



Diagnostic and Operative Laparoscopy: Experience in a Teaching Hospital

Serkan Kumbasar², Hale Akın³, Süleyman Salman¹, Ayşe Ender Yumru⁴, Erman Sever², Mucize Eriş Özdemir³

¹Clinic of Obstetrics and Gynecology, Gaziosmanpaşa Taksim Training and Research Hospital, İstanbul, Turkey

²Clinic of Obstetrics and Gynecology, Sakarya Training and Research Hospital, Sakarya, Turkey

³Clinic of Obstetrics and Gynecology, Süleymaniye Obstetrics and Pediatrics Training and Research Hospital, İstanbul, Turkey

⁴Clinic of Obstetrics and Gynecology, Şişli Hamidiye Etfal Training and Research Hospital, İstanbul, Turkey

ABSTRACT

Objective: The objective of this study was to determine under the view literature, the indications, findings, and complications of diagnostic and operative laparoscopy performed at a teaching hospital.

Methods: A total of 503 cases for which the laparoscopy was performed for diagnostic and operative purposes was included into this study. Demographic characteristics, length of operative time, length of hospital stay, conversion rate to open procedure, and complication rates were evaluated.

Results: In our clinic, operative laparoscopy was performed in 405 out of 503 cases. The mean age, gravida, parity, and living child numbers of cases were 32.97 ± 7.29 years, 1.06 ± 1.72 , 0.47 ± 1.11 , and 0.6 ± 1.15 , respectively. Indications of patients undergoing laparoscopy were as follows: diagnostic purpose, tubal obstructions, polycystic ovary syndrome, myoma uteri, adnexial mass, habitual abortion, tubal ligation, adhesions, ectopic pregnancy, amenorrhea, decensus uteri, intrauterine device extraction, chronic pelvic pain, repair of uterine perforation, which occurred during hysteroscopy. Laparotomy was required in seven cases while performing laparoscopy. The complications were reported in 17 of 503 patients with diagnostic and operative laparoscopy.

Conclusion: Laparoscopic procedures have become the choice of treatment for most gynecological diseases. Avoidance of laparotomy, smaller incisions, lesser perioperative problems, minimal tissue damage, and shorter duration of hospitalization are well-known advantages of laparoscopy. However, the physician must be an expert in its application and must have adequate knowledge to overcome complications. (*JAREM* 2015; 5: 97-101)

Keywords: Laparoscopy, experience, diagnostic

INTRODUCTION

Laparoscopy is an invasive diagnostic, evaluation, and surgical method. Advances in imaging and instrumentation have resulted in an increase in surgical experience; as a consequence, laparoscopy, which was initially used in a few simple surgical procedures such as diagnostic purposes and tubal ligation, has become an acceptable, and even preferred, alternative to open surgical procedures. Compared with laparotomy, laparoscopy has several advantages such as less postoperative pain, small surgical scar, reduced costs, lower bleeding rates, and shorter duration of hospitalization stay (1-3). However, the necessity of surgical equipment and experienced staff, previous abdominal surgery, and patient obesity are factors that limit the use of laparoscopic surgery (2). Depending on surgical experience, a variety of operations ranging from diagnostic laparoscopy to oncological procedures are performed. Here, we aimed to retrospectively analyze the results of diagnostic and operative laparoscopic operations performed in our clinic by reviewing the literature.

METHODS

Data on diagnostic and operative laparoscopic procedures performed in Süleymaniye Training and Research Hospital between 2003 and 2006 were retrospectively analyzed. A total of 503 patients were included in the study. Data pertaining to patient demographics, indication for surgery, procedures during laparoscopy (L/S), postoperative pathological diagnosis, and complications were analyzed.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software (SPSS Inc.; Chicago, IL, USA) and expressed as means \pm standard deviations (mean \pm SD) and percentages.

