

Patient Safety Strategies and Tactics

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Surgical Fires: Electrosurgical Cases

The AMC PSO recently analyzed a surgical fire that arose during the use of electrosurgical cautery. Though rare, these events have disastrous consequences for patients and the surgical team.

The analysis identified three surgical fire interventions: prevention, response, and training.

Safety Strategies: Prevention

It is essential to understand that the majority of surgical fires are the result of team failures rather than individual failures. Therefore, interventions should be directed at the entire team rather than the provider wielding the electrosurgical unit (ESU).

- Each member of the team must be constantly aware of changing risks during the case (e.g., patient shifting causing tenting that creates an oxygen rich environment) and be empowered to identify and address these risks.
- A culture of strong surgical teamwork will improve communication, foster collaboration, and minimize hierarchy, enabling every team member to speak up about near misses or potential adverse events.
- Surgical checklists that include an assessment of fire/burn risk as part of the preoperative Time Out are already being used to reduce the risk of surgical fires. Incorporation of this step added only five seconds to the checklist process and has not lead to “checklist fatigue”.
 - By using these checklists, it is possible to identify whether a case was low or high risk for surgical fire. Plans should be developed for high risk cases and every member of the

team is responsible for ensuring that they are followed.

Mitigation strategies for high risk cases included:

- Minimization or elimination of enriched oxygen delivery during the case.
 - Particular caution should be taken during head, neck, and upper chest surgery when an ESU is used in the presence of combustible anesthetic gases.
- Additionally, the surgical team should establish the lowest possible cautery settings and communicate them to the nursing staff.
- Care should be given to avoid placing the device tip in contact with surgical drapes, and, when not in use, the ESU should be placed in a non-conductive holster.

Safety Strategies: Response to Surgical Fires

The AMC PSO has noted that many facilities use OR critical event or crisis checklists to guide the timely and effective response to a surgical fire. Support for the use of these checklists was recently reported by *Ziewacz et al in the Journal of the American College of Surgeons (2011;213:212-217.e10)*.

The study authors noted that lack of compliance with critical event response best practices was common, since operating room crises were so rare. Further, although checklists were standard in management of aviation and other high-reliability fields, they had not been widely considered for use in the OR. The authors compared teams using checklists to those working on memory alone and found that checklist use resulted in a 6-fold reduction in failure of adherence to critical crisis management steps. The authors concluded that checklist use can improve safety and management in operating room crises.

Response to surgical fires can also be improved when senior leaders, particularly those from risk management and patient safety, are immediately involved to address the non-clinical issues that will arise. They can make sure that surgical and respiratory equipment is appropriately sequestered and is not discarded or returned to the manufacturer.

Additionally, they can debrief the team members right after the event while memories are still fresh and everyone is still present. The emotional impact of the event should be acknowledged during the debriefing and the organization's peer support and employee assistance programs should be contacted.

Senior leadership can also oversee notification of state regulatory agencies, coordination with the local fire department, and response to any media inquiries.

Safety Strategies: Training

The AMC PSO strongly recommends fire safety education and training for all members of the OR staff. Education can be facilitated with consultants to sponsor large scale, multi-disciplinary grand rounds, which include fire safety content. It is possible to present this information over the course of several one hour sessions. The Anesthesia Patient Safety Foundation (APSF) "Prevention and Management of Operating Room Fires" video is often included as a part of training sessions. This video is available at http://apsf.org/resources_video.php.

Organizations also routinely hold "Patient on Fire" drills to familiarize staff with their response to this critical event and were exploring ways to include surgical fire scenarios into existing simulation programs.

Although national standards for provider training have yet to be developed for the use of electrosurgical cautery, the Food and Drug Administration is building a coalition of public and private healthcare organizations to prevent surgical fires. More information can be found at

<http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm282810.htm>.

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amcpso@rmf.harvard.edu