

Mature Cystic Teratoma with Squamous Cell Carcinoma-Rare Case Presentation

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 25 Nov 2023	Introduction: Mature cystic teratomas are part of a subclass of ovarian germ-cell tumour believed to arise from the primordial germ cells. Ovarian germ-cell tumours account for around 20–25% of ovarian neoplasms and 5% of ovarian cancers. A secondary malignant transformation of the various tissue components of mature cystic teratoma can occur, typically in postmenopausal women. More than 80% of malignant transformations are squamous-cell carcinomas arising from the ectoderm; the rest are carcinoid tumours or adenocarcinomas. Methods and Methodology, Case Report: A 40-year-old postmenopausal patient came with lower abdominal pain past 2 months. The patient was submitted to a gynecological examination and to transvaginal ultrasound, which confirmed the presence of right adnexal mass measuring 11×8× 2 cm; the mass proved to have cystic features in association with intracystic fat, raising the suspicion of an ovarian teratoma. In addition, areas of acoustic shadowing were discovered, raising the suspicion of a Rokitansky nodule exhibiting solid components such as hair and teeth. Pelvic CT scan demonstrated right adnexal dermoid cyst causing mild hydronephrosis. A total hysterectomy with bilateral adnexectomy was performed, and the specimen was submitted for histopathological examination. Histopathological examination revealed Mature Cystic Teratoma with Squamous Cell Carcinoma. Discussion: Ovarian teratoma develops from germ cells and might present different cellular types originating from one or more of the germ layers, represented by endoderm, ectoderm and mesoderm. Of this malignant transformation is about 1- 2 %. Malignant transformation of ovarian teratoma can arise from any type of germ cell that is present at the level of these tumors; therefore, adenocarcinomas, squamous cell carcinomas, sarcomas, melanomas, adenosquamous carcinomas or even carcinoid tumors might occur. Of this squamous cell carcinoma is common. Conclusion: Although ovarian teratomas are frequently encountered, a small proportion of them will develop further complications, such as infection or malignancy. In cases in which malignant transformation occurs, squamous cell carcinoma is the most commonly encountered type of malignancy. Novelty: Malignant transformation of mature cystic ovarian teratoma is a scarce eventuality, only rare cases being reported so far. Furthermore, the development of this transformation in the setting of an abscessed tumor is even scarcer Keywords: Mature cystic Teratoma, Squamous cell carcinoma
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1. Introduction

Among ovarian germ cell tumours, the most commonly encountered tumour type is the mature benign teratoma, which is sometimes referred to as dermoid cysts. Mature cystic teratomas (MCTs) are commonly observed in women within the reproductive age group, with bilateral presentation occurring in around 10-17% of cases. The most prevalent type of ovarian germ cell tumour is responsible for approximately 10% to 20% of all ovarian tumours⁽¹⁾. In this study, we aim to investigate the impact of social media usage on mental health. They have the potential to arise from differentiated tissues originating from the three primary germ layers, namely the ectoderm, mesoderm, and endoderm. The malignant transformation of MCT might potentially manifest in any of the three germ layers, and it is characterised by a relatively low rate of occurrence. The occurrence rate of

squamous cell carcinoma (SCC) in ovarian mucinous cystic tumours (MCTs) ranges from 0.17% to 2%. Furthermore, around 80% of SCC-MCT cases originate from ectodermal tissue⁽²⁾.

The majority of individuals diagnosed with mature teratomas typically do not exhibit any symptoms, but they may experience pain and a sensation of abdominal occupancy as a result of the mass effect⁽²⁾.

The preoperative identification of malignancy poses significant challenges due to the generic nature of symptoms and indications, as well as the limited predictive capabilities of tumour markers and imaging modalities⁽³⁾. With regards to clinical manifestations, it is common for tumours in their early stages to be incidentally found during a physical examination or through postoperative pathology analysis. However, when the tumour progresses to more advanced stages, patients may experience symptoms such as a palpable mass, bloating, and abdominal pain. The tumour may potentially manifest as an acute abdomen as a result of torsion or rupture⁽⁴⁾.

