

Complications of Diagnostic and Operative Laparoscopies – A Five Year Experience

DIAGNOSTİK VE OPERATİF LAPAROSKOPI KOMPLİKASYONLARI – BEŞ YILLIK DENEYİMİMİZ

Mehmet HARMA*, Hülya ARTUÇ**, Müge HARMA*, Hasan KAFALI*, Nurettin DEMİR***

* Yrd.Doç.Dr., Harran Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum AD,

** Arş.Gör.Dr., Harran Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum AD,

*** Prof.Dr., Harran Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum AD, ŞANLIURFA

Summary

Objective: This retrospective study was carried out to determine the success rate and the incidence of complications of all diagnostic and operative laparoscopies which were performed in the Harran University Obstetrics and Gynecology Department.

Material and Methods: During the period December 1998 to October 2003, 151 laparoscopies (84 diagnostic, 26 operative, and 41 tubal sterilization with bipolar coagulation) were reviewed, all with CO₂ insufflation. The charts and surgical reports of cases were abstracted and complications recorded.

Results: Only three (1.9%) required conversion to laparotomy. The most frequent complication was postoperative pain (55 cases; 36.4% of total cases). Four patients (2.6% of total) suffered trocar-related injuries, four (2.6%) uterine perforation with the uterine manipulator, three (1.9%) anesthetic complications, two (1.3%) subcutaneous emphysema, two (1.3%) postoperative fever and one (0.6%) postoperative adynamic ileus. There was one (0.6%) possibly associated death.

Conclusion: Laparoscopy has proved an effective and relatively safe procedure. However, more serious complications –i.e. mortality– should be considered even in a low rate. As operative laparoscopy becomes more widely accepted the complication rate can be expected to rise. In order to reduce the prevalence of complications, training programmes must include supervision at all levels of development and there must be a high degree of awareness of the potential risks of laparoscopic surgery.

Key Words: Laparoscopic surgery, Complication, Operative laparoscopy, Diagnostic laparoscopy

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Özet

Amaç: Bu çalışmada, Harran Üniversitesi Tıp Fakültesi Kadın Hastalıkları ve Doğum Kliniğinde yapılan tüm diagnostik ve operatif laparoskopik girişimlerdeki komplikasyon sıklığının, retrospektif olarak değerlendirilmesi amaçlandı.

Gereç ve yöntemler: Çalışmada, Aralık 1998 ve Ekim 2003 tarihleri arasında CO₂ gazı kullanılarak yapılan 151 (84 diagnostik, 26 operatif ve bipolar koagülasyon yapılan 41 tubal sterilizasyon) laparoskopi incelendi. Olguların kayıtları ve ameliyat raporlarındaki komplikasyonlar belirlendi.

Bulgular: Laparoskopi yapılan olguların 3 (%1.9)'ünde laparotomiye geçildi. Komplikasyon olarak en sık (55 olgu; %36.4) postoperatif ağrı saptandı. Diğer komplikasyonlar, trokara bağlı zedelenme (4 olgu; %2.6), manipulatöre bağlı uterus perforasyonu (4 olgu; %2.6), anestezik komplikasyonlar (3 olgu; %1.9), cilt altı amfizemi (2 olgu; %1.3), postoperatif ateş (2 olgu; %1.3), ileus (1 olgu; %0.6) idi. Bir (%0.6) olgu septik şok sonrası gelişen koma sonucunda ex oldu.

Sonuç: Laparoskopi etkin ve görece güvenilir bir işlemdir. Ancak, düşük oranda da olsa, mortalite gibi daha ciddi komplikasyonların gelişebileceği dikkate alınmalıdır. Operatif laparoskopinin giderek yaygınlaşmasıyla komplikasyon oranının artması beklenmektedir. Komplikasyonların prevalansını azaltmak için eğitim programları sürdürülmeli ve laparoskopik cerrahinin olası riskleri bilinmelidir.

Anahtar Kelimeler: Laparoskopik cerrahi, Komplikasyon, Operatif laparoskopi, Diagnostik laparoskopi

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Gynecologic procedures are increasingly performed by laparoscopy. Standard laparoscopic surgery techniques have been established for a number of gynecological pathologies. The development of laparoscopic instrumentation has

made it possible to decrease the complication rate in diagnostic and operative procedures. However, laparoscopic surgery requires a certain training period and may be prone to several complications. It has been well documented that the risk of

complications associated with these procedures is low for diagnostic laparoscopy, tubal sterilization, and most operative laparoscopy. Advances in techniques, equipments, and increased training in the use of gynecologic laparoscopic surgery will allow for a broadening of the practice of this treatment modality.

The first laparoscopy performed at Harran University Obstetrics and Gynecology Department was in December 1998. Until October 2003, a total of 151 (84 diagnostic, 26 operative and 41 tubal sterilization with bipolar coagulation) had been performed, all with CO₂ insufflation. This retrospective review was carried out to determine the success rate and the incidence of complications.

