Mature Cystic Teratoma with a Well-Differentiated Neuroendocrine Tumor: A Case Report

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Abstract

Neuroendocrine neoplasms of the ovary are rare, constituting 0.1% of all ovarian neoplasms and less than 5% of all neuroendocrine neoplasms. We report a rare case of neuroendocrine tumor within a mature cystic teratoma, managed at Khoula Hospital, Muscat, Oman. A 41-year-old woman, G7P6, presented at 9+3 weeks of gestation with vaginal bleeding and abdominal pain. A diagnosis of complete miscarriage was made, with an incidental finding of dermoid cyst in the right ovary on ultrasound. Three days later, she presented with suspected torsion and underwent emergency laparoscopic right ovarian cystectomy. Histopathological examination revealed a mature cystic teratoma with a small focus of a well-differentiated neuroendocrine tumor. The patient was referred to the Oncology Centre, where she underwent laparoscopic right salpingo-oophorectomy and left ovarian cystectomy after detailed investigations and multidisciplinary team meeting. Histopathology revealed a well differentiated dermoid cyst in the left ovary, with no evidence of neuroendocrine tumor. No residual dermoid cyst or neuroendocrine tumor was found in the right salpingo-oophorectomy specimen. The patient did not require further adjuvant treatment and is under six-monthly clinical and imaging follow-up. Neuroendocrine neoplasms of the gynecological tract are a heterogenous group of tumors requiring multidisciplinary management. Due to the rarity of the disease and the absence of consensus on treatment guidelines, proper histopathological grading and referral to experienced centers play a crucial role in achieving optimal outcomes.

Keywords: Neuroendocrine Tumors; Teratoma, Ovarian; Referral and Consultation; Ovarian Neoplasms.

Introduction

Neuroendocrine neoplasms (NENs) of ovary are rare, constituting 0.1% of all ovarian neoplasms and less than 5% of all NENs.[1,2] We report rare case of a neuroendocrine tumor (NET) within a mature cystic teratoma, managed at Khoula Hospital, Muscat, Oman.

Case Report

A 41-year-old multiparous woman (G7P6) presented at 9+3 weeks gestation with vaginal bleeding and abdominal pain.

A previous ultrasound had confirmed an intrauterine pregnancy. A transvaginal scan at presentation showed a thin endometrium, consistent with a complete miscarriage. An incidental 9 × 7 cm dermoid cyst was detected in the right adnexa. Cancer antigen 125 (CA125) was 44 U/ml, while carbohydrate antigen 19-9 (CA19-9), AFP, and lactate dehydrogenase were normal. A follow-up review in the gynecology clinic was planned. However, the patient presented three days later with persistent right-sided abdominal pain. With a clinical suspicion of ovarian torsion, an emergency laparoscopy and right ovarian cystectomy was performed.

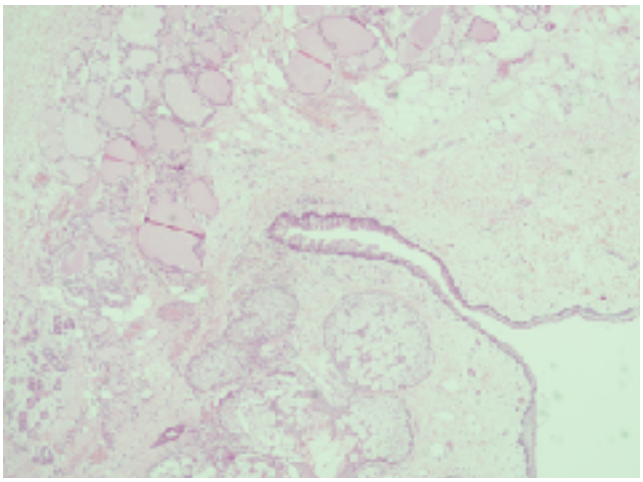

Figure 1: Hematoxylin and eosin staining of a mature cystic teratoma lined by stratified squamous epithelium with underlying skin adnexa. Thyroid tissue is present, magnification = × 40.