RESULTS

A total of 503 patients underwent laparoscopic procedures in our clinic. Four hundred and twenty-four (84.2%) patients undergoing 503 L/S interventions were operated due to infertility, and 79 (16%) were operated for gynecological reasons. The mean age was 31.635 ± 7.29 years. Mean gravida and parity was 1.06 ± 1.72 and 0.47 ± 1.11 , respectively, and the mean number of abortions was 0.6 ± 1.15 . A total of 111 patients (22.07%) were active smokers (Table 1). The mean duration of hospitalization was determined as 1.96 ± 0.5 . The mean operative time was 48.85 ± 26.04 min, ranging from a minimum of 15 min to a maximum of 120 min. The operation that lasted the shortest was performed for diagnostic purposes; no gynecological lesion was observed during the laparoscopic examination of the abdomen. The longest operation was laparoscopic hysterectomy performed due to uterine descensus. The difference between pre- and postoperative hematocrit was 2.63 ± 2.53 . In total, 100/503 (19%) patients who were operated had a previous history of abdominal surgery (Table 2). Appendectomy was performed in 32 (32%), section in 26 (26%), laparotomy in 20 (20%), myomectomy in 10 (10%), inguinal hernia operation in 7 (7%), and cholecystectomy in 5 (5%) of the 100

patients who underwent abdominal surgery prior to the operation (Table 2).

Of the 503 patients who underwent laparoscopy, 98 (19.48%) and 405 (80.51%) underwent diagnostic and operative laparoscopy, respectively. The indication was primary and secondary infertility in 257 (60.4%) and 166 (39.9%) of the patients, respectively; laparoscopy was performed with a gynecological indication in 79 (37.97%) patients. The information on indications and operations of patients who underwent laparoscopy is presented in Table 3.

Normal pelvic examination findings were found in 95 (46.79%) of 205 patients who underwent diagnostic laparoscopy; meanwhile, adhesion was identified in 51 (24.87%), endometriosis in 42 (20.48%), evidence of a previous infection in 16 (7.8%), and congenital anomalies in 3 (1.4%) patients.

Ninety-six patients in whom an adnexal mass was detected upon gynecological examination and ultrasound scans were evaluated. For the 96 patients whose Doppler ultrasound and tumor markers did not fulfil the malignancy criteria in the result of laparoscopic observation, endometrioma was identified in 49 (50.52%), ovarian cyst in 15 (15.46%), dermoid cyst in 9 (9.28%), tubo-ovarian abscess in 4 (4.12%), paraovarian cyst in 15 (15.46%), cystadenoma in 2 (2.06%), and fibroma in 2 (2.06%) patients.

Operative laparoscopy was performed in 15 patients due to ectopic pregnancy. Among these patients, linear salpingostomy was performed in 9 (60%), salpingectomy in 4 (26.61%), and salpingo-oophorectomy in 2 (13.34%) patients. Tubal pathology was found in 110 (25.94%) of 424 patients for whom laparoscopy was performed due to infertility. Bilateral in 40 and unilateral in 36, tubular obstruction was found in a total of 76 (17.92%) patients. Bilateral in 11 and unilateral in 18 patients, a total of 28 patients (6.60%) had hydrosalpinx. Tubal congenital malformation was found in five (1.17%) patients. Tubal passage was observed using methylene blue in 314 (74.06%) infertile patients. Bilateral tubal passage was not observed in 58 (13.67%) patients. At least one tubal passage was found in 47 (11.84%) patients. The most common intervention performed together with laparoscopy was hysteroscopy (359 patients) (70.71%). In the hysteroscopic examination performed accompanying L/S in the 359 patients, a normal uterine cavity was observed in 166 patients (46.23%). Meanwhile, a uterine septum was detected in 118 (32.86%), Asherman's syndrome in 34 (9.47%), endometrial polyps in 30 (8.85%), and fibroids in 11 (3.36%) patients.

