



## Laparoscopy Versus Laparotomy - A Comparative Study In The Management Of Benign Adnexal Masses In Tertiary Care Hospital

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### Abstract:

**Background:** Benign adnexal masses are commonly diagnosed gynaecological problems. Uncertainty of histopathological findings, non-availability of resources and surgical training makes the decision of best surgical approach a challenge.

**Objective:** To compare the effectiveness and safety of laparoscopic surgery and laparotomy in managing benign adnexal mass lesions at the tertiary care centre in Maharashtra.

**Methods:** Prospective comparative study was conducted for a period of 2 years among women with presumed benign adnexal masses requiring surgical treatment. They were randomly assigned to laparoscopy Group and laparotomy Group of 33 each. The two groups were matched demographically and various parameters were compared.

**Results:** There were no differences in basic demographic characteristics between the two groups. The most common presenting complaint among both the groups was chronic pain in abdomen. There was significantly longer operative time ( $58.52 \pm 9.193$  vs.  $44.33 \pm 6.565$  minutes) but less blood loss ( $65.0 \pm 14.624$  ml vs.  $84.42 \pm 16.641$  ml) in Laparoscopy group as compared to Laparotomy group. The post-operative ambulation time ( $0.79 \pm 0.331$  vs.  $1.86 \pm 0.337$  days) and duration of hospital stay ( $2.53 \pm 0.879$  vs.  $4.67 \pm 1.493$  days) was significantly shorter among the cases studied in Laparoscopy Group than Laparotomy Group. No intra-operative complications were noted and the postoperative complications did not differ significantly between two study groups.

**Conclusions:** This study showed that laparoscopy is a better option than Laparotomy for any benign adnexal mass as it is associated with lesser blood loss, earlier ambulation, shorter hospital stay and faster recovery.

**Keywords:** Benign adnexal masses, laparoscopy, laparotomy, surgical complications.

### Introduction

Adnexal masses are commonly diagnosed clinical problems among women of all ages making it an indication for gynaecologic surgery among 5.26% women; of which 93% are ovarian in origin.<sup>1</sup> These

masses usually present as incidental findings. They could be functional cysts, benign and malignant ovarian tumors, paraovarian cysts, tubo-ovarian abscesses, hydrosalpinx, fimbrial cysts, Tuberculous salpingitis and so on.<sup>2</sup> Histopathological findings of these adnexal masses are uncertain in most of the

lesions and hence the decision of best surgical approach is still a challenge.

Among the available gynaecological surgeries, laparotomy has advantages such as shorter operative time, less chance of injuries and ease of operation. It is also the surgery of choice among patients with comorbidities like elderly patients, cardiovascular disease, diabetes mellitus, obesity etc where it is difficult to establish pneumoperitoneum, ventilation etc.<sup>3</sup> It also overcomes the fear of encountering cancer, performing inadequate staging and upstaging of the disease by tumor seeding that is seen in laparoscopy.<sup>3</sup>

In spite of the reported higher costs of surgical instruments and the longer learning curve<sup>1</sup>, operative laparoscopy has still been accepted as the gold standard in the management of wide range of gynaecological ailments, including the benign adnexal masses<sup>4</sup>. It has advantages like aesthetically pleasing small incisions, allows performance of concomitant surgery, better magnification and anatomical view, less postoperative pain, short hospital stay, earlier recovery and reductions in post-operative complications.<sup>5</sup>

Hence this study aims to gauge which method results in the best clinical outcome for the surgical treatment of benign adnexal masses.

### Objective:

To compare the effectiveness and safety of laparoscopic surgery and laparotomy in managing benign adnexal mass lesions at the tertiary care centre in Maharashtra.

### Materials And Methods:

A Prospective randomised study was carried out in the Government Medical College and hospital, Nagpur, Maharashtra, India comparing Laparoscopy and laparotomy in the management of benign adnexal masses from December 2019 to December 2021.

Written informed consent was obtained from all patients to undergo either laparoscopy or laparotomy. All women undergoing surgery for benign adnexal masses and meeting the inclusion criteria were randomly divided into 2 groups- Laparoscopy and Laparotomy groups of 33 participants each.

### Inclusion criteria:

All women undergoing surgery for benign adnexal mass .

