

Literature Review

How to Recognize, Prevent and Address Complications of Laparoscopic Gynecologic Surgery

Mengenali, Mencegah dan Mengatasi Komplikasi Operasi Ginekologi Laparoskopik

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Abstract

Objective: To highlight the needs of awareness on recognising, prevent and address complications in laparoscopic gynecologic surgery.

Methods: Literature review.

Discussion: The complications of laparoscopic gynecologic surgery mainly can be classified as complications related to anaesthesia, entry technique, electrosurgical, postoperative and visceral due to surgical procedure it self. Lam proposed a 6 phase-based classification of laparoscopic surgery complications; patient identification, anaesthesia and positioning, abdominal entry and port placement, surgery, postoperative recovery and counselling. The aim of this classification is to promote a culture risk management to improve patient safety and outcome. Every phase above should be able to assessed, analysed and executed properly to prevent complications.

Conclusion: Complication in operative laparoscopy is generally minor and can be handled successfully. However, although very rare, major complications are detrimental to the patient. It also becomes heavy burden for the surgeons. Preventive measures should be implemented not only by the operator but also the anaesthesiologist, and theatre practitioners. Systematic drills, which regularly rehearsed is essential in order to maintain team proficiencies.

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Keywords: complications, gynecologic laparoscopy, operative laparoscopy

Abstrak

Tujuan: Untuk menekankan pentingnya mengenali, mencegah dan mengatasi secara dini komplikasi operasi laparoskopik ginekologi.

Metode: Kajian pustaka.

Diskusi: Komplikasi operasi ginekologi laparoskopik dapat diklasifikasikan menjadi komplikasi yang berhubungan dengan anestesi, teknik masuknya trokar utama, terkait elektro surgikal, komplikasi pascaoperasi dan komplikasi visera (pembuluh darah, usus, cedera traktus urinarius) terkait tindakan operasi itu sendiri. Lam mengusulkan suatu klasifikasi berbasis fase, antara lain, identifikasi pasien, anestesi dan posisi pasien, akses masuk abdomen dan penempatan trokar; terkait operasi, pemulihan pascaoperasi dan konseling. Tujuan dari klasifikasi ini adalah untuk meningkatkan budaya sadar risiko, guna meningkatkan keselamatan pasien. Setiap tahap harus dapat dilaksanakan, dinilai dan dianalisis dengan baik untuk mencegah terjadinya komplikasi.

Kesimpulan: Komplikasi pada operasi ginekologi laparoskopik umumnya ringan dan dapat ditangani dengan baik. Walaupun jarang terjadi, komplikasi berat umumnya sangat merugikan pasien dan menjadi beban operator. Langkah-langkah pencegahan ini harus dilaksanakan oleh operator, tim anestesi serta seluruh tim kamar operasi. Simulasi harus dilaksanakan, guna mempertahankan ke-cakapan tim.

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Kata kunci: komplikasi, laparoskopik ginekologi, laparoskopik operatif

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INTRODUCTION

Laparoscopic surgery has been widely used by various fields of medical science; one that rapidly developed is gynecologic surgery area. Worldwide, laparoscopic gynecologic surgery performed with an increasingly complex variety of indications. At present, sophisticated laparoscopic procedures such as laparoscopic hysterectomy, myomectomy, sacrocolpoplexy, and pelvic lymph node dissection have become daily routine operations.¹

Although the benefits of laparoscopic gynecologic surgery have been recognised for the last decades, the range of complications of this procedure has not been highlighted. Risk of complications increases with the complexity of the surgical procedure and strongly influenced by the experience of the surgeon. Prevention of complications of laparoscopic gynecologic surgery should be started by raising awareness and take necessary precautions to ensure safety. Review of complications rate worldwide shown in Table 1.²⁻⁴

Table 1. Review of Laparoscopic Surgery Complications Worldwide²⁻⁴

Author	Country	Number of sample	Mortality	Overall Rate	Conversion to Laparotomy
Bateman ²	USA	2.324		8.6/1000	
Jansen ²	Netherland	25.764	8/100,000	5.7/1000	3.3/1000
Harkki ²	Finland	32.205		4/1000	
Chapron ²	France	29.966	3.3/100,000	4.6/1000	3.2/1000
Miranda ²	United Kingdom	2.140	0	7.9/1000	
Min Sun Kyung ³	Korea	2668	0	12.4/1000	0.4/1000
Putz ¹	Norway	2.308	0	28/1000 (intraoperative complications)	

