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Retrospective Evaluation of Laparoscopic Gynecologic Interventions and Histopathological Correlations: A Hospital-Based Study

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ABSTRACT

Introduction: Laparoscopic surgery has become a cornerstone in modern gynecology, offering minimally invasive alternatives for both diagnostic and therapeutic management of various conditions. Despite the benefits associated with it, intraoperative laparoscopic impressions do not always correlate well with histopathological findings. Therefore, evaluation for diagnostic accuracy needs to be done. The present study was undertaken with the aim of assessing laparoscopic gynecologic interventions and their histopathological correlations. **Methods & Materials:** This retrospective descriptive study was conducted in the Department of Obstetrics and Gynecology Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, Bangladesh, reviewing all laparoscopic gynecologic procedures performed from January 2024 to December 2024. A total of 134 patients who underwent laparoscopic interventions for benign and suspected malignant gynecologic conditions were included. Data analyses were done with SPSS version 26. **Result:** Among 134 laparoscopic gynecologic procedures, cystectomy was most common (49.3%), followed by diagnostic laparoscopy with chromopertubation (16.4%) and salpingectomy (11.2%). Adnexal masses were the leading indication (53.7%). Serous cystadenoma was the most frequent histopathological finding (18.7%), with dermoid and endometriotic cysts each at 8.2%. Complication and conversion rates were low (6.7% and 3.7%, respectively), and overall concordance between laparoscopic findings and histopathology was high (91%). **Conclusion:** This study revealed that adnexal pathologies, mainly ovarian cysts, represented the most frequent indications for laparoscopic intervention, with predominant intervention being cystectomy. The main histopathological result was serous cystadenoma. The complication and conversion rates were low. The high diagnostic–histopathologic concordance confirms that laparoscopy is a safe, effective, and reliable tool in managing benign gynecologic conditions.

Keywords: *Laparoscopy, Histopathology, Gynecology, Ovarian Cysts*

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INTRODUCTION

Laparoscopic techniques have revolutionized gynaecologic surgery over the past few decades, offering significant advantages over traditional open procedures. These include enhanced visualization of pelvic anatomy, reduced intraoperative blood loss, shorter hospital stays, and faster postoperative recovery [1,2]. With advancements in imaging and instrumentation, laparoscopy has become a cornerstone for both diagnostic and therapeutic interventions in gynecology, ranging from adnexal masses to endometriosis and hysterectomy procedures [3,4]. The introduction of the International Ovarian Tumour Analysis (IOTA) simple ultrasound rules has markedly improved the preoperative assessment of adnexal masses, allowing accurate differentiation between benign and malignant lesions [5]. This, in turn, has enabled better patient selection for laparoscopic management, reducing unnecessary laparotomies and associated morbidities [5,6]. Several studies have confirmed that laparoscopic surgery for benign adnexal pathology is associated with lower complication rates and excellent recovery profiles when compared with open approaches [6,7]. In resource-limited settings, hospital-based audits have demonstrated that laparoscopic management is both feasible and effective when performed by trained surgeons, leading to improved perioperative outcomes without compromising safety. Moreover, advances in laparoscopic hysterectomy techniques have extended minimally invasive options even to patients with large uteri or complex pathologies, producing outcomes comparable to open surgery but with fewer complications and shorter recovery times [8]. However, the success of laparoscopic gynecologic interventions depends heavily on accurate intraoperative diagnosis and its correlation with final histopathology. The visual appearance of lesions during laparoscopy may not always correspond precisely with histopathologic findings, particularly in cases such as endometriosis, where diagnostic concordance rates vary significantly. Studies have shown that over- or underestimation of disease extent based on laparoscopic visualization alone can occur, underscoring the importance of histopathologic verification to ensure diagnostic accuracy and appropriate management. In oncologic settings, the debate over the safety of minimally invasive techniques continues. Systematic reviews and randomized controlled trials have raised concerns about potential risks in specific cancer surgeries, such as the LACC trial, which demonstrated inferior oncologic outcomes for minimally invasive radical hysterectomy compared to open surgery in early-stage cervical cancer. Such evidence emphasizes the need to evaluate not only surgical feasibility but also long-term oncologic adequacy when applying laparoscopy in malignant gynecologic conditions [9,10]. This study aims to assess the laparoscopic gynecologic interventions and histopathological correlations.

