GYNECOLOGIC LAPAROSCOPIC SURGERY; EXPERIENCE OF CENTER OF FERTILITY AND REPRODUCTIVE MEDICINE AT SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

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ABSTRACT

BACKGROUND: Recent data suggests that up to 80% of gynecologic surgeries can be accomplished laparoscopically. However, laparoscopy does not come without risks – specifically risks of injury to the bowel, urinary tract, and vasculature. This study assesses the indications for, as well as the complications and outcomes of gynecologic laparoscopic surgery in the Center of Fertility and Reproductive Medicine at St Paul's Hospital Millennium Medical College (CFRM at SPHMMC).

METHODS AND MATERIALS: This was a cross sectional study using data abstracted from medical records between April 2019 to September 2020. We included all gynecologic laparoscopies done during this study period. The data was collected with Open Data Kit (ODK) software and then transferred to Microsoft Excel then to SPSS version 20 analysis..

RESULTS: There were 135 gynecologic surgeries performed, with a mean patient age of 32.4 years. About two-thirds of them presented with primary infertility, and 30% had a previous laparotomy or laparoscopy. The main indication for laparoscopy is hydrosalpinx (51.1%). The overall complication ratio was 3.7% and ratio of conversion to laparotomy was 5.2%.

CONCLUSION: The complication ratio was higher compared to previously published studies from Asia and Europe.

KEYWORDS: Gynecology, laparoscopy, surgery, Saint Paul's Hospital Millennium Medical College.

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INTRODUCTION

Laparoscopy is a surgical procedure where a surgeon accesses the abdominal cavity by making small opening into the belly for the introduction of instruments [1]. Over the last 30 years, laparoscopy has shown marked advancement and has become popular with both patients and surgeons for its fast recovery, better aesthetic result, less pain, and shorter hospital stay [2]. Currently, laparoscopy is the preferred operating technique for gynecologic procedures such as ovarian cystectomy, diagnosis and management of endometriosis [3–6], myomectomy [7], tubal ligation [8], diagnosis and management of tubal pathology [9–11], treatment of ectopic pregnancy [12,13], workup of unexplained infertility [14], and hysterectomy [1]. In addition, it is also being used in the management of pelvic organ prolapse, urinary incontinence, chronic pelvic pain and some pelvic cancers [1]. Large abdominal mass, irreducible external hernia, hypovolemic shock, inexperienced surgeon, lack of appropriate instruments, and medical problems (eg. cardiorespiratory failure, obstructive airway disease, myocardial infarction) are contraindications for laparoscopic surgery [1].

Laparoscopic surgery is not without complications. Many risks, like deep vein thrombosis, adhesion formation and anesthesia exposure, are shared with laparotomy. But the occurrence of injury to bowel, bladder, and major pelvic vessels is higher in laparoscopy. In general, laparoscopic complications are grouped into two categories: major and minor [1]. Major complications include injury to the hollow organs of the viscera (intestine, bladder, or ureter), bleeding or infection during laparoscopy that later needs exploration, death or severe medical sequelae. Minor complications includes anemia following mild bleeding, fever, abdominal wall hematoma, urinary tract infection, postoperative urinary retention, and paralytic ileus. For these reason patients with previous history of surgery for appendicitis, tuboovarian abscess, and patients with clearly documented adhesions should be carefully selected [7]. Obese patients with a BMI of above 45kg/m2 are also at increased risk for laparoscopic-associated complications for two reasons: one, pneumoperitoneum creation with Veress needle can occur due to increased thickness of adipose tissue, and second, they don't tolerate prolonged Trendelenburg position due to increased airway pressure [2].

Despite the multiple advantages of laparoscopy over laparotomy like less adhesion, less hospital stay, less postoperative pain and faster return to work, it is still underutilized in low and middle income countries (LMIC) [1]. This is mainly because of limited funding for laparoscopic instruments, a culture of surgical practice and training that does not promote new technology, and a lack of willingness by surgeons to engage in more technical and time consuming procedures. Despite these barriers, laparoscopic surgery is showing slow but encouraging progress in many resource limited African settings [16]. In Ethiopia, there are now ten hospitals (both private and government) that provide biliary, gastrointestinal, and gynecologic laparoscopic surgery. Most of them are located in Addis Ababa, and due to training constraints, are limited to providing only diagnostic and minor laparoscopic procedures. This study was conducted to review the experience of laparoscopic surgeries at CFRM at SPHMMC. It also evaluated the occurrence and management of intraoperative complications. For future studies, in the field of gynecologic laparoscopic surgery, our study will provide baseline information.

