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Dealing with complications in laparoscopy

Alan Lam, MBBS(Hons), FRACOG, FRCOG, Associate Professor [a,*], Yuval Kaufman, BSc, MD, Fellow at CARE [a], Su Yen Khong, MBChB, MRCOG, Fellow at CARE [a], Andy Liew, MBBS, BSc(Hons), FANZCA [a], Stephen Ford, MBBS, BSc(Hons), FANZCA, VMO Anaesthetist [a], George Condous, MRCOG, FRANZCOG, Associate Professor [b]

[a] *Centre for Advanced Reproductive Endosurgery, (CARE), Royal North Shore Hospital, University of Sydney, Sydney, Australia*
[b] *Early Pregnancy, Acute Gynaecology and Advanced Endosurgery Unit, Nepean Centre for Perinatal Care, Nepean Clinical School, University of Sydney, Nepean Hospital, Sydney, Australia*

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With increasing adoption of laparoscopic surgery in gynaecology, there has been a corresponding rise in the types and rates of complications reported. This article sets out to classify complications associated with laparoscopy according to the phases of the surgery; assess the incidence, the mechanisms, the presentations; and recommend methods for preventing and dealing with complications in laparoscopic surgery. Its aim is to promote a culture of risk management based on the development of strategies to improve patient safety and outcome.

In the modern history of laparoscopy, the momentous transition from diagnostic to operative laparoscopic procedures accelerated following the first report of laparoscopic hysterectomy in the late 1980s.[1] Since then, there has been a rapid worldwide adoption of increasingly complex laparoscopic procedures across many surgical specialties, most notably in gynaecology.[2,3] Unfortunately, the increased adoption of laparoscopic surgery has also been accompanied by a corresponding rise in the rates and types of complications reported.[4–9]

'Complication' is defined in the Oxford English Dictionary as "a new problem or illness that makes treatment of a previous one more complicated or difficult".[10] Complications to laparoscopy are similar to

* Corresponding author. Tel.: +612 99669121; Fax: +612 99669126.
E-mail address: alanlam@sydneycare.com.au (A. Lam).

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side-effects to medications. While uncommon, both inevitably occur, often at the least expected time and in the least expected situation. This article sets out to classify complications associated with laparoscopy according to the phases of the surgery; assess the incidence, the mechanisms, the presentations; and recommend methods for preventing and dealing with complications in laparoscopic surgery.

Classification of complications

Rather than approaching the many different types of complications in laparoscopy as isolated events, we propose that they be classified according to the phases of the procedure:

- 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

The aim of this phase-based classification is to promote a culture of risk management based on the development of strategies to improve patient safety and outcome[11], the underlying principles of which can be remembered by the acronym of **ACT**:

- ***Awareness*** that a complication can occur at ***any time*** before the patient enters the operating room through to the postoperative phase.
- ***Communication*** and ***counseling*** skills are essential in preventing and dealing with complications.[12]
- ***Teamwork*** and ***training*** are important risk management principles in protecting and ensuring patient safety from harm, particularly in laparoscopic surgery due to the frequent introduction of new technologies or techniques.[13,14]

Let us now see how the ACT risk-management principles can be applied to prevent and deal with complications which may occur during the various phases of laparoscopic surgery.

Phase I – Patient identification

It is the responsibility of the surgical team to go through the routine of checking the patient identity, consent form, listed procedure, site of surgery and whether a patient has an allergy before the patient is anaesthetised. Failure to complete this basic step may cause grievous harm and complications in laparoscopic surgery before an incision is made.[15–18]

Phase II – Anaesthesia and positioning

Laparoscopic surgery presents unique anaesthetic challenges which are not seen in open surgery. These include the effects of pneumoperitoneum, patient positioning, extraperitoneal gas insufflations and venous gas embolism.[19]

Pneumoperitoneum

The creation of pneumoperitoneum can cause both immediate as well as dynamic cardiopulmonary effects. Initial gas insufflation may result in pronounced bradyarrhythmias and even asystole as a result of vasovagal reflex from peritoneal stretch.[20,21] This needs to be differentiated from intravascular gas insufflations, intra-abdominal blood loss from vascular injury or anaphylactic reactions. The release of pneumoperitoneum, with or without administration of short-acting adrenergic drugs such as atropine or adrenaline, should result in rapid reversal of the bradycardia, and may be followed by re-insufflation at a slower rate.

Once the procedure is underway, the continuing raised intra-abdominal pressure can cause a reduction in venous return via the inferior vena cava and a rise in systemic vascular resistance