### Exclusion criteria:

- Women with genital malignancy.
- Previously known dense adhesions.
- Severe cardiopulmonary disease.
- Any evidence of ascites or gross metastatic disease based on the preoperative imaging studies.
- Women who had undergone previous abdominal surgery for malignancies.
- The tumors having features suggestive of malignancy during preoperative assessment.

The two groups were matched demographically. Various parameters were compared between the two groups. Data regarding presenting clinical history, menstrual & obstetric history, past medical & surgical history, preoperative assessment, operative notes, postoperative progress, and histopathological reports were collected.

Pre-operative Tumor marker analysis, RMI scoring and ultrasonography was done for all the patients to confirm the diagnosis. Patients with metastatic and malignant diseases were not included in the study, which was confirmed clinically or by radiological methods. All pre-operative investigations were reviewed. All of the patients had same pre-operative preparation; total laboratory investigations and hospitalization one day before operation. All patients were operated under Spinal Anaesthesia and by the same surgeon. All of the patients received same antibiotic prophylaxis pre and postoperatively and both of these two groups received suitable analgesics for pain control. All patients were given adequate analgesia Injection Diclofenac 75 mg BD. All patients were given prophylactic antibiotics in the form of Injection Cefotaxim 1 gm intravenously 1 hour prior to skin incision. All of them were followed up for 4 weeks to check for any further complications.

Operating time was noted from skin incision to dressing the wound after closure of the incision. The blood loss was assessed by weighing the used mops & gauze pieces preoperatively & post-operatively with a high accuracy digital weighing machine and also by measuring the amount of blood suctioned out.

Postoperative progress was noted in terms of severity of pain, ambulation time, duration of hospital stay, occurrence of fever & wound related complications. Febrile morbidity was defined as an oral temperature of 100.4°F/38.0°C or higher, excluding the first 24 hour postoperatively, measured on 2 occasions at least. Duration of hospital stay was calculated from the day of surgery to the day of discharge. Post operative pain was assessed after surgery using the visual analogue scale. The results were statistically analysed.

### Results:

In this study there is homogeneity among demographic characters with regards to their age, marital status, parity, BMI, prior history of surgery, chief complaints and there were no significant differences. (Table no.1)

In the present study, the most common presenting complaint was chronic pain in abdomen. Among the 33 cases studied in Laparoscopy Group 3(9.09%) had acute pain abdomen, 11 (33.33%) had chronic pain in abdomen, 3(9.09%) had complains of dysmenorrhea or dyspareunia, 8(24.24%) women were infertile, 2(6.06%) had menstrual disturbances and 6 (18.18%) had pelvic mass as their chief presenting complaints. Among the 33 cases studied in laparotomy group, 2(6.06%) presented with acute pain in abdomen, 18(54.54%) had chronic pain in abdomen, 3(9.09%) had dysmenorrhea or dyspareunia, 3(9.09%) women were infertile, 4(12.12%) had menstrual disturbances and 3(9.09%) had pelvic mass as their main presenting complaints. However there was overlapping of symptoms among both the groups. In this study co-morbidities and prior surgical history was noted among 15.15 % and 27.27% of laparoscopy group and 18.18 % and 30.3 % of laparotomy group respectively.

There was significantly longer operative time ( 58.52 ± 9.193 vs. 44.33 ± 6.565 minutes) but less blood loss (65.0 ± 14.624 vs. 84.42 ± 16.641 ml) in Laparoscopy group as compared to Laparotomy group. The post-operative ambulation time ( 0.79 ± 0.331 vs. 1.86 ± 0.337 days) and duration of hospital stay ( 2.53 ± 0.879 vs. 4.67 ± 1.493 days) was significantly longer among the cases studied in Laparoscopy Group as compared to Laparotomy Group. The mean pain score on visual analogue scale among the cases studied in in Laparoscopy Group

and Laparotomy Group was 3.79 ± 0.82 and 6.21 ± 0.857 respectively, which was statistically significant. (Table 2 and figure 1) The mean diameter of adnexal mass among the cases studied in Laparoscopy Group and Laparotomy Group was 6.12 ± 2.023 and 5.55 ± 1.597 centimetres respectively. There were no Intra-operative complications noted in both the groups in this study and none of the cases randomised for laparoscopy was converted to laparotomy.

Of 33 cases studied in Laparoscopy Group, 2 (6.06%) had post-op complication (fever) whereas in Laparotomy Group, 4 (12.12%) had post-operative complications (1 urinary tract infection, 2 wound discharge and 1 wound gape). The distribution of incidence of post-operative complications among the cases studied did not differ significantly between two study groups (P value>0.05).