Material and Methods

The 151 cases reported on are all the patients on whom laparoscopies were performed at the Harran University Obstetrics and Gynecology Department up until October 2003. We did a retrospective medical record documentation review of all cases. Data were collected included indications for laparoscopic surgery, type of procedure, operative complications, site of injury and symptoms and findings during postoperative course. In our practice all cases of laparoscopy were performed by the closed-entry (by Veress needle first) technique using with CO₂ gas as the distension medium introduced through a Veress needle placed intraumbilically. The intraabdominal gas pressure was monitored automatically (Electronic Endoflator[®], Karl Storz Mfg., Tuttlingen, Germany) as was set at 15 - 18 mm Hg and a basal flow rate of 1 liter/min during the procedure. Additional lateral ports were inserted just lateral to the inferior epigastric vessels by internal direct visualization. Disposable 5-10 mm trocars (Endopath[®], Ethicon Endo-Surgery, Inc., Cincinnati, OH, USA) were inserted to an avascular area lateral to these vessels. A disposable uterine manipulator (Manipujektor[®], Cooper Surgical, Kronner Medical Mfg., Roseburg, OR, USA; Endopath[®] Ethicon Endo-Surgery, Inc., Cincinnati, OH, USA) was used for providing uterine elevation.

Results

Diagnostic laparoscopy was performed for the following indications: primary or secondary infertility, mislocated intrauterine device (IUD), müllerian anomaly, primary amenorrhea, endometriosis and chronic pelvic pain.

Indications for operative laparoscopy were ectopic pregnancy, endometrioma, pelvic adhesions, adnexal mass, polycystic ovary syndrome, pelvic adhesions, descensus uteri, tubo-ovarian abscess, mislocated IUD, intractable dysmenorrhea and uterine perforation.

The following procedures were performed: salpingectomy, linear salpingostomy, resection of endometrioma, thermal coagulation of small endometriotic implants, adhesiolysis, fimbrioplasty, ovarian biopsy, ovarian drilling, ovarian cystectomy, salpingectomy, uterine ventrosuspension, uterine nerve ablation, aspiration of tubo-ovarian abscess, and removal of foreign body (IUD).

Characteristics of complications are presented in Table 1. One death (0.6%) was recorded, in a patient who had had three previous abdominal operations and suffered a perforation of the sigmoid colon while undergoing diagnostic laparoscopy for endometriosis. She recovered from the subsequent peritonitis but died 16 days after an exploratory laparotomy with cardiac arrest and coma.

In three other cases (1.9%), the procedure was unsuccessful and conversion to laparotomy was necessary. One of these involved failure to remove

Table 1. Characteristics of complications

	Cases n (%)	Type of laparoscopy procedure	
		Diagnostic	Operative
Postoperative pain	55 (36.4)	29	26
Trochar-related injuries	4 (2.6)	2	2
Uterine perforation	4 (2.6)	2	2
Anesthetic complications	3 (1.9)	1	2
Conversion to laparotomy	3 (1.9)		3
Subcutaneous emphysema	2 (1.3)	1	1
Postoperative fever	2 (1.3)	2	
Postoperative ileus	1 (0.6)	1	
Death	1 (0.6)	1	

an IUD, one failure to remove a solid ovarian mass, and one repair of uterine perforation sustained while undergoing laparoscopic tubal sterilisation.

By far the most common complication was postoperative pain (in 55 cases, 36.4% of the total). Twenty-six patients (13 each with diagnostic or operative procedures) complained of abdominal pain, 18 (8 diagnostic and 10 operative) of back pain and 11 (8 diagnostic and 3 operative) of shoulder pain.

Four patients (2.6% of total) sustained trocar-related injuries. Three of these involved bleeding from lateral ports, which was stopped with cauterisation; and one patient developed a hematoma from bleeding from the superficial epigastric artery.

Four patients (2.6% of total) suffered uterine perforation with the uterine manipulator while undergoing diagnostic procedures or tubal sterilisation. One of these was repaired under laparotomy, one underwent extracorporeal suture, while intervention was not thought necessary in the other two cases.

Three patients (2%) suffered anesthetic complications—prolonged apnea in two and an asthmatic attack in the other.

Two patients (1.3%) showed subcutaneous emphysema with CO₂. One of these presented as vulvar edema in a patient undergoing operation for the removal of an ovarian cyst and the other was the previously mentioned patient who sustained a hematoma from bleeding from the superficial epigastric artery. Both recovered spontaneously.

Two patients (1.3%) who had undergone diagnostic laparoscopies presented with postoperative fever which resolved in 24 hours.

One patient (0.6%) showed postoperative adynamic ileus after a diagnostic procedure. This resolved without treatment in three days.

Discussion

Complications can occur with any form of surgery. In the early 1980s, the incidence of laparoscopic complications was 1.1% to 5.2% in minor procedures and 2.5% to 6% in major ones

(1), while at the end of the 1990s the total complication rate was 0.4%, with rates of 0.06% in diagnostic laparoscopies, 0.05% in sterilization, and 1.2% in operative laparoscopies (2).

