pain and distension. Her medical history was significant for hypertension, chronic kidney disease on medical management. She had previously undergone a cholecystectomy 27 years ago and had no personal or familial history of malignancy. On clinical examination, a large abdominal mass corresponding to an 18-week gestational size was noted, deviated to the left. Vaginal examination confirmed the presence of the same mass, which was closely adherent to the uterus.

Serum tumor markers revealed an elevated CA19-9 level (86 U/mL), while CA125 and CEA were within normal limits. Contrast-enhanced MRI demonstrated a well-defined solid-cystic lesion in the left adnexa, likely of ovarian origin, with a fat-fluid level and close abutment to the anterior abdominal wall (*Figure 1*).

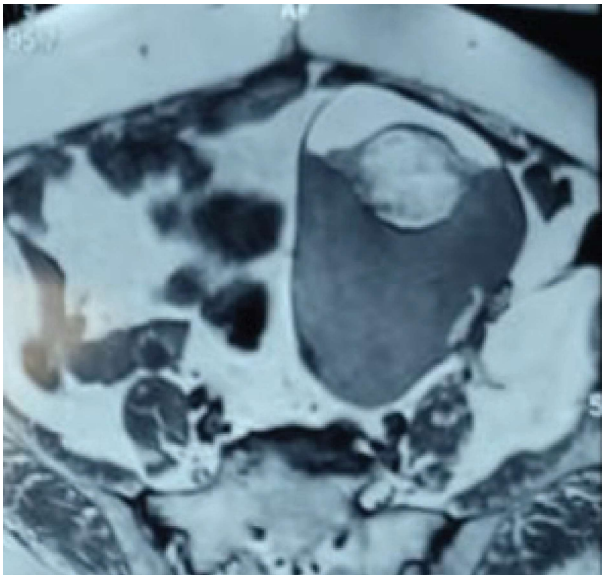

Figure 1: A left adnexal solid-cystic lesion with fat-fluid level, calcifications, and soft tissue components shows direct uterine infiltration and bowel adhesions, suggestive of malignant transformation of an ovarian dermoid

PET-CT identified a large, lobulated, mixed-density lesion measuring 12.9 × 8.8 × 8.4 cm, with peripheral calcifications and metabolically active irregular wall thickening (SUV max 16.2), highly suggestive of a malignant transformation. Additionally, multiple metabolically active mediastinal and bilateral hilar lymph nodes suggested a possible inflammatory or infectious process. Focal loss of fat planes with distal ileal loops indicated probable adhesions, further supporting the diagnosis of a left ovarian dermoid tumor undergoing malignant transformation.

Given these findings, the patient underwent a staging laparotomy, including total abdominal hysterectomy, bilateral salpingo-oophorectomy, and infra colic omentectomy. Intra operative assessment revealed the absence of ascitic fluid, and peritoneal washings were collected for cytology. A 10 × 10 cm solid-cystic mass was identified in the left ovary (*Figure 2*), densely adherent to the uterine fundus and adjacent bowel loops. The right ovary and fallopian tube appeared grossly normal, while the left fallopian tube was splayed over the adnexal mass. There was no evidence of enlarged pelvic or para-aortic lymph nodes. A 4 × 4 cm serosal tear was noted over the sigmoid colon, necessitating primary repair. The infra colic omentum appeared uninvolved, and an R0 resection was achieved, although intra operative rupture of the cystic component occurred.