In terms of treatment, the optimal strategy remains uncertain. There is a viewpoint held by certain individuals that the therapeutic approach for squamous cell carcinoma (SCC) should align with the concepts applied in the treatment of epithelial ovarian cancer, given that SCC originates from the epithelium. There are those who hold the viewpoint that according to SCC guidelines from different sources is the appropriate course of therapy. Additionally, there exists a group of individuals who propose that, given the development of malignancy within the framework of a fully formed teratoma, treatment should coincide with protocols designed for ovarian germ cell tumours. The issue is in the fundamental disparity among these three methodologies^(4,5).

The purpose of this article is to report a case study involving the diagnosis of squamous malignancy over a mature teratoma using intraoperative pathology analysis.

2. Case Report

The individual under examination is a 64-year-old woman who has reached the postmenopausal stage. The patient's primary complaint is stomach pain, which has persisted for a duration of two months. Notably, the patient does not exhibit any constitutional syndrome symptoms such as asthenia, anorexia, or involuntary weight loss. The transvaginal ultrasound (TVS) examination revealed the presence of a cystic mass in the right adnexa, displaying characteristics that indicate the likelihood of a malignant neoplasm.

There was no pertinent pathological family history evident in her medical records. The individual did not exhibit any comorbidities such as Diabetes Mellitus and hypertension. With respect to the individual's gynaecological background, it is noted that menarche occurred at the age of 13, and subsequently, a regular monthly cycle was seen. She did not mention or make reference to earlier gynaecological examinations. The absence of toxic habits.

The transvaginal ultrasound examination revealed the presence of a cystic mass in the right adnexa, measuring 11×8×2 cm, which had the characteristic feature of intracystic fat. Furthermore, the presence of acoustic shadowing regions was identified, leading to the suspicion of a Rokitansky nodule displaying solid elements such as hair and teeth.

The patient had a surgical procedure scheduled. A comprehensive surgical procedure involving the removal of the uterus and both fallopian tubes and ovaries, known as a total hysterectomy with bilateral salpingo-oophorectomy, was conducted. Subsequently, a sample was sent for histological analysis. Upon microscopic examination the examination of several segments of the right adnexal cyst demonstrates the presence of a combination of non-malignant tissues. The cyst wall is composed of stratified squamous epithelium, which is infiltrated by dysplastic malignant squamous cells that have invaded the ovarian stroma. The subepithelial layer has lobules consisting of sebaceous glands accompanied by hair follicles, sweat glands, melanocytes, and melanin pigments. The presence of fat necrosis and dystrophic calcification accompanied by foreign body giant cell formation can be observed in some regions.

