Fifty-two anesthesia-related claims filed with the Maryland Office of Health Claims Arbitration from January 1990 through February 1994 were analyzed in terms of patient care variables, types of anesthesia, surgical categories, legal causes of action, and patient outcomes to determine whether differences existed in the rate of filing of cases provided by CRNAs and anesthesiologists.

In Maryland, all claims against a healthcare provider in excess of $20,000 must be filed with the Office of Health Claims Arbitration. During the study period, 70% of the claims were filed against anesthesiologists, 17% were against nurse anesthetists, and 13% named both the anesthesiologist and the nurse anesthetist. Claimants ranged from 13 to 78 years of age; the mean age was 45 years. Slightly more than half of the claims (54%) were on behalf of women. The majority of the claims originated in community hospitals (73%) and medical teaching centers (23%). The remainder of claims (4%) originated in military hospitals, medical offices, and surgicenters.

Study findings indicated that general anesthesia accounted for two thirds of the claims, followed by regional anesthesia care (23%), local anesthesia (3.8%), and monitored anesthesia care (2%). Gynecological, neurosurgical, and orthopedic surgeries accounted for more than half of the claims.

Two thirds of all claims alleged failure to attend to changes in the perioperative status of the patient. This included inadequate monitoring of the patient's position and failure to respond to changes in cardiopulmonary status. The second most prevalent cause of action concerned problems securing or maintaining a safe airway. Death was the most frequent adverse outcome (21.2%). Airway trauma (15.4%), nerve damage (15.4%), and brain damage (7.7%) were also cited as adverse outcomes.

Key words: Anesthesia mishap, legal action, malpractice filing.

Introduction
With increasing emphasis being placed on cost-containment in healthcare, Certified Registered Nurse Anesthetists (CRNAs) offer a cost-effective alternative to all-physician delivery of anesthesia care. A study conducted by the Health Economics Research Corporation indicated that the annual salary for a CRNA in 1990 was $75,233, while that of an anesthesiologist was $220,800. The study estimated that more efficient use of CRNAs to deliver anesthesia could net healthcare savings of $1 billion annually by the year 2010. Consequently, some medical analysts have called for a restructur-
ing of the current healthcare system to produce a reduced reliance on physicians and increased utilization of advanced practice nurses, such as CRNAs, certified nurse midwives, and nurse practitioners. An issue of great importance surrounding this type of reform is whether advanced practice nurses provide care of comparable quality to their physician counterparts.

A primary responsibility of the anesthesia provider is to administer a safe anesthetic that also produces an acceptable patient outcome. Safe anesthetic care has been said to include six discrete functions:

1. Collection of sufficient data for preoperative and perioperative planning.
2. Administration of a physiologically sound anesthetic, reflective of the patient's condition and type of anticipated surgery.
3. Collection of appropriate perioperative data to evaluate the patient's course and extrapolation of pertinent information which allows timely and efficacious interventions, if required.
4. Competent evaluation of all instituted therapies.
5. Documentation of all events surrounding the perioperative course in the medical record.
6. Instiution of all decision making and clinical judgment within the framework of accepted clinical and academic theory, as well as accepted standards of patient care.

Recent research indicates that human error or lack of attention are major contributors to adverse patient outcomes during anesthesia administration. Yet few studies exist which have addressed CRNA and anesthesiologist patient outcomes and differences in legal actions filed against these two types of providers. In this study, patient care variables, anesthesia, surgical categories, legal causes of action, and patient outcome all were analyzed to determine the factors associated with filing anesthesia-related claims.

**Materials and methods**

Maryland has had a system of mandatory arbitration of medical malpractice claims in place since 1976. The Health Claims Arbitration Board was founded in hopes of decreasing judicial settlement of claims. The procedural operation of the health claims arbitration system is fairly straight-forward. The act requires that all claims, suits, and actions by a person against a healthcare provider for alleged malpractice in which damages are in excess of $20,000 must first be filed and presented to the Arbitration Board.