The most common pathology was a simple serous cyst followed by Endometrioma. Other histopathological variants were Dermoid cyst, Haemorrhagic cyst, fibroma, mucinous cystadenoma and tubo-ovarian abscess (Table-3). About 21.21% adnexal masses operated laparoscopically and 12.12% operated by laparotomy were found to be of para-ovarian origin. Cystectomy with cyst wall excision was done in most of the cases. In laparoscopy group only 1 (3.03%) and in laparotomy group 6 (18.18%) underwent unilateral oophorectomy.

### Discussion:

Worldwide many centres have adopted Laparoscopy as the standard treatment in patients affected by supposed benign adnexal masses<sup>6</sup>. Although operative laparoscopy has evolved rapidly, laparotomy is still preferred especially in government set-ups for many gynaecologic procedures due to inadequate technical equipment and the lack of trained and experienced surgeons<sup>7</sup>. Also scientific support has been lacking for most of the procedures<sup>6,7</sup>. To help address this paucity of information, we compared laparoscopic adnexectomy with those of laparotomy as the standard approach in terms of effectiveness, complications. safety and patient recovery.

The homogeneity among demographic characters in regards to their age, parity, BMI, indication for

surgery etc. was also corroborated by other researchers in similar studies by Feng Liang et.al<sup>7</sup>, Carley et.al<sup>8</sup>, Badawy et.al<sup>9</sup> and Oby nagar et.al<sup>1</sup>. In the present study, the most common complaint was chronic pain followed by Infertility in both the groups. According to the study conducted by Badawy et.al<sup>9</sup> most common complaint was Infertility followed by chronic pain which comprised of more than half of their study participants.

Because laparoscopic surgery needs experience and training, laparoscopic cystectomy takes a long time at the commencement as compared to laparotomy, but with progressive experience, training and development of this technique operation time has got considerably shorter. A lot of studies are in agreement like Oby nagar et.al<sup>1</sup> (50.85±7.6 vs. 45.72±11.7 minutes), Badawy et.al<sup>9</sup> (71.5 ± 4.9 vs. 42.6 ± 2.7 minutes) and Mais et.al<sup>11</sup> (70 ±20 vs. 67 ±12 minutes). This study demonstrates significantly less blood loss during the laparoscopic surgery than laparotomy (65.0 ± 14.624 ml and 84.42 ± 16.641 ml respectively) which was similar to the study done by Oby Nagar et.al<sup>1</sup> (30.8±14.9 vs. 77.2±17.9 ml), Feng liang et.al<sup>7</sup> (75.0 ± 10.3 vs. 105.6 ± 11.6 ml) and Pittaway et.al<sup>12</sup>(72 vs.222 ml)

Early ambulation decreases the chances of post-op DVT & pulmonary embolism. In this study, it was shown that the patients who underwent laparoscopy(0.79 ± 0.331days) were mobilized earlier than those who underwent laparotomy(1.86 ± 0.337 days). A study conducted by P M Yuen et.al<sup>10</sup> also showed similar findings of ambulation time (laparoscopy 12.4 ± 11.1 hours and laparotomy 25.2 ± 17.8 hours). Hospital stay is a matter of concern for every patient and their family. Longer duration of hospital stay is usually associated with financial burden and psychological stress. Duration of postoperative hospital stay was significantly less among laparoscopy patients than laparotomy (2.53 ± 0.879 vs. 4.67 ± 1.493 days respectively). This data favourably compared with literature by Oby Nagar et.al<sup>1</sup> (3.02±0.9 vs. 5.53±0.9 days), Feng liang et.al<sup>7</sup> (4.0 ± 1.5 vs. 8.9 ± 2.6 days) and Pittaway et.al<sup>12</sup>(1 vs. 3 days). The post-operative pain will be less if surgery is performed by minimally invasive route and this statement is borne out of the literature. Our data is again in keeping with this significantly as the mean pain score (analysed by Visual Analogue Scale) at 24 hours in Laparoscopy Group and Laparotomy Group

was 3.79 ± 0.82 and 6.21 ± 0.857 respectively. Similarly P M Yeun et.al<sup>10</sup> reported VAS of 3.1 ± 2.5 for laparoscopy group and 4.9 ± 2.5 for laparotomy group in the first 24 hours.

