

Laparoscopy in the Management of Adnexal Masses

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Abstract

Background: Laparoscopic surgery has become the gold standard in the treatment of benign adnexal masses, whereas laparotomy remains the standard for the treatment of malignant tumors.

Aims: To evaluate the safety and effectiveness of laparoscopy in the management of benign adnexal masses.

Materials and Methods: This is a Observational study, conducted on 30 patients admitted to department of Obstetrics and Gynaecology, who were diagnosed with benign adnexal mass, confirmed with various blood investigations and USG, MRI, were subjected to laparoscopic procedures. All the patients were followed up with histopathology report.

Results: 30 patients with adnexal masses admitted for the treatment had been evaluated and who underwent laparoscopy were included in the study. The mean age of the patients with adnexal masses in the study group was 32.4 years. The commonest presenting complaint in the study was pain abdomen in 24 (80%) patients. 23 patients had significant abdominal findings of which 13 (43.34%) had tenderness in lower abdomen. Among the study 21 patients were found to have mass felt in the fornix. In the present study 18 (69%) patients found to have simple ovarian cysts on ultrasonography. The marker CA-125 mean was 15.14 U/ML. The most common operative procedure done was ovarian cystectomy in 19 (63.34%) patients. The mean estimated blood loss in our study was 105ml. The mean ambulation time of the patients was within 6.4 hours. The mean time among the patients to oral feeds was within 7.23 hours. The mean length of the stay in the hospital was 8.13 days in the study population.

Conclusion: Proper selection of cases, multidisciplinary team approach, expert laparoscopic surgical skills and good histopathological reporting are imperative for best patient outcomes.

Keywords: Laparoscopic surgical skills, Histopathological reporting, Ovarian cystectomy.

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Introduction

A mass originating from the ovaries, fallopian tubes, or surrounding tissue is termed as Adnexal mass. Adnexal masses occur in asymptomatic women with a prevalence of 0.17% to 5.9% and 7.1% to 12% in symptomatic women of all age groups but very common among reproductive age.[1] These masses can be of gynaecological or non-gynaecological origin. They can be benign masses, borderline or malignant masses.

Differential diagnosis of adnexal mass is varied and complex. It includes functional cysts, paraovarian cysts, tubo-ovarian abscesses, broad ligament fibroid, hydrosalpinx, benign and malignant ovarian tumors, pyosalpinx, ectopic pregnancies, tubal malignancy, fimbrial cysts, sigmoid colon or colon distended with gasses or faeces, pelvic kidney, and pregnancy in bicornuate uterus.

Adnexal masses are usually identified either through clinical examination or through ultrasound examination of the pelvis for symptoms caused by the mass or it can be an incidental finding. Ultrasound in patients is one of the important investigation to learn about the adnexal mass and pelvic pathology. With recent advances, MRI has become important because of its excellent soft tissue contrast, larger field of view and direct multiplanar capabilities, can better delineate and characterize normal pelvic anatomy and adnexal pathology. MRI has been found to be highly accurate in the characterization of adnexal masses. Adnexal masses are commonest indication for gynecologic surgery. The incidence of adnexal masses undergoing surgical intervention is 5.26% of which 93% are ovarian in origin.[2]

Adnexal masses during pregnancy are of no exception. The incidence of adnexal masses during pregnancy can range between 1:81 and 1:8,000.[3] Despite the fact that a great majority of the adnexal masses are diagnosed at the time of first trimester ultrasound, it is estimated that over 1-2% of them will become symptomatic during the first trimester of pregnancy and they will develop complications that will require surgical treatment.[4] The most common causes of ovarian masses during pregnancy include dermoid cyst, functional cysts, serous/mucinous cystadenoma and endometrioma. In recent times, laparoscopy has significant role in the management of adnexal masses in pregnancy.[5]

Despite the well-known advantages of minimally invasive surgery, caution with laparoscopic surgery has been suggested for both the mother and the fetus due to complications such as fetal loss, malformation and preterm birth.[6] Laparoscopy is a widely used procedure in gynaecological cases both for diagnostic and operative purposes. The faster recovery time, minimal pain, fewer days of hospitalization and better aesthetic results has made laparoscopy immensely popular.

