

## **Incidence of Post Tubal Ligation Syndrome And Failure Rates After Laparoscopic vs Open Tubal Ligation as a Permanent Contraceptive Method.**

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### **ABSTRACT**

#### Background

Tubal ligation is a popular permanent contraceptive method, performed either laparoscopically or via open surgery. Understanding the comparative outcomes of these methods is crucial for informed clinical decisions and patient counseling. This study aimed to compare the incidence of Post-Tubal Ligation Syndrome (PTLS) and failure rates between laparoscopic and open tubal ligation methods.

#### Methods

This two-year observational study was conducted at AIIMS, Patna, involving 200 women (100 per group). Data were collected on demographic characteristics, PTLS symptoms, failure rates, complications, recovery times, and patient satisfaction. Statistical analysis was performed using SPSS version 21.0.

#### Results

The incidence of PTLS was significantly lower in the laparoscopic group (23%) compared to the open group (45%,  $p < 0.05$ ). Failure rates were not significantly different between the groups (3% laparoscopic vs. 7% open,  $p > 0.05$ ). The laparoscopic group had fewer complications, faster recovery times, and higher patient satisfaction.

#### Conclusion

Laparoscopic tubal ligation is associated with a lower incidence of PTLS, fewer complications, faster recovery, and higher patient satisfaction compared to open tubal ligation. Both methods were effective for pregnancy prevention, though laparoscopic surgery showed superior overall outcomes.

## Recommendations

Laparoscopic tubal ligation should be preferred for permanent contraception due to its lower complication rates and higher patient satisfaction. Further studies with larger sample sizes and diverse populations are recommended to validate these findings.

## Keywords

Tubal ligation, laparoscopic surgery, open surgery, Post-Tubal Ligation Syndrome, contraception, patient satisfaction.

## INTRODUCTION

Tubal ligation, a permanent method of contraception, has been widely used for decades. However, recent studies have prompted reevaluation of its efficacy and complications, such as Post-Tubal Ligation Syndrome (PTLS). Tubal ligation can be performed via two primary methods: laparoscopic and open surgery. While both methods aim to prevent pregnancy by occluding the fallopian tubes, their outcomes and associated complications can vary significantly.

Recent research highlights the importance of comparing these methods to inform clinical decision-making. A study found that hormonal intrauterine devices (IUDs) were more effective at preventing pregnancy than tubal ligation, challenging the long-held belief that tubal ligation is the gold standard for permanent contraception [1]. This study analyzed data from over 83,000 Medi-Cal recipients and found higher than expected pregnancy rates among those who underwent tubal ligation, with a rate of 2.64% compared to 2.40% for levonorgestrel IUDs and 2.99% for copper IUDs [1]. This real-world data underscores the need for thorough evaluation of all contraceptive options to guide patient choices effectively.

In addition to efficacy, the incidence of PTLS, characterized by symptoms such as dysmenorrhea, menstrual irregularities, and chronic pelvic pain, is a significant concern. A study found that PTLS symptoms were more prevalent in women who underwent open tubal ligation compared to those who had laparoscopic procedures [2]. This suggests that laparoscopic tubal ligation might be associated with fewer long-term complications and better overall patient outcomes.

Moreover, the method of tubal ligation can influence the risk of postoperative complications and recovery time. A study indicated that laparoscopic tubal ligation is associated with shorter recovery times and fewer immediate postoperative complications compared to open surgery [3]. This is particularly relevant in enhancing patient satisfaction and reducing healthcare costs.

This study designed to evaluate the incidence of Post-Tubal Ligation Syndrome (PTLS) and the failure rates of tubal ligation performed via laparoscopic and open surgical methods.

## **METHODOLOGY**

### *Study Design*

This was a comparative, observational study.

### *Study Setting*

The study spanned for 2 years from March 2017 to March 2019 at All India Institute of Medical Sciences (AIIMS), Patna.

### *Participants*

The study involved 200 women, with 100 participants in each group (laparoscopic tubal ligation and open tubal ligation).

### *Inclusion Criteria*

1. Women aged 18-45 years opting for permanent contraception.
2. Participants who had given informed consent.
3. Women with no history of previous tubal ligation or sterilization procedures.

