

## Complications and Management of Paraovarian Cyst: A Retrospective Analysis

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### Abstract

**Introduction** Despite their relative frequency, paraovarian cyst received only scant attention. Clinician should be aware of the complications of paraovarian cyst.

**Objective** To analyse the clinical profile, complications and management of paraovarian cyst.

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**Materials and Methods** Retrospective analysis of 51 patients with operative diagnosis of paraovarian cyst was carried out at our institution over a 5-year period.

**Results** Majority (60.78%) of paraovarian cysts were found in the third and fourth decades, and the mean age of the patients was 31.8 years. 62.74% patients with paraovarian cyst presented with abdominal pain, and the rest were an incidental finding. Ultrasound made a correct diagnosis in 47.05% of patients. Mean size of paraovarian cyst was 7.51 cm. Complications of paraovarian cyst noted in our study are cyst enlargement (79.62%), adnexal torsion (18.51%), haemorrhage (7.4%), rupture (1.85%) and benign tumour (12.96%). 84.31% paraovarian cysts were managed by laparoscopy. Fertility-sparing surgery was done in 57.39% of paraovarian cysts.

**Conclusion** Paraovarian cyst should be considered in the differential diagnosis of adnexal mass. The importance of differentiating it from ovarian cyst cannot be

overemphasized. Laparoscopic approach and preferably a fertility-sparing surgery should be considered in the management of complications of paraovarian cyst.

**Keywords** Paraovarian cyst · Complications · Laparoscopy

## Introduction

Paraovarian cyst needs to be differentiated from ovarian cyst, as it is not thought to behave in the same way both clinically and biologically. Paraovarian cyst accounts for only 5–20% of all adnexal masses. Paraovarian cyst originates in the broad ligament between the fallopian tube and ovary. The terms paraovarian cyst and paratubal cyst are used interchangeably depending on their proximity to ovary or fallopian tube. They develop either from the mesothelium of broad ligament (68%) or from paramesonephric (30%) or mesonephric remnants (2%). Their exact incidence is not known due to their frequent asymptomatic presence. They are identified in 15.7% of patients undergoing operative laparoscopy. Paraovarian cyst draws clinical attention in the event of complications like cyst enlargement, torsion, rupture, haemorrhage and neoplasm [1, 2].

As there are no clear guidelines for the management of paraovarian cyst and its complications, this study aims to analyse the clinical profile, complications and management of paraovarian cyst.

## Materials and Methods

Fifty-one patients with operative diagnosis of paraovarian cyst over a 5-year period from 2012 to 2017 were identified from the medical records of our institution. Age, menarche, marital, menopausal status and the clinical presentation details of the patients were noted from the admission record. Ultrasound and CT/MRI diagnosis and findings in terms of laterality, size, echogenicity, septation and papillary projection were noted.

From the operative records indication for surgery, type of operative procedure, operative findings and complications like adnexal torsion, paraovarian cyst haemorrhage and rupture were obtained. Histopathology reports of these patients were collected. This data was analysed.

## Results

Table 1 shows the clinical profile, imaging and complications of paraovarian cyst.

Mean age of the patients in our study was 31.8 years (range 13–72 years), and most (60.78%) of them were in the reproductive age group. About two-third of the patients presented with abdominal pain, and the rest were found incidentally on imaging or surgery done for other reasons. Abdominal pain in paraovarian cyst was due to cyst enlargement in 17 patients, adnexal torsion was noted in 10 patients, haemorrhage was noted in 4 patients and cyst rupture was noted in a patient. Of the cases of incidental paraovarian cyst, 10 cases were identified during evaluation of menstrual irregularity, 4 cases at infertility workup, 1 case at health check-up, 2 cases at Caesarean section and 1 case at puerperal sterilization. Two paraovarian cysts, each found at Caesarean section and puerperal sterilization, were earlier managed by cyst aspiration in first trimester.