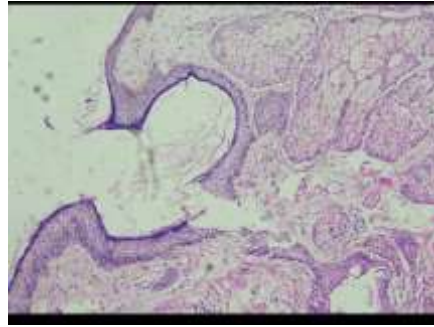


Figure1: Cystic Teratoma

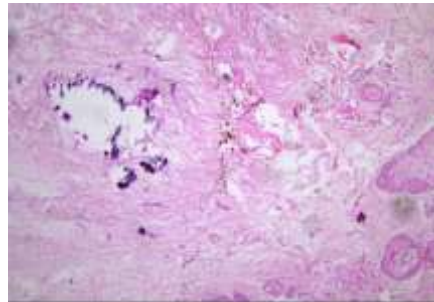


Figure2: Dystrophic calcification and Melanin incontinence

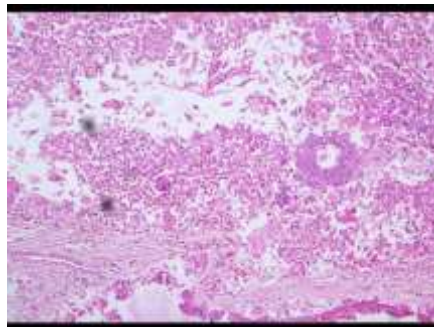


Figure3: Foreign body giant cell

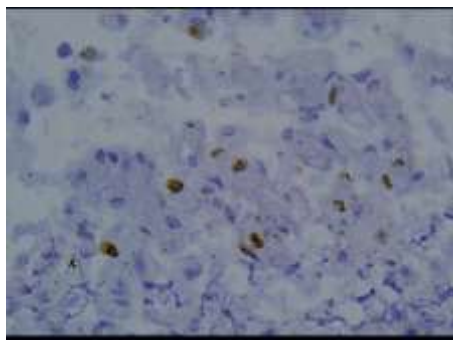


Figure4: K i67

3. Results and Discussion

Ovarian teratoma is derived from germ cells and can exhibit a variety of cellular components derived from one or more germ layers, including endoderm, ectoderm, and mesoderm ^(2,6). Hence, it is possible to observe diverse structures within ovarian lesions, including epidermis, sebaceous or sweat glands derived from ectodermal structures, as well as teeth, muscle, fat, or bone originating from mesodermal structures. Additionally, gastrointestinal, respiratory, or thyroid tissues originating from endodermal structures may also be present ^(2,7). The presence of the lesion may lead to the emergence of typical manifestations, including abdominal pain and urinary or digestive symptoms. Alternatively, the lesion may remain without symptoms until complications arise. The most commonly observed complications include torsion, intraperitoneal rupture, and invasion of neighbouring viscera ⁽⁸⁾. The occurrence of malignant transformation and infection as consequences has been infrequently documented, with an estimated incidence rate of 1-2% among all reported cases ⁽⁹⁾.

The malignant transformation of ovarian teratoma can originate from any germ cell type found inside these tumours. Consequently, several types of malignancies such as adenocarcinomas, squamous cell carcinomas, sarcomas, melanomas, adenosquamous carcinomas, or even carcinoid tumours might

manifest. Nevertheless, it appears that a significant proportion, around 80%, of cases demonstrating malignant characteristics are ultimately diagnosed as squamous cell carcinomas ^(10,11).

Various criteria have been proposed to enhance the preoperative identification of cases in which malignant transformation may have taken place. Notably, elderly patients, typically those aged 55 years and above, who exhibit larger tumours (defined as exceeding 10 cm) and radiological indications of intra-tumoral vascularization, appear to have a higher likelihood of presenting malignant transformation of ovarian teratomas. In regards to the age at which this lesion may be encountered, research has shown that individuals with this condition tend to be 10-15 years older compared to those identified with benign lesions ⁽¹²⁾.

When considering the appropriate surgical strategy, it appears that the open approach should be the preferred alternative. While the use of minimally invasive techniques may appear appealing for their potential to enhance patient recovery, some researchers have emphasised the need to exercise caution in employing this approach. Specifically, they have highlighted the elevated risk of spillage and cystic effraction during laparoscopic manipulation and specimen extraction ^(13,14). Nevertheless, in the case that the laparoscopic technique is selected and spillage occurs, it is strongly advised to provide sufficient peritoneal cleaning using warmed fluids. This is done with the intention of preventing the formation of additional peritoneal lesions ⁽¹⁵⁾. Furthermore, recent investigations have provided evidence to support the safe use of the minimally invasive surgical approach when utilising an endoscopic retrieval bag for specimen containment ⁽¹⁶⁾.

In situations where individuals express a desire for fertility preservation, medical professionals may suggest the option of salpingo-oophorectomy, particularly for patients who have been diagnosed with the condition in its early stages. Nevertheless, it is crucial to engage in diligent monitoring in such instances to accurately detect cases when there is a progression of the disease ^(17,18).

After the completion of diagnosis and staging procedures, the patient will undergo postoperative follow-up or be admitted to the oncology department for adjuvant treatment ⁽¹⁸⁾.

