

Intraperitoneal fire during abdominal surgeries: 'Fire in the belly' not always a good thing!

Dear Editor,

Operating theatre (OT) fires are rare but frightening events that cause considerable damage to OT personnel and increase patient morbidity and rarely fatality. Anaesthetists, usually vigilant for OT fires during high-energy device usage, such as lasers during airway surgeries, may not be as vigilant for fire hazards during other surgeries.^[1] We present two cases of fire that occurred during retroperitoneal sarcoma excision and cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC), causing patient morbidity.

Both patients did not undergo bowel preparation as per our institutional Enhanced Recovery After Surgery (ERAS) protocol. Both had an uneventful anaesthetic induction and were maintained on oxygen and nitrous oxide (50:50), later switched to an air oxygen mixture in isoflurane and controlled ventilation. Both explosions occurred while opening the colon with electrocautery. The first patient suffered damage to 5–8 cm of the proximal mesocolon and needed extended left hemicolectomy with colo-colic anastomosis. The second patient required revision of ileocolic anastomosis. In both cases, no OT personnel were injured.

The gastrointestinal tract is notorious for producing flammable gases (hydrogen and methane), causing explosions and fire. The proportions may vary in the bowel according to diet, digestion, metabolism and preoperative bowel preparation. Hydrogen and methane have an explosive range of 4%–72% and 5%–15%, respectively, if the oxygen concentration is more than 5% in the gut. The oxygen concentration decreases from 10% to 5% from the stomach to the colon; the concentration of flammable gases increases as oxygen is used during anaesthesia. An OT is always at risk of fires, as all the 'fire triad' components are present.^[2] Oxygen concentration is usually high from supplemented oxygen and from multiple ignition sources, that is, electrocautery, faulty electric equipment or laser, and fuel is provided by gases in the gut or sterilisation agents like alcohol or material such as drapes, swabs, tracheal tubes and nebulisers.^[3] The fuel source in both our cases was flammable gas in the colon with higher oxygen concentration, causing an explosive cocktail and electrocautery as the ignition source.

Most explosions are likely to occur in the unprepared or obstructed colon with colonic distension during surgery. Diathermy use can cause explosions with alcohol-based skin preparations, colonic gas and oxygen-enriched environments.^[4] Increased gaseous volume in the intestinal lumen by nitrous oxide aids combustion. The fire risk may increase due to unprepared bowels; complete cleansing before colonic surgery is advisable. The 2013 ERAS guidelines recommended routine mechanical bowel preparation (MBP) for colon surgical patients due to concerns of dehydration, patient distress and prolonged ileus postoperatively.^[5] These recommendations may result in most surgeons not using MBP, causing an explosive gas buildup in the colon. We suggest using a scalpel and not diathermy to open the distended bowel, irrespective of the bowel preparation status. Diathermy can be used subsequently after gases have escaped from the bowel.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients consented to their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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