Classifications of Complications

According to the type of laparoscopic procedure, laparoscopic surgeries were classified into four groups: diagnostic, minor, major and advanced laparoscopic surgery.³ Type of procedure related to complications followed. The complications of laparoscopic gynecologic surgery mainly classified as complications related to anaesthesia, entry techniques, electrosurgical complications, visceral complications (vascular, bowel, urinary tract injury) and postoperative complications. This can be simplified as approach and technique related.

In 2009, Lam proposed a phase-based classification of laparoscopic surgery complications. The aim of this classification is to promote a culture of risk management, based on strategies to improve patient safety and outcome. According to phases of laparoscopic surgery procedure, complications can occur in any of this 6 phases; phase I - patient identification, phase II - anaesthesia and positioning, phase III - abdominal entry and port placement, Phase IV - surgery, phase V - postoperative recovery, phase VI - counselling.⁴ To prevent any complications either minor or major complications, every phase above should be able to be assessed, analyzed and executed properly.

Phase I - Patient identification

Pre-operative evaluation is mandatory before planning surgery. This step will provide valuable information in order to reduce both anaesthetic and surgical complications. Complete history, physical examinations together with laboratory/ radiology workup will help in illustrating steps that will be implemented. It must be ensured that the patient has neither absolute nor relative contraindications such as significant compromise on cardio-respiratory system/hemodynamic instability, severe intra-abdominal adhesions, advanced malignancy, pregnancy. Risk factors, such as obesity, a low body mass index (BMI), previous surgery, previous intra-abdominal infection, inflammatory bowel disease and any medical conditions, should be identified.⁵

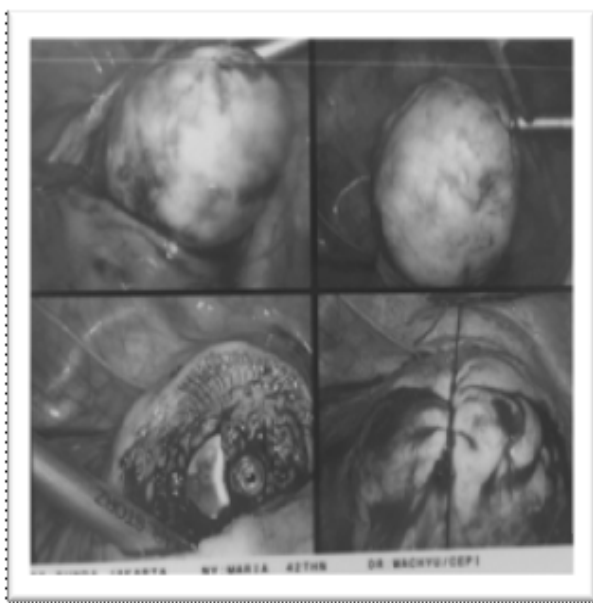


Figure 1. Appearance of uterine manipulator indicates that the intramural myoma reach the uterine cavity

Apart of patient peculiarity, other factors such as operator skills and training, equipment, the capability of operating theatre, hospital facility for post-operative care (ICU if necessary) and capability of theatre practitioners (scrub nurse, surgical assistant and theatre runner), should be taken under consideration before deciding any procedure. Prior plan of treatment (preoperative, intraoperative and also postoperative) should be carefully made to improve surgical outcomes.

Phase II - Anaesthesia and positioning

Most of the gynecologic laparoscopy surgeries are performed with the patient in the supine position with various modifications of the lithotomy position, with or without Trendelenburg positioning. The Trendelenburg position is used in these procedures to shift the abdominal viscera from the pelvis cranially to improve exposure.⁵ This specific factor should be highlighted. Modified lithotomy position is associated with a particular risk of positioning injury. Incorrect positioning can lead to complications; which range from minor transient injuries to major permanent damage that caused long-term functional restrictions, secondary morbidity, or even death.⁶

