

Major complications of laparoscopy: a 17-year follow up in a teaching hospital in Saudi Arabia

N. Sahly, A. Sahly, N. Al Mansouri, N. Al Sinani, S. Kafy

Department of Obstetrics and Gynecology, King Abdulaziz University, Jeddah (Saudi Arabia)

Summary

Objective: To follow the incidence of major complications in women who had gynecologic laparoscopy at a university hospital in Saudi Arabia. **Design:** Retrospective chart review. **Materials and Methods:** The hospital records of all women who underwent gynecologic laparoscopy at King Abdulaziz University Hospital, Jeddah, Saudi Arabia from April 1997 to September 2013 was reviewed. Demographic data, indications, types and presence of complications of laparoscopic procedures performed were determined. **Results:** During the study period, a total of 1580 gynecologic laparoscopies were performed. One thousand and sixty-three were diagnostic (67.3%) and 517 were operative (32.7%). Indications for laparoscopy were 771 (48.8%) for infertility, 196 (12.4%) for abdomen and pelvic pain, 238 (15.1%) for pelvic mass, 73 (4.6%) for abnormal vaginal bleeding, 207 (13.1%) for ectopic pregnancy, 28 (1.8%) for removal of missing intrauterine contraceptive device, 24 (1.5%) for tubal ligation, and 43 (2.7%) for other indications. Conversion to laparotomy occurred in 119 women (7.5%). There were no deaths in the series. However, one vascular and one bladder injury had occurred. **Conclusion:** Despite the increased variety and complexity of operative cases, the presence of subspecialty staff and improved training has contributed to maintaining a low rate of complications in gynecologic laparoscopy

Key words: Complications; Laparoscopy; Saudi Arabia.

Introduction

Laparoscopy is a widely and universally utilized approach in the diagnosis and treatment of various gynecological conditions. According to an analysis done on 1399 Food and Drug Administration (FDA) reports, generally there are over two million laparoscopic cases performed annually in the US [1], from which about half are gynecologic laparoscopies. The number of minimally invasive gynecologic surgery has increased exponentially and its introduction has decreased the number of open gynecologic surgeries [2-5]. Advantages including shorter hospital stay, improved postoperative pain, patient aesthetics, and a low complication rate deemed this approach more favorable to conventional laparotomy [2, 4]. The authors performed this review as a follow up study to the report published by Rouzi *et al.* [6], to determine the rate of major complications that occurred in women who underwent gynecologic laparoscopy at the present university hospital in Saudi Arabia.

Materials and Methods

Retrospectively, the hospital records of all women who underwent gynecologic laparoscopy at King Abdulaziz University Hospital, Jeddah, Saudi Arabia from April 1997 to September 2013 were retrieved from the surgical data base and reviewed. Demographic data, indications, types of laparoscopic procedures, pres-

ence of complications, and conversion to laparotomy were collected. Data was entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0 to calculate frequencies, percentages, mean, and standard deviation.

Results

During the study period, a total of 1,580 gynecologic laparoscopies were performed (Figure 1). The mean age of the recruited patients was 33.69 years (\pm SD 8.7). The youngest was 14 and the eldest was 80 years of age. All laparoscopic procedures were done via multiport abdominal access, veress insufflation technique, and closed using the umbilicus as the primary entry port. One thousand and sixty-three were diagnostic laparoscopies (67.3%) and 517 were operative (32.7%). Basic and intermediate (level 1 and 2) gynecological laparoscopies were conducted by residents in training supervised by consultants [7] (Table 1). Advanced procedures were carried out by consultants with minimally invasive training or experience. Indications for laparoscopy were 771 (48.8%) for infertility, 196 (12.4%) for abdomen and pelvic pain, 238 (15.1%) for pelvic mass, 73 (4.6%) for abnormal vaginal bleeding, 207 (13.1%) for ectopic pregnancy, 28 (1.8%) for removal of missing intrauterine contraceptive device, 24 (1.5%) for tubal ligation, and 43 (2.7%) for other indications. (Tables 2-4). Conversion to laparotomy occurred in a total of 119 women