### *Exclusion Criteria*

1. Women with a history of pelvic inflammatory disease.
2. Participants with any contraindications to general anesthesia.
3. Women with known reproductive anomalies or severe comorbid conditions.

### *Bias*

To minimize selection bias, participants were randomly assigned to the laparoscopic or open tubal ligation groups. Blinding was not possible due to the nature of the procedures. However, outcome assessors were blinded to the type of procedure performed.

#### *Data Collection*

Data were collected through patient interviews, medical records, and follow-up visits. The following data points were collected:

- Demographic information (age, parity, medical history)
- Preoperative assessment results
- Details of the surgical procedure
- Postoperative recovery data
- Follow-up outcomes, including the incidence of PTLs and failure rates

#### *Procedure*

##### 1. Preoperative Phase:

- Participants underwent a thorough medical evaluation and counseling regarding the procedure.
- Informed consent was obtained.

##### 2. Operative Phase:

- Participants were randomly assigned to undergo either laparoscopic or open tubal ligation.
- Standardized surgical protocols were followed for both procedures.

##### 3. Postoperative Phase:

- Participants were monitored for immediate complications.
- Follow-up visits were scheduled at 1 month, 6 months, 1 year, and 2 years post-surgery to assess for PTLs and any signs of procedure failure.

#### *Statistical Analysis*

Data were analyzed using SPSS version 21.0. Descriptive statistics were used to summarize the demographic data and baseline characteristics. Comparative analysis was performed using

chi-square tests for categorical variables and t-tests for continuous variables. Logistic regression analysis was used to identify potential predictors of PTLs and failure rates. A p-value of  $<0.05$  was considered statistically significant.

## RESULT

The study included 200 women, with 100 participants in each group (laparoscopic tubal ligation and open tubal ligation). The demographic and baseline characteristics of the participants are summarized in Table 1.

**Table 1: Demographic and Baseline Characteristics**

Characteristic	Laparoscopic Group	Open Group	p-value
Mean Age (years)	32.5 ± 5.4	33.1 ± 5.8	0.44
Mean Parity	3.2 ± 1.1	3.3 ± 1.0	0.65
History of Pelvic Surgery	10 (10%)	12 (12%)	0.64
Comorbid Conditions (%)			
Hypertension	15 (15%)	18 (18%)	0.54
Diabetes Mellitus	12 (12%)	14 (14%)	0.66

The incidence of PTLs was significantly lower in the laparoscopic group compared to the open group ( $p < 0.05$ ). Table 2 presents the incidence of PTLs in both groups.

**Table 2: Incidence of Post-Tubal Ligation Syndrome (PTLS)**

PTLS Symptoms	Laparoscopic Group	Open Group	p-value
Dysmenorrhea	8 (8%)	20 (20%)	0.01
Menstrual Irregularities	10 (10%)	25 (25%)	0.004
Chronic Pelvic Pain	5 (5%)	15 (15%)	0.02
Total PTLs Incidence	23 (23%)	45 (45%)	0.001

The failure rates of tubal ligation were observed to be higher in the open group compared to the laparoscopic group, although the difference was not statistically significant ( $p > 0.05$ ). Table 3 details the failure rates in both groups.

**Table 3: Failure Rates**

Failure Rates	Laparoscopic Group	Open Group	p-value
Pregnancy within 1 year	1 (1%)	3 (3%)	0.31
Pregnancy within 2 years	2 (2%)	4 (4%)	0.41
Total Failure Rate	3 (3%)	7 (7%)	0.21

Complications were minimal in both groups, but the laparoscopic group had a faster recovery time and fewer complications compared to the open group. Table 4 summarizes the complications and recovery times.

**Table 4: Complications and Recovery Time**

Complication/Recovery Time	Laparoscopic Group	Open Group	p-value
Immediate Postoperative Pain	20 (20%)	35 (35%)	0.02
Infection	2 (2%)	5 (5%)	0.45
Recovery Time (days)	3.5 ± 1.2	5.2 ± 1.5	0.001

Patient satisfaction was higher in the laparoscopic group, as shown in Table 5.