Patients positioning and length of procedure has a significant impact on the patient's hemodynamic which eventually will impact anaesthesia. Optimal patient positioning should prevent pressure injuries (pressure ulcers), skin irritation, burns, nerve damage, circulatory problems and hypothermia.⁶ Neurological injury alone can occur as a result of transection, compression, stretching or entrapment mechanism. Every hour in lithotomy position will increase the risk of lower limb neuropathy to 100 fold.⁷

Generally, the patient should initially be placed supine with arms tucked in by her sides on the operating table in a neutral position with the thumb pointing up.⁸ Both legs are placed in lithotomy position supported by padded stirrups. The thigh positions should be parallel to the abdomen while the knee flexed to 90-120 degrees.^{5,7} Hip flexion and hip abduction (measured from inner thigh to inner thigh) of less than 90 degrees and minimal external rotation of the hip.⁷

Besides patients positioning, laparoscopic surgery also presents unique anaesthetic challenges

which differ from open surgery, such as the effects of pneumoperitoneum, extra peritoneal gas insufflations and venous gas embolism.⁹

Phase III - Abdominal entry and port placement

Abdominal entry and port placement have been recognised as one step that contributes on more than 50% serious laparoscopic complications.⁴ The rates of life-threatening complications due to abdominal entry are relatively low, 0.4/1000 for iatrogenic gastrointestinal injuries and 0.2/1000 for major blood vessel injuries.⁹ In a prospective multicenter observational study, Jansen et al. found that two deaths occurred in 25,764 procedures in one year period due to approach-related.⁶ Therefore abdominal entry and port placement should not be underestimated.

Entry associated complications can occur as visceral or vessel injury.⁸ Surgical complications associated with the entry to the peritoneal cavity include: damage to the anterior abdominal wall and major retroperitoneal vessels, damage to the bowel, extra peritoneal insufflation, herniation through port sites and failure to achieve access to the peritoneal cavity.¹⁰

Various techniques can be used on abdominal entry and port placement during laparoscopic gynecologic surgery, such as Closed (Veress needle) entry technique, Open (Hasson) entry technique, Direct Entry and Vision-Guided Direct Entry.¹⁰ Each technique has its advantages and disadvantages. Many studies have compared each technique applied to various indications, however, based on currently available data, no abdominal entry method that considered superior over another and recommended as the standardised method.⁹

ISGE on 2016 suggest that safe and effective laparoscopic entry will be best served when the surgeon would use technique, entry position and type of instrumentation which he/she feels most comfortable for the majority of procedures. However if in particular circumstances, this chosen technique poses a major risk of complications, the operator should be willing to use an alternative technique/position/instrument that he/she has been adequately trained to use.⁹

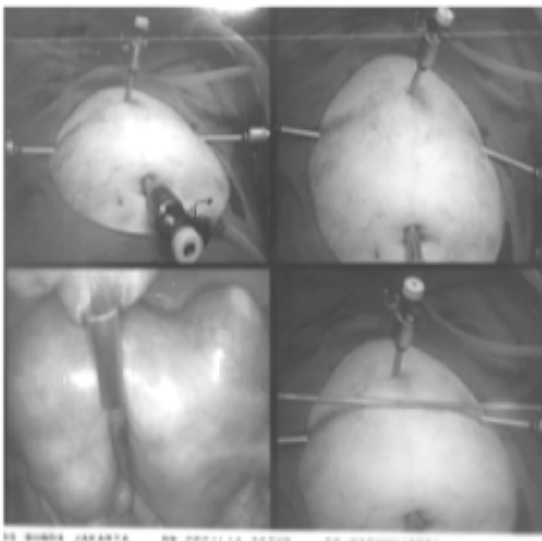


Figure 2. Position of main and associated trocar during abdominal entry.

