Case Report

DOI: 10.7860/JCDR/2014/11138.5222

Pathology section

Collision Tumours of Ovary: A Very Rare Case Series

AJAY KR. SINGH[1], MONIKA SINGH[2]

ABSTRACT

Collision tumours are composed of two histologically distinct neoplasms in the same organ without intermixture of cell types. Here the author present a case series of 4 cases of collision tumours of ovary with brief review of literature. Two cases have a combination of mucinous cystadenoma and teratoma whereas third case is a combination of serous papillary cystadenoma with teratoma and the fourth case has a combination of serous papillary cystadenocarcinoma and teratoma. The cases were diagnosed post-operatively. It is important to correctly diagnose the component of tumour for further management and favourable prognosis.

Keywords: Collision tumour, Histologically, Ovary

CASE REPORTS

Cases 1 and 2: Collision tumour combination of mucinous cystadenoma with teratoma is most commonly encountered one in ovary.

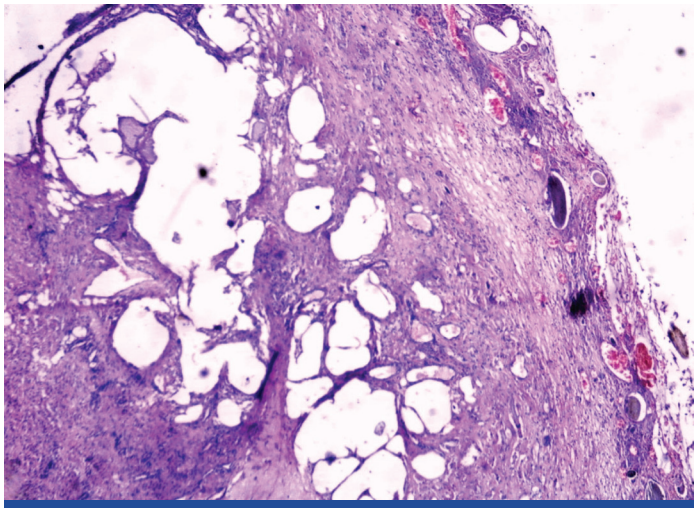
Case 1: A 35 year old, para 3+0, female presented with complains of pain and abdominal lump for the past seven months with regular menstrual cycles. On physical examination abdomen was soft and a mobile with right adnexal mass was felt. Routine haematological profile was unremarkable. USG examination revealed ovarian tumour measuring 10 x 9 x 6 cm. On the basis of USG finding patient underwent right salpingoopherectomy.

On gross examination, tumour measured 10 x 8 x 5.5 cm in size. The outer surface was cystic and smooth with attached fallopian tube measuring 1.5 cm with patent lumen. Cut surface showed multiloculated cysts filled with mucin along with areas showing pultaceous material, fatty tissue and hair. Representative sections [Table/Fig-1] were taken. Sections from the multiloculated cyst revealed cyst wall lined by a single layer of mucin secreting tall columnar epithelium showing focal atypia, stratification and nuclear hyperchromasia consistent with mucinous cystadenoma (boderline). Sections from the teratoid part showed hair shafts, adipose and muscle tissues.

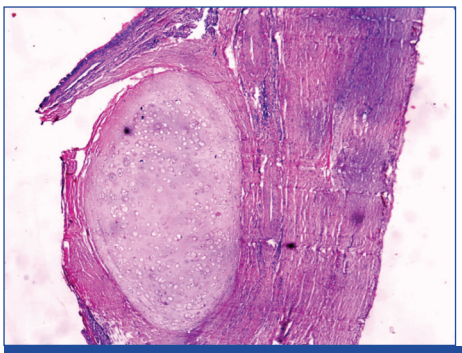
Case 2: Second case was a 50 year old multiparous women with complaints of abdominal lump and weakness for the past six months. She had attained menopause four years back. On physical examination mobile tender right adnexal mass was felt. Routine haematological examination were normal except for mild anemia (Hemoglobin -9.5g/dl). USG revealed right ovarian tumour mass. On gross examination ovarian mass measured 8 x 7 x 2.5 cm with attached fallopian tube measuring 2 cm in length with a patent lumen. The outer surface was shiny and cystic .Cut surface revealed multilocular cystic cavities filled with mucin and adjacent areas showing heamorrhage and calcification. Sections [Table/Fig-2] from the cystic area revealed cytic wall lined by unilayerd mucin secreting columnar epithelium showing focal atypia. Sections from the teratoid component showed adipose tissue, hair follicles, stratified squamous epithelium and blood vessels. Based on the microscopic findings a diagnosis of collision tumour of ovary was made.