Revised manuscript accepted for publication February 13, 2017

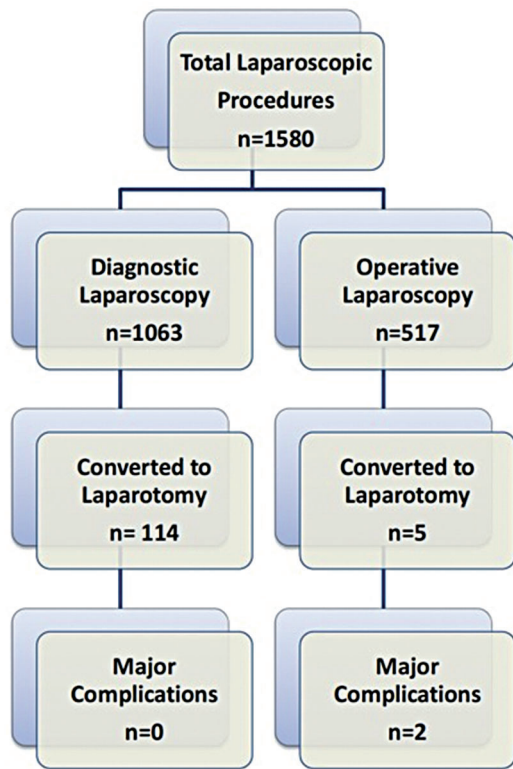


Figure 1. — Flow chart of study population and key outcomes.

Table 1. — *European Society for Gynaecological Endoscopy (ESGE) Classification of Laparoscopy.*

Level	Procedure
First Level (Basic)	Diagnostic laparoscopy
	Tubal sterilization
	Cyst aspiration
	Biopsies
Second Level (Intermediate)	Salpingotomy / salpingectomy
	Salpingo-oophorectomy
	Cystectomy
	Moderated adhesiolysis
	Minimal / mild endometriosis
Third Level (Advance)	Hysterectomy
	Myomectomy
	Urinary incontinence
	Extensive adhesiolysis
	Severe endometriosis
Fourth Level	Bowel or bladder lesions reparation
	Pelvic floor disorders
	Oncology (lymphadenectomy, radical hysterectomy, axilloscopy)
	Recto-vaginal endometriosis

(7.5%). The majority occurred in 114 women (96%) from the diagnostic laparoscopy group and in only five women (4%) in the operative laparoscopy group. There were no

Table 2. — *Clinical presentation of patients who underwent gynecologic laparoscopy at King Abdulziz University From April 1997 to September 2013.*

Clinical Presentation	Number (n)	Percentage (%)
Infertility	771	48.8
Pelvic mass	238	15.1
Ectopic pregnancy	207	13.1
Pelvic / abdominal pain	196	12.4
Abnormal menstruation (including amenorrhea)	73	4.6
Missing IUCD	28	1.8
Requested tubal ligation	24	1.5
Genital tract anomalies	17	1.1
Pelvic organ prolapse	12	0.8
Recurrent pregnancy loss	10	0.6
Evacuation of molar pregnancy	1	0.06
Recurrent ascites	1	0.06
Requested reversal tubal ligation	1	0.06
Stress incontinence	1	0.06
Total	1,580	100.0

Table 3. — *Type of laparoscopy performed according to the clinical presentation.*

Clinical presentation	Type of laparoscopy performed		Total
	Diagnostic (n=1063)	Operative (n=517)	
Infertility	691	80	771
Pelvic mass	79	159	238
Ectopic pregnancy	77	130	207
Pelvic / abdominal pain	133	63	196
Abnormal menstruation (including amenorrhea)	53	20	73
Removal of missing IUCD	2	26	28
Requested tubal ligation	1	23	24
Genital tract anomalies	9	8	17
Pelvic organ prolapse	2	10	12
Recurrent pregnancy loss	10	0	10
Evacuation of molar pregnancy	1	0	1
Recurrent ascites	1	0	1
Wants reversal tubal ligation	1	0	1
Stress incontinence	0	1	1
Total	1063	517	1,580

deaths in the either group and the overall Major complication rate was 1.26/1,000. There were no major complications in the diagnostic group. In the operative group, the authors report two major complications; one vascular (0.63/1,000) and one bladder injury (0.63/1,000). The vascular injury was an abdominal access injury. It occurred in a 20-year-old lady, with a BMI of 38.6 kg/m² who underwent laparoscopy for a 7 x 6 cm persistent left ovarian cyst, and no prior surgeries. Entry through the umbilicus was not possible due to technical difficulty after multiple trials and so the left subcostal route was used. The patient developed a hematoma at the port site and went into shock. Midline la-

Table 4. — Type of operative laparoscopic procedure performed in relation to the affected organ.