**Table 5: Patient Satisfaction**

Patient Satisfaction	Laparoscopic Group	Open Group	p-value
Highly Satisfied	80 (80%)	60 (60%)	0.001
Satisfied	15 (15%)	30 (30%)	0.02
Neutral	5 (5%)	10 (10%)	0.27
Dissatisfied	0 (0%)	0 (0%)	-

## DISCUSSION

The study aimed to compare the incidence of Post-Tubal Ligation Syndrome (PTLS) and failure rates between laparoscopic and open tubal ligation procedures performed on women at AIIMS, Patna, over a period of two years. The study included 200 participants, equally divided into two groups, with each group consisting of 100 women.

The demographic and baseline characteristics, such as mean age, mean parity, and comorbid conditions, were similar between the two groups, ensuring comparability. This similarity indicates that the observed outcomes were likely due to the differences in the surgical procedures rather than underlying patient differences.

The incidence of PTLS was significantly lower in the laparoscopic group compared to the open group. Specifically, symptoms like dysmenorrhea, menstrual irregularities, and chronic pelvic pain were all more prevalent in the open tubal ligation group. This suggests that laparoscopic tubal ligation is associated with fewer postoperative complications related to PTLS, enhancing the overall quality of life for patients undergoing this procedure.

Regarding failure rates, although the laparoscopic group showed a lower incidence of failure (1% within the first year and 2% within two years) compared to the open group (3% and 4%, respectively), the differences were not statistically significant. This finding implies that both methods are generally effective for permanent contraception, though there is a trend towards lower failure rates with the laparoscopic approach.

The study also revealed that complications were fewer and recovery times shorter in the laparoscopic group. Participants in the laparoscopic group experienced less immediate postoperative pain and required fewer days for recovery compared to those in the open group. These results highlight the advantages of laparoscopic surgery in terms of reduced postoperative morbidity and quicker return to daily activities.

Patient satisfaction was notably higher in the laparoscopic group, with 80% of participants reporting high satisfaction compared to 60% in the open group. This higher satisfaction likely reflects the reduced incidence of PTLS, fewer complications, and faster recovery times associated with laparoscopic tubal ligation.

Overall, the results of this study suggest that laparoscopic tubal ligation is a superior method compared to open tubal ligation in terms of lower incidence of PTLS, fewer complications, faster recovery, and higher patient satisfaction. These findings support the recommendation of laparoscopic tubal ligation as the preferred method for permanent contraception in women

seeking this option. However, both methods were found to be effective in preventing pregnancy, with no significant difference in failure rates.

Atılğan et al. (2021) compared single-incision-two port laparoscopic tubal ligation to conventional three port laparoscopic tubal ligation. They found that single-incision provided better cosmetic outcomes, lower postoperative pain scores, and shorter operating times without increasing complication rates or sterilization failure [4].

Kahveci (2018) studied the reproductive outcomes after laparoscopic tubal reanastomosis for sterilization regret. The overall pregnancy rate was 28.1%, with a mean age of 33.1 years for the pregnant group compared to 36.6 years for the non-pregnant group. The study highlighted laparoscopic reversal as a viable alternative to IVF for younger women with sterilization regret [5].

Mercier et al. (2019) assessed the impact of expedited scheduling on interval tubal ligation completion rates. The study found that expedited scheduling significantly increased completion rates within six months of delivery (50% vs. 9%) and improved patient satisfaction with the scheduling process [6].

Byrne et al. (2020) evaluated the safety of postpartum tubal ligation in relation to BMI. The study concluded that increased BMI did not significantly affect morbidity rates but was associated with longer operative times and higher wound complication rates in obese women [7].

Zhang et al. (2021) analyzed pregnancy outcomes in patients with tubal infertility following laparoscopic treatment. They found that factors such as patient age, tubal function score, and history of tubal pregnancy significantly influenced pregnancy outcomes [8].

Saha (2019) studied the prevalence and types of post-sterilization failures in a tertiary care hospital. The study found that 61% of pregnancies following sterilization failure were ectopic, emphasizing the need for thorough patient counseling on the risks and signs of failure [9].

Verma et al. (2023) compared menstrual disorders in post-tubal ligated women with non-ligated controls. The study found no significant difference in the incidence of menstrual disorders between the two groups, suggesting that tubal ligation does not adversely affect menstrual patterns [10].

## CONCLUSION

The study demonstrated that laparoscopic tubal ligation had a lower incidence of PTLs, fewer complications, faster recovery time, and higher patient satisfaction compared to open tubal ligation. However, the failure rates were not significantly different between the two methods.

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