

**SAGES**

Society of American Gastrointestinal and Endoscopic Surgeons

Laparoscopy Preparation and Troubleshooting Guide

Developed and Distributed by the SAGES Continuing Education Committee

To minimize equipment malfunction, scheduled routine maintenance should be in place for all components of laparoscopy. Manufacturers' recommendations for routine replacement of some parts (e.g. bulbs) should be taken into consideration.

PREOPERATIVE PRECAUTIONS

Circulator Nurse Duties or Tasks

Prior to patient entry into operating room.

1. OR table position: Assure OR table is properly set up for the procedure. For laparoscopic cholecystectomy, table should be positioned so cholangiography can be done. For laparoscopic foregut procedures, have spreader bars or other leg supports attached. Ensure that tilt mechanism is functional and table & joints are level. Have bean-bag mattress with padding on table for advanced procedures. Have lead shielding available if fluoroscopy is to be done. Set up foot board when indicated.
2. Power sources: Check that all power sources are connected and device units are switched "on" (Don't use multi-socket single source or circuit will overload).
3. CO2 insufflator: Assure adequate volume of CO2 gas (green zone on insufflator LED) and availability of backup up CO2 tank. (Have wrench and gasket available). Check that insufflator alarm is set to function properly.
4. Electrosurgical unit: Check proper functioning of auditory alarm and have patient grounding pad available.
5. Video monitors: Ensure that video monitors are operational and position monitors in a location appropriate for the procedure. Check that a test pattern appears on the monitor before the camera is plugged in.
6. Suction/irrigation: Check that suction canister is set up and irrigation bag is available and attached to pressure irrigation unit if needed for procedure.
7. Have sequential compression devices (SCD's), Foley catheter and nasogastric tube available.
8. Assure that video documentation sources are operational and CD, DVD or VHS tape is available.
9. Minimize floor clutter; move cables and tubing so that they will not interfere with stretcher, C-arm, surgeons, etc.

After patient enters operating room

1. Verify identification of patient and confirm the procedure to be done with patient and operating room team, including verifying site of surgery.
2. Assist in proper positioning of patient on operating room table and ensure that pressure points are well padded.
3. Secure patient to operating room table, apply safety strap.
4. Post anesthesia induction, apply electrocautery grounding pad to patient and connect to electrocautery unit.
5. Post prep and drape, connect all lines passed from sterile field to appropriate units – camera cord, light source, cautery cord(s), suction/irrigation lines and CO2 tubing. Ensure that CO2 tubing is securely attached to insufflator line. Verify that suction line is turned on and connected and irrigation line is open if irrigation is to be used.
6. Position any foot pedals (electrocautery, ultrasonic coagulator, etc.) appropriate to surgeon position and preference.
7. Place SCD's to both legs according to surgeon preference.
8. Complete checklist of Patient's Preparation for Surgery.

Scrub Tech/ RN Duties

1. Check functionality of reusable instruments; check free movement of instrument handles and jaws; check sealing caps for cracked rubber, stretched openings; check to assure that instrument cleaning channel screw caps are in place.
2. Check Veress needle for proper plunger/spring action and assure easy flushing through stopcock and/or needle channel.
3. If Hasson cannula to be used, assure availability of stay sutures and retractors. Check valves, plunger, spring, and assure tight seals on reusable Hasson cannula. Assure availability of appropriate size and type of accessory trocars.
4. Close stopcocks on all ports.
5. Check laparoscope for clarity and vision.
6. Have local anesthetic of choice and injection syringe available.
7. When cholangiography is anticipated prior to surgery or cystic duct is cannulated during procedure, mix and appropriately dilute cholangiogram contrast solution. Evacuate cholangiography tubing, syringe, and catheter of all air bubbles.

