

Case report

Simultaneous Occurrence of the Two Most Common Benign Ovarian Tumours : A Case Report and Review of the Literature

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Abstract

Ovarian tumors are a heterogeneous group of neoplasms that include epithelial, germ cell, sex cord, and stromal tumors. The most common benign ovarian tumors are serous and mucinous cystadenomas (epithelial origin) and mature teratomas (germ cell origin). Collision tumors are defined as the simultaneous occurrence of two histologically distinct neoplasms in the same organ. We report a case of a 38-year-old woman presenting with right lower abdominal pain. Gynecological examination and 3D ultrasound revealed a large multilocular cystic mass in the right ovary. Laparoscopic adnexectomy was performed, and histopathological examination identified three separate neoplasms: a serous cystadenoma of the fallopian tube, and both a mucinous cystadenoma and a mature cystic teratoma within the ovary. Collision tumors in the ovary are extremely rare and often undetectable with imaging alone. This case highlights the critical role of histopathological examination in achieving an accurate diagnosis.

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Introduction

Ovarian tumors represent a highly heterogeneous group of neoplasms that can be divided into two main categories, according to their cellular origin and malignancy. Based on cellular origin, they are classified into epithelial and non-epithelial tumors, while from the perspective of malignancy they are categorized as benign or malignant.

Epithelial ovarian tumors are the most common and they include tumors such as serous, mucinous, endometrioid, clear cell tumors, and Brenner tumors. They are further classified by the degree of differentiation into well-differentiated, moderately differentiated, and poorly differentiated types. Non-epithelial tumors are much less common and include tumors arising from sex cord-stromal elements and germ cell tumors. Each of these groups can be further subdivided based on cell type and degree of differentiation.

Among benign epithelial tumors, serous and mucinous cystadenomas account for approximately 20–25% of all benign ovarian tumors, while mature teratomas represent around 95% of all germ cell tumors. Together, these tumors are the most common benign ovarian neoplasms, whereas malignant ovarian tumors are most often of epithelial origin [1,2,4].

Ovarian tumors are frequently asymptomatic, which allows them to grow to considerable dimensions and subsequently cause symptoms such as abdominal pain, distension, and in some cases even rupture. Due to the lack of early symptoms, malignant ovarian tumors are most often diagnosed at an advanced stage. Ovarian tumors account for approximately 3% of all female malignancies and yet they are the leading cause of death among gynecological tumors, mostly due to the absence of specific symptoms in early stages.

The term collision tumor describes the simultaneous occurrence of two distinct and histologically different neoplasms in the same organ. This occurrence has been reported in several organs, including the esophagus, stomach, liver, kidney, bones, lungs and brain,

however, when it comes to the ovary, collision tumors are considered exceedingly rare.

In this paper, we present the case of a 38-year-old woman with the simultaneous occurrence of a mucinous cystadenoma and a mature teratoma in the same ovary. This rare case presentation highlights the challenges in preoperative diagnosis, since imaging techniques often cannot clearly determine the difference between two tumors and it emphasises the crucial role of histopathological examination in the diagnostic process.

Case report

A 38-year-old woman presented to the emergency department with dull, intermittent pain localized to the right lower abdominal quadrant. The pain started a month ago. She reported no other gastrointestinal, urinary or gynaecological symptoms. Her menstrual cycles were regular and there was no history of dysmenorrhea, menorrhagia or other gynaecological symptoms. The patient had no significant personal or family history for malignant diseases. Physical examination was normal however gynecological examination revealed an adnexal enlargement on the right side, which was non-tender and mobile. There was no ascites or palpable lymph nodes.

A 3D transvaginal ultrasound examination revealed a large, multilocular cystic lesion within the right ovary, measuring approximately 95 × 94 × 100 mm, with a solid component inside the cyst measuring approximately 30 × 23 × 42 mm. The doppler examination did not show significant vascularity. Tumor markers (CA-125, CA 19-9, CEA, AFP, β -hCG, and LDH) were within normal reference ranges. The differential diagnosis included benign mucinous cystadenoma, serous cystadenoma, mature teratoma, endometriotic lesion or a borderline or malignant neoplasm.

Due to the size of the mass and the patient's symptoms, surgical treatment was recommended. A laparoscopic right adnexectomy was performed to remove the mass. Intraoperative findings showed a large

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cystic ovarian mass with smooth external surface, intact capsule, and no evidence of peritoneal deposits, ascites or adhesions. The left adnexa and uterus appeared normal. No suspicious lymph nodes were found. The mass was removed using an endoscopic retrieval bag to prevent intraperitoneal spillage. The mass was removed and submitted for histopathological evaluation.

Gross pathological examination revealed a multilocular cyst containing mucinous fluid and a separate area containing sebaceous material with hair. Microscopic examination found three different neoplasms: a mucinous cystadenoma lined by tall columnar epithelium with apical mucin, a serous cystadenoma (tubal-type cyst) lined by single-layered cuboidal epithelium and a mature teratoma that was composed of keratinized squamous epithelium, skin adnexa, adipose tissue, and mature neural tissue. Serous cystadenoma was found within the fallopian tube. Mucinous cystadenoma and mature cystic teratoma were both found on the ovary. The tumors were separated by normal ovarian stroma, which confirms the diagnosis of a collision tumor, and there was no malignant transformation present.

The postoperative period was uneventful, and the patient was discharged in good general condition. On follow-up at 3 and 6 months, she remained asymptomatic, with no evidence of recurrence on ultrasound examination.

