Mature ovarian teratoma with pneumatosis cystoides-like appearance – morphological and immunohistochemical study

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Teratomas belong to germ cell tumors localized in gonads or extragonadally. Ovarian teratomas are mostly benign cystic tumors composed of mature tissues derived from one or more germ cell layers. Presence of multiple cystic spaces in the tumor wall known as *pneumatosis cystoides-like* pattern is common, but rarely described change. We present o case report of 56-year-old woman with an accidentally discovered ovarian tumor. Histological and immunohistochemical findings corresponded with diagnosis mature cystic teratoma with *pneumatosis cystoides-like* appearence.
Keywords: mature cystic teratoma, ovarian teratoma, pneumatosis cystoides-like pattern

Zrelý ovariálny teratóm s obrazom podobným cystoidnej pneumatóze – morfologická a imunohistochemická štúdia
Teratómy patria medzi germinatívne nádory vyskytujúce sa v gonádach alebo extragonadálne. Ovariálne teratómy sú väčšinou benígne cystické nádory tvorené zrelými tkanivami vychádzajúcimi z jednej alebo viacerých zárodočných vrstiev. Početné cystické priestory v stene nádoru označované ako obraz *podobný cystoidnej pneumatóze* sú častou, no zriedka opisovanou zmenou. Prezentujeme prípad 56-ročnej ženy s náhodne nájdeným nádorom vaječníka. Histologické a imunohistochemické nálezy zodpovedali diagnóze zrelého cystického teratómu s obrazom *podobným cystoidnej pneumatóze*.
Kľúčové slová: zrelý cystický teratóm, ovariálny teratóm, obraz podobný cystoidnej pneumatóze

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Introduction

Ovarian teratomas are mostly benign tumors composed of mature tissues derived from one or more germ cell layers. The tumors can be solid; however, they typically form cystic structures. Multicystic appearance of ovarian teratoma known as *pneumatosis cystoides-like* pattern is common, but rarely described change[(1)]. It occurs in about one-third of ovarian mature cystic teratomas[(2)]. Only sporadically these cases are published.

Case report

We present a case report of 56-year-old woman without any clinical symptomatology with an ovarian tumor detected accidentally during routine gynecological examination. Salpingo-oophorectomy was performed. The tissue was formalin fixed paraffin embedded, stained with hematoxylin-eosin (H & E) and examined immunohistochemically with different antibodies. We did not have frozen tissue, so we were unable to prove presence of fat.

Macroscopically ovarian tissue was only partially preserved with cystic tumor 4 cm in diameter. Cut section showed a unilocular cyst with smooth greyish white external surface. The cyst wall was 3 mm thick with focal thickening up to 10 mm without multicystic appearance noted on gross examination. The lumen of the cyst was filled with yellowish keratinaceous and sebaceous material with hairs. Fallopian tube was unremarkable.