Troubleshooting

PROBLEM

CAUSE

SOLUTION

1. Poor Insufflation/loss of pneumoperitoneum

CO2 tank empty or volume low	Change tank
Accessory port stopcock(s) open	Inspect all accessory ports. Open or close stopcock(s) as needed
Leak in sealing cap, reducer	Change cap or stopcock cannula
Excessive suctioning pressure	Allow time to reinsufflate, lower suction
Loose, disconnected or kinked insufflation tubing	Tighten connections or reconnect at source or at port, unkink tubing
Hasson stay sutures loose	Replace or secure sutures
CO2 flow rate set too low	Adjust flow rate
Valve on CO2 tank not fully open	Use valve wrench to open fully
Leak at skin where port enters cavity	Apply penetrating towel clip or suture around port

2. Excessive pressure required for insufflation (initial or subsequent)

Veress needle or cannula tip not in peritoneal space	Reposition needle or cannula under visualization if possible
Occlusion of tubing (kinking, table joints, etc.)	Inspect full length of tubing
CO2 port stopcock turned off	Fully open stopcock
Patient is "light"	Communicate to anesthesia
Morbidly obese patient	Use longer Veress needle

3. Inadequate lighting (partial/complete loss)

Light is dim	Increase gain. Check scope for adequate fiberoptics. Replace light cable, laparoscope and/or camera
Light is on standby	Take light off standby
Loose connection at source or scope	Adjust connection
Light is on "manual-minimum"	Go to "automatic"
Fiber optics are damaged	Replace light cable
Automatic iris adjusting to bright reflection from instrument	Re-position instruments, or switch to "manual"
Monitor brightness turned down	Readjust brightness setting, adjust gain
Room brightness floods monitors	Dim room lights
Bulb is burned out	Replace bulb
Scope dark	Check white balance

4. Poor quality picture

Flickering electrical interference, poor cable shielding	Replace cautery cables, switch camera head, make sure cables don't cross, use different plug points
Color problems	White balance camera, check chrome on monitor, check printer/VCR/digital capture cables
Glare not caused by lighting	Check for loose cables not plugged in

5. Lighting too bright

Light is on "manual-maximum"	"Boost" on light source is activated
Monitor brightness turned up	Go to "automatic, Deactivate boost", Readjust setting

6. No picture on monitor(s)

Camera control or other components (VCR, printer, light source, monitor) not "on"	Make sure all power sources are plugged in and turned on
Cable connector between camera control unit and/or monitors not attached properly	Cable should run from "video out" on camera control unit to "video in" on primary monitor. Use compatible cables for camera unit and light source
Cable between monitors not connected	Cable should run from "video out" on primary monitor to "video in" on secondary monitor
Input select button on monitor doesn't match "video in" choice	Assure matching selection
Input selection button on monitor or video peripherals (eg VCR, digital capture, printer) not selected	Adjust input selection

7. Poor quality picture**a. fogging/haze**

Condensation on lens from cold scope entering warm abdomen	Use anti-fog solution or hot water, wipe lens externally
Condensation on scope eyepiece, camera lens	Detach camera from scope (or camera from coupler); inspect and clean lens as needed

b. flickering, electrical interference

Moisture in camera cable connecting plug	Use suction or compressed air to dry out moisture (don't use cotton tip applicators on multi-pronged plug)
Poor cable shielding	Move electrosurgical unit to different circuit or away from video equipment, make sure cables do not cross, switch camera head; replace cables as necessary
Insecure connection of video cable between monitors	Reattach video cable at each monitor

c. blurring, distortion

Incorrect focus	Adjust camera focus ring
Cracked lens, internal moisture	Inspect scope/camera, replace if needed
Too grainy	Adjust enhancement and/or grain setting for units with this option

8. Inadequate suction/irrigation

Occlusion of tubing (kinking, blood clot, etc.)	Inspect full length of tubing. If necessary, detach from instrument and flush tubing with sterile saline
Occlusion of valves in suction/irrigator device	Detach tubing, flush device with sterile saline
Not attached to wall suction	Inspect and secure suction & wall source connector
Irrigation fluid container not pressurized	Inspect pressure bag or compressed gas source, connector, pressure dial setting

9. Absent or "weak" cauterization

Patient not grounded properly	Assure adequate grounding pad contact
Connection between electro-surgical unit and instrument loose	Inspect both connecting points
Foot pedal or hand switch not connected to electro-surgical unit	Make connection
Wrong output selected	Correct output choice
Connected to the wrong socket on the electro-surgical unit	Check that cable is attached to endoscopic socket
Instrument insulation failure outside of surgeon's view	Use new instrument and inspect insulation



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