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Original Research Article

## Laparoscopic surgery in gynecology: epidemiological, clinical and outcome aspects at the University Hospital Center of Gynecology and Obstetrics Befelatanana

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### ABSTRACT

**Background:** Laparoscopic surgery represents one of the most important surgical advances of the last decades. In Madagascar, its use in gynecology remains limited. This study aimed to describe the epidemiological, clinical and outcome characteristics of gynecological laparoscopic procedures at the University Hospital Center of Gynecology and Obstetrics Befelatanana (CHUGOB).

**Methods:** A retrospective descriptive study was conducted on 39 gynecological laparoscopic procedures performed between July 1, 2019 and December 31, 2020 at CHUGOB. Epidemiological, clinical, intraoperative and postoperative data were analyzed.

**Results:** Laparoscopy accounted for 4.12% of gynecological surgical procedures during the study period. The mean age of patients was 29 years. Infertility was the main indication (43.58%). Intraoperative findings were mainly tubal obstruction (32.55%) and abdominopelvic adhesions (23.25%). The mean operative time was  $90.72 \pm 20.2$  minutes. Postoperative outcomes were uncomplicated in 71.79% of cases. The mean hospital stay was 2.86 days and the patient satisfaction rate was 92%.

**Conclusions:** Laparoscopy is a safe and effective surgical technique with good postoperative outcomes and high patient satisfaction. Its use should be encouraged as a first-line approach in gynecological surgery whenever conditions allow.

**Keywords:** Adhesiolysis, Laparoscopy, Ovarian cyst, Surgery, Tubal infertility

### INTRODUCTION

Laparoscopic surgery, also known as endoscopic surgery, laparoscopic surgery or video-assisted surgery, is a closed-abdomen procedure performed under endoscopic visualization after insufflation of an artificial pneumoperitoneum.<sup>1,2</sup> Because it is performed through small abdominal incisions, it is considered minimally invasive surgery and offers several advantages, including reduced postoperative pain, shorter hospital stay, decreased adhesion formation, improved cosmetic results

and reduced respiratory complications.<sup>3</sup> Historically, the first diagnostic laparoscopy was attempted in 1955 by the French gynaecologist Raoul Palmer, who later reported successful adhesiolysis and ovarian and tubal biopsies.<sup>4,5</sup> Although laparoscopic surgery has become widespread in developed countries, its implementation in Madagascar remains limited. The aim of this study was therefore to describe the epidemiological, clinical and outcome aspects of gynecological laparoscopic surgery at University Hospital Center Of Gynecology And Obstetrics Befelatanana, Madagascar.

**METHODS**

**Study design and setting**

This was a retrospective descriptive study conducted in the University Hospital Center of Gynecology and Obstetrics Befelatanana, Madagascar. This center is the national referral institution for the management of gynecological and obstetrical disorders.

**Study period and population**

The study covered the period from 1<sup>st</sup> July 2019 to 31<sup>st</sup> December 2020. All patients who underwent laparoscopic surgery with complete medical records were included.

**Variables studied**

The variables collected included socio-demographic data (age, occupation, place of residence), medical and surgical history, clinical and paraclinical findings (pelvic ultrasonography, hysterosalpingography and cervico-vaginal swabs), operative data (indications, type of procedure, intraoperative findings, surgical procedures performed, operative time and intraoperative incidents), as well as postoperative data (complications, duration of hospitalization, patient satisfaction and long-term outcomes)

**Data collection and analysis**

Data were collected from medical records, anesthesia records and operative reports using a standardized questionnaire. Statistical analysis was descriptive and performed using Microsoft Excel.

**RESULTS**

**Frequency**

During the study period, 39 laparoscopic procedures were performed among 946 gynecological surgical procedures, representing a frequency of 4.12%.

**Socio-demographic data**

The mean age of patients was 28.92±7.19 years, ranging from 23 to 42 years. The most represented age group was 25–29 years (49%). (Figure 1) Most patients worked in the tertiary sector (76.93%), while the secondary and primary sectors represented 17.95% and 5.12%, respectively. More than half of the patients lived in urban areas (71.80%), whereas 23.07% lived in suburban areas and 5.13% in rural areas.

