

# Clinical, radiological, and histopathological analysis of paraovarian cysts

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## ABSTRACT

**Introduction:** Paraovarian cyst arise from either mesothelium or from paramesonephric remnant. These present as either adneal mass or as an incidental finding. Diagnosis is usually established on ultrasound and it is important to differentiate these from ovarian cyst.

**Material and Methods:** The present study is a retrospective analysis of 32 women with a confirmed diagnosis of paraovarian cyst after surgery. The clinical profile, symptoms and radiological findings of these patients were noted from the hospital records. A correlation was made with the surgical findings and the final histopathological diagnosis.

**Results:** Only 2 patients were postmenopausal and one case was diagnosed during pregnancy. Ultrasound accurately diagnosed paraovarian cyst in 87.5% patients. 78% paraovarian cysts were found to be simple and none had any malignant change. We reported a higher incidence of cystic adenomatoid tumor in these paraovarian cysts.

**Conclusion:** In our study, most paraovarian cysts occur in reproductive age group and present as an adnexal mass. Ultrasound is the diagnostic modality and a paraovarian cyst needs to be differentiated from ovarian cyst. Most of them were simple cysts on histopathology.

**Key Words:** Histology, paraovarian cyst, ultrasonography

## INTRODUCTION

Paraovarian cysts represent 5–20% of all adnexal masses in pathologically verified series.<sup>[1,2]</sup> Histopathologically, they are classified into one of three categories: paramesonephric, mesonephric, or mesothelial.<sup>[3,4]</sup> The most common age of presentation is either in the third or in the fourth decade.<sup>[3]</sup> These are often misdiagnosed as ovarian cyst and need accuracy for correct diagnosis. The neoplastic paraovarian cysts originate from a neoplastic transformation of a paraovarian simple cyst or from the adjacent ovary.<sup>[5]</sup> Laparoscopy is the surgical approach in the management of these cysts. Most of the cases undergoing surgery

either have an incidental finding of an adnexal mass, lower abdominal pain, or rarely presenting as torsion.<sup>[6,7]</sup>

In this study, we have retrospectively evaluated the sonographic findings in surgically proven paraovarian cysts and correlated them with their histopathological findings.

## MATERIALS AND METHODS

Thirty-two women with an operative diagnosis of paraovarian cysts were identified from the surgical records over a period of 4 years from January 2010 to January 2014. Ethical approval was obtained from the institution before starting the study. The age of the patient and menopausal status were

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noted from the hospital records. The reason for the surgery, clinical presentation, and the detailed ultrasonographic findings were also noted. Additional radiological findings in the form of magnetic resonance imaging (MRI) evaluation were noted if done. The surgical reports were reviewed for the description of the location, size, and the possible torsion of the cyst. The pathological examination included a gross examination of the cyst for any loculations, presence of any papillary projections or any solid areas. The paraovarian cyst was defined as simple cyst if it lacked any septa or loculations on ultrasound and then finally confirmed by histopathology.

## RESULTS

characteristics of the paraovarian cysts have been described in Table 1. Thirty-two women were identified to have paraovarian cysts. Mean age of the women was  $35.7 \pm 6.9$  years (range 19–65 years). Two patients were postmenopausal, whereas 19 were perimenopausal. Ten patients had an incidental finding of paraovarian cyst on ultrasound done for some other reason, whereas rest had an abdominal pain or pressure symptoms. One patient who was G4P3 L3 presented with acute abdomen at 12 weeks pregnancy and was found to have torsion of the paraovarian cyst [Figures 1 and 2]. Suction evacuation was done for termination of pregnancy along with cystectomy. The second patient had torsion of the paraovarian cyst as an incidental finding on surgery.

Ultrasound accurately diagnosed paraovarian cyst in 87.5% (28 out of 32) patients and misdiagnosed four cases as ovarian cysts. These 28 patients were diagnosed cyst in paraovarian in location, separate from the ipsilateral ovary. On ultrasound, 78% of the paraovarian cysts were found to be simple cyst with clear contents, 18.7% simple cyst with small punctuate echoes floating inside, and only one paraovarian cyst was found to have thin septa, perhaps reflecting the growth of various small paraovarian cysts. Papillary projection or solid area was found in none. MRI was done in 10 patients in whom ultrasound findings were not definite of paraovarian cyst, ipsilateral ovary was not seen separately or the cyst was complex in nature. In all these patients, paraovarian cyst was visualized separately from the ipsilateral ovary [Figure 3].