METHODS AND MATERIALS

The study conducted an institution based, cross-sectional study for all women who underwent laparoscopic gynecologic surgery at CFRM at SPHMMC from April 2019 to September 2020.

The inclusion criteria included all women who had undergone all gynecologic laparoscopic surgery that had been documented in the operation room log book. Women were excluded if their medical records were illegible or incomplete.

The calculated sample size using single population proportion formula,

$$n = \frac{(z2\ 1-\alpha/2p(1-p)}{d2}$$

5% acceptable margin of error(d), a confidence level of 95%(z), and a complication rate of 6.7%(p) derived from a prior similar study from Cameroon [16] to yield a sample size of 96 participants. However, given that the total number of cases at CFRM at SPHMMC far exceeded this sample size, we opted to incorporate all 135 cases that were performed during this study period in order to provide better representation.

The gynecologic laparoscopic surgeries were categorized into four levels [20]. Level one includes basic procedures for diagnostic purposes only. This includes chromopertubation, acquisition of pelvic washings, and second-look laparoscopy. Level two, termed minor laparoscopy includes tubal sterilization, ovarian biopsy, adhesiolysis not involving bowel, and destruction of minor endometriotic lesions. Level three, major laparoscopy, includes any procedure that required well defined laparoscopic techniques such as resection of ectopic pregnancy, management of pelvic inflammatory disease, polycystic ovarian drilling, removal of benign ovarian cysts, tuboplasty, management of moderate to severe endometriosis, and extensive adhesiolysis. Level four, advanced laparoscopy, includes myomectomy, hysterectomy, pelvic lymphadenectomy, resection of retroperitoneal endometriosis and surgery for gynecologic malignancy.

The questionnaire for data collection included age, weight, previous history of surgery, history of tuberculosis or sexual transmitted disease, indication for laparoscopy, complication and its management, outcome of complication management, and duration of surgery.

Complication was defined as any incident that shifted the surgical plan into an unplanned direction which necessitate additional action like laparotomy. Injury to the bowel, bladder, ureter, major vasculature, peritonitis, and thromboembolic events were considered as complication.

The data was collected using Open Data Kit (ODK) software and then transferred to Microsoft Excel then to SPSS version 20 analysis to generate descriptive statistics. Approval of ethical clearance obtained from SPHMMC IRB office. The researchers have no any interest of conflict with other individual, group or drug companies

RESULTS

The study included 135 women who underwent laparoscopy between April 2019 through September 2020. The mean age of patients was 32.4 years with 67.4% (n=91) between 20-34 years of age. Sixty-nine percent (n=93) presented with primary infertility.

Table 1: Basic characteristics of patients who undergone gynecologic Laparoscopy at CFRM at SPHMMC, September 2020.

Age in years	No.	%
20-34	91	67.4
35-39	34	25.2
40-45	10	7.4
History of previous infection		
STI	6	4.4
TB	19	14.1
No infection	72	53.3
Not documented	38	28.1
Infertility type		
Primary	93	68.9
Secondary	42	31.1
Previous history laparotomy		
No	105	77.8
Yes	30	22.2
Previous history of laparoscopy		
No	123	91.1
Yes	12	8.9

Half of patients reported no history of infection. Fourteen percent (n=19) had a history of tuberculosis. Twenty-two percent (n=30) had history of laparotomy and 9% (n=12) had a prior history of laparoscopy.

The most common indication for laparoscopy was hydrosalpinx which accounted for 51.1% (n=69) of cases. This was followed by benign ovarian tumor 22.2% (n=30), diagnostic laparoscopy - chromopertubation 11.1% (n=15), and myomectomy 8.1%(n=11).