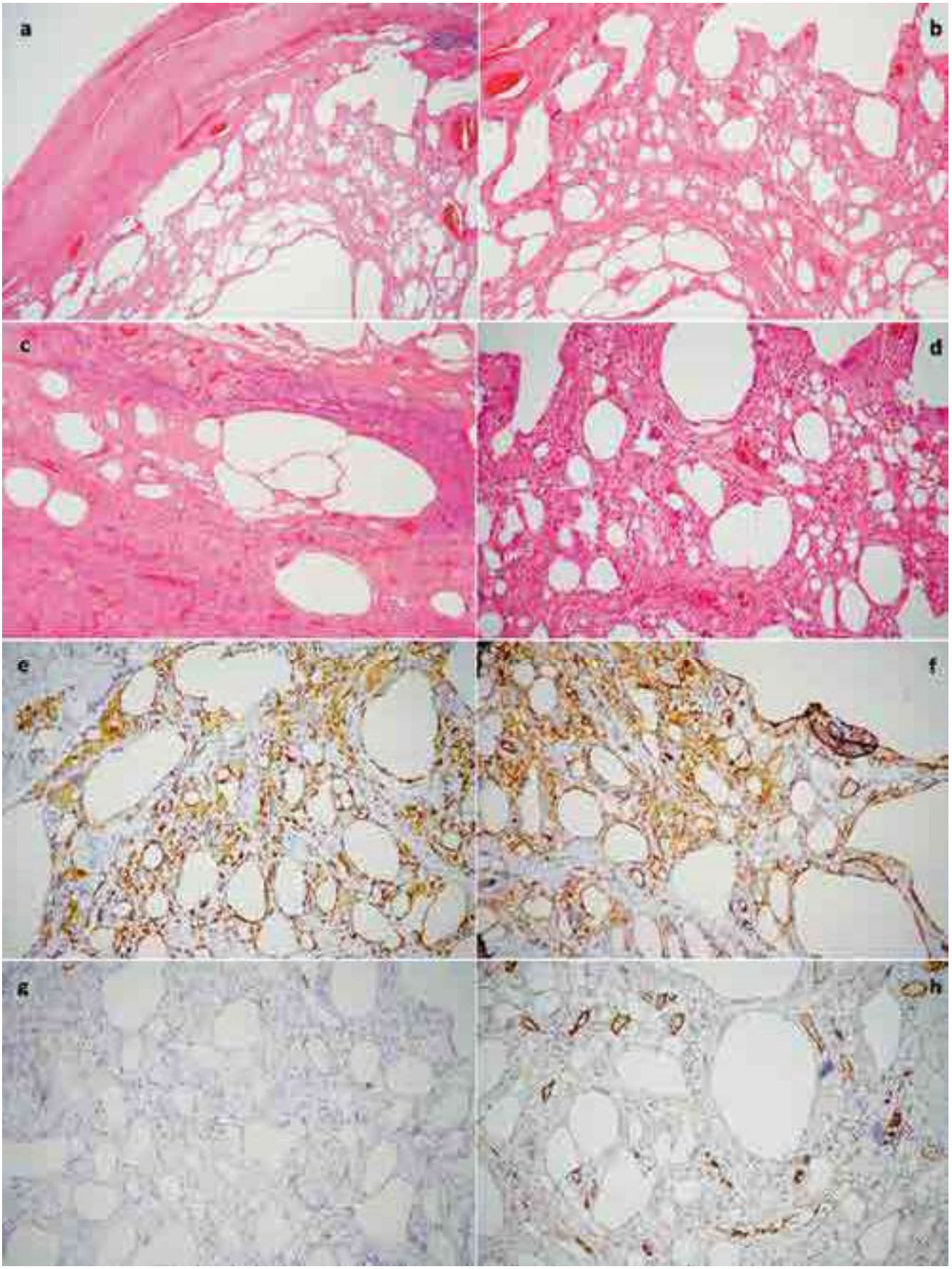
Histologically cystic tumor was lined by only partially preserved keratinizing stratified squamous epithelium with hair follicles, pilosebaceous and sweat glands with desquamated squames in the cyst lumen. The cyst wall was composed of fibrous tissue with multiple cystic spaces of varying size from less than 1 mm to 5 mm large lined partially or completely by one layer of mononuclear plump or flat cells and multinucleated giant cells of foreign body type with foamy cytoplasm ***(Figure 1a – d)***. The cystic spaces were either closely packed or separated by fibrous tissue with vessels, multinucleated giant cells and mild chronic lymphocytic inflammatory infiltrate.

Immunohistochemical cytoplasmic CD68 and membranous CD31 positivity was present both in multinucleated giant and mononuclear cells ***(Figure 1e – f)***. The cells were negative for cytokeratin cocktail AE1/3, CD34, FVIII (factor VIII), D2-40 ***(Figure 1 g – h)*** and S100, however the multinucleated giant cells exhibited weak cytoplasmic S100 positivity. Endothelial cells lining small thin-walled blood vessels were FVIII and CD34 positive. The lumen of cystic spaces was empty.

Discussion

Teratomas belong to germ cell tumors localized either in gonads or primary extragonadally. Ovarian teratomas are tumors typical for women in reproductive age. They are mostly in the form of pure cystic tumors with benign biological behavior. Mature cystic teratomas, known as dermoid cysts are the most common germ cell tumors of ovaries accounting for 25% of all ovarian tumors, up to 70% of benign tumors in premenopausal women and 20% of postmenopausal ones[(1,3)]. Histologically they are composed of mature structures arising from one, two or all three embryonic germ layers, the ectoderm, mesoderm and endoderm. In some teratomas lipogranulomatous, fat necrosis-like, sieve-like or *pneumatosis cystoides-like* pattern can be present, even prominently[(4)].