Discussion

Serous and mucinous cystadenomas are the most common epithelial tumors and the most common benign ovarian tumors. They mostly occur in women between the ages of 40 and 60 years old but they can also occur in younger women. Small cystadenomas, measuring only a few centimetres, are usually incidental findings, however they can grow to significant sizes and cause different symptoms like pelvic pain, bloating and discomfort. The treatment of ovarian cystadenomas depends on several different factors like the age of the patient, reproductive status, symptoms and the size of

the mass. Salpingo-oophorectomy or ovarian cystectomy is the appropriate treatment in most cases of cystadenomas. Cystectomy is a better option for younger women in their reproductive years. Although mucinous tumors are the most common type of benign ovarian tumors they can also be malignant or borderline malignant. The malignancy of mucinous ovarian tumors depends on the specific histologic variant and tumor stage [1,5,6].

Mature teratomas or also know as dermoid cysts are the most common germ cell tumors and, together with epithelial cystadenomas, are the most common benign ovarian tumors. Mature teratomas contain differentiated tissue from at least two or all three germ layers (ectoderm, mesoderm, endoderm) such as skin, hair, cartilage, fatty tissue, teeth or neural tissue. Dermoid cysts can occur at any age but they are most common between the ages of 20 to 40, during the female reproductive period. The treatment depends on different factors, like in the case of cystadenomas, with ovarian cystectomy usually being the preferred treatment. Mature teratomas are almost always benign however a small chance for malignant transformation exists [1,7,8]. The most common secondary malignant transformations of ovarian teratomas are to squamous cell carcinomas [9]. Teratomas are usually slow growing and asymptomatic with a favourable outcome for the patients, however because of their growth they can cause complications such as torsion, hemorrhage and rupture [10].

Collision tumors represent a rare simultaneous occurrence of two neoplasm appearing together in the same organ but without any histological intermixing. Collision tumors are very rare in the ovary and the most common component is usually mature teratoma. The most common combination of tumors is a combination of mature teratoma and mucinous or serous cystadenoma [3,4,11]. In a retrospective study from 2024, a co-existence of ovarian teratomas with other gynaecological tumors was investigated. In the study, out of 288 patients with mature teratomas there were 14 women (4.9%) with a co-existent serous cystadenoma and 7 women (2.4%) with a

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mucinous cystadenoma, other tumors like endometrioid ovarian cancer, struma ovarii or Brenner cyst were less common (0,3%) [12].

Different theories of the development of collision tumors have been studied but neither theory has been definitively proven. The first theory suggest that the presence of two different tumors is a chance accidental occurrence. The second theory is that the first tumor changes the microenvironment in the tissue thus making it more susceptible for the development of the second tumor or for the implantation of metastatic tumor cells. The last theory proposes that both tumors originated from a common stem cell [4,13,15,16].

Preoperative diagnosis of collision tumors, like all other ovarian tumors, consists of imaging techniques. Ultrasound is the primary method, however the results can often be inconclusive because of multiple masses. Computer tomography and magnetic resonance can also be used for more detailed imaging, but the final diagnosis is based on pathohistological examination. Histological examination is also crucial because malignant transformation of teratomas and cystadenoma is possible and has to be excluded. The diagnosis of collision tumor is made when there is normal ovarian tissue

present between the two tumors and there is no histological intermixing at the surface. Teratoma with cystadenoma components has an intermixture of histological components from both tumors. Transition zone at the surface between the tumors makes it hard to differentiate the collision tumors from mixed tumors [13,14].

Conclusion

This case report shows a patient with simultaneous occurrence of the two most common types of benign ovarian tumors representing a rare example of a collision tumor in the ovary. Although collision tumors have been reported in various organs, their occurrence in the ovary is extremely uncommon and poses unique diagnostic and therapeutic challenges. Multiple ovarian neoplasms are often difficult to detect during imaging techniques or even during surgical procedures. This case report and review of literature highlights the crucial role of histopathological examination in the diagnostic process and contributes to a better understanding of the clinical behaviour, diagnosis and management of collision tumors.

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Istovremena pojava dva najčešća benigna tumora jajnika: prikaz slučaja i pregled literature

Sažetak

Tumori jajnika predstavljaju heterogenu skupinu novotvorina koja obuhvaća epitelne tumore, tumore zametnih stanica, tumore spolnog tračka i stromalne tumore. Najčešći benigni tumori jajnika su serozni i mucinozni cistadenomi (epitelno podrijetlo) te zreli teratomi (podrijetlo zametnih stanica). Kolizijski tumori definirani su kao istovremena pojava dviju histološki različitih neoplazmi u istom organu. Prikazujemo slučaj 38-godišnje žene koja se javila s boli u donjem desnom kvadrantu abdomena. Ginekološki pregled i 3D ultrazvuk otkrili su veliku multilokularnu cističnu tvorbu u desnom jajniku. Učinjena je laparoscopska adnektomija, a histopatološkim pregledom identificirane su tri odvojene neoplazme: serozni cistadenom jajovoda, te mucinozni cistadenom i zreli cistični teratom u jajniku. Kolizijski tumori jajnika izuzetno su rijetki i često se ne mogu otkriti samo slikovnim metodama. Ovaj slučaj naglašava ključnu ulogu histopatološkog pregleda u postavljanju točne dijagnoze.

Ključne riječi: tumori jajnika; cistadenom; zreli teratom; kolizijski tumor