Histopathological examination of the specimen revealed a mature cystic teratoma lined by stratified squamous epithelium with underlying skin adnexa [Figure 1]. Other components included adipose tissue, cartilage, smooth muscle, respiratory epithelium, seromucinous glands, and thyroid tissue. Focally, there was a small area of infiltrative nests and tubules with stippled nuclei and amphophilic cytoplasm [Figure 2]. No mitosis was identified, and the cells were diffusely positive for neuroendocrine markers CD56 and synaptophysin [Figure 3], with focal positivity for chromogranin A. Ki67 (a cell proliferation marker) was positive in less than 1% of the cells. Based on the histological findings, small size (3.2 mm), absence of mitosis, low Ki67 index, and immunostaining profile, a diagnosis of a mature cystic teratoma with a well-differentiated NET (Grade 1) was established. The patient exhibited no symptoms of carcinoid syndrome.

She was referred to the Oncology Centre for further evaluation and multidisciplinary team management. Magnetic resonance imaging (MRI) of the pelvis showed a normal uterus and right ovary, while the left ovary was enlarged with a dermoid cyst. No enlarged lymph nodes or ascites were present. Ga-68 DOTATOC PET/CT scan showed no uptake in either adnexa. Histopathology slides were reviewed and confirmed a mature cystic teratoma with a completely excised focus of NET. The multidisciplinary team recommended removal of the right ovarian remnant and discussed the feasibility of left ovarian cystectomy versus left salpingo-oophorectomy with the patient. She opted for left ovarian cystectomy, with an agreement for subsequent completion surgery depending on histopathology results.

A laparoscopic right salpingo-oophorectomy and left ovarian cystectomy were performed. Histopathology confirmed a well-differentiated dermoid cyst (4.2 × 2.7 × 2.2 cm) in the left ovary, with no evidence of NET. No residual dermoid cyst or NET was found in the right salpingo-oophorectomy specimen. The multidisciplinary team concluded that no further adjuvant treatment was necessary, and six-monthly clinical and imaging follow-ups were arranged.