Table 1. Demographic data of patients for whom laparoscopy was performed

	Mean±SD
Age (years)	31.635±7.29
Gravida (n)	1.06±1.72
Parity (n)	0.47±1.11
Abortion (n)	0.6±1.15
Previous operation history (n)	100 (19%)
Active smoking	111 (22%)
SD: standard deviation	

Pre- and postoperative complications developed in 17 (3.37%) of the 503 patients who underwent laparoscopic procedures (Table 4).

An indication occurred in 7 (1.39%) patients to opt for laparotomy. The necessity to perform laparotomy was due to excessive adhesions developing from previous surgery (n=2), excessive adhesions caused by endometriosis (n=1), surgical methods failing to provide hemostasis occurring as a result of myoma enucleation during L/S myomectomy operation (n=2), when L/S salpingectomy attempt to ectopic pregnancy material failed (n=1), and difficulty in surgical manipulation during L/S with an IUD indication in the abdomen (n=1).

Although diagnostic laparoscopy was performed due to an indication of primary infertility in three (0.59%) patients, uterine perforation developed during cervical dilation. In the first patient, the bleeding area was controlled by bipolar cautery of the perforation area. In the second patient, because the bleeding did not stop with bipolar cautery, hemostasis was accomplished using laparoscopic suture in the perforated area. The third patient spontaneously healed without any additional intervention.

Major vascular injury complications developed in two (0.39%) patients. The iliac vein was wounded in a patient when inserting the 10-mm trocar into the abdomen. Laparotomy was urgently performed, and hemostasis was achieved by repairing the vein. While ovarian drilling was performed in the other patient, external iliac artery injury occurred during the use of the needle forceps. Emergency laparotomy was performed, and the vein was repaired. Re-laparotomy was performed due to bleeding into the abdomen during the postoperative follow-up of the patient. Ten units of blood and six units of fresh-frozen plasma were administered. When hemostasis was achieved, the patient was followed up in the surgery intensive care. Following treatment, the patient recovered and was discharged from the hospital 10 days after surgery.

Based on the observations of subcutaneous crepitations, a diagnosis of subcutaneous emphysema was made in two (0.39%) patients in the postoperative period. The patients followed up in the hospital were discharged without any problems as a result of spontaneous resolution of the crepitations.

Minor vascular injury occurred in one (1.9%) patient. Bleeding due to deep inferior epigastric artery injury developed at the position of the trocar. The arterial injury was repaired by laparotomy.

Table 2. Distribution of patients with a history of operation according to type of operation

	In 100 cases
Appendectomy (n)	32%
Section (n)	26%
Laparotomy (n)	20%
Myomectomy (n)	10%
Inguinal hernia operation (n)	7%
Cholecystectomy (n)	5%

Table 3. Performed operations and indications for operation

Indication	n (%)	Operation	n (%)
Diagnostic (infertile patient)	205 (40.75)	Diagnostic	98 (19.48)
Adnexal mass	96 (19.09)	Cauterization of endometriosis	69 (13.71)
Tubal occlusion	45 (8.9)	Endometrioma extirpation	66 (13.12)
Polycystic ovary syndrome	34 (6.75)	Adhesiolysis	51 (10.13)
Fibroids	33 (6.56)	Ovary and paraovarian cyst extirpation	39 (7.75)
Habitual abortion	21 (4.17)	Ovarian drilling	34 (6.75)
Tubal ligation	15 (2.98)	Myomectomy	33 (6.56)
Ectopic pregnancy	15 (2.98)	Fimbrioplasty, tuboplasty	30 (5.96)
Adhesion	10 (1.98)	Tubal ligation	22 (5.53)
Primary amenorrhea	10 (1.98)	Salpingectomy	20 (3.97)
Uterine descensus	7 (1.39)	Linear salpingectomy	11 (2.18)
Chronic pelvic pain	6 (1.19)	Dermoid cyst extirpation	9 (1.78)
IUD removal	3 (0.59)	LAVAH	7 (1.39)
Secondary amenorrhea	2 (0.39)	LUNA	6 (1.19)
Uterine perforation	1 (0.20)	Salpingo-oophorectomy	6 (1.19)
		IUD removal	3 (0.59)
		Uterus reparation	1 (0.20)
Total	503 (100)	Total	503 (100)