Successful laparoscopic cystectomy was done in seventeen patients, and laparoscopic adnexectomy was done in three patients. Three patients underwent total abdominal hysterectomy with bilateral adnexectomy: two were postmenopausal and one had septated cyst on ultrasound which was reported as serous cystadenoma on histopathology. Nine patients underwent laparotomy followed by cystectomy, one of these had acute abdomen during pregnancy. On intraoperative findings, 20 were situated on the right side, whereas 12 were present on the left side. None of the patients had bilateral paraovarian



**Figure 1:** Torsed paraovarian cyst seen separate from ovary with the fallopian tube stretched over the cyst



**Figure 2:** Paraovarian cyst better identified after detorsion



**Figure 3:** Magnetic resonance T1-weighted image: Paraovarian cyst seen on the right side separate from the ovary

cyst. Twelve paraovarian cysts were more than 8 cm, largest being 15 cm. The mean diameter was 7.5 cm in 47% cases. On histopathology, 75% paraovarian cysts were simple paraovarian cyst, five were reported as cystic adenomatoid tumor [Figure 4], and one was reported as serous cystadenoma.

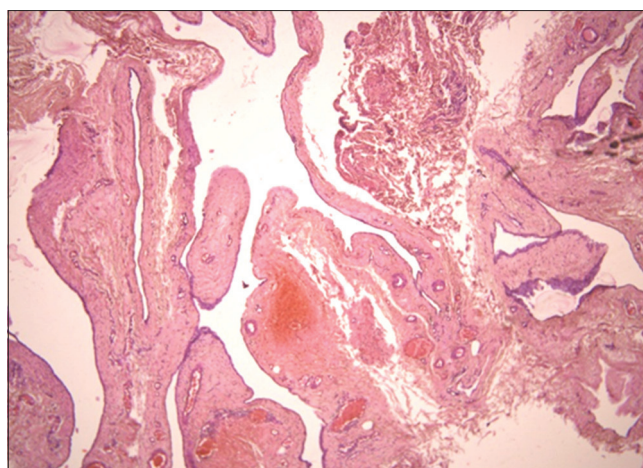
**Table 1: Characteristics of the paraovarian cysts**

Characteristics	Absolute value
Mean age	35.7 ± 6.9 years
Adolescent	1
Young	10
Perimenopausal	19
Postmenopausal	2
Presentation	
Incidental finding	10
Abdominal pain	15
Pressure symptoms	5
Torsion	2
USG findings	
Correct diagnosis	28/32
Ultrasound characteristics	
Simple cyst	
With clear contents	25
With echogenic debris	6
Septations	1
Solid areas	0
Papillary projections	0
MRI	
Done in	10/32
Simple cyst	9
Septations	1
Echogenic debris	3
Solid areas	0
Papillary projections	0
Surgery	
Laparoscopic cystectomy	17
Laparoscopic adnexectomy	3
Laparotomy followed by cyst removal	9
Transabdominal hysterectomy with cyst removal	3
Right	20
Left	12
Bilateral	0
Mean diameter	
< 6 cm	3
6-8 cm	15
> 8 cm	12
HPE	
Simple serous cyst	24
Cystic adenomatoid tumor	5
Serous cystadenoma	1
Malignancy	0

MRI: Magnetic resonance imaging, HPE: Histopathological examination, USG: Ultrasonography

## DISCUSSION

Paraovarian cysts arise from the broad ligament, usually from either mesothelial and paramesonephric elements or, rarely, from mesonephric remnants.<sup>[1]</sup> Paraovarian cysts occur over a wide age range, most commonly in the third



**Figure 4:** Histopathology of paraovarian cyst showing cystic adenomatoid tumor

and fourth decades.<sup>[3]</sup> Serous cysts of Mullerian origin most commonly occur in or adjacent to the ovaries;<sup>[8]</sup> however, cysts of Mullerian origin occurring separately from the ovaries and fallopian tubes are rare.<sup>[9]</sup>

Most of them are small, and are not associated with any clinical symptoms. Paraovarian and paratubal cysts are usually found in the mesosalpinx between the ovary and fallopian tube. Paraovarian cysts mostly originate from the mesothelium covering the peritoneum (68%) and are lined with flattened epithelium.<sup>[10]</sup> They may also arise from paramesonephric (Mullerian) remnants (30%) and mesonephric (Wolffian) remnants (2%).<sup>[3]</sup> Cysts which originate from paramesonephric remnants are lined with secretory, ciliated columnar or cuboidal epithelium. Mesonephric type cysts, on the other hand, are lined with cuboidal or flattened epithelium.<sup>[9]</sup>

