

8. SAGES Laparoscopic Surgery Safety Checklist

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Introduction

Laparoscopic surgery has become the preferred approach for a wide variety of intra-abdominal pathology. As a result, hundreds of thousands of laparoscopic procedures are undertaken in the USA every year. For example, approximately 500,000 laparoscopic cholecystectomies and 200,000 laparoscopic gastric bypasses alone are being performed yearly. Surgical complications such as wound infections and postoperative bleeding account for nearly half of all surgical adverse events and many of these are thought to be potentially preventable [1].

Laparoscopic surgery has increased the complexity of commonly performed abdominal procedures which require not only additional surgical expertise, but also involve the use of sophisticated laparoscopic and energy equipment as well as increased demands on the operating room staff for set-up and troubleshooting of equipment. It has been shown that structured surgical team behaviors and preoperative checklists and briefings improve perioperative outcomes [2, 3]. Furthermore, a surgical safety checklist has demonstrated to significantly decrease morbidity and mortality in global populations [4]. Therefore, a safety checklist specific to laparoscopic surgery appears to be a reasonable strategy given the additional complexity that laparoscopy brings to the operating environment and may prove in the future to provide similar beneficial outcome effects.

In this chapter, we present the evidence for preoperative surgical safety checklists and propose the use of the SAGES Laparoscopic Surgery Safety Checklist during laparoscopic surgery.

Surgical Safety Checklists

In 2008, the World Health Organization (WHO) and the Safe Surgery Saves Lives Program published safety guidelines for surgical patients with the goal to strengthen the commitment of clinical staff to address safety issues within the operative environment [5]. These guidelines included improving anesthetic safety practices, ensuring correct site surgery, minimizing the risk of surgical site infections, and improving communication within the surgical team. A 19-item checklist was then designed and intended to reduce overall perioperative surgical complications (Appendix 1). However, it has been suggested that these checklists need to be customized by specialty, since items that are not relevant to the surgical specialty may actually adversely impact patient's safety [6].

The elements of the WHO Guideline for Safe Surgery checklist include a sign in before the induction of anesthesia; a time out before skin incision is made; and a sign out before the patient leaves the operating room. Using the 19-item WHO checklist, Haynes et al. showed in a prospective pre- and postintervention study that after the implementation of a surgical safety checklist, the rate of postoperative deaths and complications decreased significantly in a diverse group of hospitals [4]. Remarkably, postoperative complications and death rates fell by 36% each, the majority of which was due to a reduction in the incidence of surgical site infections. The mechanism of improvement was thought to be multifactorial which involved both system and behavioral team changes. A prospectively collected multicenter outcomes study in 1,750 patients undergoing urgent noncardiac surgery was also associated with an approximately one-third reduction in morbidity due primarily to fewer surgical infections and a lower incidence of major blood loss [7].

Similarly, during a commonly performed laparoscopic procedure, Buzink and colleagues demonstrated that the combined use of an integrated operating room system with the *Pro/cheQ* tool, a digital procedure-specific checklist, the number of risk-sensitive events was reduced by 65% during laparoscopic cholecystectomy when compared to an operating room integrated system alone [8]. Integrated operating room systems may also help prevent technical problems, improve ergonomics, reduce operating room clutter, and enhance efficiency by decreasing turnover time and improving the flow of information [9, 10].

The use of equipment checklists during laparoscopic surgery has shown to prevent problems with laparoscopic equipment by over 50% [11]. Verdaasdonk and colleagues developed a 28-item checklist based on problems that arose frequently with laparoscopic equipment.

They then piloted this checklist in 60 laparoscopic cholecystectomy cases in which half utilized the checklist and half did not. Fewer episodes of wrong patient positioning and wrong settings and connections of the equipment were noted in the checklist group and overall the checklist resulted in a 53% lower incident rate per procedure compared with controls. Another group found that a 10-step checklist during laparoscopic cholecystectomy was associated with a reduction in conversion rates to open cholecystectomy [12]. These observations suggest that a laparoscopic-specific checklist is feasible and would help reduce equipment problems and potentially improve outcomes for these commonly performed procedures. It has also been suggested that surgeons' skills coupled with basic team performance and basic surgical equipment may enable a surgeon to achieve a 90% success rate in high-risk operations [13]. In other words, poor team performance and poor equipment may lead to frustration on the part of the surgeon and, thereby, have detrimental effects on his/her performance.