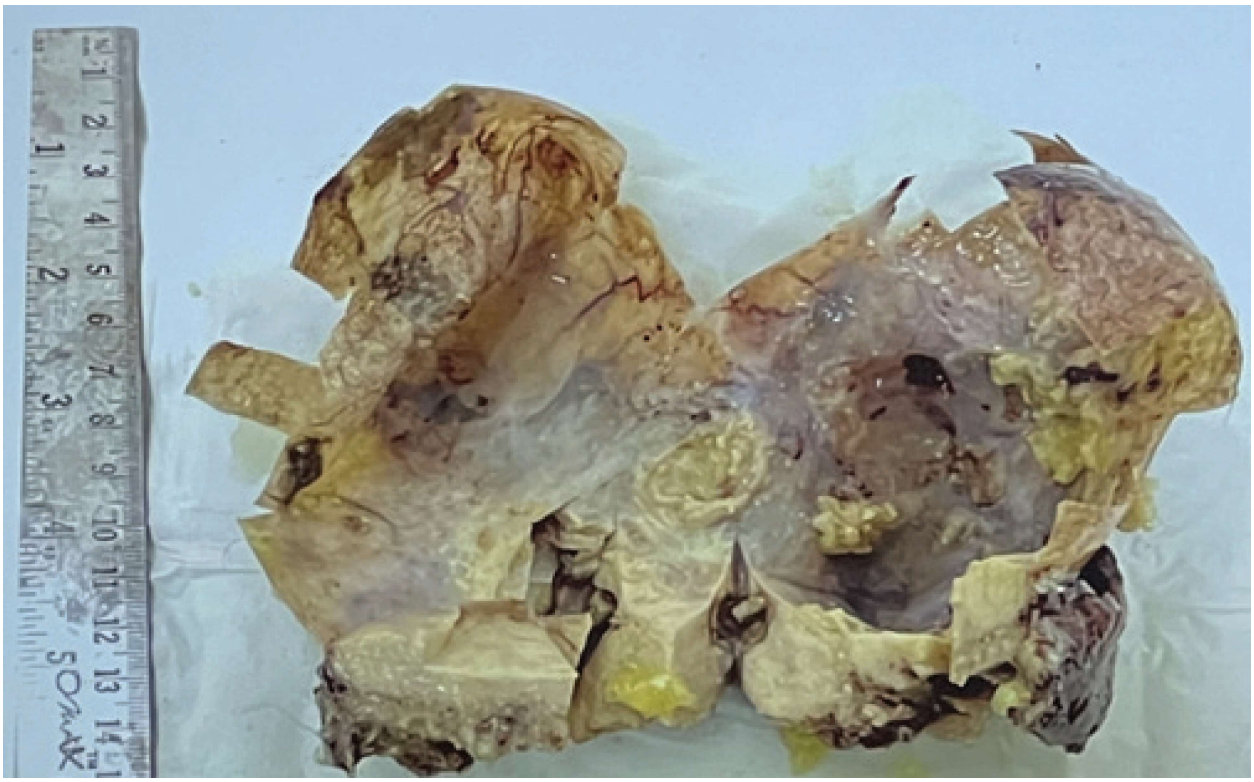

Figure 2: Cut section of left adnexal mass with solid areas

Final histopathological examination confirmed a 10 × 9.5 × 7 cm teratoma with malignant transformation into a moderately differentiated (Grade 2) squamous cell carcinoma, with evidence of ovarian surface involvement and uterine corpus involvement. Postoperatively, the patient was referred to medical oncology, where she completed six cycles of adjuvant chemotherapy with paclitaxel and carboplatin. She has remained in clinical remission for the past 15 months and continues to be under routine oncologic surveillance.

DISCUSSION

Squamous cell carcinoma (SCC) transformation in mature cystic teratoma of the ovary (MCTO) is the most common form of malignant transformation in these tumors and the leading

cause of ovarian SCC. The progression is believed to follow a continuum from squamous metaplasia to atypical hyperplasia, carcinoma in situ, stromal invasion, and ultimately invasive carcinoma. While the mean age for benign MCTO is 32.7 years, SCC transformation typically occurs later, with an average age of 53.5 years.[4] In our case, the patient was 57 years old. Some cases have a documented history of MCTO, suggesting that untreated teratomas may undergo malignant transformation over time. High-risk human papilloma virus (HPV) infection, along with genetic alterations in TP53, p16, and PIK3CA, has been implicated in this process. Next-generation sequencing studies have identified TP53 mutations in 80% of cases, with an association between these mutations and improved prognosis.[5]

Early-stage detection is more common in SCC-transformed MCTO than in epithelial ovarian cancer, with 50% of cases diagnosed at FIGO stage I, compared to only 15% of all ovarian cancers. This may be attributed to the gradual malignant transformation of preexisting teratomas, often detected incidentally following adnexal mass resection. As in epithelial ovarian cancer, FIGO stage remains the most critical prognostic factor, with a 5-year survival rate of 85% for stage I cases, but less than 50% for stage II and III.[6] Our patient was diagnosed at FIGO stage II ovarian cancer.

