The AANA Foundation Closed Malpractice Claims Study: Obstetric Anesthesia

“The only real mistake is the one from which we learn nothing.”—John Powell

Obstetric (OB) anesthesia is a highly specialized area of practice. The unique nature and devastating impact of adverse outcomes in this population necessitates careful scrutiny of related incidents. Despite the decrease in maternal mortality during the last half of the 20th century, anesthesia-related complications accounted for 2.5% of total maternal deaths from 1987 to 1990. A recent study of maternal deaths in the United States identified anesthesia as the sixth leading cause of maternal mortality, following hemorrhage, embolism, pregnancy-induced hypertension, infection, and cardiomyopathy. Maternal death and neonatal brain damage were the 2 most common anesthesia-related OB complications in the 1991 American Society of Anesthesiologists (ASA) Closed Claim Study. This study found that maternal death claims were related predominantly to the use of general anesthesia, specifically the inability to establish or maintain a patent airway. The continued tragic loss of young mothers from preventable pregnancy-related deaths provides justification for an intensive evaluation of anesthesia-related adverse maternal outcomes. It is anticipated that the analysis of these events will provide knowledge that can be used to formulate preventative measures for future care.

Historically, research methodologies designed to study maternal morbidity and mortality related to anesthesia have been constrained by a multiplicity of factors. The presence of confounding variables including the physiologic changes associated with pregnancy, coexisting diseases, the interaction between the patient’s condition and the anesthetic or surgical intervention, error by the surgeon or anesthesia provider, and equipment failure make it difficult to attribute the mishap to a single cause. Generalizations made based on the statistical analysis of adverse outcomes is limited by the small sample size. A study of maternal mortality in the United States between 1988 and 1990 reported 1.7 anesthetic-related deaths per million live births. Data extrapolated from previous studies suggest that half of the deaths attributed to anesthesia in the United States are preventable.

Inaccuracies regarding the incidence and cause of maternal deaths limit the ability to interpret these statistics. Underreporting of maternal mortality and associated risks in the United States has been estimated to range from 20% to 75%. Underestimates in Great Britain’s maternal death database, noted to be the best system for collecting these types of statistics, are approximately 30%. The data derived from death certificates for maternal research is confounded by the miscoding of diagnoses on the documents and the inability to ascertain the actual cause of death. The inconsistent definitions of maternal mortality between revisions of the International Classification of Diseases precludes equivocal comparisons of OB death rates. The development of an appropriate methodological design to measure the exact rate and nature of adverse maternal outcomes related to anesthesia is probably an insurmountable task. A novel research methodology for the study of adverse events was...
demonstrated by the ASA Closed Claim Study. This analysis provided valuable information regarding OB morbidity and mortality, including implications for improving anesthesia safety.4

The study of outcome data using a peer review process has become a mechanism for evaluating and improving patient care. The rationale for studying closed claims is that it offers the opportunity to study a collection of infrequent OB events that otherwise would be considered isolated incidents. Developing an understanding of common factors underlying OB malpractice claims against anesthesia providers will allow specific areas of clinical practice to be scrutinized. The anticipated benefits of this study include developing recommendations for anesthesia education and continuing education programs that will advance the body of knowledge regarding OB anesthesia.

Methods
The American Association of Nurse Anesthetists Foundation (AANAF) in collaboration with the St Paul Insurance Companies initiated the study of anesthesia-related sentinel events in 1995. A sentinel event is defined as an unusual or unexpected outcome that occurs despite clinical knowledge and expertise that should have prevented the incident. A data collection instrument was developed by a team of 8 Certified Registered Nurse Anesthetist (CRNA) researchers to extract discrete and continuous scale data from closed claim files. Resources used to construct the tool included the A+ Risk Management Data collection tool and the AAN AF Scope and Standards for Nurse Anesthesia Practice.12 The review process requires the rater to make subjective judgments regarding the quality of care that was provided and write a summary that describes the damaging event and provides a detailed account of the adverse outcome. Content validity of the instrument was obtained by a group of experts familiar with the theoretical underpinnings of the research. A study of the interrater reliability of the data collection instrument revealed an acceptable degree of overall agreement.11

A claim is a demand for financial compensation for an adverse outcome alleged to be the result of medical care. CRNA-related claims are ones in which a CRNA was named in the claim and judged to possibly have contributed to the adverse patient outcome. A non–CRNA-related closed claim is one in which a CRNA was named in the claim and was judged to not have contributed to the adverse patient outcome (Table 1). This designation was made following an extensive review of the information contained on the data collection instrument. The monetary figures cited in this research reflect what was paid by the insurance carrier on behalf of the CRNA; they do not include any expenses or other settlements. The 41 claims reviewed in this study were obtained using a computerized data search at St Paul Fire and Marine Insurance Company. Obstetric claims represent 19% of the total AAN AF closed claim database.