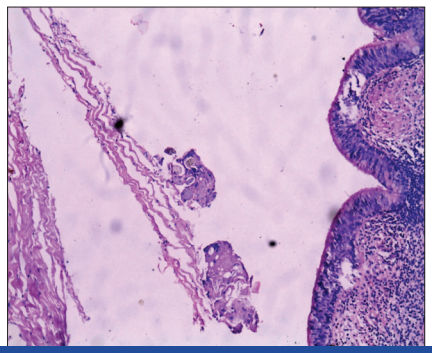
Case 3: Third case was a 42 year old parous woman presented with lower abdominal pain and menstrual irregularity. On physical examination a right sided adnexal mass was felt. Laboratory investigation was unremarkable except raised serum CA-125, i.e., 165 u/ml. On USG a right ovarian tumour was found. Patient underwent right sided salpingo-opherectomy. On gross examination ovary measued 5 x 4 x 3 cm. Outer surface was smooth and shiny. Cut surface revealed loculated cyst having few of them filled with clear fluid and other filled with pultaceous material, solid areas and hair. Representative sections were taken. Sections [Table/Fig-3] from the cystic part showed an epithelial neoplasm disposed in papillae which were lined by unilayered columnar cells having moderate amount of cytoplasm. Sections from the solid part showed hair follicles. On the basis of microscopic finding a diagnosis of collision tumour having serous papillary cytadenoma with teratoma was made.

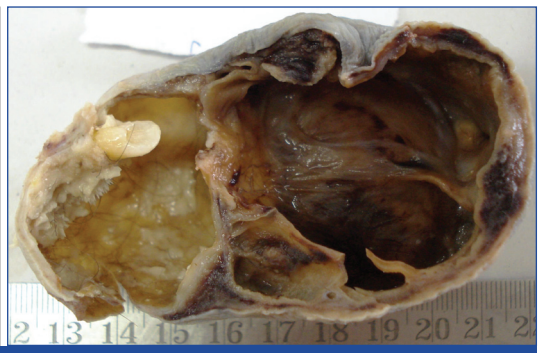
Case 4: A 40 year old multiparous woman presented with abdominal heaviness and dysfunctional uterine bleeding. On physical examination bilateral adnexal mass was felt. Laboratory investigations were unremarkable except raised serum CA-125, i.e., 210 u/ml. USG revealed bilateral ovarian tumour. Patient underwent bilateral salpingoopherectomy. On gross examination right ovary [Table/Fig-4] was measuring 4 x 4 x 3.5 cm. Outer surface was smooth. Cut surface revealed trilocular cyst with two locules containing clear fluid and the third locule containing pultaceous material and adjacent solid areas. Left ovary showed a cystic tumour



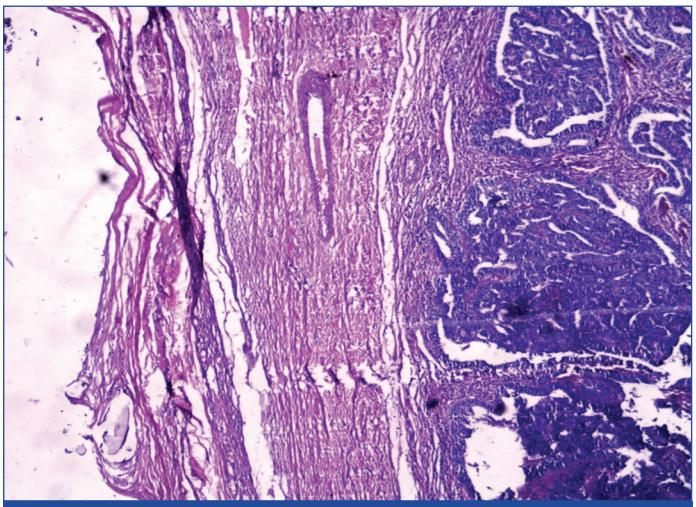
[Table/Fig-1]: H&E (20X)-Section show one surface having serous cystadenoma lining of columnar epithelium along with other surface filled with hair follicles and keratins







[Table/Fig-2]: H&E (40X)- Section show cartilage surrounded by outer layer of cyst with single layer of columnar cells of cystadenoma **[Table/Fig-3]:** H&E (20X)- Section show one surface having serous cystadenoma lining of columnar epithelium along with other surface filled with hair follicles and keratins **[Table/Fig-4]:** Gross photographs : gross photograph show two adjacent cyst in same ovary one having mucinous lining and transluscent and other filled with pultaceous material with hair and teeth



[Table/Fig-5]: H&E (10X)- Section show serous adenocarcinoma and one corner having hair follicle and keratins suspended in cystic lining

measuring 3 x 2 x 1 cm. Cut surface revealed single cyst filled with white coloured material along with gray white solid areas. Attached fallopian tube right and left measured 2 and 2.5 cm respectively. Representative sections [Table/Fig-5] were taken.