Phase IV - Surgery

The rate of laparoscopic surgery complications after entry range between 0.1-8.3%.⁸ Injury can occur as direct injuries to visceral organs, such as vascular injury, urinary tract injury and bowel injury, or as result of herniation through port sites (Richter's hernia), thermal injuries and also anastomotic leaks.^{8,11} Major vascular injuries are the rarest¹¹, while most mortality caused by bowel injury (reported mortality rates up to 3.6%).¹² The major risk factor for bowel injury is adhesions from prior surgery.¹¹ Adhesiolysis is a challenging procedure and should only be performed by an experienced surgeon. In gynecological surgery, both laparoscopic and laparotomy, adhesions are reported as the major cause of complications.¹²

Specific complications need specific management. Complications to blood vessels likely occurred to inferior epigastric and iliac vessel. Uterine injuries which occur due to instrument manoeuvre can be managed with observation, pressure, sutures or diathermy. Bowel injury may be recognized by observation of faecal contents, faecal odour, diathermy burn or a hematoma visible on the bowel, postoperative abdominal pain, temperature, vomiting or peritonitis. General surgeon involvement is advised in managing these complications. Management may be with peritoneal lavage and broad-spectrum antibiotics, laparoscopy or laparotomy with or without bowel

repair, resection or colostomy formation. Injury to inferior epigastric vessel controlled by pressure, the insertion of a catheter balloon tamponade, sutures or diathermy. Injury to iliac vessel need prompt control and repair, laparotomy and vascular surgeon input as generally appropriate.⁵

Injury to the urinary tract can happen to ureter or bladder. Ureteric injury management depends on time of presentation. Cystoscopy and pyelogram are helpful. Stenting and surgical repair with urology input may be required. Bladder injury can be recognised from visual inspection, hematuria, air in the catheter bag, urine leakage from trocar incision or oliguria. Cystogram is helpful in diagnosis. Urology input is advised. Nerve injury (Sciatic, perineal and brachial nerves implicated especially) usually transient and can be managed conservatively. Incisional hernia is uncommon and usually occurs with port sites >5mm and should be managed surgically.⁵

Laparoscopy is a mode of access with its strength and weakness. Regarding its superiority, it should be remembered that in some cases laparotomy is a better approach. Conversion from laparoscopy to laparotomy intra-operative should never be considered as a failure; it only replaces one possible legitimate approach with another. Not performing laparotomy where required can lead to unnecessary complications.¹³

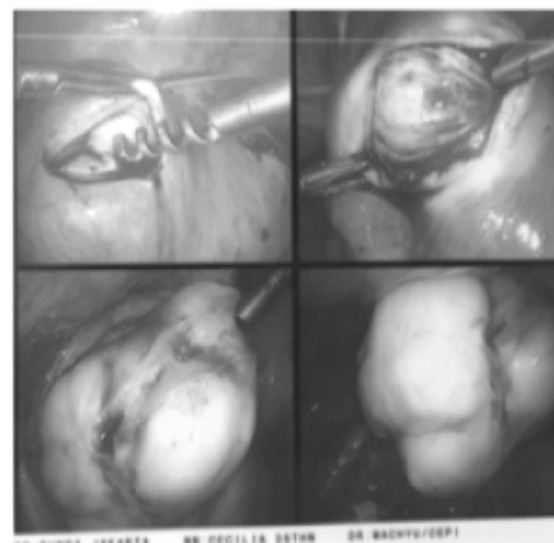


Figure 3. Application of myom-screw to big myoma is a crucial step.

Phase V - Postoperative recovery

Complications of surgery sometimes may not present until postoperative period, so that observation and follow up is always necessary. It is estimated that 26-95% of the injuries diagnosed during the postoperative period. Sign of complications can occur as early as 12 hours after surgery, and delayed symptoms likely occur until the first 14 days after surgery.^{2,13} Key to minimised complication is by recognising symptoms as early as possible. Unrecognized injury and delayed diagnosis in the most dangerous postoperative complications. Any unusual sign or symptoms in post laparoscopy cases should be evaluated. Possible complications should be followed with full workup and treated immediately. In case a patient needs further surgical evaluation, sooner is better than later. Delays in treatment cause "complications of a complication".²

Phase VI - Counselling

Patient education is the key to managing complication in laparoscopic surgery. Early recognition of laparoscopic complications after operation requires patient education.² Physician should be aware that the patient does need to be treated not only medically, but also psychologically. Patient and family should be treated as partners and involved in the decision-making process.

Managing Complications

The most important steps in dealing with complications of laparoscopy are prevention and recognition of early warning signs of complications. Thus, any complication occurred can be minimised and addressed accordingly. This should be implemented in every phase of operative laparoscopy, ranging from preoperative to postoperative period.