The technical parameters such as the panoramic view, magnified view during the procedure and relatively small risk of complications resulted in the wide use of laparoscopic surgery in gynaecology. Laparoscopy has now become the gold standard method for management of a wide range of gynaecological ailments, including the adnexal masses but controversies exist in managing suspicious or malignant masses. The present study is conducted to evaluate the effectiveness and safety of laparoscopy along with the clinical outcomes in the management of adnexal masses thought to be benign preoperatively.

Materials and Methods

This is an Observational study, conducted on 30 patients admitted to Department of Obstetrics and Gynaecology, Santhiram Medical College and General Hospital, Nandyal from September 2020-October 2022, who were diagnosed with benign adnexal mass, confirmed with various blood investigations and USG, MRI, were subjected to laparoscopic procedures. All the patients were followed up with histopathology report.

Inclusion Criteria

All women with benign adnexal masses (radiological finding), Normal Preoperative estimation of Tumour marker especially CA 125, adnexal masses which require surgical management.

Exclusion Criteria

Ectopic pregnancy, imaging features suspicious of Malignancy (i.e. Solid masses, thick septa, fixed mass etc), exceptionally high CA-125 values, mass arising from non-gynaecologic causes on laparoscopy, known contraindications of laparoscopy (cardiovascular or pulmonary instability, hemodynamic instability etc).

In women presenting with a pre-operative diagnosis of benign adnexal mass, a written informed consent was taken. All patients were counselled that in the case of an unexpected intraoperative diagnosis of malignancy, a classical vertical incision could be taken. A detailed history including age, chief complaints with duration, menstrual history including menopausal status if any, concomitant systemic diseases, any past medical or surgical history was obtained.

Clinical examination which included, general physical examination of patient's height, weight, BMI, breasts, thyroid & spine was noted. Followed by recording of pulse rate, blood pressure, temperature. This was followed by per abdominal, per speculum & per vaginal examinations. Systemic examination of cardiovascular system, respiratory system & central nervous system was recorded.

Blood investigations included, Complete hemogram, Blood grouping & Rh typing, Urine Routine, Random Blood Sugar (RBS), Renal Function Test (RFT) & Serum Electrolytes, Liver Function Tests (LFT), HIV, HBsAg, VDRL & Tumour markers -CA 125. Primary imaging modality was via Ultrasound with or without Doppler. CT/MRI was also employed when there was a suspicion of malignancy. Laparoscopic surgery was performed after pre-anaesthetic assessment. Intra operative findings were noted. The decision for oophorectomy or ovarian cystectomy was based on the age of the patient and on the surgical findings.

Specimens were removed through the trans-umbilical port and was sent for histopathology. Operative findings - which includes blood loss, duration of surgery, any complications including conversion to laparotomy was noted. Post op complications were noted which includes fever, nausea, vomiting, wound infection, urinary retention, paralytic ileus, postoperative transfusions. Patients were discharged when they were fully mobile, passing urine satisfactorily, and not requiring narcotic analgesia. The results of the histopathology was made available within 2 weeks from surgery and would determine if any further treatment was needed.

Results

A total of 30 subjects were included in the final analysis.

Table 1: Demographic distribution of patients.

