

Laparoscopic surgery

The following is an extract from *Standards and Recommendations for Safe Perioperative Practice (Fifth Edition)*, published by the Association for Perioperative Practice.

Laparoscopic surgery has specialised electrosurgical equipment. This includes long active electrodes, specialised tips and automatic vessel ligators and cauterisers. Laparoscopic surgery has specific hazards in relation to monopolar electrosurgery (AORN 2019). These hazards are primarily related to the high number of instruments and cannula that are contained in the small space of the abdominal cavity and the possibility of electrical interference with each other. The main hazards associated with these procedures are direct coupling and capacitive coupling.

Direct coupling

Direct coupling will occur in situations where an active electrode inadvertently touches another instrument that is itself in direct contact with tissue, resulting in a burn on that tissue. Care should always be taken to ensure that the uninsulated section of the active electrode is in full view prior to the electrode being activated (O'Riley 2010).

Capacitive coupling

Capacitive coupling occurs because of the nature of the high frequency electrosurgical current and can occur without contact between two adjacent metallic objects, which are separated by an insulator. Capacitive coupling may occur in a 'sandwich' between the active electrode, its insulation and a metal cannula. Capacitive charge builds up on the metal cannula. Normally the charge safely disperses through the tissues of the abdominal wall in contact with the metal cannula. However, when a plastic abdominal anchor is used, a charge may build up on the cannula which may be picked up by an adjacent metal instrument, which in turn might be transmitted back to the patient through adjacent tissues.

The potential can be reduced through the following:

- Choose the lowest voltage waveform possible
- Use the lowest power setting possible
- Choose all metal or all plastic cannula (metal preferable) – do not mix metal and plastic components

- Touch tissue before activating instrument (do not activate instrument in air)
- Check instruments for defects in insulation before and after use
- Use of non-metal equipment
- Use short activation times
- Use bipolar electrosurgery wherever possible.

All members of the perioperative team should be aware of the possibility of burns occurring outside the operating surgeon's field of vision within the confined space (AfPP 2016).

Endoscopic surgery

Any endoscopic surgery approach requires the use of metal instruments in confined spaces, increasing the risk that an active electrode will come into contact with a metal endoscope, resulting in a burn for either the patient or the surgeon. The principles discussed above therefore also apply with endoscopic electrosurgery.

An additional danger during endoscopy is the explosion of methane from the patient's bowels caused by electrosurgical sparks. A low voltage waveform which produces fewer sparks, and a low power setting, is therefore advisable. Good bowel prepping may also reduce this risk.

RECOMMENDATIONS FOR LOCAL POLICY

Communication

8.2.1 Discussion of use of electrosurgery and equipment required is undertaken at the appropriate points within the five steps to safer surgery process.

8.2.2 Verification of appropriate staff to support operation and application of the appropriate equipment checks must be made within the five-step process and these staff must be present in the use of electrosurgery.



8.2.3 Particular patient issues that affect the application and use of ESU, for example a pacemaker, electronic tag or cochlear implant must be discussed at team briefing or within the five-step process and practice agreed within the team. A SOP/policy should be constructed with input from the perioperative team and operating surgeons. Company input regarding various implants should be included in the policy, this of course will not be exhaustive. A checklist is adopted on processes for medical implants insitu when diathermy is to be used.

References and further reading

Association for Perioperative Practice 2016 **Standards and Recommendations for Safe Perioperative Practice** Harrogate, AfPP

Association for perioperative Registered Nurses **2019 Perioperative Standards and Recommended Practices** Denver, AORN Inc

O'Riley M 2010 Electrosurgery in perioperative practice. In: **Foundations in Practice** Harrogate, Association for Perioperative Practice