This study consisted of a retrospective review of all anesthesia-related claims filed with the Maryland Health Claims Arbitration Office from January 1990 through February 1994. Primarily, 50% of the cases occurred between 1988 and 1990. The earliest date of occurrence was in 1986, and the latest was in 1992, with these 2 years contributing to about 25% of the cases. No subjects who filed an anesthesia-related claim that exceeded $20,000 were excluded from the study. Since this research consisted of a retrospective review of public documents, no participant consent form was necessary. However, a waiver form was completed and an exemption was granted by the Committee for the Protection of Human Subjects, Medical College of Pennsylvania, because the investigator was a Maryland student enrolled in a nurse anesthetist program at the Medical College of Pennsylvania.

Variables examined in this study included:

1. Age of the patient
2. Sex of the patient
3. Procedure
4. Type of anesthesia utilized:
   A. General
   B. Regional
   C. Monitored anesthesia care
5. Day of week event occurred
6. Time of day event occurred
7. Anesthesia provider named
   A. Anesthesiologist
   B. Certified Registered Nurse Anesthetist (CRNA)
   C. Both anesthesiologist and CRNA
8. Type of hospital/healthcare facility
   A. Teaching hospital
   B. Community hospital
   C. Outpatient surgicenter
   D. Other
9. Basis for legal cause of action lodged
   A. Inadequate preoperative assessment
   B. Inadequate informed consent
   C. Failure to adequately monitor patient status
   D. Damage during laryngoscopy or intubation
   E. Inadequate respiratory care (e.g., failure to secure airway, failure to properly ventilate)
   F. Inappropriate medication administered
   G. Inappropriate dose of medication
   H. Failure to properly position the patient
   I. Failure to perform anesthesia in a timely fashion
   J. Failure to properly administer anesthesia
   K. Failure to respond to intraoperative changes in the patient's condition

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L. Failure to respond to postoperative changes in the patient's condition

10. Adverse outcomes
   A. Death
   B. Nerve damage
   C. Brain damage
   D. Airway trauma
   E. Neonatal death
   F. Neonatal brain damage
   G. Sexual assault
   H. Burn injury
   I. Esophageal damage
   J. Teeth or mouth damage
   K. Back or spinal cord injury
   L. Vascular damage
   M. Wrong operative procedure
   N. Acute myocardial infarction
   O. Inability to start or complete surgery

Analysis of data

To assist in the analysis of the research questions, the entire sample of 52 claims was subjected to descriptive level statistics. Factors such as ASA physical status and time of day of the occurrence were excluded due to incomplete availability of data from the Maryland Health Claims Arbitration records.

Results

- **Demographics.** The age range of the claimants was 13 years to 78 years, and the mean age was 45 years. Slightly more than half of the claims (54%) were on behalf of women. The majority of the claims originated in community hospitals (73%) and medical teaching centers (23%). Military hospitals and freestanding clinics yielded one claim each or the remaining 4% of the filings.

- **Type of anesthesia.** General anesthesia accounted for two thirds of the claims, followed by regional anesthesia (approximately 23%), local anesthesia (3.8%), and monitored anesthesia care (2%). Regional anesthesia was further broken down into epidural (13.5%), spinal or subarachnoid blocks (9.6%), and peripheral nerve blocks (3.8%).

- **Types of surgery performed.** Gynecological, neurosurgical, and orthopedic surgeries accounted for more than half of the claims. The next most prevalent procedures were obstetric and genitourinary, both accounting for 7.7% of all claims.

- **Causes of action.** The legal causes of action, or the critical events that led to the given adverse outcomes, were grouped into four major categories: preoperative problems, airway problems, monitoring problems, and anesthesia provision problems. Two thirds of all claims were due to failure to attend to changes in the preoperative, intraoperative, or postoperative status of the patient. This included inadequate monitoring of patient position and failure to respond to changes in cardiovascular status. The second most prevalent cause of action concerned problems with securing or maintaining a safe airway. Twenty-three percent of all claims related to an inability to provide the patient adequate ventilation or to damage to the airway, teeth, or esophagus during laryngoscopy. Inadequate administration of anesthesia was the next most common cause of action reported (11.4% of all claims). Less reported causes included equipment malfunction attributable to inadequate preanesthetic check-out (9.6%), wrong surgery (5.8%), wrong drug (1.9%), incorrect sponge count (1.9%), and fraudulent record keeping (1.9%).