**Obstetrical data**

Nulliparous women accounted for 64.10% of the population, pauciparous women for 23.08% and multiparous women for 12.72% (Figure 2). Regarding

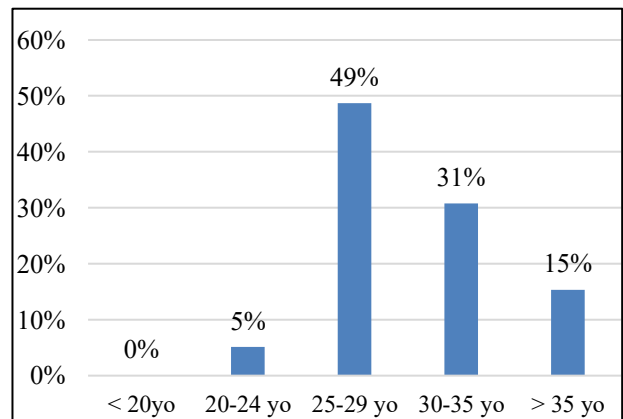
abortion history, induced abortions and spontaneous miscarriages were identified in the study population.

**Medical and surgical history**

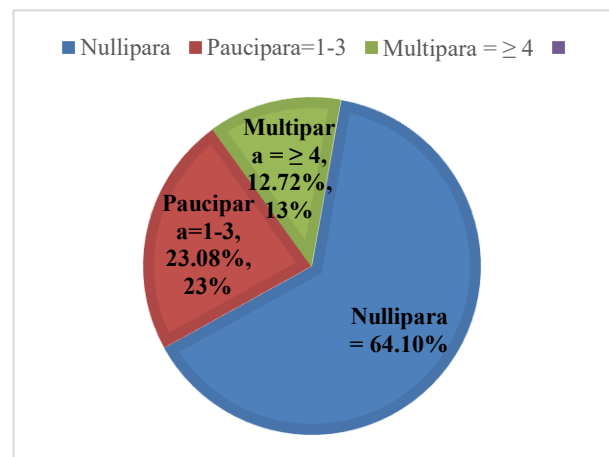
More than half of the patients (61.53%) had no notable medical history. A history of sexually transmitted infection (STI) was found in 20.53% of cases (8 patients), while previous salpingitis and ovarian cysts each accounted for 7.69% (3 cases). Concerning surgical history, 25.61% of patients (10 cases) had previously undergone abdominopelvic surgery, including 4 cesarean sections and 6 other abdominopelvic procedures (Table 1).

**Preoperative investigations**

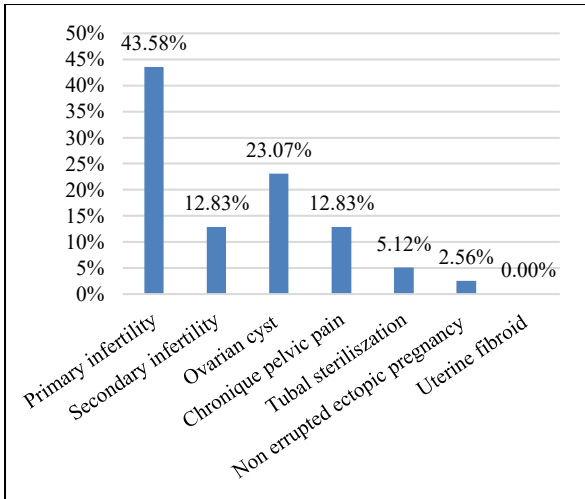
Pelvic ultrasonography was performed in all patients and revealed ovarian cysts, uterine fibroids, unruptured ectopic pregnancies, salpingitis or normal findings. Hysterosalpingography was performed in 8 patients and showed 4 cases of bilateral tubal obstruction, 3 cases of right tubal amputation associated with partial obstruction of the left tube and 1 case of left tubal amputation. Cervico-vaginal swabs were obtained from 11 patients, revealing Gardnerella vaginalis infection in 4 cases, Candida albicans infection in 1 case and 6 negative results.



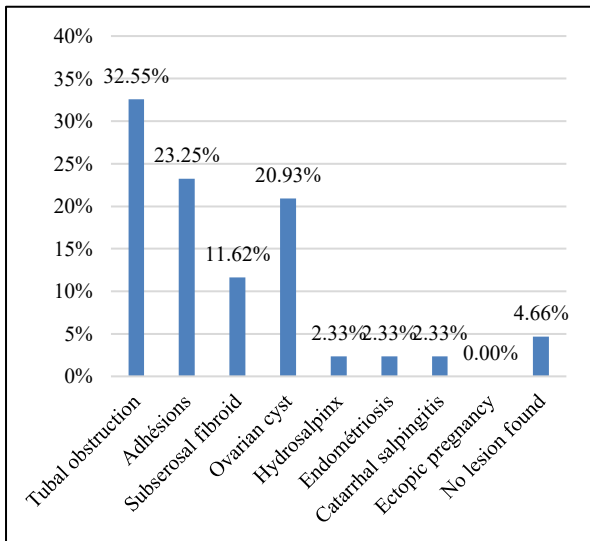
**Figure 1: Distribution according to age group.**