Ultrasound made a correct diagnosis in less than half of the patients. Twenty-three patients were misdiagnosed as ovarian cyst and 4 patients as hydrosalpinx. Even MRI made a correct diagnosis only in half of the patients. Paraovarian cyst was more common on the right side, and few were bilateral. Complications of paraovarian cyst noted in our study are cyst enlargement (79.62%), adnexal torsion (18.51%), haemorrhage (7.4%), rupture (1.85%) and benign tumour (12.96%).

Among the 51 patients with 54 paraovarian cysts, 20.34% were  $\leq 5$  cm, 66.66% were 6–10 cm in size, and 12.96% were  $> 10$  cm. The mean cyst diameter in our study was 7.51 cm (range 3–18 cm). As shown in Table 2, out of the 11 paraovarian cysts of  $\leq 5$  cm size, 72.72% were found incidentally. Among the 36 paraovarian cysts of 6–10 cm size, 72.2% presented with abdominal pain. Of the 7 paraovarian cysts of  $> 10$  cm size, 71.4% presented with abdominal pain.

Table 3 shows 10 paraovarian cysts had undergone adnexal torsion. Fifty per cent cases of torsion were noted in reproductive age women. Sixty per cent of torsion occurred in the cyst of 6–10 cm size. Torsion was more common on the right side (3:2). Only 40% of them were managed by detorsion and paraovarian cystectomy.

Among the 54 paraovarian cysts, 47 were simple cyst, 7 were benign paraovarian tumour, and none were malignant paraovarian tumour. As shown in Table 4, among the 6 patients of multiloculated cysts, 5 were simple paraovarian cyst and 1 was a benign tumour. Out of 6 patients of echogenic cysts, 4 were simple haemorrhagic paraovarian cyst and 2 were benign tumour. All the 4 paraovarian cysts with papillary projection turned out to be a benign tumour. Five paraovarian tumours were managed by laparoscopic cystectomy and 2 each by laparoscopic and open adnexectomy. Histological type of the benign tumour was serous cystadenoma in 5 patients and serous cystadenofibroma in 2 patients of paraovarian cyst.

Management (approach and type of surgery) of paraovarian cyst in our study was based on the age of the patient,

**Table 1** Clinical profile, imaging and complications of paraovarian cyst

Characteristics of paraovarian cyst	Absolute value	Frequency (%)
<b>Age group</b>		
Adolescent	10	19.6
Reproductive	31	60.78
Perimenopause	6	11.76
Menopause	4	7.84
<b>Clinical presentation</b>		
Abdominal pain	32	62.74
Incidental	19	37.25
<b>Ultrasound diagnosis</b>		
Correct diagnosis	24	47.05
Wrong diagnosis	27	52.94
<b>MRI done in</b>		
Correct diagnosis	7	58.33
Wrong diagnosis	5	47.05
<b>Laterality</b>		
Right	29	56.86
Left	19	37.25
Bilateral	3	5.88
<b>Complications</b>		
Cyst enlargement	43	79.62
Torsion	10	18.51
Haemorrhage	4	7.4
Rupture	1	1.85
Benign tumour	7	12.96

**Table 2** Analysis of paraovarian cyst of varying size

Characteristic of paraovarian cyst	Cyst size ≤ 5 cm (n = 11)	Cyst size 6–10 cm (n = 36)	Cyst size > 10 cm (n = 7)
<b>Age</b>			
Adolescent	–	9	3
Reproductive age	6	22	3
Perimenopause	4	2	1
Menopause	1	3	–
<b>Presentation</b>			
Abdominal pain	3	26	5
Incidental	8	10	2
<b>Complications</b>			
Torsion	2	6	2
Haemorrhage	2	2	–
Rupture	–	1	–
Benign tumour	2	5	–