LAVAH: laparoscopic assisted vaginal hysterectomy; LUNA: laparoscopic uterine nerve ablation; IUD: intrauterine device

Table 4. Demographic data of patients who underwent laparoscopy

	Number of patients	%
Laparotomy	7	1.39
Uterine perforation	3	0.59
Major vascular injury	2	0.39
Subcutaneous emphysema	2	0.39
GIS lesion	1	0.19
Minor vascular injury	1	0.19
Mortality	1	0.19

GIS: gastrointestinal system

Bowel injury occurred in one (0.19%) patient. A complication involving injury of the complete layer of the small intestine occurred as a result of a 10-mm trocar insertion. The laceration in the bowel of the patient was repaired by applying end-to-end anastomosis through laparotomy.

In one (0.19%) patient, L/S was performed for diagnostic purposes due to primary infertility. No *gynecopathological* lesions were detected upon laparoscopic examination of the patient. Because of anesthesia-related complications, generalized cerebral edema occurred in the patient, who died in the 13th postoperative hour during the follow-up in the adult intensive care unit.

Although laparoscopic surgery is very safe, particularly in experienced centers and in the hands of experienced surgeons, complications may occur. Studies that have reported complications associated with laparoscopic surgery have been listed in Table 5.

DISCUSSION

The role of laparoscopy is expanding in the operative management of gynecologic pathologies (4-7). A substantial change has occurred in gynecologic surgery over the past 20 years, with all types of gynecologic surgery becoming available using laparoscopy, which could only be used for diagnostic purposes in the beginning (8-11). Currently, gynecological operations usually performed by laparotomy can be performed by laparoscopy. In laparoscopy, postoperative analgesic requirements are fewer, hospitalization stay is shorter, and return to normal activities is faster because operations are performed through small incisions (12-14). Despite the advantages mentioned, we encounter potential limitations and complications in L/S. In laparoscopic procedures, an increased risk of complications may be due to L/S limitations and limited surgical experience.

In a study on complications related to laparoscopic surgery performed by Härrki-Siren et al. (15, 16) comprising 32,205 patients, the risk of developing complications was 4/1,000. Although this risk was 0.6/1,000 in diagnostic laparoscopy, it was 12/1,000 in major surgeries.

Similarly, in the study of 29,966 patients in France, Chapron et al. (17) reported the total complication rate as 4.6/1,000. Chapron et

Table 5. Complications of laparoscopic surgery (the rate was calculated over 100)

	Laparotomy	Gastrointestinal lesion	Hemorrhage	Urogenital lesion	Electrocoagulation	Mortality
Philips et al. (4)	0.41	0.27	0.64	-	0.05	0.011
Loffer and Pent (5)	0.56	0.06	0.56	0.0006	0.22	0.01
Gordon and Magos (6)	-	0.11	0.09	0.02	0.1	0.01
Frenkel et al. (7)	0.18	0.07	0.08	-	-	-
Semm (8)	0.11	-	-	-	-	-
Lecuru et al. (9)	1.96		0.35	0.35	0.35	-
Riedel et al. (10)	0.17	0.07	0.04	-	0.03	0.002
Yuzpe (11)	-	0.06	0.06	0.06	-	-
Peterson et al. (12)	0.42	0.08	0.26	0.08	-	0.005
Lehmann-Willenbrock et al. (13)	0.181	0.030	0.017	0.03	0.050	0.0008
Chapron et al. (14)	0.28	0.15	0.11	0.01	-	0.01
Querleu et al. (15)	0.33	0.15	0.097	0.04	0.034	0.006
Süleymaniye Training and Research Hospital	1.39	0.19	0.59	-	-	0.19

al. (17) reported the complication rate in diagnostic laparoscopy as 1/1,000, in minor laparoscopy as 0.84/1,000, in major laparoscopy as 4.34/1,000, and in advanced laparoscopy as 17.45/1,000.