The utilization of checklists in the operating room must have a full commitment from the entire surgical team and should be carried out with conscious effort and not in a superficial or perfunctory manner [14]. Checklist misuse can also have potentially detrimental effects on safety and teamwork in the operating room. In aviation, a badly performed checklist has shown to provide a false sense of security [15]. Therefore, a careful and rigorous implementation plan is required to ensure that the checklist is used routinely and correctly [16].

SAGES Laparoscopic Surgery Safety Checklist

Laparoscopic surgery, because of its inherent reliance on high technology equipment and potential for equipment failure or other technologic problems that may interfere with the conduct of the operation, requires that staff be able to solve the myriad of equipment problems that may arise. In response to this perceived need, in the 1990s the SAGES Continuing Education Committee developed the SAGES Troubleshooting Guide which was revised and updated in 2005. The guide addresses strategies to deal with problems in eight broad categories: (1) poor insufflation/loss of pneumoperitoneum; (2) excessive insufflation pressure; (3) inadequate lighting; (4) lighting too bright; (5) problems with monitor picture; (6) image quality problems; (7) inadequate suction/irrigation; and (8) problems with electrocautery. The Troubleshooting Guide is available in laminated copies or as a pdf download from the SAGES website [17].

As a part of the process to update the Troubleshooting Guide, the SAGES Laparoscopic Surgery Safety Checklist was developed to guide surgical teams in ensuring that equipment, patient position, and safety checkpoints were carried out. Much like an aviation preflight check, this document divides checklist responsibilities into three general categories: circulator nurse pre-patient entry checks, scrub nurse/technician pre-patient entry checks, and a series of checklist items that should occur after patient entry. The checklist is not intended to add to the burden of documentation that is already required by the circulating RN in the operating room, but instead should be viewed as a mechanism to eliminate reliance on human memory and to ensure that the necessary equipment is available, operational, and connected and that the OR table, patient and monitors are all properly positioned and should be used as an adjunct to the general safety parameters that are in the WHO checklist. These measures are intended to enhance efficiency, performance, and safety in the complex environment of a laparoscopic surgery suite.

The original checklist has recently been updated and modified by the SAGES Quality, Outcomes, and Safety Committee and is shown in [Appendix 2](#). This laparoscopic checklist may be used either as the sole checklist employed on operative cases or it may be used in conjunction with the WHO or institution-specific checklists that deal with issues of patient and procedure verification, antibiotics and DVT prophylaxis, imaging availability, and others. SAGES is in the process of partnering with the Association of Operating Room Nurses (AORN) to trial the Laparoscopic Safety Checklist in multiple centers across the USA to evaluate its utility and impact on safety and efficiency in laparoscopic surgery.

Summary

The proper use of a Surgical Safety Checklist improves surgical team communication and efficiency that translates into a significant reduction in morbidity and mortality. The SAGES Laparoscopic Surgery Safety Checklist is yet another tool aimed to decrease adverse events during laparoscopic surgery. Surgical teams should work together to ensure that checklists become a routine part of every operating room culture.

Surgical Safety Checklist		
Before induction of anaesthesia <small>(with at least nurse and anaesthetist)</small>	Before skin incision <small>(with nurse, anaesthetist and surgeon)</small>	Before patient leaves operating room <small>(with nurse, anaesthetist and surgeon)</small>
Has the patient confirmed his/her identity, site, procedure, and consent? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	<input type="checkbox"/> Confirm all team members have introduced themselves by name and role. <input type="checkbox"/> Confirm the patient's name, procedure, and where the incision will be made. Has antibiotic prophylaxis been given within the last 60 minutes? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	Nurse Verbally Confirms: <input type="checkbox"/> The name of the procedure <input type="checkbox"/> Completion of instrument, sponge and needle counts <input type="checkbox"/> Specimen labelling (read specimen labels aloud, including patient name) <input type="checkbox"/> Whether there are any equipment problems to be addressed
Is the site marked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable	Anticipated Critical Events To Surgeon: <input type="checkbox"/> What are the critical or non-routine steps? <input type="checkbox"/> How long will the case take? <input type="checkbox"/> What is the anticipated blood loss? To Anaesthetist: <input type="checkbox"/> Are there any patient-specific concerns? To Nursing Team: <input type="checkbox"/> Has sterility (including indicator results) been confirmed? <input type="checkbox"/> Are there equipment issues or any concerns? Is essential imaging displayed? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	To Surgeon, Anaesthetist and Nurse: <input type="checkbox"/> What are the key concerns for recovery and management of this patient?
Is the anaesthesia machine and medication check complete? <input type="checkbox"/> Yes		
Is the pulse oximeter on the patient and functioning? <input type="checkbox"/> Yes		
Does the patient have a: Known allergy? <input type="checkbox"/> No <input type="checkbox"/> Yes Difficult airway or aspiration risk? <input type="checkbox"/> No <input type="checkbox"/> Yes, and equipment/assistance available Risk of >500ml blood loss (7ml/kg in children)? <input type="checkbox"/> No <input type="checkbox"/> Yes, and two IVs/central access and fluids planned		