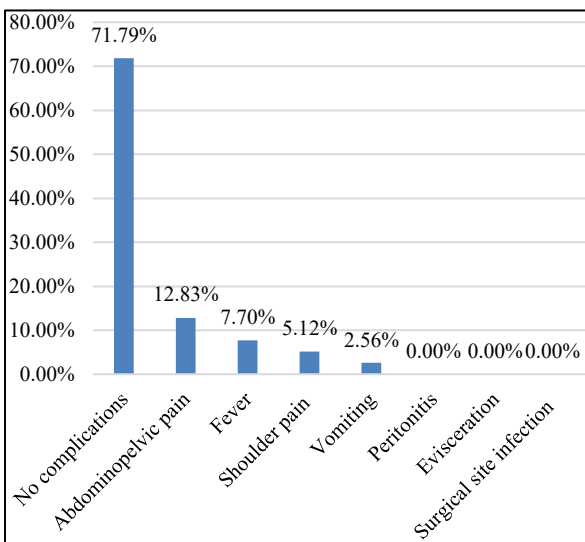
**Figure 2: Distribution according to parity.**



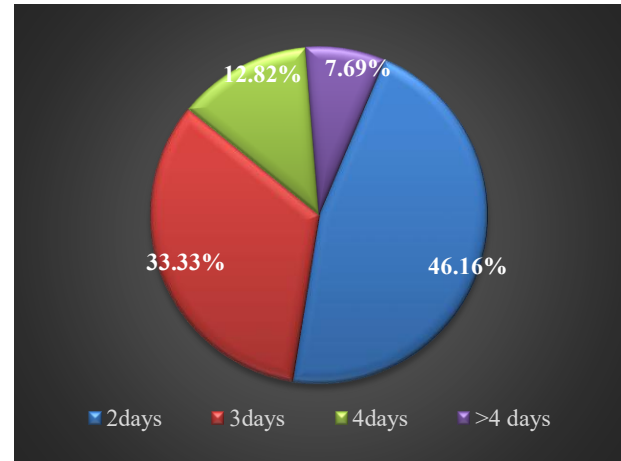
**Figure 3: Distribution according to indications.**



**Figure 4: Distribution according to lesions found.**



**Figure 5: Distribution according to post-laparoscopic complications.**



**Figure 6: Distribution according to length of hospital stay.**

**Surgical indications**

The main operative indication was investigation of primary infertility, accounting for 43.58% of cases. Ovarian cysts represented 23.07% of indications. Secondary infertility and chronic pelvic pain each accounted for 12.83% of indications. There were also 2 cases of tubal ligation and section (5.12%) and 1 case of unruptured ectopic pregnancy (2.56%) (Figure 3).

**Intraoperative findings**

The laparoscopic series identified seven types of lesions. Tubal obstruction was the most frequent finding, accounting for 32.55% (14 cases), followed by abdominopelvic adhesions (23.25%, 10 cases), ovarian cysts (20.93%, 9 cases) and subserosal fibroids (11.62%, 5 cases). Endometriosis, catarrhal salpingitis and hydrosalpinx each accounted for 2.33% of cases (1 case each). No lesions were identified in 2 patients (4.66%) (Figure 4).

**Surgical procedures**

The most frequently performed procedures were adhesiolysis, ovarian cystectomy, neosalpingostomy and fimbrioplasty (Table 2).

**Operative time**

Mean operative time was 90.72±20.2 minutes, ranging from 60 to 170 minutes (Table 3).

**Postoperative outcomes**

No patient experienced intraoperative incidents or accidents related either to the surgical technique or anesthesia. Immediate postoperative outcomes were uncomplicated in 71.79% of patients. Observed postoperative complications included abdominopelvic pain in 12.83% of cases, shoulder pain related to residual

CO<sub>2</sub> in 2 patients, 3 cases of fever (7.70%) that resolved favorably with antibiotic therapy and 1 case of vomiting related to anesthetic agents. No cases of evisceration, wound suppuration, peritonitis or death were recorded (Figure 5).

### **Hospital stays**

Most patients (46.16%) had a hospital stay of 2 days. Mean hospital stay was 2.86 days with a range of 2 to 5 days (Figure 6).