Age (years)	Number of patients	Percentage
<20	0	0
21-30	14	46.67
31-40	12	40
>41	4	13.33
Total	30	100
Parity status		
Nulliparous	5	16.67
Primiparous	1	3.33
Multiparous	24	80
Chief Complaints		
Pain abdomen	24	80
Swelling per abdomen	1	3.33
Anxious to conceive	2	6.67
Menstrual irregularity	2	6.67
Bleeding P/V	0	0
White discharge	1	3.3
Incidental finding	0	0
Medical history		
Hypothyroidism	2	6.67
Hypertension	1	3.33
Diabetes	1	3.33
Cardiovascular diseases	0	0
Tuberculosis	0	0
Treatment for infertility	0	0
No significant history	26	86.67

In our study 14 (46.67%) patients were found between 21-30 years age group and 12 (40%) were between 31-40 years age group and 4 (13.33%) patients in above 40 years age group. In the present study, the mean age of presentation was 32.4 years. The youngest age at presentation was 22 years and the oldest age at presentation was 50 years. Among the study population, majority 22/30 (73.3%) were pre-menopausal women and 8 of 30 underwent Hysterectomy. Among the study population, 5/30 (16.67%) were nulliparous, 1/30 (3.33%) were

primiparous and 24/30 (80%) were multiparous. The most common presenting complaints was 'Pain Abdomen' in 24/30 (80%) followed by patients who were anxious to conceive in 2/30 (6.67%). 2 (6.67%) patients presented with menstrual irregularity and 1 (3.33%) patient presented with swelling per abdomen. 2 patient (6.67%) were on treatment for hypothyroidism, 1 (3.33%) patient was on anti-hypertensive medication, 1 patient (3.33%) was on treatment for type 2 diabetes mellitus (DM).

Table 2: Distribution of patients by surgical history and abdominal examination

Past Surgical History	Number of patients	Percentage
Post Caesarean section	11	27.5
Post Tubectomy	17	42.5
Post Hysterectomy	9	22.5
Post Hysterotomy	1	2.5
Others	2	5
Findings on abdominal examination		
Tenderness in lower abdomen	13	43.34
Mass per abdomen	10	33.33
No clinical findings on abdominal examination	7	23.33

11 patients (27.5%) were post caesarean section, of which 3 were post caesarean, 7 underwent caesarean section along with tubectomy and 1 underwent caesarean section along with tubectomy and hysterectomy. 17 patients (42.5%) were tubectomised of which 4 were tubectomised, 7 were with post caesarean section, 4 were

hysterectomised along with tubectomy, 1 with hysterotomy, 1 underwent caesarean section, tubectomy and hysterectomy. 9 patients (22.5%) were post hysterectomised of which 4 underwent tubectomy along with hysterectomy and 1 underwent caesarean section along with tubectomy and hysterectomy, 4 were hysterectomised. 1

(2.5%) patient underwent hysterotomy. Of the other 2 patients (5%), 1 had salpingectomy for ruptured ectopic pregnancy and the other had surgery for breast mass. Among the study population, 23 patients (76.6%) had significant abdominal

findings. 13 (43.34%) patients were noted to have tenderness in lower abdomen and 10 patients (33.33%) mass per abdomen was felt. The other 7 (23.33%) did not show the below findings on examination.

Table 3: Distribution of patients findings

Per Speculum	Number of patients	Percentage
Cervix Hypertrophy	3	10
Cervical Erosion	2	6.67
Cervix-Bleed on touch	2	6.67
Vaginal discharge	10	33.33
Insignificant	13	43.33
Significant per vaginal findings		
mass felt in the fornix	21	70
cervical motion tenderness	2	6.67
fornix tenderness	4	13.33
No significant findings	3	10
Ultrasound Abdomen Report		
Ovarian Torsion	2	6.67
Simple Ovarian cyst	18	60
Complex Ovarian cyst	3	10
Para ovarian cyst	3	10
Hydrosalpinx	2	6.67
Fimbrial cyst	1	3.33
Teratoma	1	3.33
Size of adnexal mass (cm)		
<5 cm	8	26.67
6- 10 cm	19	63.33
11-15 cm	3	10