Most of the times an unrecognized and unidentified minor intra-operative complication could become a major postoperative complication requiring re-intervention. Of 66 cases studied in Laparoscopy and Laparotomy Group, none had any intra-operative complications. However organ and vessel injuries was reported by various studies world-wide. A study done by Feng Liang et.al<sup>7</sup> showed that the laparoscopy had few intraoperative complications than open surgery (vascular injury, 1.3% vs. 10.7%; organ damage, 1.3% vs. 9.3%). Pittaway et.al<sup>12</sup> reported ureteral injury in 1 patient of laparoscopy group. Bladder injuries were common in laparotomy group as noted by Pittaway et.al<sup>12</sup>, Deckardt et.al<sup>13</sup> and P M yuen et.al<sup>10</sup>. Bowel injuries were similar in both laparoscopy and laparotomy group as reported by Gal.et.al<sup>14</sup> (1:1) and Deckardt et.al<sup>13</sup> (1:2). Inferior epigastric artery injury was noted in 1 patient of laparoscopy group each as reported by P M Yeun et.al<sup>10</sup>, Gal et.al<sup>14</sup> and Badawy et.al<sup>9</sup>. Gynaecologists are concerned that in patients having unrecognized neoplasms, there might be an increase in the rate of intraperitoneal spillage during laparoscopy. Deckardt et.al<sup>13</sup> reported evidence of chemical peritonitis among 1 patient who underwent laparoscopy. However in this study there were no such cases probably due to experience, training and use of endo-bag.

In this study 3.03 % of women who underwent laparotomy had urinary tract infection. This was similar to studies done by Badawy et.al<sup>9</sup> (4%), Gal et.al<sup>14</sup> (3.13%) and P M Yuen et.al<sup>10</sup> (10%) where patients who underwent laparotomy had higher rates of urinary tract infection compared to those of laparoscopy. Incision size is much smaller with laparoscopy than laparotomy with significantly lower incision related complications as reported by Oby Nagar et.al<sup>1</sup> (2.5 vs. 17.5) and Deckardt et al<sup>13</sup> (0.86 vs. 2.63). Similarly in this study 9.09 % of patients of laparotomy group had wound discharge of which 3.03% had wound gape for which re-suturing was done. A study done by Badawy et.al<sup>9</sup> also reported that 6% of laparotomy patients had wound gaping. A study done by Gal et.al<sup>14</sup> showed that 3.123 % patient from laparoscopy group had Deep venous



thrombosis. Also umbilical granuloma was present in 2.08% and 0.86% among laparoscopy cases reported by Badawy et.al<sup>9</sup> and Deckardt et.al<sup>13</sup> respectively. With time these complications have reduced and none of these complications were noted in our study. However the number of cases was not large enough to assess the rates of rare complications.

In this study serous cyst, endometrioma and dermoid cysts made up the majority of benign adnexal masses removed surgically. On reviewing literature many studies revealed similar picture. Torsion was noted among 6.06% of laparoscopy group and none in laparotomy group. Oby Nagar et.al<sup>1</sup> also reported 5% and 12.5% twisted cysts in laparoscopy and laparotomy respectively.

This research supports the many studies<sup>15</sup> conducted worldwide by demonstrating that the endoscopic approach can be performed quickly, safely and by achieving the surgical objectives as effectively as laparotomy with the distinct patient advantages of small incisions, decreased complications, hospital stay and recovery time.

#### Conclusion:

Our study showed that wherever feasible, laparoscopy is a better option than laparotomy in management of benign adnexal masses as it is associated with less operative time, lesser blood loss, earlier ambulation, shorter hospital stay, less intra

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operative and post operative complications, faster recovery and less post operative morbidity.

The gynaecologist should discuss the options with patients and relatives and make clear recommendations on which route of surgery will maximize benefits and minimize risks given the specific clinical situation and determine the best course of action after this discussion. This study demonstrates the outcome, safety and effectiveness of laparoscopic approach to each and every patient who presents to a gynaecology OPD with benign adnexal lesion who would otherwise opt for laparotomy especially in a government setting. It also stresses on intensifying the training programs to develop laparoscopy skills for managing adnexal masses.

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#### Declarations:

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Conflict of interest: None declared

No violation of human rights and safety.