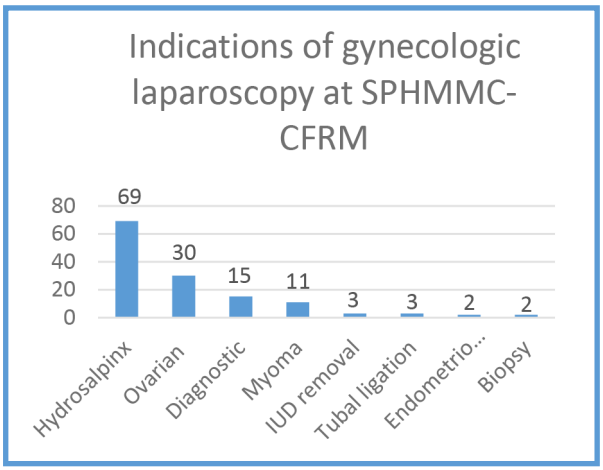

Figure 1 Laparoscopic Indications for patients who undergone gynecologic Laparoscopy at CFRM at SPHMMC-, September 2020.

Of the 69 patients with hydrosalpinx, 97% (n=67) were diagnosed preoperatively by transvaginal ultrasound. Intraoperatively 64%(n=44) were found to have bilateral hydrosalpinx, 29% (n=20) were found to have unilateral hydrosalpinx, and 4% (n=3) had only adhesive disease without hydrosalpinx. For patients with laparoscopically confirm hydrosalpinx, 54% (n=37) underwent bilateral salpingectomy, 17% (n=12) underwent unilateral salpingectomy, and proximal tubal occlusion (PTO) for hydrosalpinx was the only procedure performed in 16% of cases (n=11). When evaluating the level of laparoscopic difficulty, two-thirds of these were level three (major), followed by minor type or level one(17.8%). About 9% of the total laparoscopic procedure is regarded as advanced type of level four.

Table 2: Distributions of intraoperative procedure done for hydrosalpinx and Level of Laparoscopy difficulty and their histopathology result at CFRM at SPHMMC

Intraoperative procedure for hudrosalpinx	Frequency	%
bilateral salpingectomy	37	27.4
unilateral salpingectomy	12	8.9
one side salpingectomy the other side PTO	9	6.7
unilateral PTO	6	4.4
bilateral proximal tubal occlusion(PTO)	5	3.7
Difficulty of Laparoscopy	**Frequency**	%
advanced laparoscopy	12	8.9
major laparoscopy	89	65.9
minor laparoscopy	24	17.8
diagnostic	10	7.4
Histopathology	**Frequency**	%
inconclusive	59	43.7
benign mass	48	35.56
bacterial infection	16	11.85
TB	11	8.15
malignant tumor	1	0.74

The study showed two cases were unable to get completed laparoscopically. In both instances entry to the peritoneum using the Verres needle or trocar was unsuccessful due to obesity and adhesions and these cases were converted to laparotomy. There were five (3.7%) complications: two bladder injuries, two bowel injuries, and one hemorrhage from utero-ovarian pedicle. Three were diagnosed intraoperatively and two were diagnosed on the second and third postoperative days. Those that were diagnosed intraoperatively were managed by conversion to laparotomy. And those diagnosed in the postoperative period were taken back to the operating room for diagnostic laparotomy and management. Thus, 5.2% (n=7) of cases were converted to or managed by laparotomy. All patient's for whom the final outcome was laparotomy improved and subsequently were discharged from the hospital (length of stay ranging from 4-21 days). For those cases without complication, patients were discharged on first postoperative day.

Table 3: Characteristics of the five major complications against to indications, level of laparoscopy, previous history of surgery and history of infection at CFRM at SPHMMC, September 2020.