Among the study population, 3 (10%) of 17 had cervical hypertrophy, 2 (6.67%) had cervical erosion and 2 (6.67%) showed bleed on touch. 10 (33.33%) of 17 had vaginal discharge (Table 8). The other 13 (43.33%) patients showed no changes on per speculum examination. Among the study population, 27 patients had significant per vaginal findings, among these, 21 patients (70%) were found to have mass felt in the fornix, followed by 2 patients (6.67%) who were found to have cervical motion tenderness, 4 patients (13.33%) had fornix tenderness. Among the study group, 18 (60%) were

with simple ovarian cyst of which 1 had ovarian cyst along with hydrosalpinx. and 2 simple ovarian cysts underwent torsion. 2 (6.67%) had ovarian torsion. 2 (6.67%) were with hydrosalpinx, 3 (10%) were with para-ovarian cyst, 3 (10%) were with complex ovarian cyst, 1 (3.33%) with fimbrial cyst. 1 (3.33%) with ovarian teratoma. In our study among 30 patients, 8 (26.67%) patients were found have adnexal mass of size <5cm, 19 (63.33%) patients have size between 6-10cm and 3 (10%) patients were found to have adnexal mass of size between 11-15cm (Table 11).

Table 4: Distribution of patients by CA125

Parameter	Mean ± SD	Median	Minimum	Max.	95% C.I Lower Upper
Tumour marker CA125	15.14+7.56	15.05	3.7	31.7	12.44 17.85

The marker CA-125 mean was 15.14+7.56 in the study population, minimum was 3.7 and maximum was 31.7 in the study population. Among our study 16 (53.3%) patients were found to have CA125 between 11- 20 , 9(30%) between 0-10, 3(10%) between 21-30, 2 had CA125 between 31- 40.

Table 5: Distribution of patients by operative procedures for adnexal masses

Type of procedures	Number of patients	Percentage
Ovarian Cystectomy	19	63.34
Fimbrial Cystectomy	1	3.33
Salpingectomy	1	3.33
Salpingo Oophorectomy	5	16.66
Oophorectomy	2	6.67
Para-ovarian cystectomy	1	6.67

Among the study population, 19 (63.34%) underwent ovarian cystectomy of which 10 were only cystectomy, 4 were cystectomy along with salpingectomy, 2 were cystectomy with oophorectomy, 2 underwent cystectomy with ovarian drilling and 1 underwent cystectomy with ovariectomy. 5 (16.66 %) underwent salpingo-oophorectomy of which 2 alone were salpingo-oophorectomy, 1 underwent salpingo-oophorectomy along with fimbrial cyst excision, 1 with salpingo-

oophorectomy with salpingectomy of the other side, 1 with salpingo-oophorectomy with salpingectomy of the other side with ovarian drilling. 2 (6.67%) underwent para ovarian cystectomy. 1 (3.33%) underwent fimbrial cyst excision with salpingectomy and ovarian cystectomy. 2 (6.67%) underwent oophorectomy. 1 (3.33%) was with salpingectomy along with oophorectomy of the other side.