**Table 1: Distribution according to past medical and surgical history.**

Number of cases (n=39)		%
<b>Medical history (n=39)</b>		
Sexual transmitted infection	8	20.53
Salpingitis	3	7.69
Asthma	1	2.56
Ovarian cyst	3	7.69
No medical history	24	61.53
<b>Surgical history (n=39)</b>		
Cesarian section	4	10.25
Ectopic pregnancy	2	5.12
Cystectomy	2	5.12
Appendicectomy	1	2.56
Hernia	1	2.56
No surgical history	29	74.39

**Table 2: Distribution according to surgical procedure.**

Surgical procedure	Number of case (n=42)	%
Adhesiolysis	14	33.34
Fimbrioplasty	10	23.81
Néosalpingostomy	5	11.91
Oophorectomy	6	14.28
Adnexectomy	3	7.14
Tubal sterilization	2	4.76
Total salpingectomy	1	2.38
Salpingotomy with hydrosalpinx drainage	1	2.38

**Table 3: Distribution according to surgical duration.**

Surgical duration	Number of case (n=39)	%
60-89 mn	9	23.08
90-119 mn	27	69.23
>120 mn	3	7.69

### **Long-term outcomes**

Long-term follow-up identified two pregnancies among infertile patients. Overall patient satisfaction reached 92%.

## **DISCUSSION**

### **Frequency**

The frequency of 4.12% observed in our series appears very low compared with reports from developed countries. For example, in the gynecology department of the Clermont-Ferrand University Hospital in France, 60 laparoscopic procedures were performed solely for the treatment of ectopic pregnancies over a four-year period as

early as 1974.<sup>6</sup> In another center in Marseille, 1,562 laparoscopic surgical procedures were carried out over six years.<sup>7</sup> Compared with African series, our rate falls within a comparable range. The limited practice of endoscopic surgery in developing countries such as Madagascar may be explained by the small number of trained endoscopic surgeons, inadequate operating-room staff, limited accessibility of equipment, poor availability of consumables and the advanced clinical presentations frequently observed in patients.<sup>8</sup>

### **Epidemiological data**

The mean age of the patients was 29 years, with a predominance of the 25–29 years age group (49%). This

finding is comparable to that reported by Tchente et al in Yaoundé, who found a mean age of 31 years among 609 patients and to that reported by Traoré et al in Bamako, who observed a mean age of 27 years.<sup>9</sup> Nulligravid and nulliparous women were the most represented in our series, reflecting the predominance of infertility among women of reproductive age. This profile is consistent with data reported in the African literature.<sup>10</sup> Most patients lived in urban areas (71.80%) and worked in the tertiary sector (76.93%), probably reflecting better geographical and financial access to specialized healthcare for this socio-professional category.

### **Medical and surgical history**

A history of sexually transmitted infections (20.53%) and salpingitis are predisposing factors for tubal lesions and consequently infertility. Induced abortion is also recognized as a potentially contributing factor to secondary infertility.<sup>11</sup> Previous abdominopelvic surgery, identified in 25.61% of patients, represents a risk factor for postoperative adhesions and often justifies the use of laparoscopy for infertility assessment and management.

### **Operative indications**

Infertility represented the main indication in our series (56.41% when combining primary and secondary infertility), which is consistent with most African studies.<sup>8,11</sup> In this context, laparoscopy not only enables accurate diagnosis of pelvic lesions but also allows therapeutic procedures to be performed during the same operation. Ovarian cysts constituted the second indication (23.07%), while chronic pelvic pain ranked third (12.83%). These proportions are generally similar to those reported by other African teams.<sup>9,12</sup>

### **Intraoperative findings**

Tubal obstruction was the most frequently observed lesion (32.55%), followed by abdominopelvic adhesions (23.25%) and ovarian cysts (20.93%). This lesion profile, dominated by sequelae of upper genital tract infections, is characteristic of developing countries where sexually transmitted infections and pelvic infections remain major public health concerns.<sup>13</sup> This also explains the predominance of adhesiolysis among the surgical procedures performed.

### **Intraoperative incidents and accidents**

No intraoperative accidents or incidents were recorded in the series, which is comparable to observations reported by several African authors.<sup>14</sup> However, other authors have reported bowel injuries and hemorrhagic complications.<sup>9</sup> In a series of 712 laparoscopic surgical procedures, four accidents were attributed to operator inexperience or failure to follow fundamental surgical principles.<sup>3</sup> These findings emphasize the importance of adequate training and the availability of backup equipment.

### **Operative time**

The mean operative time of 90.72±20.2 minutes observed in our series is comparable to that reported by several authors. For comparison, average operative times of approximately 60 minutes have been reported by several African teams whereas other series described operative times reaching up to 107 minutes.<sup>8,15,16</sup> Variations in operative duration between studies may be explained by surgeon experience, associated procedures, intra-abdominal conditions and the quality of available equipment.