Aksu and Coşkun (18) reported that the operating staff had to perform laparotomy in 34 (0.95%) of 3,572 patients operated in Hacettepe University between 1996 and 2003. In the same study, the overall complication rate was 1.88/100.

Malinowski et al. (19) reported that the total complication rate for laparoscopic surgery performed in 342 patients between 1991 and 1999 in Poland was 5.5/100. In the same study, and the rate of conversion to laparotomy was 0.9/100.

In a study performed in Sudan Medani Hospital with 703 patients, Mirghani and Babiker (20) reported an overall complication rate of 2.3/100.

Complications developed in a total of 17 (3.37%) patients in our study, with laparotomy performed in 7/503 (1.39%) patients. Complications occurred more frequently in the early years when laparoscopic operations were first introduced. The complication rate decreases with the increase in surgical experience.

The incidence of adjacent organs and urethral and vascular injuries is increasing with the spread of laparoscopic surgery and with its use in both oncological surgery and in cases of pelvic inflammatory disease, including endometriosis with common severe adhesions (21). Retroperitoneal injury in laparoscopic surgery may be due to inadequate technique and may be inevitable even for the most experienced operators (21, 22). Surgical cleavage, resulting from a combination of a lack of tactile access, two-dimensional work, and retroperitoneal fibrosis, can contribute to complications in laparoscopic surgery. Nevertheless, we think that an adequate combination of surgical skills, education, and experience can contribute to reduced operating time, increased

surgical effectiveness, and reduced complications. An increased risk of complications is associated with the inexperience of surgeons still undergoing training. The rates of complications decrease with the increase in the experience of centers and surgeons.

CONCLUSION

Although laparoscopic surgery is safely and effectively used for thousands of patients worldwide, the risk of complications should be kept in mind. Advanced operations should be performed by more experienced surgeons.

Ethics Committee Approval: Ethics committee approval was not obtained due to the retrospective nature of this study.

Informed Consent: Due to the retrospective design of the study, informed consent was not taken.

Peer-review: Externally peer-review.

Author Contributions: Concept - S.K.; Design - S.K.; Supervision - A.E.Y.; Resources - S.S.; Materials - H.A.; Data Collection and/or Processing - E.S.; Analysis and/or Interpretation - S.S.; Literature Search- M.E.Ö.; Writing Manuscript- S.K.; Critical Review - A.E.Y.; Other - S.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Nezhat C, Nezhat F, Nezhat C. Operative laparoscopy (minimally invasive surgery): state of the art. J Gynecol Surg 1992; 8: 111-41. [\[CrossRef\]](#)
2. Camanni M, Bonino L, Delpiano EM, Migliaretti G, Berchalla P, Del-tetto F. Laparoscopy and body mass index: feasibility and outcome in obese patients treated for gynecologic diseases. J Minim Invasive Gynecol 2010; 17: 576-82. [\[CrossRef\]](#)