Organ (number, % from total)	Procedure	Number (n=517)
Ovary (n=221 , 42.7%)	Cyst aspiration / cautery	28
	Ovarian drilling (cautery / laser for PCO)	37
	Ovarian cystectomy	151
	Oophorectomy	3
	Detorsion	1
	Wedge resection	1
Ovaries and tubes (n=10 , 2.0%)	Salpingo-oophorectomy	10
Fallopian tube (n= 171 , 33.0%)	Management of ectopic (salpingotomy or salpingectomy / ostomy)	136
	Tubal ligation (sterilization)	23
	Tube cannulation / aspiration	5
	Tuboplasty	1
	Paratubal cyst aspiration / removal	6
Uterus (n=22 , 4.3%)	Hysterectomy	14
	Myomectomy	8
Pelvis (n=93 , 18.0%)	Removal or cautery of endometriosis	22
	Adhesiolysis	20
	IUCD removal	26
	Neovagina	8
	Biopsy	8
	Sacrocolpopexy	4
	Lymphadenectomy	2
	Removal of foreign Body (endoclip)	1
	Abscess	1
	Appendectomy	1

parotomy revealed a large retroperitoneal hematoma around the inferior vena cava (IVC) with no obvious bleeding point and no injury to major vessels. The patient was resuscitated appropriately and had an uneventful postoperative period and was discharged on the fifth postoperative day. The urinary bladder injury occurred in a 47-year-old lady undergoing laparoscopic assisted vaginal hysterectomy due to persistent heavy uterine bleeding. The bladder was injured during the vaginal part of the hysterectomy and was repaired vaginally. A urinary catheter was left in situ for seven days and was removed after a normal retrograde cystogram.

Discussion

Laparoscopy is one of the commonest surgical procedure used for both diagnostic and operative purposes in gynecology [2-4]. It has been gradually replacing laparotomies for many diverse gynecological conditions including oncology [8]. Fortunately, despite the increasing numbers of procedures worldwide, major complications such as vascular, bowel, and urinary tract injuries remain stable [9]. According to Magrina *et al.*, the overall complication rate reported in about 1,549,360 patients who underwent gynecologic laparoscopy ranged from 0.2% to 10.3% [10]. Moreover, trocar insertion still accounts for 40% of laparoscopic complications and most of the fatalities [1]. The most serious complications include perforation of bowel 0.4/1,000 or a 0.2/1,000 major abdominal vessel injury,

which commonly occur during trocar introduction [11]. Bowel injuries sustained during gynecologic laparoscopy are under reported. This is due to lack of recognition of the injury during surgery, or delay in bowel damage to be obvious like for e.g thermal injury [12]. Unlike the previous review by Rouzi *et al.*, the authors do not report any form of bowel injury. In contrast, vascular injuries are more apparent and affect patient hemodynamics leading to earlier intervention. Despite that, it could be fatal if not managed promptly [10].

