

# NEW TRENDS IN ADVERSE RESPIRATORY EVENTS

Raymond Bailie, M.D.

Karen L. Posner, Ph.D.

**When the ASA Closed Claims Project was initiated** in the mid-1980s, adverse respiratory events were the leading cause of malpractice claims against anesthesiologists. Claims for adverse respiratory events were often extremely costly, as the vast majority of these events resulted in severe permanent brain damage or death.<sup>1</sup> As new technologies, standards and guidelines were adopted, this picture improved tremendously in the 1990s and later. While adverse respiratory events still account for nearly one-quarter of claims against anesthesiologists in the years since 2000, the types of respiratory events leading to malpractice claims and their contribution to anesthesia liability have changed. This update will provide a brief overview of recent trends in adverse respiratory events in the ASA Closed Claims Project.

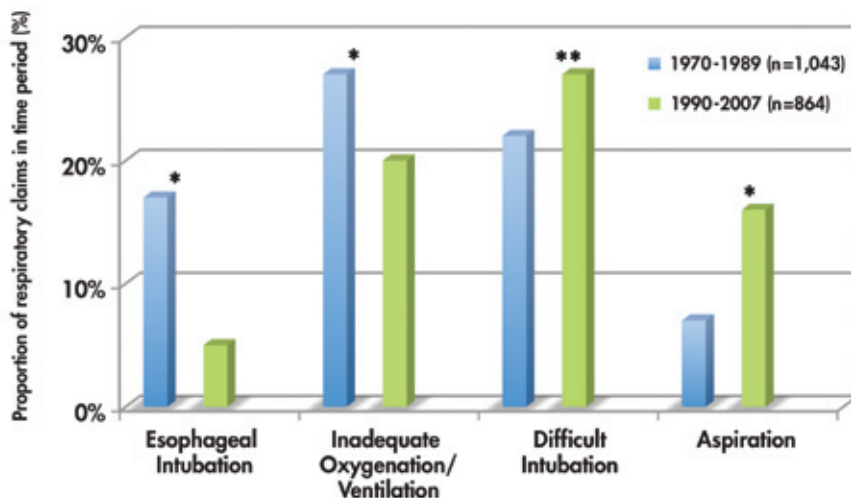
## The ASA Closed Claims Project

Closed malpractice claims data are collected by ASA members from a panel of participating liability insurers throughout the U.S., estimated to represent approximately one-third of practicing anesthesiologists. Claims for damage to teeth or dentures are excluded. The Closed Claims Project database contains 8,954 claims for events dating from 1970 to 2007. In the current analysis, claims for chronic pain management have been excluded.



Raymond Bailie, M.D. is a CA-3 Resident, Department of Anesthesiology, University of Washington, Seattle.

Figure 1: Changes in Respiratory Events Over Time



Most common respiratory events as a proportion of total respiratory events in each time period (1970-89 and 1990-2007).

\* $p < 0.001$ , 1970-1989 vs. 1990-2007

\*\* $p < 0.05$ , 1970-1989 vs. 1990-2007

## Most Common Adverse Respiratory Events

Adverse respiratory events accounted for half of anesthesia malpractice claims for death and brain damage in the 1970s and early 1980s,<sup>2</sup> drawing attention to respiratory system management as a top patient safety priority. The three leading adverse respiratory events before 1990 were inadequate oxygenation/ventilation, difficult intubation and undetected esophageal intubation. The most dramatic change over the decades has been the decline in esophageal intubation and a relative increase in claims associated with aspiration of gastric



Karen L. Posner, Ph.D. is Laura Cheney Professor in Anesthesia Patient Safety, University of Washington, Seattle.

# FROM ASA CLOSED CLAIMS PROJECT

contents [Figure 1]. The most common adverse respiratory events leading to anesthesia malpractice claims since 1990 are inadequate oxygenation/ventilation, difficult intubation and aspiration of gastric contents [Figure 1].

