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:** Ensure OR table is properly set up for the procedure according to sugeon preference. Ensure that tilt mechanism is functional, and table & joints are level. Have bean bag mattress with padding on table for procedures to be done in decubitus position. Have lead shielding available and reverse the position of the bed if fluoroscopy is to be done (e.g. laparoscopic cholecystectomy). Set up foot board, foam pad, split leg attachments or stirrups (depending on sugeon preference) if steep reverse Trendelenburg will be used. Set up shoulder brace or foam pad if steep Trendelenburg will be used. Place brackets for liver retractor if needed for the case. Ensure table can accommodate patient's weight.
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:** Ensure adequate volume of CO2 gas (green zone on insufflator LED) and availability of backup CO2 tank. (Have wrench and gasket available). Check that insufflator alarm is set to function properly. If the insufflator has a small cavity or arthroscopy setting, make sure the device is set to large cavity or laparoscopy.
4. **Electrosurgical unit:** Check proper functioning of auditory alarm and have patient dispersive electrode 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. Ensure monitor is on the proper laparoscopic setting (not arthroscopic or endoscopic).
6. **Suction/irrigation:** Check that suction cannister is set up and irrigation bag is available and attached to pressure irrigation unit if needed for procedure.
7. **Scope warmer:** Ensure that scope warmer is available and functioning properly (e.g. if warming basin is used, be sure it is on and set to appropriate temperature.)
8. Have sequential compression devices (SCDs), Foley catheter and nasogastric tube available.
9. Ensure that video documentation sources are operational.
10. **Minimize floor clutter:** move booms, cables, video monitors and tubing so that they will not interfere with gurney, C-arm, surgeons, etc.
11. Check preference card and ensure all specialized equipment is available and in working order.
12. Ensure availability of appropriate size and type of accessory trocars, and check availability for bariatric length trocars in higher BMI patients.

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. Place sequential compressive devices to both legs according to surgeon preference, prior to induction.
4. Secure patient to operating room table, apply safety strap.
5. Post anesthesia induction, apply electrosurgical dispersive electrode pad to patient and connect to electrosurgical unit.
6. After prepping and draping, 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 nozzle. Verify that suction is turned on and properly connected and spike is fully inserted into irrigation solution bag (if irrigation is to be used).
7. Position any foot pedals (monopolar, bipolar, ultrasonic dissector, etc.) appropriate to surgeon position and preference.
8. Complete checklist of Patient's Preparation for Surgery.

Scrub Tech/ RN Sterile Equipment Duties or Tasks

1. Check functionality of reusable instruments; check free movement of instrument handles and jaws; check sealing caps for cracked rubber, stretched openings; check to ensure that instrument cleaning channel screw caps are in place.
2. Check Veress needle for proper plunger/spring action and ensure easy flushing through stopcock and/or needle channel.
3. If Hasson cannula to be used, ensure availability of stay sutures and retractors. Check valves, plunger, spring, and ensure tight seals on reusable Hasson cannula.
4. Close stopcocks on all ports.
5. Check laparoscope for clarity and vision.
6. Have local anesthetic of choice and injection syringe available.
7. If contrast will be used in conjunction with fluoroscopic procedures (e.g. cholangiography), mix and appropriately dilute contrast solution according to surgeon preference. Evacuate air bubbles from tubing, syringe and catheter.

INTRAOPERATIVE TROUBLESHOOTING

Problem	Cause	Solution
1. Poor insufflation / loss of pneumoperitoneum		
	CO2 tank empty or volume low.	Change CO2 tank.
	Accessory port stopcocks(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 re-insufflate, lower suction intensity.
	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, check to be sure insufflator is set to large cavity setting.
	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.
	Patient inadequately paralyzed.	Discuss with Anesthesia colleagues to ensure appropriate relaxation and depth of anesthetics.
2. Excessive pressure required for insufflation (initial or subsequent)		
	Veress needle of cannula tip not in peritoneal space.	Reposition needle or cannula under direct 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" (not fully paralyzed).	Communicate with anesthesia.
	Morbidly obese patient.	Consider use of longer Veress needle or cannula, or any other safe method of peritoneal cavity entry.

3. Inadequate lighting (partial/complete loss)

Light is dim.	Increase gain. Check laparoscope for adequare fiberoptics. Replace light cable and/ or camera. If using 5mm laparoscope, consider upsizing to 10mm laparoscope.
Light is on standby.	Take light off standby.
Loose connection at source or scope.	Adjust connection.
Light is on “manual-minimum”.	Switch to automatic or increase brightness setting.
Fiber optics are damaged.	Replace light cable.
Automatic iris adjusting to bright light reflection from instrument.	Reposition instruments, or switch to manual setting.
Light is absorbed by blood or bile in the operative field.	Remove blood with suction or switch to manual setting.
Monitor brightness turned down.	Readjust brightness setting, adjust gain.
Room brightness floods monitors.	Dim room lights.
Bulb is burned out.	Replace bulb.
Residue related to heat from light-source of light cord.	Scrape off residue or replace light cord.
Laparoscope is 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, don’t different plug points.
Color problems.	White balance camera, check chrome on monitor, check printer/ 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 boot” mode, readjust monitor settings.

6. No picture on monitor(s)

Camera control or other components (video recorder, printer, light source, monitor) not “on”.	Make sure all power source is activated.
Cable connectors 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.
Cables between monitors not connected.	Cables 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 (e.g. video recorder, digital capture, printer) not selected.	Adjust input selection.

7. Poor quality picture

a. Fogging / Haze

Condensation on lens from cold laparoscope entering warm abdomen.	Use anti-fog solution or hot water, wipe lens externally.
Condensation on laparoscope eye piece, camera lens.	Detach camera from laparoscope (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 our moisture (do NOT 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.
Unsecure connection of video cable between monitors.	Reattach video cable at each monitor.

c. Blurring, distortion

Camera out of focus.	Adjust camera focus ring.
Cracked lens, internal moisture.	Inspect laparoscope/ camera, replace if needed.
Image too grainy.	Adjust enhancement and/ or gain 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 calves in suction/ irrigator device.	Detach tubing, flush device with sterile saline.
Not attached to wall suction.	Inspect and secure suction and wall source connector.
Not attached to irrigation bag.	Ensure spike is fully inserted into the irrigation bag.
Irrigation container not pressurized	Inspect pressure bag or compressed gas source, connector, and pressure dial setting. Ensure irrigation bag is elevated to maximize gravitational effect.
Too many devices connected to suction, creating “steal”	Turn off suction to completing devices.
No flow of irrigant despite all the above.	Ensure device is turned on, adequate battery/ power, may need to change out for a new irrigator.

9. Absent or “weak” electrosurgery instrument effect

The dispersive electrode pad is not properly in place.	Ensure adequate dispersive electrode pad contact.
Connection between electrosurgical unit and instrument loose.	Inspect both connecting points.
Foot pedal or hand switch not connected to electrosurgical unit.	Ensure appropriate connection to electrosurgical unit.
Wrong output selected.	Correct output choice.
Connection to the wrong socket on the electrosurgical unit.	Check that cable is attached to laparoscopic socket.
Instrument insulation failure outside of surgeon’s view.	Use new instrument and inspect insulation, inspect tissue around instrument for iatrogenic injury.
Continual lack of electrosurgery effect despite all the above.	Completely change out the electrosurgery cable for a new one and send cable to check for defects.

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