The incidence injuries of the urinary tract reported generally is 0.2 to 15 per 1,000 gynecology cases [13]. This is especially higher in advanced levels and complex gynecologic laparoscopic surgery compared to laparotomy [14, 15], and is believed to be less in the hands of more skilled surgeons. This was concluded by Kobayashi *et al.* after reviewing 1,253 total laparoscopic hysterectomy (TLH) cases performed by only two technically advanced surgeons in a single center in Japan [16]. In this review, ureteric injuries were minimized by early surgical ureteric exposure in the technique they described or the use of concomitant intraoperative cystoscopy to aid in recognition, but not prevention, of urologic injuries [13]. The use of laparoscopic surgery at King Abdulaziz University Hospital has expanded with an increasing number of advanced and complex procedures over time. Since the previous study published in the Saudi Medical Journal in 1999 [6], the total number of laparoscopic procedures - diagnostic and operative - has increased from 995 to 1,580 procedures. In ad-

dition, the rate of diagnostic to operative laparoscopy decreased from about 8:1 to 2:1. This was due to the increasing number of operative laparoscopies being performed by highly skilled staff, which the present authors believe contributed also to the decreased rate of conversion to laparotomy in the operative group by overcoming technical difficulties and managing occurring complications laparoscopically when appropriate. It has been demonstrated that the laparoscopic management of gynecological complications recognized during laparoscopic surgery is safe, feasible, and efficient without the need of laparotomy in the hands of highly trained surgeons [17]. Fortunately, the major complication rate in this study (1.26 /1,000) was similar to existing reported rates; thus maintaining a universally accepted complication rate [18]. In the present review there were no deaths, anesthesia complications, bowel, nor ureteric injuries. However, the conversion to laparotomy was strikingly high in the diagnostic laparoscopy group. The conversion rate reported in the literature ranges from 0–19% [19, 20]. The present overall laparotomy rate was 7.5% (n=119), which some studies suggest that this warrants an audit (> 5%) [21]. Conversion to laparotomy was higher in the diagnostic group than in the operative group (n=114 vs. 5), and took place mainly for the surgical management of ectopic pregnancy (50/114) and ovarian cysts (39/114). A subgroup analysis revealed that this was prior to the year 2003, where less-experienced surgeons were attempting complicated procedures and had to convert to open to complete the surgery due to their technical limitations. After 2003 the number of diagnostic laparoscopies converted to laparotomies decreased initially by half and continued to decrease over time as operative laparoscopy gradually started taking over by fellowship trained subspecialty staff. The present authors believe that the evolution of the learning curve in minimally invasive gynecology at the present center had greatly contributed to the improvement in patient outcomes and the increase in variety and complexity of gynecologic laparoscopic procedures carried out with minimal complications due to the presence of competent and adequately trained staff in minimally invasive gynecologic surgery with advanced skills and better knowledge of the pelvic anatomy, who thereby provide preceptorship training. This leads to appropriate staff credentials and the early introduction of basic and intermediate laparoscopic training during the residency period. For those reasons and despite the increased diversity of gynecologic cases approached laparoscopically at the present center, morbidity and mortality remained at minimum. Furthermore, the present authors believe that the recent introduction of the virtual laparoscopic skill lab trainer in this center will contribute greatly to improving the outcome, and further advancement in the field of minimally invasive gynecology.

Conclusion

Laparoscopy continues to be a safe and effective procedure. Despite the increased variety and complexity of operative cases, the presence of subspecialty staff and improved training has contributed to a maintaining a low rate of complications in gynecologic laparoscopy. Currently recognized as a subspecialty, minimally invasive gynecology continues to advance in this center with minimal morbidity and mortality.

