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Hall A1 South Area G

Closed Claims Analysis of Cautery Fires in the Operating Room

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Background: Following publication of the 2008 American Society of Anesthesiologists (ASA) Practice Advisory for the Prevention and Management of Operating Room Fires,¹ the Anesthesia Patient Safety Foundation has emphasized oxygen delivery in the prevention of surgical fires and produced an educational video on fire prevention and management.² We analyzed operating room fires from the use of electrocautery during surgery using the ASA Closed Claims Project database.

Methods: After IRB approval, we reviewed 85 claims for cautery-related surgical fires from 7031 total surgical claims in 1985 through 2008. We analyzed factors associated with fires including procedures, use of and type of device for oxygen delivery, and fire triad elements (ignition source, oxidizer, fuel) by anesthetic technique. High fire-risk procedures were defined as cautery in close proximity to an oxidizer-enriched atmosphere.¹ Trends over time were analyzed by Fisher's exact test. $P < 0.05$ was deemed significant.

Results: Cautery fires increased from $< 1\%$ of claims in 1985-1994 to 4% of all surgical claims in 2000-2008 ($p < 0.001$). Most (96%) fires occurred in high-risk procedures. Most fires ($n = 71$, 84%) occurred during sedation, the majority during monitored anesthesia care (MAC, $n = 68$), with the remainder ($n = 3$) during regional anesthesia (RA). Sixteen percent ($n = 14$) of cautery fires occurred during general anesthesia (GA). Cautery fires during MAC increased from 6% of MAC claims in 1985-1989 to 32% of MAC claims in 2000-2008 ($p < 0.01$), while fires during GA occurred in 0.6% of GA claims in 1995-2008 (Figure). Oxygen was used in 96% of all cautery fire claims. In three low-risk procedures, fire ignited flammable fuels with no supplemental oxidizer.

Nearly all claims associated with sedation (MAC/RA) involved high-risk procedures (99%) with use of supplemental oxygen (54% of these had nasal cannula and 31% face mask). Most (94%) burns in sedation claims were to the skin and/or mouth region, with burns involving the airway in only 4 claims. Of the fires occurring during GA, 71% were oral and tracheal surgeries using an ETT (cuff leak or rupture during surgery) and 14% were head, neck or upper chest surgeries with GA by face mask. Over half (57%) of burns during GA involved the airway, with the remainder of burns (43%) limited to the skin and/or mouth.

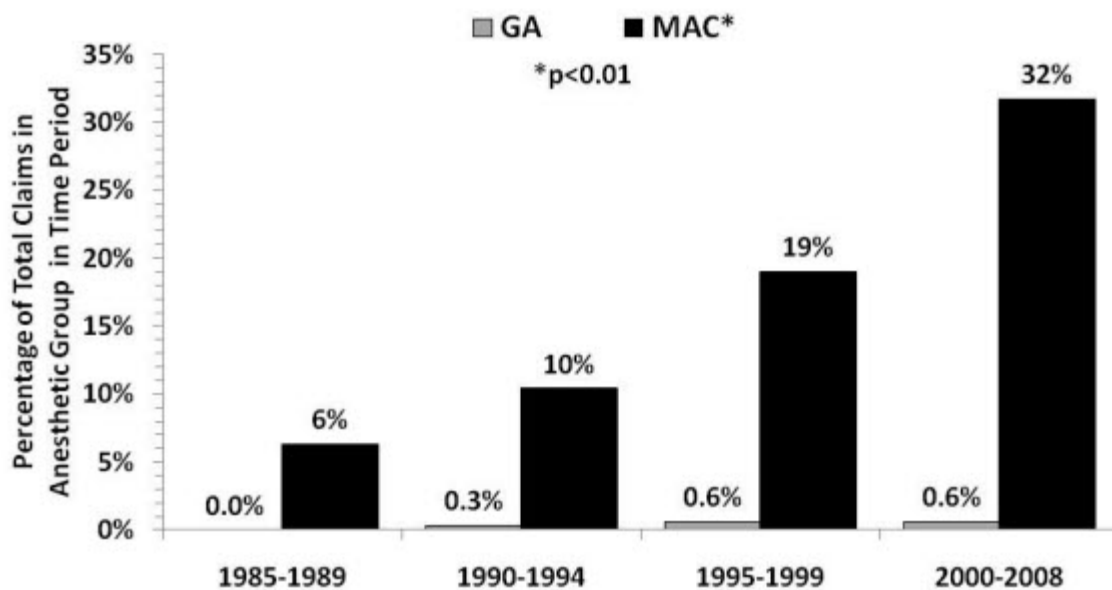
Conclusions: Malpractice claims for cautery fire burns increased significantly over time, especially associated with MAC. Most fires occurred in high-risk procedures in which the cautery was used in close proximity to oxygen. Extra precautions should be taken with procedures that involve close proximity of cautery to oxygen. Adherence to the ASA Operating Room Fires Algorithm¹ may minimize the risk of cautery fires in the operating room.

References:

1. Anesthesiology 2008; 108:786-801.
2. Fire Safety Video: http://www.apsf.org/resources_video_commentary.php?id=1, Accessed Apr 29 2011.

Figure 1

Cautery Fire Trends Over Time by Anesthetic Technique



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