Laparoscopy is considered to offer major benefits over laparotomy in terms of less blood loss, less need for blood transfusion, less need for postoperative analgesia and a shorter duration of hospital stay (3). However, 4.7% to 6.3% of cases require conversion to laparotomy (3, 4).

Complications also occur. Strangely enough, postoperative pain, the most commonly found undesirable after-effect in this study, is seldom mentioned in the literature though it is a common topic of complaint by patients and undoubtedly occurs with a fairly high frequency.

The one type of post-laparoscopy pain which has received some attention is shoulder pain. This was thought to be due to irritation of the diaphragmatic nerves by carbonic acid formed from the CO₂ used in the procedure, but experiments with gases other than CO₂ have produced the same or similar effect and it is now thought that the source of nerve irritation is simply cold and drying (5). A study of the use of an intraperitoneal gas drain to reduce pain after laparoscopy found that it decreased the frequency of shoulder pain (6) and reduced postoperative analgesia requirements but was less cost-effective than simple oral analgesia (7). A recent development is gasless laparoscopy, in which a special lift system is used instead of CO₂. This is claimed to afford better recovery time and less pain (8,9). Failing this, heating and humidifying the CO₂ is claimed to be of benefit.

Whether the much more common abdominal and back pain is similarly due to an effect of CO₂ insufflation or to direct insult is unclear. Pre-emptive diflunisal provides postoperative analgesia and decreases postoperative opioid consumption in patients undergoing laparoscopic surgery (10).

Failure to introduce the Veress needle into the peritoneal cavity may produce extra-peritoneal emphysema. Direct trocar insertion without pneumoperitoneum has been found to be as effective as pneumoperitoneum with Veress needle (11,

12). CO₂ insufflation is also related to occasional cases of subcutaneous emphysema (13), of which there were two in our series, both of which resolved spontaneously.

Vascular complications of laparoscopy are among the most serious. The vast majority of major vascular injuries occur during the set-up phase of laparoscopy (creation of the pneumoperitoneum, installation of the trochars) (14). Open laparoscopy does not reduce the risk of major complications during the set-up procedures for laparoscopy (15). Bleeding from puncture of the deep inferior epigastric artery is another serious complication. This artery is at risk during the insertion of secondary trochars and cannulae. One of our cases had a hematoma from bleeding from the superficial epigastric artery. There were three other trochar-related injuries, while they involved relatively minor bleeding which was stopped with cauterisation. Two previous large studies (16, 17) found trochar injuries to be the most frequent complication. Access devices –i.e. trochar and cannulae– contribute to patient morbidity through visceral and vascular injury, as well as incision-related complications such as dehiscence and hernia (18).

Uterine perforation with the laparoscopic instruments is probably the next greatest risk with laparoscopic procedures. There were four in our series, of which one required repair under laparotomy and one extracorporeal suture, while the remainder did not require treatment.

Anesthetic risks particular to laparoscopy result from operative pneumoperitoneum in the Trendelenburg position (19) which causes elevation in the levels of stress hormones and a decrease in hemodynamic parameters and may pose ventilation-perfusion challenges. However, a healthy patient may tolerate these changes (20). Head-down or head-up positions do not further alter respiratory system compliance (21). Whether this mechanism was a factor in the three cases recorded in this series is unclear.

Reactivation of a dormant infection during laparoscopic surgery is possible but uncommon (22). Whenever surgery is performed in the pres-

ence of an active infection or is to repair the pelvis that has been damaged through a chronic infection, antibiotics should be used liberally. Whether the postoperative fever (resolving in 24 hours) after diagnostic laparoscopy in two of our cases was related to infection or was a non-specific result of the procedure is unknown.

Postoperative adynamic ileus has not been reported as a complication of diagnostic laparoscopy and is presumably rare (23). Our one case resolved in three days without treatment.

In summary, laparoscopy has proved an effective and relatively safe procedure in our facility. However, the possibility of a necessary conversion to laparotomy should always be borne in mind and greater consideration needs to be given to means of lessening and managing post-operative pain.

Complications did occur and point up the need for those performing the procedure to be well trained and diligent in the technique, especially in placement of the Veress needle, trochar insertion and use of the uterine manipulator. As operative laparoscopy becomes more widely accepted and more surgeons adopt this form of management to more and more procedures, the complication rate can be expected to rise. It is becoming increasingly evident that, in order to reduce the prevalence of complications, training programmes must include supervision at all levels of development and there must be a high degree of awareness of the potential risks of laparoscopic surgery.

Diagnostic and sterilization laparoscopies appear to be safe, but more complex laparoscopies are associated with an unacceptably high number of serious complications requiring continuous follow-up and expertise (24). It is important to ascertain the true complication rates and outcomes, to evaluate the risks and benefits of these procedures. Great attention should be paid to the high number of complications.

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Yazışma Adresi: Dr.Mehmet HARMA
6. Sokak, 2/9
Bağçelievler, 06500 ANKARA
mehmetharma@superonline.com