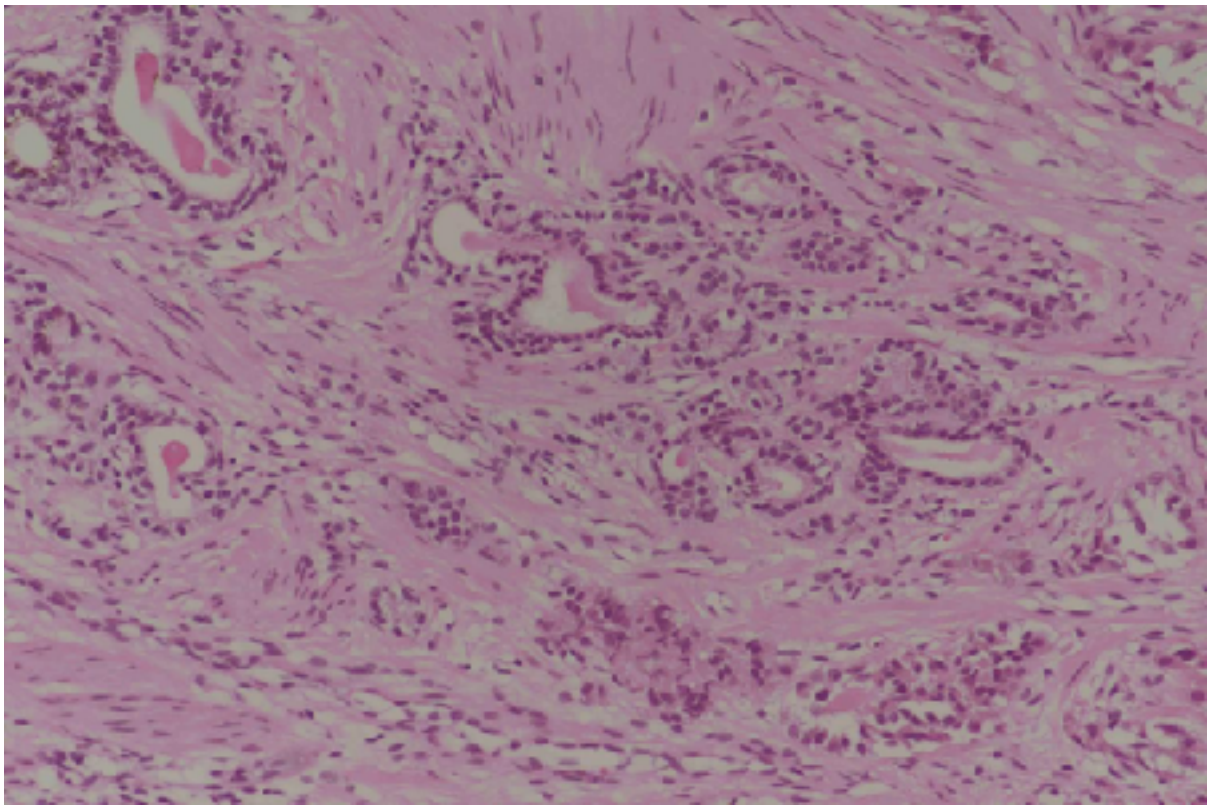

Figure 2: Hematoxylin and eosin staining of a focus of neuroendocrine tumor, magnification = × 10.