Esophageal intubation has nearly disappeared with the adoption of end-tidal carbon dioxide monitoring to verify intubation [Figure 1]. Esophageal intubation represents only 5 percent of adverse respiratory events from 1990 and later, most often occurring in remote locations such as the ICU or cardiac catheterization suite, or performed during emergency situations by non-anesthesia providers.<sup>3</sup>

With the introduction of pulse oximetry in the mid-1980s and its adoption as a standard of anesthesia care in 1990, claims for inadequate oxygenation/ventilation declined from 27 percent of respiratory events in 1970-1989 to 20 percent of respiratory events in 1990-2007 [Figure 1]. A recent trend is the occurrence of inadequate oxygenation/ventilation in association with monitored anesthesia care, often associated with oversedation and inadequate monitoring of ventilation.<sup>4</sup> Inadequate oxygenation/ventilation is the most common specific event occurring in non-operating room locations such as the cardiology suite, gastrointestinal suite or radiology.<sup>3</sup>

Difficult intubation remains a concern, representing 27 percent of adverse respiratory events in 1990-2007 [Figure 1]. While difficult intubation still occurs, the severity of injury when the difficult airway occurs upon induction of anesthesia was reduced in recent claims, after publication of the Difficult Airway Algorithm.<sup>5</sup> Management of the difficult airway at extubation and other phases of anesthesia care remains a significant safety problem.<sup>5</sup>

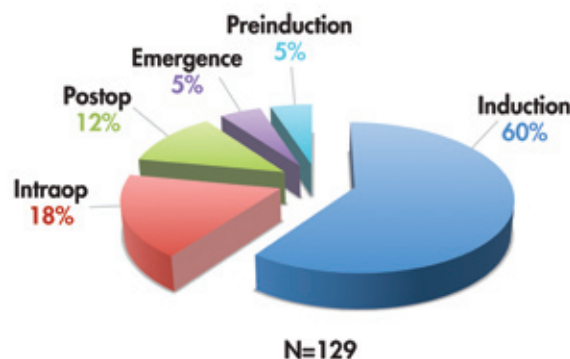
Aspiration of gastric contents has emerged to become the third most common adverse respiratory event leading to anesthesia claims since 1990. Aspiration accounted for only 7 percent of adverse respiratory events in 1970-1989 but has increased after 1990 to represent nearly one in five adverse respiratory events leading to anesthesia claims [Figure 1].

## Aspiration of Gastric Contents

We recently reviewed claims for aspiration of gastric contents from 1990 and later.<sup>6</sup> Patients in aspiration claims were older, sicker, and more often had abdominal and emergency procedures than patients in other claims in the database, not surprising given the risk factors for aspiration of gastric contents. Although most cases of aspiration occurred during general anesthesia, 12 percent of cases occurred during regional anesthesia or monitored anesthesia care.

Aspiration occurred during induction in 60 percent of claims, with the remainder occurring most commonly intraoperatively or post-procedure [Figure 2]. Cases with intraoperative aspiration were performed during general anesthesia with a mask or laryngeal mask airway, during regional anesthesia or during MAC. Examples include a patient with an incarcerated hernia and vomiting, with repair occurring under subarachnoid block with sedation progressing to mask general anesthesia, and a patient for a Port-a-Cath placement during general anesthesia with a laryngeal mask airway, despite vomiting in the preoperative holding area. In some claims, aspiration occurred on induction despite what appeared to be an appropriate rapid sequence induction with cricoid pressure.

Figure 2: Timing of Aspiration of Gastric Contents



However, in many claims, the rapid sequence induction was either not performed in the presence of significant risk factors for aspiration or was performed unconventionally, such as with low doses of slow-onset muscle relaxants or after significant sedation. These types of cases suggest the need for heightened awareness of risk factors for aspiration of gastric contents and more cautious anesthesia choice and airway control during general anesthesia.

## Summary

Adverse respiratory events continue to represent an important area of liability for the anesthesiologist. Undetected esophageal intubation is now relatively rare, occurring outside the operating room. Aspiration is emerging as the third most common adverse respiratory event in recent claims.

**References:** Available at the back of the *NEWSLETTER* e-version online at [www.asahq.org](http://www.asahq.org) or by request by sending an e-mail to [communications@asahq.org](mailto:communications@asahq.org).