

TITLE: RESPIRATORY MISHAPS: PRINCIPAL AREAS OF RISK AND IMPLICATIONS FOR ANESTHETIC CARE

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Introduction. The ASA Committee on Professional Liability is currently conducting a nationwide study of closed insurance claims for anesthetic mishaps in the United States. The purpose of this study is threefold: 1) to identify major areas of loss, 2) to assess the contribution of substandard care, and 3) to develop strategies that will reduce patient risk and professional liability.

After review of 624 closed claims, difficulties in the management of the respiratory system have emerged as the single most common cause of injury. Therefore, we have conducted a preliminary in-depth analysis of all injuries related to respiratory management.

Methods. Closed claims for anesthetic mishaps occurring between 1978 and 1986 were obtained from 18 participating insurance carriers in the United States. Claims limited to tooth injury were excluded. An anesthesiologist evaluated and summarized each claim using a standardized form. Each form was reviewed for completeness by the principal investigators and then entered into a computer data base. All claims related to respiratory management (193 cases) were selected for further review.

Results. As shown in Table 1, three categories of mishap -- inadequate ventilation, esophageal intubation, and difficult intubation -- accounted for the majority (74%) of respiratory-related claims. The subcategory "Other Events" includes a variety of respiratory mishaps (e.g., air embolism, bronchospasm, inadvertent extubation), each with an overall incidence of less than 2%. Aspiration was an uncommon event; its overall incidence was less than 1%.

The majority of claims involving inadequate ventilation were primarily the result of poor monitoring (55%) or personnel deficiencies such as impaired vigilance and inadequate training or supervision (21%). Factors which played a relatively minor role in inadequate ventilation included underlying disease states (9%), drug errors (5%), and equipment problems (5%). A notable feature of claims involving esophageal intubation was that the anesthesiologist or anesthetist heard bilateral breath sounds and considered the endotracheal tube to be properly placed in more than half of the cases.

Table 2 displays outcome and cost data for settlement of the three largest groups of claims. Difficult intubation resulted in a substantially lower incidence of death than inadequate ventilation or esophageal intubation. The relatively low median payment for difficult intubation reflects the smaller proportion of deaths. Non-dental trauma to the airway accounts for the high incidence of "other" injuries in the difficult intubation group.

Overall, 69% of respiratory-related claims were judged preventable with better monitoring. The use

of pulse oximetry alone might have prevented 24% of mishaps, and the combination of pulse oximetry and capnography might have prevented another 40% of mishaps.

Discussion. Although the results presented here are only preliminary and cannot be used to determine the overall incidence of specific injuries, the data do suggest that respiratory-related mishaps are a major source of risk and financial loss in the practice of anesthesiology. The results also suggest that patient safety research may be particularly beneficial in four specific areas: selection of monitors, personnel performance, detection of esophageal intubation, and management of difficult intubation.

Pulse oximetry and capnography were identified as the most important tools in the prevention of adverse outcomes. The use of these two monitors might have prevented the majority of respiratory-related complications. This finding must be interpreted cautiously, as it is based on case assessments conducted by a small group of reviewers. The reliability of these assessments is currently under investigation in a nationwide interrater reliability study of closed claims data.

Table 1. INCIDENCE OF RESPIRATORY MISHAPS

Category/Subcategory	No. of Claims	% of Total (N=624)
All respiratory mishaps	193	31
A) Inadequate ventilation	80	13
B) Esophageal intubation	41	7
C) Difficult intubation	22	3
D) Other respiratory mishaps	50	8

Preliminary data, 4/87.

Table 2. OUTCOME AND COST OF RESPIRATORY MISHAPS

	Inadequate Ventilation (n = 80)	Esophageal Intubation (n = 41)	Difficult Intubation (n = 22)
OUTCOME (%)			
Death	76	76	41
Brain Damage	23	20	18
Other	1	4	41
COST (\$1000's*)			
Mean ± S.D.	510 ± 870	430-650	595 ± 1450
Median	270	225	80

*Unadjusted for inflation. Preliminary data, 4/87.