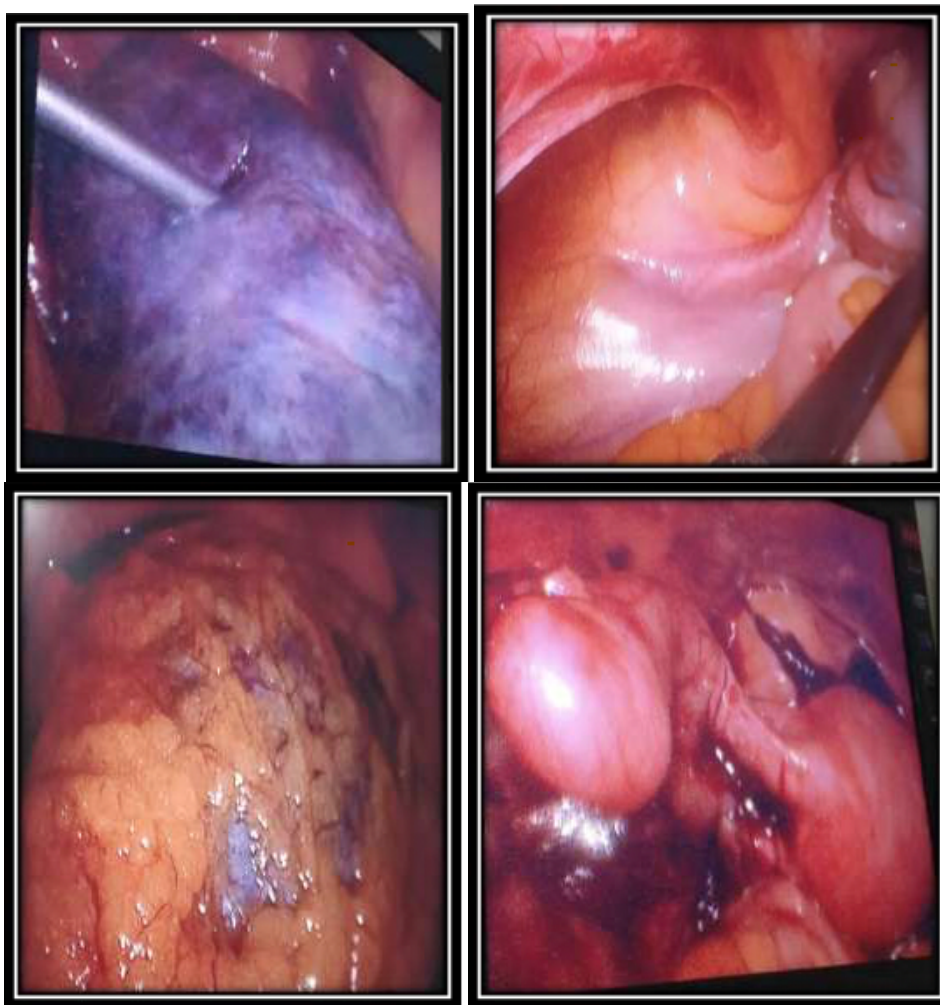


Figure 1: Laparoscopic images of few cases in our study

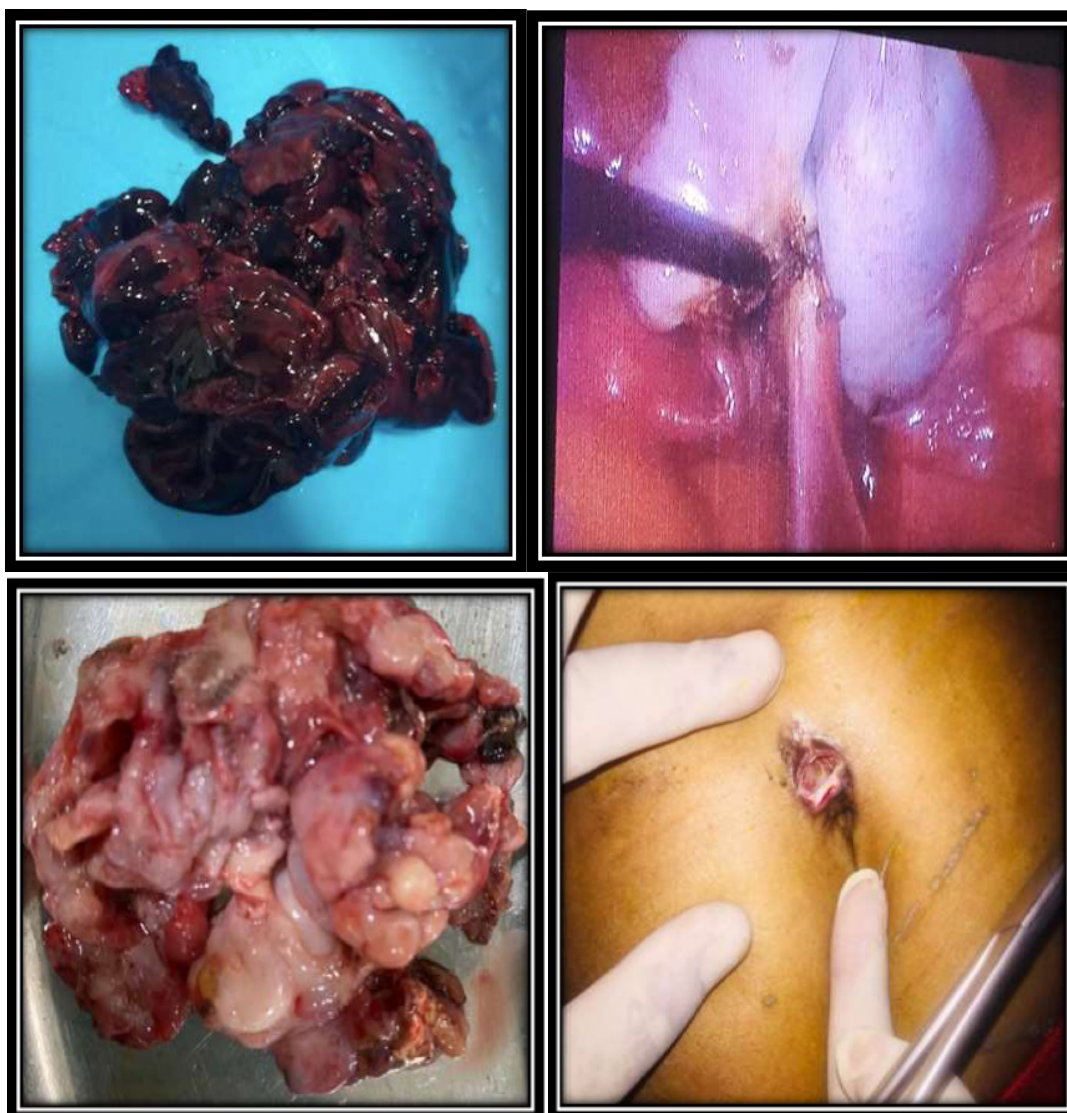


Figure 2:

Table 6: Distribution of patients by duration of time taken for surgery and amount of blood loss

Time taken for surgery (hours)	Number of patients	Percentage
<1 HRS	0	0
1-2HRS	19	63.33
2-4HRS	11	36.67
Amount of blood loss (ml)		
<100 ml	19	63.34
110 – 150 ml	10	33.33
160 – 200 ml	1	3.33

Among our study 19 (63.33%) patients underwent laparoscopic surgery within 1-2 hours, 11 (36.67%) patients underwent surgery within 2-4 hours.

Table 7: Distribution of patients by Intra operative complications

Intra operative complications	Number of patients	Percentage
Anaesthetic complications	1	3.33
Visceral/vascular injuries	0	0
Mass rupture	0	0
Laparoscopy conversion to Laparotomy	0	0
No complications	29	96.67

Table 8: Distribution of patients by post-operative pain scale on Day1

Post-operative pain scale	Number of patients	Percentage
Pain scale 1	3	10
Pain scale 2	7	23.33
Pain scale 3	3	10
Pain scale 4	7	23.33
Pain scale 5	6	20
Pain scale 6	4	13.34

Among the study population, on post-operative day 1 (Table 18), in 3 participants (10%) postoperative period pain scale was 1, in 7 participants (23.33%) post-operative period pain scale was 2, in 3 participants (10%) post-operative period pain scale was 3 and in 7 participants (23.33%) post-operative period pain scale was 4, 6 participants (20%) post-operative period pain scale was 5, 4 participants (13.34%) post-operative period pain scale was 6.