A comprehensive review study was conducted to investigate the phenomenon of squamous cell carcinoma degeneration in mature cystic ovarian teratoma. The study encompassed a total of 17 cases, which were identified over a span of 22 years. The average age at the time of diagnosis was found to be 55 years, with the majority of cases being detected in the early stages of the disease. The authors emphasised that none of the subjects subjected to lymph node dissection demonstrated lymphatic metastasis. Regarding the long-term consequences, the aforementioned study cohort revealed that the collective one-year survival rate stood at 60%, with notable correlations observed between this rate and both the stage of disease and the specific adjuvant therapy employed. Hence, patients who were identified with stage I illness and subsequently received adjuvant platinum-based chemotherapy and pelvic irradiation demonstrated the most favourable long-term results, as indicated by previous studies ⁽²⁾.

A comprehensive systematic study, encompassing the years 1978 to 2007, was conducted in 2008 to investigate the transition of mature ovarian teratomas into squamous cell carcinoma ⁽¹⁹⁾. The researchers incorporated a total of 64 papers, which provided a summary of 277 patients. The average age at the time of diagnosis was 55 years, and the majority of patients were diagnosed during the first stages of the disease. There was no observed significant link between the blood levels of tumour markers and the stage at which the diagnosis was made. However, it was shown that patients who were diagnosed in advanced stages experienced a much worse prognosis. It is noteworthy that individuals who were diagnosed in the early stages of their condition, although presenting with burst tumours, did not exhibit a diminished prognosis. In relation to the effect of adjuvant therapy, the authors emphasised that the administration of alkylating drugs alone may enhance survival, whereas the efficacy of radiation therapy was seen as uncertain ⁽¹⁹⁾. Regarding the example being presented, it is crucial to emphasise the noteworthy aspect that involves the malignant change linked with the ovarian tumour.

4. Conclusion

Ovarian teratomas are widely observed, with a minority of cases presenting additional issues, such as infection or malignancy, often in the form of squamous cell carcinoma (SCC). Several factors have been identified as predictors of the malignant evolution of mast cell tumours (MCT). These factors include advancing age, the presence of a substantial tumour size, and a significant proportion of solid components within the MCT. The diagnosis of the entity should be conducted following a comprehensive investigation of the primary focus of squamous cell carcinoma (SCC) in other locations, in order to eliminate the probability of metastasis to the ovary.

References:

1. Berek J.S. Epithelial ovarian cancer. In: Berek J.S., Hacker N.F. (eds). Practical gynecologic oncology. fourth ed. Lippincott Williams & Wilkins: Philadelphia. 2005. p. 443.
2. Hackethal A, Brueggmann D, Bohlmann MK, Franke FE, Tinneberg HR, Münstedt K. Squamous-cell carcinoma in mature cystic teratoma of the ovary: systematic review and analysis of published data. *Lancet Oncol*. 2008;9:1173–80.
3. Maharjan S: Mature cystic teratoma of ovary with squamous cell carcinoma arising from it . *Clin Case Rep*. 2019, 7:668-671. 10.1002/ccr3.2062
4. Li C, Zhang Q, Zhang S, et al.: Squamous cell carcinoma transformation in mature cystic teratoma of the ovary: a systematic review. *BMC Cancer*. 2019, 19:217. 10.1186/s12885-019-5393-y
5. Li C, Zhang Q, Zhang S, et al.: Squamous cell carcinoma transformation in mature cystic teratoma of the ovary: a systematic review. *BMC Cancer*. 2019, 19:217. 10.1186/s12885-019-5393-y
6. Goudeli C, Varytimiadi A, Koufopoulos N, Syrios J, Terzakis E: An ovarian mature cystic teratoma evolving in squamous cell carcinoma: a case report and review of the literature. *Gynecol Oncol Rep*. 2017, 19:27-30. 10.1016/j.gore.2016.12.005
7. Caspi B, Lerner-Geva L, Dahan M, Chetrit A, Modan B, Hagay Z and Appelman Z: A possible genetic factor in the pathogenesis of ovarian dermoid cysts. *Gynecol Obstet Invest* 56(4): 203-206, 2003. PMID: 14614249. DOI: 10.1159/000074755
8. Avci S, Selcukbiricik F, Bilici A, Ozkan G, Ozagari AA and Borlu F: Squamous cell carcinoma arising in a mature cystic teratoma. *Case Rep Obstet Gynecol* 2012: 314535, 2012. PMID: 23320213. DOI: 10.1155/2012/314535
9. Hirakawa T, Tsuneyoshi M and Enjoji M: Squamous cell carcinoma arising in mature cystic teratoma of the ovary. Clinicopathologic and topographic analysis. *Am J Surg Pathol* 13(5): 397-405, 1989. PMID: 2712191. DOI: 10.1097/00000478-198905000-00007
10. Dos SL, Mok E, Iasonos A, Park K, Soslow RA, Aghajanian C, Alektiar K, Barakat RR and Abu-Rustum NR: Squamous cell carcinoma arising in mature cystic teratoma of the ovary: a case series and review of the literature. *Gynecol Oncol* 105(2): 321- 324, 2007. PMID: 17240432. DOI: 10.1016/j.ygyno.2006.12.008
11. Hirakawa T, Tsuneyoshi M and Enjoji M: Squamous cell carcinoma arising in mature cystic teratoma of the ovary. Clinicopathologic and topographic analysis. *Am J Surg Pathol* 13(5): 397-405, 1989. PMID: 2712191. DOI: 10.1097/00000478-198905000-00007
12. Kashimura M, Shinohara M, Hirakawa T, Kamura T and Matsukuma K: Clinicopathologic study of squamous cell carcinoma of the ovary. *Gynecol Oncol* 34(1): 75-79, 1989. PMID: 2737532. DOI: 10.1016/0090-8258(89)90111-x
13. Ulker V, Numanoglu C, Akbayir O, Akyol A, Tuncel A, Akca A and Aydin O: Malignant transformation arising from mature cystic teratoma of the ovary: a report of six cases. *J Obstet Gynaecol Res* 38(5): 849-853, 2012. PMID: 22448642. DOI: 10.1111/j.1447-0756.2011.01797.x
14. Wang PH, Yen MS, Juang CM, Chen YJ, Chao HT and Yuan CC: Intraperitoneal cancer spread after laparoscopic cystectomy for mature teratoma with malignant transformation. *Eur J Gynaecol Oncol* 23(2): 131-132, 2002. PMID: 12013109.
15. Mecke H and Savvas V: Laparoscopic surgery of dermoid cysts-
16. -intraoperative spillage and complications. *Eur J Obstet Gynecol Reprod Biol* 96(1): 80-84, 2001. PMID: 11311766. DOI: 10.1016/s0301-2115(00)00390-0
17. Gadducci A, Guerrieri ME and Cosio S: Squamous cell carcinoma arising from mature cystic teratoma of the ovary: A challenging question for gynecologic oncologists. *Crit Rev Oncol Hematol* 133: 92-98, 2019. PMID: 30661663. DOI:10.1016/j.critrevonc.2018.10.005
18. Sinha A and Ewies AA: Ovarian mature cystic teratoma: Challenges of surgical management. *Obstet Gynecol Int* 2016: 2390178, 2016. PMID: 27110246. DOI: 10.1155/2016/2390178
19. Tseng CJ, Chou HH, Huang KG, Chang TC, Liang CC, Lai CH, Soong YK, Hsueh S and Pao CC: Squamous cell carcinoma arising in mature cystic teratoma of the ovary. *Gynecol Oncol* 63: 64-70, 1996. PMID: 8946873. DOI: 10.1006/gyno.1996.0337
20. Abhilasha N, Bafna UD, Pallavi VR, Rathod PS and Krishnappa S: A review of squamous cell carcinoma arising in mature cystic teratoma of the ovary. *Indian J Cancer* 53(4): 612-614, 2016. PMID: 28485364. DOI: 10.4103/0019-509X.204763