It can be diagnosed as a pelvic mass incidentally on ultrasound or can be associated with abdominal pain or suspected adnexal torsion.<sup>[7]</sup> Clinically, it is difficult to distinguish a paraovarian cyst from an ovarian mass. Therefore, imaging is frequently used to reveal the diagnosis. Simple paraovarian cysts are usually visualized as simple unilocular cysts with thin walls and smooth margins. Paraovarian cysts occur in the characteristic location of the paraovarian that part of the mesosalpinx between the ovary and the fallopian tube. The tube and ovary are stretched over the smooth cyst wall, and the intact abutted ovary is separated from the cyst. Absence of follicular structures, mobility of the mass, and dissociation from ovary when pushed by vaginal probe are the consistent ultrasound features of a paraovarian cyst.<sup>[6]</sup> Paraovarian cysts are usually single cysts, but bilateral paraovarian cysts have been reported.<sup>[3,11,12]</sup> Presence of a complex cyst with internal echoes or soft tissue within the cyst suggest features of neoplasia.<sup>[6,8,11]</sup> Korbin *et al.* described the sonographic

features of 14 paraovarian cystadenomas: 3 of them appeared as simple cysts, whereas 9 appeared as complex cysts with a nodular solid component and the remaining as septated cysts.<sup>[8]</sup> It has been reported that paraovarian cysts vary greatly in size. In younger patients, paraovarian cysts also resemble functional cysts and peritoneal inclusion cysts. Functional cysts tend to change their sizes when observed at follow-up. Peritoneal inclusion cysts are often large and related to the pelvic adhesions due to previous pelvic surgery or pelvic inflammatory disease or endometriosis.<sup>[13]</sup> Other differential diagnoses include dilated tube and endometrioma.

According to a consensus statement by the Society of Radiologists in Ultrasound, cysts larger than 7 cm warrant further evaluation with MRI irrespective of the age.<sup>[14]</sup> Detection of a normal ipsilateral ovary close to but separate from the cysts is an important radiological finding for the diagnosis of paraovarian cysts. It can be diagnosed by transabdominal ultrasound also. However, MRI may be useful when the ipsilateral ovary is not visualized separately. In addition, in the presence of complex paraovarian masses or features of neoplasia, MRI is preferred for better delineation of the mass in pelvis and evaluation of lesion vascularity.<sup>[15]</sup> However, the cost limits its use of MRI in a low-resource setting like ours. Kishimoto *et al.* described MR features of these cysts. Dilated tube represents tubular configuration, and endometrioma is multifocal and shows low signal intensity on T2-weighted MRI. The signal intensity of paraovarian cysts is low on the T1-weighted images and homogeneously high on the T2-weighted image. The cyst complicated with hemorrhage showed high intensity on the T1-weighted images.<sup>[15]</sup>

Laparoscopy is currently the most common surgical approach in the management of paraovarian cysts.<sup>[16]</sup> Many surgeons prefer to either aspirate the cystic fluid via the laparoscope or to perform a fenestration of the cyst before removing it.<sup>[7]</sup> If a neoplastic paraovarian cyst is suspected either pre- or intra-operatively, it may be removed through an endobag, and spillage of the cyst's fluid may be avoided.

They may be either simple cyst or cyst of neoplastic origin. Most of the neoplastic paraovarian cysts are usually benign serous cyst,<sup>[6-8,11]</sup> whereas borderline or malignant tumors are rare.<sup>[11]</sup> In a study done by Savelli *et al.*, out of total 50 patients, 35 patients had simple paraovarian cysts, 8 had cystadenofibroma, 5 had cystadenomas, and 2 had serous papillary borderline tumors.<sup>[6]</sup> Smorgick *et al.* reported 7 cystadenomas and 8 cystadenofibromas out of 47 paraovarian cysts on histopathology.<sup>[7]</sup> We reported a higher incidence of cystic adenomatoid tumor in paraovarian cyst (15.6%) in our study. Adenomatoid tumors are benign tumors originating in the mesothelium and are proliferation

of gland-like structures arising from the female genital tract. These occur in areas or organs close to mesothelium-lined surfaces.<sup>[17]</sup> The true incidence of these tumors is unknown since they are often detected by chance. The adenomatoid tumor includes irregular gland-like spaces that are either slit-like or round or cystically dilated.<sup>[18]</sup> We have described five such cases in this study.

The retrospective nature of the study imposes several inherent limitations such as its reliance on the medical records.

## CONCLUSION

The diagnosis of paraovarian cyst requires precision, visualization of ipsilateral ovary separate from the cyst being the most consistent finding. It can present as torsion of the adnexa. Thus, the knowledge of its anatomy and radiological findings is must before surgical intervention. Laparoscopic cystectomy remains the surgical approach for the management of paraovarian cyst. We reported a higher incidence of cystic adenomatoid tumor in paraovarian cyst.

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## Conflicts of interest

There are no conflicts of interest.

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