Patient selections are needed to reduce the risk of complications. Predetermined systematic, safe and practised back up plans of action must be in place in the event that a complication occurs. Complications can also be reduced by experience and proper training. Proper training is required especially in dealing with surgical complications. Experienced and well-trained surgeon can face difficulties and complexity of cases better than poorly trained surgeons. There is no one best approach for all surgery. Surgeons should use the

recommended technique which most comfortable and make it familiar. Switch to laparotomy should be implemented without any doubt when it is necessary. Good communication between the operator with the patient and family, anesthesiologist and theatre practitioners is crucial in generating a successful surgery. Together with good documentation that portrays a clear description of techniques utilised.

Guidelines and recommendations are necessary and should be developed to create preventive habitude in laparoscopic practice. However, it should be remembered that each centre has its characteristic (facility, society and cases specific) so that these guidelines should always be viewed as advice, instead of rules. Furthermore, it should be able to be adjusted with the peculiarity of each practice.

CONCLUSION

Complications in operative laparoscopy are generally minor and can be handled successfully. Although major complications are infrequent, the incidences of major complications are generally very detrimental to the patient and become a heavy burden for operators. These complications can be prevented by maximising patient selection, predetermined planed of surgery and anaesthesia, competent theatre practitioners (scrub nurse, surgical assistant and theatre runner), appropriate and ongoing training not only on surgical technique but also on mastering the instrument and energy sources available, excellent communication and documentation. These measures should be implemented not only by the operator but also the anesthesiologist and theatre practitioners.

REFERENCES

1. Putz A, Bohlin T, Rakovan M, Putz AM, et al. European operative registry to avoid complications in operative gynecology. *Best Pract Res Clin Obstet Gynecol.* 2016; 35: 113-23.
2. Shirk GJ, Johns A, Redwine DB. Complications of laparoscopic surgery: How to avoid them and how to repair them. *J Minim Invasive Gynecol.* 2006; 13: 352-9.
3. Kyung MS, Choi JS, Lee JH, Jung US, et Al. Laparoscopic Management of Complications in Gynecologic Laparoscopic Surgery: A 5-year Experience in a Single Center. *J Minim Invasive Gynecol.* 2008; 15(6): 689-94.
4. Lam A, Kaufman Y, Khong SY, Liew A, et al. Dealing with complications in laparoscopy. *Best Pract Res Clin Obstet Gynecol.* 2009; 23: 631-46.

5. Powell F, Khaund A. Laparoscopy and laparoscopic surgery (review). *Obstet Gynecol Reprod Med*. Elsevier. 2016; 26(10): 297-303.
6. Fleisch MC, Bremerich D, Schulte-Mattler W, Tannen A, et al. The Prevention of Positioning Injuries during Gynecologic Operations. Guideline of DGGG (S1-Level, AWMF Registry No. 015/077, February 2015). *German Society of Gynecology and Obstetrics. Geburtsh Frauenheilk* 2015; 75: 792-807.
7. Advincula A, Abbott J. Complications of laparoscopic surgery (Case-Based Learning). *Obstet Gynecol Reprod Med*. Elsevier. 2014; 24(8): 250-3.
8. Cuss A, Abbott J. Complications of laparoscopic surgery. *Obstetrics, Gynecology and Reproductive Medicine (Review)*. *Obstet Gynecol Reprod Med*. Elsevier. 2011; 22(3): 59-62.
9. Djokovic D, Gupta J, Thomas V, Maher P, et al. Principles of safe laparoscopic entry. *Eur J Obstet Gynecol Reprod Biol*. 2016; 201: 179-88.
10. Cuss A, Bhatt M, Abbott J. Coming to Terms with the Fact That the Evidence for Laparoscopic Entry Is as Good as It Gets (Review article). *J Minim Invasive Gynecol*. 2015; 22(3): 332-41.
11. Herrmann A, De Wilde RL. Adhesions are the major cause of complications in operative gynecology. *Best Pract Res Clin Obstet Gynecol*. 2016; 35: 71-83.
12. Becker S, De Wilde RL. Complications in gynecological minimal-access Oncosurgery. *Best Pract Res Clin Obstet Gynecol*. 2016; 35: 63-70.
13. Gopinath D, Jha S. Urological complications following gynecological surgery. *Obstet Gynecol Reprod Med*. Elsevier. 2016; 26(10): 291-6.