**Table 3** Analysis of torsion of paraovarian cyst

Characteristic of paraovarian cyst	Torsion (n = 10)
<b>Age group</b>	
Adolescent	3
Reproductive	5
Perimenopause	0
Menopause	2
<b>Cyst size (cm)</b>	
≤ 5	2
6–10	6
> 10	2
<b>Laterality</b>	
Right	6
Left	4
Bilateral	–
<b>Operative procedure</b>	
<b>Laparoscopy</b>	
Paraovarian cystectomy	4
Salpingectomy and paraovarian cystectomy	2
Adnexectomy	2
<b>Open</b>	
Adnexectomy	2

**Table 4** Analysis of neoplastic paraovarian cyst

Characteristic of Paraovarian cyst	Benign tumour (n = 7)	Simple cyst (n = 47)
<b>Age group</b>		
Adolescent	–	12
Reproductive	6	25
Perimenopause	1	6
Menopausal	–	4
<b>Clinical presentation</b>		
Abdominal pain	3	32
Incidental	4	15
<b>Cyst size (cm)</b>		
≤ 5	2	9
6–10	5	31
> 10	–	7
<b>Content</b>		
Clear	5	43
Echo	2	4
<b>Septation</b>		
Absent	6	42
Present	1	5
<b>Papillae</b>		
Present	4	–
Absent	3	47

**Table 5** Analysis of management of paraovarian cyst

Management of paraovarian cyst	Absolute value	Frequency (%)
<b>Surgical approach</b>		
Laparoscopy	43	84.31
Open	7	13.72
Vaginal	1	1.96
<b>Operative procedure</b>		
<b>Laparoscopy</b>		
Paraovarian cystectomy	26	48.14
Salpingectomy and Paraovarian cystectomy	8	14.81
Adnexectomy	11	20.37
<b>Open</b>		
Paraovarian cystectomy	4	7.4
Salpingectomy and paraovarian cystectomy	–	
Adnexectomy	4	7.4
<b>Vaginal</b>		
Paraovarian cystectomy	1	1.85

clinical presentation, size and complications of paraovarian cyst, associated pathology and desire for future fertility. As shown in Table 5, 84.3% of patients were managed by laparoscopy, 13.72% patients by open surgery and 1.96% patients by vaginal route. 57.39% patients of paraovarian cyst were managed by Paraovarian cystectomy, 14.81% patients were managed by salpingectomy and paraovarian cystectomy, and 27.77% patients were managed by adnexectomy.

## Discussion

Paraovarian cyst can occur in any age group from neonate to menopause [3]. Risk factors for the development of paraovarian cyst are being studied. Association between obesity and paraovarian cyst has been identified [4, 5]. Paraovarian cyst has been suspected to play a role in infertility and ectopic pregnancy by disturbing tubal motility and by narrowing the tubal lumen.

Enlargement of paraovarian cyst is due to the cystic dilatation of tubal-type lining epithelium. Increase in size of the cyst at the post-pubertal period and during pregnancy suggests hormonal influence on paraovarian cyst growth, but direct link has not been clearly demonstrated. Unlike the ovarian cyst, they are non-physiological and do not respond to hormones. Paraovarian cyst enlargement presents with chronic abdominal pain or as an abdominal or adnexal mass. Clinically, paraovarian cyst is indistinguishable from ovarian cyst. Even on ultrasound, it is difficult to differentiate it from the ovarian cyst.

Adnexal torsion is higher in paraovarian cyst than in ovarian cyst (2.1–16% vs. 2.3%). As the paraovarian cyst has no pedicle on its own, it torts along with ovary or fallopian tube or both. Adnexal torsion is more common on the right side (3:1). So, it is often misdiagnosed as appendicitis and ureteric colic, and the patient may be admitted under surgery department. As it is a surgical emergency, high index of suspicion is essential.

Paraovarian cysts of neoplastic origin are usually underreported. Although malignant paraovarian tumours are very rare and only few cases have been reported in the literature, benign paraovarian tumours are not uncommon. Histological types of the benign paraovarian tumour are serous cystadenoma, papillary serous cystadenoma, serous cystadenofibroma, mucinous cystadenoma and endometrioid cystadenoma.