- **Patient outcomes.** Patient outcomes were grouped into five specific categories:
  1. Death.
  2. Nerve damage.
  3. Airway trauma.
  4. Brain damage.
  5. Other.

Nearly 60% of outcomes were in the first four categories. The fifth group, "Other," contained a variety of claims including back pain/spinal cord injury associated with neuraxial anesthesia (9.6%), infection (5.8%), and additional surgery required (5.8%). Death was the most frequent outcome (21.2%), followed by airway trauma (15.4%), nerve damage (11.4%), and brain damage (7.7%).

- **Provider.** Provider differences were examined in order to determine if differences existed in the rate of filing with respect to anesthesia provider. Seventy percent of the claims were filed against anesthesiologists, 17% were against CRNAs, and 13% named both the anesthesiologist and the CRNA. The surgery types that led to more than half the claims filed against the anesthesiologist group were obstetric/gynecological (33.5%) and orthopedic (17.7%). The other surgical categories included gastrointestinal/genitourinary.

Claims filed against CRNAs centered around neurosurgical cases (22%), followed by head, ear, nose, and throat (22%), and obstetric/gynecologic cases (22%). Orthopedic cases were the focus of 11% of all claims against CRNAs.

Joint filings against the anesthesiologist-CRNA occurred primarily in two areas. Obstetrical cases accounted for 71% of joint defendant claims. Neurosurgical cases constituted 29% of the joint provider claims.

Failure to adequately monitor patient status was the legal cause of action in more than half of claims against anesthesiologists, while ineffective airway control (19.4%), difficulty in administering
anesthesia (13.8%), and incomplete preoperative assessment or inadequate informed consent (8.3%) were represented less frequently.

Of the claims filed against CRNAs, 55.5% were based on the inability to adequately monitor patient status, while 22.2% cited failure to obtain or maintain an airway. Joint liability was alleged for inability to adequately and safely establish an airway (43%), problems monitoring patient status (43%), and ineffectively administering anesthesia (14%).

- **Patient outcome.** Death occurred in 22% of the anesthesiologist-based claims. Nerve damage and back or spinal cord injuries accounted for the next most frequent basis for claims, each accounting for 13% of cases. Airway trauma (8%) and infection/sepsis (8%) were also reported in the anesthesiologist claims. The infection/sepsis was most often alleged to have occurred as a consequence of nonsterile technique during performance of regional anesthesia and following aspiration during intubation.

Adverse outcomes associated with cases involving CRNAs included death (22%), airway trauma (22%), nerve damage (22%), and brain damage (22%).

Airway trauma was cited in 28% of the filings against the anesthesiologist/CRNA team. The next most frequent outcomes were evenly divided among death, brain injury, nerve damage, wrong surgery, and burn injury.

**Discussion**

Maryland Health Claims Arbitration Board statistics indicate that during the time of the study, 2,904 claims were filed. Of these 2,904 claims, 52 (1.7%) were anesthesia-related. Seventy percent of claims were lodged against anesthesiologists, 17% against CRNAs, and 13% were joint liability claims.

**Conclusion**

This purely descriptive study involving a small number of cases in a single state may provide a useful background when considering the issue of anesthesia malpractice filings. The important limitations of the study should be noted.

First, it is important to note that the cases represent complaints filed rather than closed claims, and actual wrongdoing may have been confirmed. Second, there is no verification that the cases listed as only physician or only CRNA were actually such. And finally, it is important to appreciate that this is not an outcomes-based study; rather it only quantified the rate of claim reports based on provider mixture.

**REFERENCES**


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