METHODS & MATERIALS

This retrospective descriptive study was conducted at the Department of Obstetrics and Gynecology, Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, Bangladesh, reviewing all laparoscopic gynecologic procedures performed from January 2024 to December 2024. A total of 134 patients who underwent laparoscopic

interventions for benign and suspected malignant gynecologic conditions were included. Patients with incomplete operative or histopathological records were excluded. Data were collected from hospital medical records, operative notes, and histopathology reports. Variables included patient demographics, indication for laparoscopy, type of procedure, intraoperative findings, complications, need for conversion to laparotomy, and histopathological diagnosis. Diagnostic procedures included laparoscopy with or without chromopertubation, while therapeutic procedures included cystectomy, oophorectomy, salpingectomy, bilateral salpingo-oophorectomy, and laparoscopic hysterectomy. Specimens were retrieved through endobags whenever possible, and all excised tissues were sent for histopathological examination. Conversion to open surgery was performed if dense adhesions, uncontrolled bleeding, or suspicious malignancy prevented safe completion of laparoscopy. Data were entered and analyzed using SPSS version 26. Descriptive statistics were used to summarize frequencies, percentages, and distributions of procedures, indications, and histopathological outcomes. Concordance between laparoscopic findings and histopathology was calculated as a percentage of matched cases. Ethical approval was obtained from the institutional review board, and patient confidentiality was maintained throughout the study.

RESULTS

Laparoscopic cystectomy was the most frequently performed procedure, accounting for nearly half of all laparoscopic interventions (49.3%). Diagnostic laparoscopy with chromopertubation comprised 16.4%, mainly for infertility workup, while salpingectomy (11.2%) and oophorectomy (6.7%) were also common. Conversion to open surgery occurred in 3.7% of cases due to dense adhesions or unexpected findings (*Table I*).

Table I
Distribution of Laparoscopic Procedures (*n* = 134).

Type of Procedure	Number of Cases	Percentage (%)
Laparoscopic cystectomy	66	49.3
Diagnostic laparoscopy with chromopertubation	22	16.4
Salpingectomy	15	11.2
Oophorectomy	9	6.7
Diagnostic laparoscopy (without chromopertubation)	8	6.0
Laparoscopic hysterectomy	5	3.7
Laparoscopy converted to open surgery	5	3.7
Bilateral salpingo-oophorectomy	4	3.0
Total	134	100

The most frequent indication for laparoscopy was adnexal mass (53.7%), followed by infertility evaluation (16.4%) and chronic pelvic pain (14.9%). Ectopic pregnancy accounted for 6% of procedures, while abnormal uterine bleeding and suspicious malignancy were less common indications (*Table II*).

Table II
Indications for Laparoscopy (*n* = 134).

Indication	Number of Cases	Percentage (%)
Adnexal mass	72	53.7
Infertility evaluation	22	16.4
Chronic pelvic pain	20	14.9
Ectopic pregnancy	8	6.0
Abnormal uterine bleeding	7	5.2
Suspicious malignancy	5	3.7
Total	134	100

Serous cystadenoma was the most frequent histopathological finding (18.7%), followed by dermoid cysts and endometriotic cysts (8.2% each). Periovarian and simple cysts each comprised 7.5% of cases. Malignant lesions were confirmed in only 2.2% of specimens. About one-third of diagnostic laparoscopies showed normal or non-specific tissue findings (*Table III*).

Table III
Histopathological Diagnosis of Excised Specimens (*n* = 134).

Histopathological Diagnosis	Number of Cases	Percentage (%)
Serous cystadenoma	25	18.7
Dermoid cyst (mature teratoma)	11	8.2
Endometriotic (chocolate) cyst	11	8.2
Periovarian cyst	10	7.5
Simple cyst	10	7.5
Mucinous cystadenoma	4	3.0
Ectopic pregnancy	8	6.0
Adenomyosis	5	3.7
Chronic cervicitis	4	3.0
Malignancy (serous carcinoma)	3	2.2
Normal or non-specific tissue	43	32.0
Total	134	100

Out of 134 cases, 91% had uneventful recoveries. Minor complications occurred in 6% of cases, mainly port-site infections and minimal intraoperative bleeding, while one patient (0.7%) experienced a major complication. Conversion to open surgery was required in 3.7% due to extensive adhesions or poor visualization (*Table IV*).

Table IV
Intraoperative and Postoperative Outcomes (n = 134).