Figure 1. *Mature cystic teratoma with pneumatosis cystoides-like appearance. Cystic spaces are empty and are partially or completely lined by mononuclear or multinucleated giant cells, a – d H & E (original magnification ×50/×100/×200/×200), e – h immunohistochemical staining (original magnification x200, DAB). (e) CD68 cytoplasmic positivity in mononuclear and multinucleated giant cells, (f) CD31 membranous positivity in mononuclear and multinucleated giant cells and in vessels, (g) D2-40 negativity, (h) FVIII negative in cells lining cystic spaces, FVIII positivity in endothelial cells.*



Formation of macroscopically and microscopically empty cystic spaces filled with gas can be present in various organs. The most common location is in gastrointestinal tract known as *pneumatosis cystoides intestinalis*. Gas-filled cysts are rarely formed in genitourinary tract, especially in vaginal or urinary bladder wall referred to as emphysematous vaginitis or cystitis.

Pneumatosis cystoides intestinalis is a condition characterized by formation of multiple gaseous cysts in the wall of the small or large intestine either iatrogenically or spontaneously associated with another disease. The cysts are filled with nitrogen, hydrogen and carbon dioxide [5]. According to the mechanical theory the gas is pushed through mucosal defect into lymphatic channels during surgery, colonoscopy or trauma. The bacterial theory suggests production of gas by fermenting bacteria in submucosa. Accumulation of gas in bowel wall from ruptured alveoli in patients with chronic pulmonary diseases is the pulmonary theory of etiology of this condition. Association with autoimmune systemic collagen diseases is also described[5,6].

In genitourinary system, different organs can be affected, leading to emphysematous nephritis, emphysematous pyelitis or emphysematous cystitis. Gas-producing bacteria are the most common causative factor, E. coli being the most important one, in association with diabetes mellitus or immunosuppression[7]. Emphysematous vaginitis is mostly caused by trichomonas infection with associated pregnancy or immunosuppression[8].

The etiology of *pneumatosis cystoides-like* structures in ovarian teratomas is not clear. The first case of ovarian mature cystic teratoma with *pneumatosis cystoides-like* structures was published in 1989 by Maudsley and Zakhour[9]. Teratoma was an incidental finding in a 29-year-old pregnant woman found during caesarian section procedure. The authors considered the cystic spaces to be gas cysts similar to *pneumatosis cystoides intestinalis* because no recognizable cyst content was identified on routine staining. The cause for gas cysts formation is not known. The similarity of this condition to emphysematous vaginitis suggests the possibility of trichomonas infection or association with pregnancy as causative factor[9].

Some authors hypothesized that cystic spaces may be the result either of oleous or sebaceous material deposition in the cyst wall or in small vessels lumens with multinucleated foreign body type giant cells granulomatous response. This hypothesis was confirmed by fat staining, immunocytochemistry and electron-microscopy. Cyst content and cytoplasm of macrophages were positive for lipids, cells lining cystic spaces were positive for endothelial (FVIII) and macrophagic (Mac387) markers[2]. In our presented case the lining cells were FVIII and CD34 negative. CD31 positivity could partially confirm their endothelial origin, however this marker is also expressed by macrophages. CD68 positivity in mononuclear and multinucleated giant cells evidenced their histiocytic origin. Lipids may be reabsorbed by macrophages leaving a relatively acellular sieve-like structures without endothelial cells and macrophages lining the cysts and without fat staining of the cyst content and macrophage cytoplasm[2]. This may give the impression of gas cysts described earlier.

Formation of cystic spaces in mature teratoma can be due to dilatation of lymphatic vessels confirmed by FVIII positivity though only focal and weak[10]. We didn't find FVIII and D2-40 positivity of lining cells excluding their lymphatic origin in our case report.

Conclusion

Pneumatosis cystoides-like appearance found in the ovarian tumor is so characteristic for cystis teratoma as to be diagnostic. Presence of these structures can be helpful, especially in a case of ovarian tumor diagnostic dilemma, when the total absence of squamous epithelium or other teratomatous tissues is found[2,10].

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