Table 9: Descriptive analysis on ambulation and oral diet post-operatively in our study group

Parameter	Mean \pm SD	Median	Minimum	Maximum	95% C.I Lower Upper
Estimated blood loss	105+29.1	100	50	200	94.59 115.4
Ambulation Within (In Hrs)	6.4+2.36	6.00	3.00	12	5.56 7.24
Started Orally Within (In Hrs)	7.23 +3.01	6.00	4.00	18	6.15 8.31
Length of hospital stay (in days)	8.13+4.9	7	3	29	6.38 9.89

Among our study 19 (63.34%) patients had blood loss below 100ml, 10 (33.33%) patients had blood loss between 110-150ml, 1 (3.33%) patient showed blood loss between 160-200ml. The mean estimated blood loss was 105+29.1 ml in the study population, minimum was 50ml and maximum was 200ml in the study population.

The mean ambulation time of the patients was within 6.4+2.36 hours in the study population, minimum was 4 hours and maximum was 12 hours in the study population. The mean time among the patients to start oral feeds within was 7.23+3.01

hours in the study population, minimum was 4 hours and maximum was 18 hours in the study population.

The mean length of stay in hospital was 8.13+4.9 days in the study population, minimum was 3 days and maximum was 29 days in the study group. The reason for mean length of the hospital stay 8 days in our study is, as the residence of the patients was far away from the institution and maximum hospital stay in our study 29 days was due to wound gape infection and need for secondary suturing.

Table 10: Post-operative Complications associated with laparoscopic management

Post-operative complications	Number of patients	Percentage
Wound infection	1	3.33
Urinary retention	0	0
Fever	1	3.33
Nausea & vomiting	0	0
Paralytic ileus	0	0
Postop Transfusion	0	0
Lung infection	2	6.67
No complications	26	86.67

In our study population, 1 (3.33%) among 30 patients developed postoperative fever, 1 (3.33%) had wound site infection, 2 (6.67%) had lung related infection (1 patient had cough postoperatively and the other had pleural effusion for which pleural tap was done). 86.67% population had no postoperative complications. In our study population, 1 (3.33%) among 30 patients developed postoperative fever, 1 (3.33%) had wound site infection, 2 (6.67%) had lung related infection.86.67% population had no postoperative complications.

Table 11: Distribution of patients by Histopathology of Adnexal masses

Type of Adnexal mass (HPE)	Number of patients	Percentage
Endometriotic cyst	1	3.33
Serous cyst of ovary	20	66.67
Mucinous cystadenoma	3	10
Simple Par-ovarian cyst	1	3.33
Hydrosalpinx	1	3.33
Teratoma	2	6.67
Corpus luteal cyst	2	6.67

Among our study of 30 population- 20 (66.67%) were found to have serous cyst, 3 (10%) had mucinous cyst, 1 (3.33%) patient had hydrosalpinx, 1(3.33%) patient had endometriosis, 2 (6.67%) patients had teratoma of ovary, 1 (3.33%) paraovarian simple cyst, 2 (6.67%) patients had corpus luteal cyst.

Discussion

A mass arising from ovary, fallopian tube or their surrounding tissues is called an adnexal mass and is of common occurrence in women. Timely diagnosis and intervention helps in preserving ovarian function. The management of these masses will depend on age of presentation, severity of symptoms, size, characteristics of mass, levels of CA 125 and risk of malignancy. Most of the symptomatic patients require a surgical intervention to ameliorate the symptoms and it is essential to rule out malignancy in these lesions. Various parameters like USG features, age of the patients and level of CA125 can be taken into consideration to rule out malignancy. Various studies have demonstrated advantages of laparoscopic surgery especially in benign adnexal masses. Laparoscopy provides advantages, like superior panoramic view, less postoperative pain, shorter stay in the hospital, lower readmission rates, and lower overall cost. Laparoscopy is now a preferred treatment option for benign adnexal masses. The primary objective was to study indications, intraoperative findings and different interventions used to deal with adnexal masses. The study also intends to evaluate postoperative complications following laparoscopic surgery.