Comprehensive staging surgery remains the cornerstone of treatment. Total hysterectomy and omentectomy have been associated with improved survival, whereas lymphadenectomy does not appear to significantly influence prognosis, suggesting that SCC transformation in MCTO predominantly spreads through local invasion rather than lymphatic dissemination. In our case, the patient underwent total abdominal hysterectomy, bilateral salpingo-oophorectomy, and omentectomy. While some retrospective studies lack precise data on lymph node dissection, lymphadenectomy is still recommended as part of comprehensive staging surgery.

For younger patients with stage IA/IC SCC-transformed MCTO, fertility-sparing surgery may be a viable option, particularly for those under 45 years of age. Reports of successful pregnancies following fertility-preserving procedures further support this approach.

The optimal chemotherapy regimen for SCC transformation in MCTO remains undefined. While bleomycin, etoposide, and cisplatin (BEP) is the standard for malignant germ cell tumors and paclitaxel-carboplatin (TC) is first-line for epithelial ovarian cancer, there is no universally accepted adjuvant regimen for SCC-transformed MCTO. Chemotherapy has demonstrated survival benefits in advanced-stage cases, with some studies suggesting that alkylating agents may improve outcomes.[4]

Despite histopathological similarities between SCC-transformed MCTO and other SCCs, which are often radiosensitive, radiotherapy has not been shown to improve survival in these patients. If considered, its potential complications must be carefully evaluated.[4]

Preoperative detection of SCC transformation remains challenging due to the lack of distinct imaging features and reliable serum markers. Limited data on chemotherapy regimens and treatment cycles further complicates the assessment of optimal therapeutic strategies. Future studies should focus on refining diagnostic criteria and establishing standardized treatment protocols to improve clinical outcomes for patients with SCC-transformed MCTO.

CONCLUSION

SCC transformation in MCTO is rare but aggressive, requiring early detection and comprehensive staging surgery. Platinum-based chemotherapy improves outcomes, while lymphadenectomy and radiotherapy offer limited benefit. Further research is needed to refine treatment strategies.

Conflict of Interest: None

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REFERENCES

1. Outwater E.K., Siegelman E.S., Hunt J.L. Ovarian teratomas: tumor types and imaging characteristics. Radiographics 2001; 21: 475-90.
2. Verguts J., Amant F., Moerman P., Vergote I. HPV induced ovarian squamous cell carcinoma: Case reportand review of the literature. Arch Gynecol Obstet 2007; 276: 285-9.

3. A. Hackethal, D. Brueggmann, M.K. Bohlmann, F.E. Franke, H.R. Tinneberg, and K. Mu ¨nstedt," Squamous-cellcarcinoma in mature cystic teratoma of the ovary: systematic review and analysis of published data," The Lancet Oncology, Vol. 9, No. 12, pp. 1173–1180, 2008, Erratum in: The Lancet Oncology, Vol. 10, No. 5, p. 446, 2009.

4. Li C., Zhang Q., Zhang S., Dong R., Sun C., Qiu C., Zhang Z., Yang X., Kong B. Squamous cell carcinoma transformation in mature cystic teratoma of the ovary: a systematic review. BMC Cancer. 2019 Mar 11; 19(1): 217.

5. Cooke S.L., Ennis D., Evers L., Dowson S., Chan M.Y., Paul J., Hirschowitz L., Glasspool R.M., Singh N., Bell S., *et al*. The Driver Mutational Landscape of Ovarian Squamous Cell Carcinomas Arising in Mature Cystic Teratoma. Clin Cancer Res. 2017; 23(24): 7633–7640.

6. Park C.H., Jung M.H., Ji Y.I. Risk factors for malignant transformation of mature cystic teratoma. Obstetrics & gynecology science. 2015; 58(6): 475–80.