Complications	Indication	Level of laparoscopy	Previous surgery	History of infection	Experience of surgeon(years)	Management	Hospital Stay(days)
Bowel injury (1)	Ovarian cyst	major	no	TB	1	laparotomy	8
Bowel injury (2)	Ovarian cyst	major	yes	PID	1	laparotomy	21
Bladder injury (1)	hydrosalpinx	major	yes	no	2	laparotomy	5
Bladder injury (2)	Ovarian cyst	major	no	PID	2	laparotomy	5
Hemorrhage	myoma	advanced	no	no	1	laparotomy	4

Tissues was routinely sent for histopathologic evaluation when indicated and 8.1% (n=11) patients were found to have active tuberculosis and 12% (n=16) patients were diagnosed with PID. All of these patients were provided with the appropriate antibiotics base on culture results and the tuberculosis patients were linked to TB centers in their vicinity. There was also one case of ovarian malignancy. There was no difference in operative time between patients had a history of prior intrabdominal surgery as compared to those who did not.

Table 4: Association between surgical time to previous history of surgery at CFRM at SPHMMC, September 2020.

	History of laparotomy		
	No (n=105)	Yes (n=30)	p-value
Surgery time, median (IQR)	65.0 (50.0, 95.0)	70.0 (50.0, 100.0)	0.44
History of laparoscopy	No (n=123)	Yes (n=12)	
	70.0 (50.0, 100.0)	67.5 (60.0, 72.5)	0.93

DISCUSSION

This study had a finding with 51.1% of cases performed for tubal pathology followed by ovarian pathology (22.2%), and 11.1% were done solely for diagnostic purposes. Myomectomy accounted for 8.2% of laparoscopies. In a review of 2888 gynecologic laparoscopy cases over 12 years, Fuentes MN et al. [17] found that the primary indication was tubal ligation (30.7%), followed by cystectomy (26.1%), unilateral adnexectomy (10.3%), and salpingectomy (10.2%). And 54% of cases were considered major laparoscopic surgeries. Another study that included 3724 gynecologic laparoscopic surgeries done in India from 2013-2017 by Shastri SS et al. [18] found that the main indication for laparoscopy was tubal sterilization (69.2%). Cystectomy and salpingectomy accounted for 17.2% of cases. These all studies indicated that the tubal surgeries were the main indication for gynecologic laparoscopy. But study by Belinga E, et al. in Cameroon [16] found that their primary indication for surgery was ovarian cyst (25%) followed by ectopic pregnancy (20%). They also found that the majority of their cases were level III (major) laparoscopies (58.6%) followed by level II (minor) laparoscopies (13.2%). This study had similar results with a majority of cases constituting level III (major) laparosocopies (67.8%) followed by level II (minor) laparoscopies (17.8%). But their indications were different because the set up that this study done is a fertility center where patients require surgery for the evaluation or management of infertility.

A study done in Cameroon [16] encountered 6.8% (18/266) laparoscopic complications including 9 hemorrhagic, 3 bowel injury. Sixty-seven percent of the complications were managed by laparoconversion.. But this study done in Ethiopia showed lower of complication of 3.7% (two bowel injury, two bladder perforation and one hemorrhage) and lower conversion to laparotomy of 5.2%; where 5 cases were done for laparoscopic complication and 2 cases for failed laparoscopy due to difficult Verres or trocar insertion. But when it was compared to Spanish [17], Taiwanese [19] and indian [18] studies, they showed lower ratio of complication 1.93%, 0.72%, 1.98% respectively. Thought our complication ratio was higher than most Asian and European centers, it was better than other African hospitals. Two of the five complications were diagnosed in the postoperative period but should have been picked intraoperatively. This may be due to inherent problem of laparoscopy itself with respect to visualization and instrument handling This can be explained due to our surgeons' lack of experience, lack of criteria for patient selection, and patient factors like previous infection and adhesive disease.

CONCLUSION

In conclusion, this study showed that complicated gynecologic procedures were being done. This study only indicated the procedure done for those patients who come for fertility care. So other gynecologic pathologies are not being dealt laparoscopically. The study showed that laparoscopy is minimal access surgery rather than minimal invasive surgery. Finally, in future we recommend that there should be prospective large scale study.

LIMITATION OF THE STUDY

The study was retrospective with small size which is done by data abstraction from chart.

DISCLOSURE OF CONFLICT OF INTEREST

The authors have no conflict of interest to and organization or individual to mention.

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