In the present study, the mean age of presentation was 32.4 years. The youngest age at presentation was 22 years and the oldest age at presentation was 50 years. This wide age range of subjects is similar to the study by Kayastha S. et.al.[7]

Commonest presenting complaint in the present study was pain abdomen seen in 80% of the patients followed by 6.6% of patients who were anxious to conceive, 6.6% of patients presented with menstrual irregularities. These findings were similar to a study by Manivasakan J, et al. [8] where 70.5% of patients with benign adnexal mass presented with pain abdomen. In a study by Al-Shukri M et. al [9] on clinicopathological study of adnexal masses, 98 % of study participants had abdominal pain as the presenting symptom.

In the present study, all the patients were premenopausal. This higher percentage of premenopausal patients is similar to the study by Bhagde AD. [1] which was done to detect and determine origin of adnexal masses. Similarly the study by Manivasakan et.al [10] had increased prevalence of ovarian masses in premenopausal 7.8% versus post-menopausal women 2.5%. Among the study population, 1 (3.33%) was with salpingectomy, 19 (63.34%) were with ovarian cystectomy, 5 (16.66%) were with salphingo-oophorectomy, 2 (6.67%) were with para ovarian cystectomy. The commonest operation performed was ovarian cystectomy (66.6%) and this was similar to study by Duggal BS et al. [11] where ovarian cystectomy was performed in 76% of patients. The mean blood loss in the present study 105+29.1 ml was similar to the study Bhattacharjee S et al. and Duggal BS et al. [11] where the estimated blood loss was reported to be 130ml and 155ml respectively.

Table 12: Comparison of complications of patients in different studies

Study	Year of the study	Study population	Conversion to laparotomy	Intra op complications	Post op complications
Jeong- won Lee et al [12]	2005	219	5 (2.28%)	0	4 (1.83%)
Duggal et al [11]	2004	121	1 (0.83%)	1 (0.83%)	0
LengJui- hua et al [13]	2006	2083	0	0	0
Surender Mohan et al [8]	2011	136	1 (0.74%)	0	1
Our study	2014- 2021	30	0	0	4 (13.3%)

In the present study, 4/30 patients had post-operative complications. The over complication rate of the present study was 13% and this is comparable with the study by Grammatikakis et. al [14] where the overall post-operative complications following laparoscopic management of 1522 patients with adnexal mass was 11.3%. The mean length of stay in hospital was 8.13+4.9 days in the study population, with a minimum stay of 3 days and a maximum hospital stay of 29 days. This

shorter duration of length of stay in the hospital is the advantage of laparoscopic procedures as noted by Duggal BS et al. [11].

Histopathological findings in the present study were suggestive of Simple ovarian cyst in 66.67 % of cases. These findings were similar to histopathological findings in study by Bhattacharjee S, et al. [66] where 26.9% of study population where found to have ovarian cyst and 11.1% where found to have dermoid cysts. In

another study by Yogini KD, et al. [15] Simple ovarian cyst was found in 29.2% of cases and this is comparable to present study. In study by Bhagde AD, et al. [1] the most common adnexal masses on histopathological diagnosis was mucinous cyst adenoma (20%).

Conclusion

Adnexal mass is a common gynaecological problem which can affect women of all age groups. They may pose significant diagnostic and management dilemmas. The statistical results and review articles suggest that the laparoscopic approach is effective and safe for managing patients with adnexal masses of known benign pathology. Proper selection of cases, multidisciplinary team approach, expert laparoscopic surgical skills and good histopathological reporting are imperative for best patient outcomes.

The potential risk of malignancy is the most important limiting factor for laparoscopic management of large ovarian cysts. Therefore, it is necessary to establish risk profiles of patients with adnexal masses in order to benefit from minimally invasive surgery wherever possible. In the present study on benign adnexal masses, there was a strong corroboration between ultrasonographic evaluation, laparoscopic findings & final histopathological examination. Laparoscopy due to better panoramic vision, reduced postoperative pain, shorter stay in hospital, lower re-admission rates is considered more beneficial than a formal laparotomy. The current study reflects of our experience in successful treatment of a large population of women with benign adnexal masses laparoscopically.

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