Parameter	Number of Cases	Percentage (%)
Uneventful recovery	122	91.0
Minor complications (bleeding, port infection)	8	6.0
Major complications (bowel or vascular injury)	1	0.7
Conversion to laparotomy	5	3.7
Total	134	100

The overall diagnostic concordance between laparoscopic impression and histopathological findings was 91%. The highest agreement was noted in malignant lesions (100%), followed closely by serous cystadenoma (92%) and dermoid cysts (90.9%). Only a small fraction showed discrepancy, primarily in cases with inflammatory or non-specific findings (*Table V*).

Table V
Correlation Between Laparoscopic Findings and Histopathology (n = 134).

Laparoscopic Impression	Confirmed by Histopathology	Concordance (%)
Serous cystadenoma	23/25	92.0
Dermoid cyst	10/11	90.9
Endometrioma	10/11	90.9
Simple cyst	9/10	90.0
Malignant lesion	3/3	100.0
Overall concordance	122/134	91.0

DISCUSSION

In this study, ovarian cystectomy was the predominant procedure (66/134, 49.3%). This proportion is close to other single-center series where ovarian cystectomy represented the largest share of operative laparoscopy; Begum et al. reported ovarian cystectomy in 43% of cases in a Bangladeshi tertiary center (their cohort), reflecting similar case-mix and surgical practice in comparable settings [11]. The small absolute difference (49.3% vs 43%) in our study likely reflects local referral patterns and case selection, with a higher caseload of benign adnexal masses referred for fertility-sparing surgery in our hospital. Adnexal mass was the leading indication in our cohort (72/134, 53.7%). This predominance mirrors numerous audits of gynecologic laparoscopy, which consistently identify adnexal pathology as the main driver of minimally invasive procedures; for example, a multi-center audit reported a majority of laparoscopic cases being adnexal or adnexal-related procedures [12]. Our higher proportion of adnexal indications (53.7%) compared with some reports (≈40–50%) may reflect focused service lines (an active benign adnexal surgery stream) and active infertility workups that increase diagnostic laparoscopy volumes. The histopathological spectrum in our study showed serous cystadenoma as the most frequent (25/134, 18.7%), with dermoid and endometriotic cysts each 8.2%. The relatively low malignant yield in our study (3/134, 2.2%) is expected in a cohort selected predominantly for presumed benign disease. We observed an overall complication rate of 6.7% (minor 6.0%, major 0.7%) and conversion to laparotomy in 3.7% (5/134). Large retrospective analyses report heterogeneous complication rates depending on case mix and definitions, but overall intra- and postoperative complication rates commonly fall in the 4–7% range, with major complications lower than 2% in many studies [13,14]. For conversions, Keurentjes et al. described conversion rates around 3–5% for laparoscopic hysterectomy and adnexal procedures in high-volume centers; our 3.7% rate sits at the lower end of that spectrum, suggesting acceptable operative safety and appropriate intraoperative judgment to convert when needed [12]. The single major complication (0.7%) is within reported expectations for modern gynecologic laparoscopy. Diagnostic concordance between laparoscopic impression and histopathology in our dataset was 91% (122/134). Concordance rates in the literature vary by lesion type: endometriosis in particular shows variable histologic confirmation after visual diagnosis, with studies reporting histology confirmation rates from roughly 50–75% depending on sampling and pathology protocols [10,15]. Our high overall concordance likely reflects that most procedures were for discrete cystic adnexal masses-entities that show clearer macroscopic features-whereas endometriosis and subtle peritoneal disease typically yield lower confirmation rates. The near-perfect concordance for malignancy in our small malignant subgroup (100%, 3/3) reinforces the reliability of gross malignant features in guiding intraoperative management, although numbers are small.

LIMITATIONS

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study showed that adnexal pathologies, especially ovarian cysts, were the most common indications for laparoscopic intervention, with cystectomy being the predominant procedure. Serous cystadenoma was the leading histopathological finding, and complication and conversion rates were low. The high diagnostic–histopathologic concordance confirms that laparoscopy is a safe, effective, and reliable tool for managing benign gynecologic conditions.

RECOMMENDATION

Laparoscopic surgery should be encouraged as the preferred approach for managing benign gynecologic conditions due to its safety, diagnostic accuracy, and favorable outcomes. Regular audit of laparoscopic–histopathological correlations and continuous surgical training are recommended to enhance diagnostic precision.

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CONFLICT OF INTEREST

None declared

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