References

- [1] Fuller J., Ashar B.S., Carey-Corrado J.: "Trocar-associated injuries and fatalities: an analysis of 1399 reports to the FDA". *J. Minim. Invasive Gynecol.*, 2005, 12, 302.
- [2] Medeiros L.R.F., Rosa D.D., Bozzetti M.C., Fachel J.M.G., Furness S., Garry R., et al.: "Laparoscopy versus laparotomy for benign ovarian tumour". *Cochrane Database Syst. Rev.*, 2009, 2, CD004751.
- [3] Jonsdottir G.M., Jorgensen S., Cohen S.L., Wright K.N., Shah N.T., Chavan N., Einarsson J.I.: "Increasing minimally invasive hysterectomy: effect on cost and complications". *Obstet Gynecol.*, 2011, 117, 1142.
- [4] Kulier R., Boulvain M., Walker D.M., De Candolle G., Campana A.: "Minilaparotomy and endoscopic techniques for tubal sterilisation". *Cochrane Database Syst. Rev.*, 2004, 3, CD001328.
- [5] Nieboer T.E., Johnson N., Lethaby A., Tavender E., Curr E., Garry R., et al.: "Surgical approach to hysterectomy for benign gynaecological disease". *Cochrane Database Syst. Rev.*, 2009, 3, CD003677.
- [6] Rouzi A.A., Al-Noury A., Mansouri M., Jamal H., Abduljabbar H.: "Major complications of laparoscopy in a teaching hospital in Saudi Arabia". *Saudi Med. J.*, 1999, 20, 359.
- [7] Molinas C.R., De Win G., Ritter O., Keckstein J., Miserez M., Campo R.: "Feasibility and construct validity of a novel laparoscopic skills testing and training model". *Gynecol. Surg.*, 2008, 5, 281.
- [8] Querleu D., Leblanc E., Ferron G., Narducci F.: "Laparoscopic surgery in gynecological oncology". *Eur. J. Surg. Oncol.*, 2006, 32, 853.
- [9] Chapron C., Fauconnier A., Goffinet F., Bréart G., Dubuisson J.B.: "Laparoscopic surgery is not inherently dangerous for patients presenting with benign gynaecologic pathology. Results of a meta-analysis". *Hum. Reprod.*, 2002, 17, 1334.
- [10] Magrina J.F.: "Complications of laparoscopic surgery". *Clin. Obstet. Gynecol.*, 2002, 45, 469.
- [11] Chapron C.M., Pierre F., Lacroix S., Querleu D., Lansac J., Dubuisson J.B.: "Major vascular injuries during gynecologic laparoscopy". *J. Am. Coll. Surg.*, 1997, 185, 461.
- [12] Desai K., Nezhat Farr R.: "Gastrointestinal complications in laparoscopy compared with laparotomy in primary gynecologic surgery". *Obstet. Gynecol.*, 2014, 123, 27S.
- [13] AAGL Practice Report: "Practice guidelines for intraoperative cystoscopy in laparoscopic hysterectomy". *J. Minim. Invasive Gynecol.*, 2012, 19, 407.
- [14] Härkki-Sirén P., Sjöberg J., Tiitinen A.: "Urinary tract injuries after hysterectomy". *Obstet. Gynecol.*, 1998, 92, 113.
- [15] Gilmour D.T., Das S., Flowerdew G.: "Rates of urinary tract injury from gynecologic surgery and the role of intraoperative cystoscopy". *Obstet. Gynecol.*, 2006, 107, 1366.
- [16] Kobayashi E., Nagase T., Fujiwara K., Hada T., Ota Y., Takaki, Y., et al.: "Total laparoscopic hysterectomy in 1253 patients using an early ureteral identification technique". *J. Obstet. Gynaecol. Res.*, 2012, 38, 1194.
- [17] Kyung M.S., Choi J.S., Lee J.H., Jung U.S.: "Laparoscopic management of complications in gynecologic laparoscopic surgery: a 5-year experience in a single center". *J. Minim. Invasive Gynecol.*, 2008, 15, 689.

- [18] Ates S., Tulandi T.: "Malpractice claims and avoidance of complications in endoscopic surgery". *Best Pract. Res. Clin. Obstet. Gynaecol.*, 2013, 27, 349.
- [19] Brummer T.H., Seppala T.T., Harkki P.S.: "National learning curve for laparoscopic hysterectomy and trends in hysterectomy in Finland 2000–2005". *Hum. Reprod.*, 2008, 23, 840.
- [20] Sokol A.I., Chuang K., Milad M.P.: "Risk factors for conversion to laparotomy during gynecologic laparoscopy". *J. Am. Assoc. Gynecol. Laparosc.*, 2003, 10, 469.
- [21] Twijnstra A.R., Blikkendaal M.D., van Zwet E.W., Jansen F.W.: "Clinical relevance of conversion rate and its evaluation in laparoscopic hysterectomy". *J. Minim. Invasive Gynecol.*, 2013, 20, 64.

Corresponding Author:
N.N. SAHLY, M.D
PO Box 80215
Jeddah, 21589 (Saudi Arabia)
e-mail: ninasahly@gmail.com