Sections from solid part of right ovary revealed respiratory epithelium, cartilage, mucus secreting glands and neural elements. Sections from cystic part showed a malignant epithelial neoplasm disposed in papillae as well as sheets, papillae were lined by pleomorphic tumour cells with high nucleo-cytoplasmic ratio, prominent nucleoli and moderate amount of cytoplasm along with fair number of mitotic figures. Sections from the left ovary also showed a malignant epithelial neoplasm of same histomorphology as described. Microscopy was consistent with an ovarian collision tumour comprising of serous papillary cystadenocarcinoma and teratoma.

DISCUSSION

Collision tumour is coexistence of two dintinct tumours in the same organ without any histological intermixing [1]. Collision tumours have been reported in various organs like gastrointestinal tract, lung, skin, adrenals, central nervous system, lymph nodes, uterus, etc., but are relatively rare in ovary. Teratoma as one of the most common component of collision combination in ovary. Pathogenesis of collision tumour has remained controversial. Collsion tumour is defined by the coexistence of two adjacent, but histologically distinct tumour components. This tumour is considered a multiple synchronous tumour in a single organ, because these components are separated from each other by stroma without histological admixture. Collision tumour of ovary are quite rare. Various combinations have been reported such as combinations of cystadenocarcinoma and dermoid cyst, teratoma and mucinous cystadenoma [2], serous cystadenomacarcinoma and teratoma, carcinosarcoma and dermoid cyst [3], choriocarcinoma and cystadenoma [4], sarcoma and mucinous tumor [5], sarcoma and serous carcinoma [6], serous cystadenoma and Sertoli-Leydig cell tumor [7], granulosa cell tumor and ovarian hepatoid carcinoma [8] granulosa cell tumour and endometroid carcinoma. Each component of collision tumors occur coincidentally with no connection, and the biologic behavior depends on their own tumor characteristics. Although pathogenesis of collision tumours is not well understood some of the hypotheses put forward to explain are:

1. The occurrence is coincidental, especially in tumors originating from neighboring tissues [9-10] or chance apposition of two unrelated tumors [11].
2. Simultaneous proliferation of two different cell lines [11].
3. Common origin from pluripotent precursor stem cell that differentiates into two components [11].
4. A carcinogenic agent may interact with different tissues, inducing different tumors [9-10].
5. An oncogenic growth factor produced by a metastatic tumor that could induce the growth of primary cancer at the site of metastases or may favor the differentiation of metastatic lesion to mimic the histology of primary tumor from the organ of metastatic lesion [12-13].
6. Alteration in the microenvironment, such as angiogenesis and inflammation, by the primary tumor could facilitate the growth of metastases from a second primary tumor from another organ [13-14]. Teratoma is a germ cell neoplasm whereas origin of mucinous cystadenoma is explained by metaplasia of the ovarian surface epithelium [15-16]. So in a case where these two tumours coexisted a possibility may be considered that teratoma originated from a germ cell rest [17]. Another possibility could be that the teratoma resulted from pathenogenesis of ovum evolved in a graffian follicle which failed to rupture, together with the mucinous adenoma cysts from the 'epithelial metaplasia' of the follicular lining [18].

Collision tumours are more often unilateral, and can vary in size from 2 to 200 cm and mostly occur in the age group of 17-66 years [18]. Most collision tumours are diagnosed postoperatively after histopathological examination. Patterson et al., retrospectively analyzed radiologic findings in histologically confirmed collision tumors associated with teratoma to look for features that might help in their preoperative diagnosis. They found that most of the collision tumors had radiologic clues such as the presence of nonfatty fluid in the cyst and a large solid component in the ovarian mass, which pointed toward the presence of two different tumors [19]. Such clues, in addition to frozen section analysis, could help in deciding on further management, particularly the type and extent of surgery. Other mixed tumour also well known, i.e., composite tumour which is defined as the intermingling of more than two different components in one tumour mass is designated as composite tumour and most famous example is a malignant mixed mullerian tumour [20].

In our cases there were no such radilogical or intraoperative clues about the existence of a collision tumour; it is therefore very crucial to do grossing of specimen carefully. Molecular methods like microallelotyping have been used to define the clonal origin of collision tumors of the gastrointestinal tract, although helpful to identify clonal origin of tumors, it is a research method and is not done routinely [21-23]. The factors which should be considered for further management after surgery are the types of component , most aggressive component and the stage of tumour, which will determine the prognosis.

CONCLUSION

Histopathologist, surgeons, and oncologists to be aware of existence of such rare collision tumours and recognition of such tumours are important as they will dictate appropriate treatment strategies dependent on the individual biological aggressiveness of each of the tumour components.