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

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Appendix 2: SAGES/AORN Laparoscopic/MIS Surgery Safety Checklist

1. Pre-patient entry

A. Circulating nurse duties

Parameter	Actions
Surgeon Preference Card	<input type="checkbox"/> Reviewed
OR Table Position	<input type="checkbox"/> Correct orientation and weight capacity <input type="checkbox"/> Bean bag mattress (if indicated) <input type="checkbox"/> Table accessories (e.g., spreader bars/leg supports/foot board (as indicated) <input type="checkbox"/> Positioned for fluoroscopy if indicated
Power sources	<input type="checkbox"/> Connected and linked to all devices
CO ₂ insufflator	<input type="checkbox"/> Check CO ₂ volume, pressure, and flow <input type="checkbox"/> Backup cylinder and accessories (wrench and key) in place <input type="checkbox"/> Filter for CO ₂ unit or tubing
Video monitors	<input type="checkbox"/> Position per procedure <input type="checkbox"/> Test pattern present
Suction/irrigation	<input type="checkbox"/> Cannister set <input type="checkbox"/> Irrigation and pressure bag available
Alarms	<input type="checkbox"/> Turned on and audible
Video documentation	<input type="checkbox"/> Recording media available and operational (DVD, print, etc.)

B. Scrub Person Duties

Parameter	Actions
Reusable instruments	<input type="checkbox"/> Check movement handles and jaws, all screws present <input type="checkbox"/> Check sealing caps <input type="checkbox"/> Instrument vents closed <input type="checkbox"/> Check cautery insulation
Veress needle	<input type="checkbox"/> Check plunger/spring action <input type="checkbox"/> Flush needle and stopcock <input type="checkbox"/> Saline solution available
Hasson cannula	<input type="checkbox"/> Check valves, plunger, and seals
Trocars/Ports	<input type="checkbox"/> Check appropriate size/type <input type="checkbox"/> Close stopcocks
Laparoscope	<input type="checkbox"/> Appropriate size and type (0° or 30°, 5 or 10 mm) for case <input type="checkbox"/> Check lens clarity <input type="checkbox"/> Anti-fog solution or warmed saline for lens cleaning

2. After Patient Entry

Parameter	Actions
Patient position	<input type="checkbox"/> Secured to OR table, safety strap on <input type="checkbox"/> Pressure sites padded <input type="checkbox"/> Arms out or tucked per procedure
Sequential compression device	<input type="checkbox"/> On and connected to device
Electrosurgical unit	<input type="checkbox"/> Ground pad applied
Foot controls	<input type="checkbox"/> Positioned for surgeon access
Power sources (camera, insufflator, light source, monitors, cautery, ultrasonics, and bipolar)	<input type="checkbox"/> Turned on
Miscellaneous	<input type="checkbox"/> Foley catheter (if indicated) <input type="checkbox"/> Naso- or orogastric tube (bougies if indicated)
Antibiotics	<input type="checkbox"/> Given as indicated

3. After Prep and Drape

Parameter	Actions
Electrosurgical unit	<input type="checkbox"/> Cautery cords connected to unit
Monopolar cautery	<input type="checkbox"/> Tip protected
Ultrasonic or bipolar device	<input type="checkbox"/> Connected to unit <input type="checkbox"/> Activation test performed
Line connections	<input type="checkbox"/> Camera cord <input type="checkbox"/> Light source (on standby) <input type="checkbox"/> CO ₂ tubing (connected and flushed) <input type="checkbox"/> Suction/irrigation (Suction turned on) <input type="checkbox"/> Smoke evacuation filter connected
Local anesthetic	<input type="checkbox"/> Syringe labeled and filled with anesthetic of choice, needle connected
Fluoroscopy case	<input type="checkbox"/> Mix and dilute contrast appropriately and label <input type="checkbox"/> Clear tubing, syringe, catheter of air bubbles, label syringes

This checklist has been developed by SAGES and AORN to aid operating room personnel in the preparation of equipment and other duties unique to laparoscopic surgery cases. It should not supplant the surgical time out or other hospital-specific patient safety protocols. For equipment problems during laparoscopic cases, refer to the SAGES Troubleshooting Guide (www.sages.org/publications/troubleshooting/).

Selected Readings

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