3. Jadoul P, Donnez J. Complications of laparoscopic surgery in gynecology. In: Donnez J, ed. *Atlas of Operative Laparoscopy and Hysteroscopy*. 3rd ed. London: Informa Healthcare 2007; 425-46.
4. Philips J, Hulka J, Keith D, Hulka B, Keith L. Laparoscopic procedures: a national survey for 1975. *J Reprod Med* 1977; 18: 219-26.
5. Loffer FD, Pent D. Indications, contra-indications and complications of laparoscopy. *Obstet Gynecol Survey* 1970; 30: 407-27. [\[CrossRef\]](#)
6. Gordon AG, Magos AL. The development of laparoscopic surgery. *Ballieres Clin Obstet Gynaecol* 1989; 3: 429-50. [\[CrossRef\]](#)
7. Frenkel Y, Oelsner G, Ben-Baruch G, Menczer J. Major surgical complications of laparoscopy. *Etir J Obstet Gynecol Reprod Bid* 1981; 12: 107-11. [\[CrossRef\]](#)
8. Semm K. Statistical survey of gynaecological laparoscopy/pelviscopy in Germany till 1977. *Endoscopy* 1977; 2: 101-6.
9. Lecuru F, Darles C, Robin F, Huss M, Ruscillo MM, Taurelle R. Morbidity of routine gynaecological laparoscopy: a report of a series of 283 procedures. *Gynaecol Endosc* 1996; 5: 79-82.
10. Riedel HH, Lehmann-Willenbrock E, Mecke H, Semm K. The frequency distribution of various pelviscopic (laparoscopic) operations, including complications rates-statistics of the Federal Republic of Germany in the years 1983-1985. *Zentrabl Gynakol* 1989; 3: 78-91.
11. Yuzpe AA. Pneumoperitoneum needle and trocar injuries in laparoscopy. A survey on possible contributing factors and prevention. *J Reprod Med* 1990; 35: 485-90.
12. Peterson HB, Hulka JF, Philipps JM. American Association of Gynecologic Laparoscopists' 1988 membership survey on operative laparoscopy. *J Reprod Med* 1990; 35: 587-9.
13. Lehmann-Willenbrock E, Riedel HH, Mecke H, Semm K. Pelviscopy/laparoscopy and its complications in Germany, 1949-1988. *J Reprod Med* 1992; 37: 671-7.
14. Chapron C, Querleu D, Mage G, Madelenat P, Dubuisson JB, Audebert A, et al. Complications of gynecologic laparoscopy. Multicentric study of 7,604 laparoscopies. *J Gynecol Obstet Biol Reprod* 1992; 21: 207-13.
15. Querleu D, Chapron C, Chevallier L, Bruhat MA. Complications of gynaecologic laparoscopic surgery-a French multicenter collaborative study. *N Engl J Med* 1993; 328: 1355. [\[CrossRef\]](#)
16. Härri-Siren P, Sjöberg J, Kurki T. Major complications of laparoscopy: a follow-up Finnish study. *Obstet Gynecol* 1999; 94: 94-8. [\[CrossRef\]](#)
17. Chapron C, Querleu D, Bruhat MA, Madelenat P, Fernandez H, Pierre F, et al. Surgical complications of diagnostic and operative gynecological laparoscopy: a series of 29 966 cases. *Human Reproduction* 1998; 13: 867-72. [\[CrossRef\]](#)
18. Aksu T, Coşkun F. Complications of Gynaecological laparoscopy-a retrospective analysis of 3572 cases from a single institute. *J Obstet Gynaecol* 2004; 24: 813-6. [\[CrossRef\]](#)
19. Malinowski A, Nowak M, Maciołek-Blewniewska G, Szpakowski A, Wieczorek A, Wilczyński JR, et al. The place of laparoscopy in gynecological practice--useful technique for diagnostic and treatment of infertility and endometriosis. *Ginekologia Polska* 2001; 72: 1347-54.
20. Mirghani OA, Babiker MY. Experience with Gynaecological laparoscopies in Wad Medani Hospital, Sudan *East Afr Med J* 1999; 76: 390-5.
21. Nezhat C, Childers J, Nezhat F, Nezhat CH, Seidman DS. Major retroperitoneal vascular injury during laparoscopic surgery. *Hum Reprod* 1997; 12: 480-3. [\[CrossRef\]](#)
22. Kurzel RB, Edinger DD Jr. Injury to the great vessels: a hazard of transabdominal endoscopy. *South Med J* 1983; 76: 656-7. [\[CrossRef\]](#)