REFERENCES

[1] Bige O, Demir A, Koyuncuoglu M, et al. Collision tumor: serous cystadenocarcinoma and dermoid cyst in the same ovary. *Arch Gynecol Obstet.* 2009; 279:767-70.
[2] Joshi CV, Enver T. Plasticity revisited. *Curr Opin Cell Biol.* 2002; 14:749-55.
[3] Cabibi D, Martorana A, Cappello F, et al. Carcinosarcoma of monoclonal origin arising in a dermoid cyst of ovary: a case report. *BMC Cancer.* 2006; 6:47.
[4] Ozaki Y, Shindoh N, Sumi Y, et al. Choriocarcinoma of the ovary associated with mucinous cystadenoma. *Radiat Med.* 2001; 19:55-59.
[5] Prat J, Scully RE. Sarcomas in ovarian mucinous tumors: a report of two cases. *Cancer.* 1979; 44:1327-31.
[6] Allen C, Stephens M, Williams J. Combined high grade sarcoma and serous ovarian neoplasm. *J Clin Pathol.* 1992; 45:263-64.
[7] Seo EJ, Kwon HJ, Shim SI. Ovarian serous cystadenoma associated with Sertoli-Leydig cell tumor—a case report. *J Korean Med Sci.* 1996; 11:84-87.
[8] Triratanachat S, Niruthisard S, Trivijitsilp P. Granulosa cell tumor and ovarian hepatoid carcinoma as a collision tumor. *Chula Med J.* 2004; 48:101-09.
[9] Nirenberg A, Ostor AG, Quinn MA. Collision tumor: serous adenocarcinoma and steroid cell tumor of the ovary. *Pathology.* 1992; 24:60-62.
[10] Cohen A, Geller SA, Horowitz I, Toth LS, Werther JL. Experimental models for gastric leiomyosarcoma: the effects of N-methyl-N'-nitro-N-nitrosoguanidine in combination with stress, aspirin, or sodium taurocholate. *Cancer.* 1984; 53:1088-92.
[11] Mayur B, Chandra S Kanthan, Rani K. Collision tumour of the colonic adenocarcinoma and ovarian granulosa cell tumor-Case report. *World Journal of Surgical Oncology.* 2007; 5:118.
[12] Abs R, Parizel PM, Willems PJ, Van de Kelft E, Verlooy J, et al. The association of meningioma and pituitary adenoma: report of seven cases and review of the literature. *Eur Neurol.* 1993; 33: 416-22.
[13] Caroli E, Salvati M and Rocchi G. Post-traumatic intracranial meningiomas. *Tumouri.* 2003; 89: 6-8.
[14] Louis DN, Ramesh V. Neuropathology and molecular genetic of neurofibromatosis 2 and related tumours. *Brain Patho*. 1995; 15: 163-72.
[15] Tang P, Soukkary S, Kahn E. Mature cystic teratoma of the ovary associated with complete colonic wall and mucinous cystadenoma. *Ann Clin Lab Sci.* 2003; 33: 465-70.
[16] Nomura K. Mucin histochemistry of ovarian mucinous cystadenomas expressing gastrointestinal characteristics. *Pathol Int*. 1995; 45: 430-35.
[17] Naim M. Immature embryoid teratoma of the gallbladder. Case of a primary primitive neoplasm. *BMJ Case Reports.* 2009.
[18] McKenney JK, Soslow RA, Longacre TA. Ovarian mature teratomas with mucinous epithelial neoplasms: morphologic heterogeneity and association with pseudomyxoma peritonei. *Am J Surg Pathol.* 2008;32: 645-55.
[19] Patterson DM, Murugaesu N, Holden L, et al. A review of the close surveillance policy for stage I female germ cell tumors of the ovary and other sites. *Int J Gynecol Cancer.* 2008;18:43-50.
[20] Lewin K. Carcinoid tumour and mixed (composite) glandular-endocrine cell carcinomas. *Am J Surg Pathol.* 1987; 11:71-86.
[21] Furlan D, Cerutti R, Genasetti A, et al. Microallelotyping defines the monoclonal or the polyclonal origin of mixed and collision endocrine-exocrine tumors of the gut. *Lab Invest.* 2003; 83:963-71.
[22] Jang KS, Lee WM, Kim YJ, Cho SH. Collision of three histologically distinct endometrial cancers of the uterus. *J Korean Med Sci*. 2012;27(1):89-92.
[23] Schoolmeester JK, Keeney GL. Collision tumour of the ovary: adult granulose cell tumour and endometroid carcinoma. *Int J Gynecol Pathol.* 2012;31(6):538-40.

PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of Pathology, KGMU, Lucknow, India.
2. Resident, Department of Pathology, KGMU, Lucknow, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Ajay Kr. Singh,
Assistant Professor, Department of Pathology,
King George,s Medical University (KGMU), Lucknow -226003, UP, India.
Phone : 91-9415082798, E-mail : drajaysingh007@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Sep 6, 2014**
Date of Peer Review: **Sep 29, 2014**
Date of Acceptance: **Oct 07, 2014**
Date of Publishing: **Nov 20, 2014**