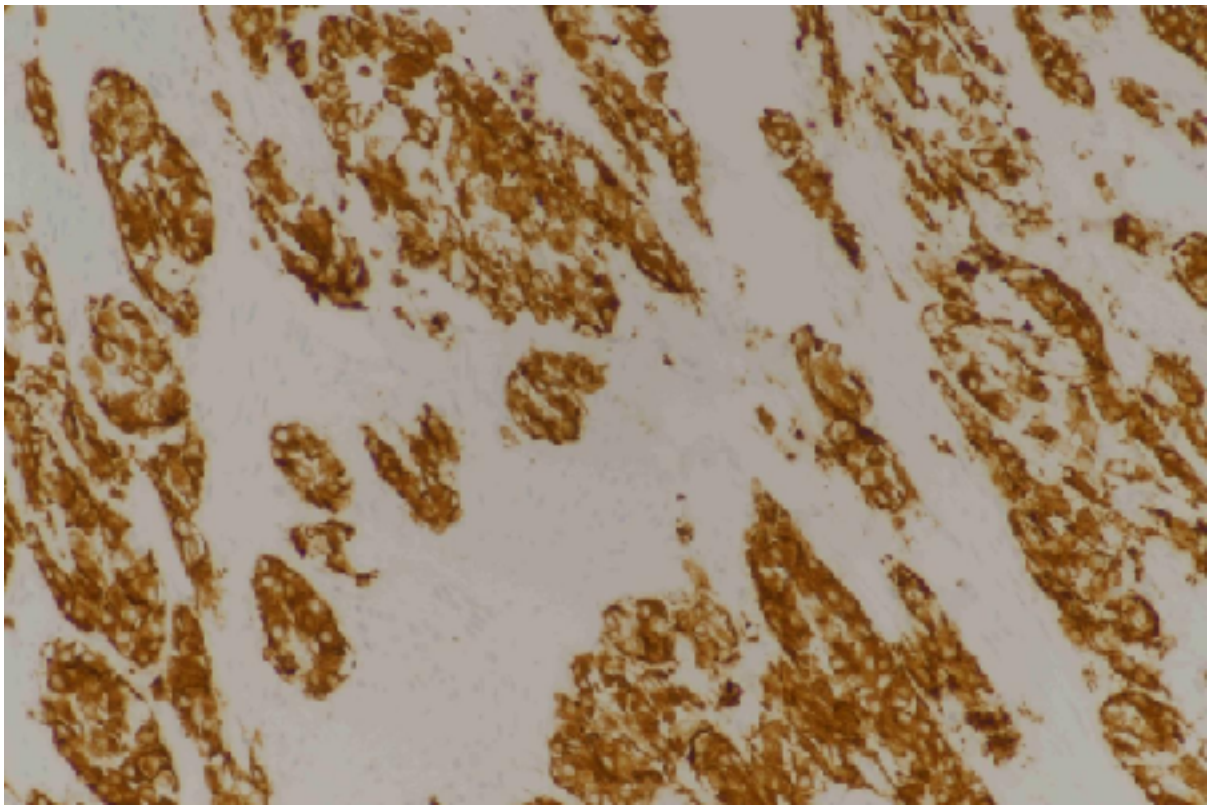

Figure 3: Diffuse positivity for synaptophysin immunostain, magnification = × 20.

Discussion

The reported annual incidence of NENs in the United States is 6.98/100 000, and the prevalence 170 000.[3-5] These heterogenous group of neoplams originate from endocrine cells derived from neuroectoderm, neural crest, and endoderm.[6,7] The gastrointestinal and respiratory tracts are the usual locations.[8] In the female reproductive system, the cervix and ovaries are the most frequent locations, with rare cases described in the uterine corpus. Ovarian NETs are uncommon, accounting for approximately 0.1% of all ovarian neoplasms and less than 5% of all NETs.[1,2] The median age at diagnosis of primary is reported as 50.8 years (range: 16–83 years). The reproductive age group and coincidence of miscarriage makes this case unique.[9]

Metastases from the gastrointestinal tract, lungs, and thymus should be always excluded, especially when ovaries are involved. Features such as extra-ovarian implants, bilateral tumors, vascular infiltration, and absence of teratomatous elements suggest metastatic disease. Differential diagnoses include Brenner tumors, granulosa cell tumors, and Sertoli-Leydig cell tumors. Thorough histopathological assessment is essential for distinguishing ovarian NENs from other primary ovarian neoplasms.[10]

In this case, diagnosis was entirely histopathological. The patient exhibited no clinical features of carcinoid syndrome. The dermoid cyst was bilateral, with only a unilateral small focus of well-differentiated NET in the right dermoid cystectomy specimen. The 2022 WHO classification system for NENs provides a universal definition based on differentiation and proliferative grading, incorporating mitotic activity and Ki67 index as diagnostic criteria.[11]

There are no set treatment guidelines for NENs of the female genital tract due to the rarity of the condition. Literature primarily consists of case reports and series. Most patients with ovarian NEN are treated according to protocols used for epithelial cancers of the ovary, with surgery being the treatment of choice. In women with normal contralateral ovary and Ki-67 index that does not exceed 5%, fertility sparing surgery should be considered.[10] However, women should be made aware that the information regarding safety of conservative treatment is limited.[12] Prognostic factors for ovarian NENs are age, disease stage, mode of treatment, and histological type.[12]

Younger age, the absence of disease at other sites, and unilateral small focus of well differentiated tumor in the background of a mature cystic teratoma were favorable prognostic factors in our patient. Women with advanced stage disease are often treated with debulking surgery followed by adjuvant chemotherapy with carboplatinum and paclitaxel and radiotherapy in line with treatment standards for epithelial ovarian cancer.[12,13]

Conclusion

Neuroendocrine neoplasms of the gynecological tract are a heterogenous group of tumors requiring multidisciplinary management. Due to the rarity of the disease and the lack of consensus on treatment guidelines, proper histopathological grading and referral to experienced centers play an important role in the outcome.

Disclosure

The authors declared no conflicts of interest. Informed consent was obtained from the patient.

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