### **Postoperative outcomes and complications**

Postoperative outcomes were uncomplicated in 71.79% of cases in our series, with a postoperative complication rate limited to 28.21%, all of which were minor. In the Cameroonian series reported by Tchente et al postoperative complications occurred in 8.3% of patients, predominantly digestive (3.4%) and infectious (2.5%) complications.<sup>9</sup> The literature reports postoperative infection rates ranging from 0.18% to 0.5%, leading some authors to recommend avoiding systematic antibiotic prophylaxis when strict aseptic conditions are respected.<sup>17-19</sup> The shoulder pain observed in two patients in our study is classically attributed to residual CO<sub>2</sub> trapped between the diaphragmatic dome and the hepatic dome, emphasizing the importance of careful and systematic evacuation of pneumoperitoneum at the end of the procedure. No deaths were recorded in our series. Mortality associated with laparoscopy ranges from 3 to 8 deaths per 100,000 laparoscopic procedures according to the literature and mainly depends on team experience and advances in anaesthesiology and intensive care.<sup>20</sup>

### **Duration of hospitalization**

The mean hospital stay of 2.86 days observed in our series falls within the range reported in African literature, which consistently demonstrates shorter hospitalization following laparoscopy compared with laparotomy.<sup>21</sup> Several authors have reported postoperative hospital stays ranging from 2 to 4.7 days after laparoscopy, compared with 4.1 to 9 days after laparotomy. Surgeon experience does not appear to significantly influence the duration of hospitalization.<sup>22</sup>

### **Patient satisfaction**

The overall patient satisfaction rate of 92% observed in our series is consistent with findings from the literature. This high satisfaction rate may be explained by favorable immediate postoperative outcomes, early discharge, shorter recovery time and the cosmetic benefit of minimal scarring. Telephone follow-up identified two pregnancies among patients treated for infertility (9.09%), a relatively low rate but one that remains consistent with the limited sample size of our study. Higher pregnancy rates have been reported in larger series.<sup>23</sup>

### **Hospital cost**

Although we were unable to evaluate the cost of laparoscopic procedures in the series, the literature consistently demonstrates that laparoscopic surgery is less expensive than conventional open surgery.<sup>24,25</sup> This reduction in cost may be explained by lower use of consumables and shorter hospital stays. Studies have also shown that laparoscopy does not generate additional costs in advanced surgery and that the use of reusable instruments contributes to reducing healthcare expenses.<sup>26-28</sup>

### **Advantages of laparoscopy**

Compared with conventional laparotomy, laparoscopy offers several advantages, including better visualization of the operative field, reduced postoperative pain and ileus, shorter operative time, preservation of the abdominal wall with reduced risk of infection and incisional hernia, shorter hospitalization and recovery periods, faster postoperative recovery and undeniable cosmetic benefits.<sup>8,9</sup> These advantages strongly support the progressive integration of laparoscopy into healthcare systems in developing countries.

### **Limitations of the study**

This study has some limitations that should be considered when interpreting the results. Its retrospective design may have led to missing or incomplete data for certain variables. The relatively small sample size, reflecting the early experience of laparoscopic surgery in the center, limits the statistical strength of the analysis. In addition, the study was conducted in a single tertiary hospital, which may not fully reflect the overall situation in other healthcare facilities in Madagascar. Finally, the absence of systematic long-term follow-up did not allow a more detailed evaluation of fertility outcomes and late postoperative complications.

### **CONCLUSION**

This study demonstrates that laparoscopic surgery is both a safe and effective diagnostic and therapeutic approach for the management of gynecological disorders at CHUGOB Befelatanana. With a frequency of 4.12% of gynecological surgical procedures, laparoscopy remains underutilized in Madagascar, mainly because of the lack of trained personnel, inadequate technical facilities and difficulties in accessing consumables. Infertility was the main indication for surgery, with intraoperative findings predominantly consisting of tubal obstruction and abdominopelvic adhesions, reflecting the high prevalence of upper genital tract infections in the setting. The technique proved to be safe, with no intraoperative accidents, limited postoperative morbidity, short hospital stays and a high patient satisfaction rate.

The development of gynecological laparoscopic surgery in Madagascar requires investment in the training of surgeons and operating-room staff, acquisition of appropriate equipment and implementation of effective equipment maintenance systems. Laparoscopy should be considered as a first-line approach whenever technical and human resources allow it.

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

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