Diagnosis of paraovarian cyst by ultrasound needs greater awareness and accuracy [6]. Findings in ultrasound are well-defined oval or round cyst located close but separate from the ipsilateral ovary, the absence of surrounding follicle and demonstration of split sign. Split sign is the slight opposite oscillatory movement between the cyst and ovary while pushed by the endovaginal probe. Differential diagnosis by ultrasound is ovarian cyst, hydrosalpinx and peritoneal inclusion cyst.

For a more definitive diagnosis, MRI can be done, but the cost is very high and the diagnostic accuracy is still uncertain. In MRI, paraovarian cyst appears as a homogenous mass that lies between the uterus and round ligament but separate from the ipsilateral ovary. Characterization of the cyst by ultrasound helps to differentiate a simple from neoplastic paraovarian cyst. Echogenic paraovarian cyst can either be a haemorrhage or neoplasm. The presence of papillary projection should arouse the suspicion of neoplasm. Apart from the clinical picture, Whirlpool sign in ultrasound helps to diagnose adnexal torsion in paraovarian cyst [7]. Use of Doppler in such situation is not mandatory as the flow can still be normal with partial torsion, leading to delay in management [8].

Management of paraovarian cyst depends on the age, presence and severity of symptoms, cyst size and its complications [9]. Till now, management is just an extrapolation from the ovarian cyst. But unlike the ovarian cyst, they are non-physiological and cannot be expected to resolve in similar fashion; they are more prone for adnexal torsion, and regardless of its size, tumours have been reported [10]. No society has come up with the strict numerical criterion to decide paraovarian cyst of up to which size can be managed expectantly. There is no role for hormonal treatment in paraovarian cyst. Paraovarian cysts found incidentally while surgery needs excision irrespective of its size to avoid possible complications.

Laparoscopic approach is preferred. Intraoperative diagnosis of paraovarian cyst is done by its location and in difficult situations like dense adhesions identification is by the characteristic crossing of vessels over the surface of the cyst. Laparoscopic paraovarian cystectomy is technically easy and less time-consuming than the ovarian cyst and is feasible in almost all cases.

The presence of adnexal torsion in paraovarian cyst should not deter one from doing detorsion and paraovarian cystectomy with adnexal preservation to ensure future fertility and gonadal function [11]. Irrespective of the gross appearance, safety and full functional recovery of the adnexa after detorsion have been well studied.

Age, menopausal status, clinical presentation, cyst size, septation and CA 125 are poor index of neoplasm. Hence, they are not useful in differentiating a simple paraovarian cyst from neoplasm. So, in the presence of papillary projection, caution should be taken at the time of surgery with the use of endobag to prevent intraperitoneal spillage and frozen section analysis [12]. Benign paraovarian tumours are managed by paraovarian cystectomy. Rarity of malignant paraovarian tumour makes its management particularly challenging, and there is no consensus on optimal management. Patients with malignant paraovarian tumour and borderline paraovarian tumour without desire for fertility are managed like malignant ovarian tumour [13]. Borderline paraovarian tumour patients with desire for future fertility can be managed with comprehensive staging and adnexectomy as they usually behave in a benign fashion [14].

## Conclusion

Optimal management of adnexal mass requires exact knowledge of nature of the mass. Paraovarian cyst should be considered in the differential diagnosis of adnexal mass both by the clinician and by the radiologist. The importance of differentiating paraovarian cyst from ovarian cyst cannot be overemphasized.

The role of expectant management in paraovarian cyst needs to be studied. Laparoscopic approach is feasible in all cases. Fertility-sparing surgery should be considered in every case. Laparoscopic paraovarian cystectomy is technically easier and not time-consuming.

## Compliance with Ethical Standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical Statement** This study was approved by the institutional ethical committee. Since this study is a retrospective analysis, no ethical issues are involved.

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