Ethical approval: The study was approved by the Institutional Ethics Committee.

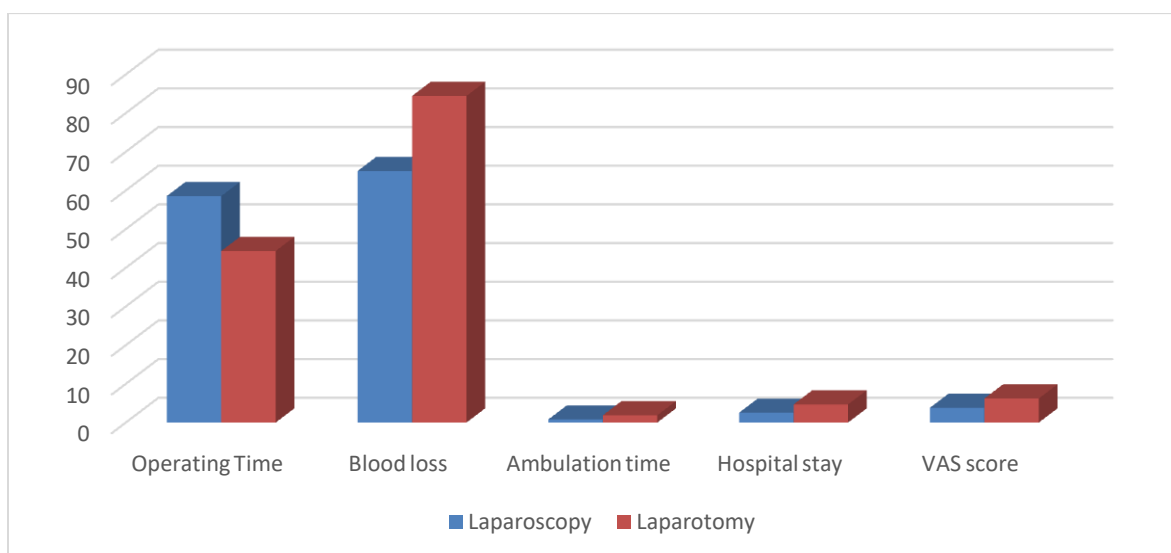
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**Table 1: Comparison of Demographic Variables between the two Groups**

Demographic Details	Laparoscopy group	Laparotomy group
Mean age (years)	27.27 ± 7.438	27.27 ± 7.316
Mean BMI (Kg/m <sup>2</sup> )	23.25 ± 1.678	23.0 ± 1.602
Prior History of Surgery	09 (27.27%)	10 (30.30%)
Unmarried	09 (27.27%)	08 (24.24%)
Married	24 (72.73%)	25 (75.76%)
Multiparous	15 (45.45%)	22 (66.67%)
Nulliparous	18 (54.55%)	11 (33.33%)

**Table 2: Comparison between different parameters in Laparoscopy and Laparotomy group**

Parameters	Laparoscopy group	Laparotomy group	P value
Mean duration of surgery (min)	58.52 ± 9.193	44.33 ± 6.565	<0.001
Mean estimated blood loss (ml)	65.0 ± 14.624	84.42 ± 16.641	<0.001
Mean Post-operative ambulation time (days)	0.79± 0.331	1.86± 0.337	<0.001
Mean duration of hospital stay (days)	2.53 ± 0.879	4.67 ± 1.493	<0.001
Mean post-op pain score (VAS)	3.79 ± 0.82	6.21 ± 0.857	<0.001

**Figure 1: Comparison between different parameters in Laparoscopy and Laparotomy group****Table 3: Inter-group distribution of Histopathological diagnosis among the cases studied.**

Histopathology of the adnexal mass	Laparoscopy N (%)	Laparotomy N (%)	Total
Dermoid	02 (6.06%)	06 (18.18%)	08
Endometrioma	08 (24.24%)	07 (21.21%)	15
Fibroma	01 (3.03%)	00 (0.0%)	01
Haemorrhagic cyst	04 (12.12%)	04 (12.12%)	08
Mucinous Cystadenoma	01 (3.03%)	02 (6.06%)	03
Simple Serous	16 (48.48%)	12 (36.36%)	28
Tubo-Ovarian Abscess	01 (3.03%)	02 (6.06%)	03
<b>Total</b>	<b>33 (100%)</b>	<b>33 (100%)</b>	<b>66</b>