Inclusion criteria for this research were all closed claims that were filed against CRNAs from 1990 to 1996 involving a vaginal or cesarean delivery. Pregnant patients undergoing non-OB procedures or elective terminations of pregnancy were not included in the analysis. In several of the OB claims, multiple anesthetic techniques were used, for example when the regional technique was inadequate and a general anesthetic was required. For the purpose of this research, the anesthetic directly implicated in the adverse event or responsible for the outcome was identified as the primary anesthetic. The severity of injury score (SIS) used in this study was the 10-point scale used by the insurance industry14 (Table 2).

SPSS 10.1 for Windows (SPSS, Inc, Chicago, Ill) was used for data analysis. Descriptive statistics were obtained on the data derived from all 41 OB claims. The nominal variables were compared using the χ² test of association. The nonparametric Kruskal-Wallis and Mann-Whitney tests were done to compare groups with respect to variables that were not nominal but were statistically nonnormal. For all statistical comparisons, a P less than .05 was considered significant.

Results
The events represented in the 41 OB claims occurred from 1990 to 1996. A nurse anesthetist was solely responsible for the anesthesia care in 35 (85%) of the

Table 1. No. of CRNA* vs non–CRNA†-related adverse outcomes (N=41)

<table>
<thead>
<tr>
<th>Adverse outcome</th>
<th>CRNA-related</th>
<th>Non–CRNA-related</th>
</tr>
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<tbody>
<tr>
<td>Death</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Brain damage</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Nerve damage</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Emotional</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

* A CRNA-related claim is one in which a CRNA was named in the claim and judged to possibly have contributed to the adverse patient outcome.
† A non–CRNA-related claim is one in which a CRNA was named in the claim and was judged not to have contributed to the adverse patient outcome.
claims. A nurse anesthetist–anesthesiologist team provided the anesthetic in 6 (15%) of the claims. The majority of the cases (n = 29 [71%]) occurred in community hospitals. The mean patient age was 27 years (range, 16-39). The mean age of patients undergoing cesarean deliveries was significantly older than the vaginal delivery group, 28.5 years vs 24.3 years. The ethnicity of 29 patients in the database was known; 22 (76%) of the patients were classified as white, and 7 (24%) were not white. The minority patients in this study had a significantly higher mortality rate. Death was identified as the outcome in 26 (86%) of the claims for minority patients compared with 8 (36%) of the claims for white patients. These findings are consistent with previous studies of pregnancy-related mortality in the United States, which found that risk increased with nonwhite ethnicity and advanced maternal age.2,15-17

The preexisting illnesses related to pregnancy identified in 7 (17%) of the claims included pregnancy-induced hypertension, 3; eclampsia, 2; hemolysis, elevated liver enzymes, and low platelets (HELLP syndrome), 1; and gestational diabetes, 1. The patients with preexisting illness had a higher mean SIS (8.3) compared with those without coexisting conditions (6.0). Although this difference was not statistically significant, the literature is replete with the impact of hemorrhage and pregnancy-induced hypertension.2,3,18,19 The contraindication to regional anesthesia in patients with preeclampsia and HELLP syndrome also place this group at an increased risk.3 These relationships justify the further analysis of these factors in subsequent studies.

Information regarding the presence or absence of prenatal care was missing on 30 (73%) of the claims. Socioeconomic status was not retrievable from the documents. The inclusion of these data in subsequent studies is indicated based on the relationship of these factors to outcome in previous research.15,19 More than one half of the patients (n = 24 [59%]) represented in the claims were classified as obese. There was no difference in the SIS between obese and nonobese patients. The proportional representation of these patients in the database should be followed up as the incidence of obesity in the general population increases. The heightened risk for airway problems and death in the morbidly obese maternal patient justifies continued comparisons of outcome between obese and nonobese parturients.20

The mode of delivery in 29 (71%) of the claims was via a cesarean section, and the case was considered an emergency in 13 (45%) of these cases. In 19 (95%) of the 20 maternal and neonatal death claims, the mode of delivery was surgical. In 13 (65%) of these claims, the patients received general anesthesia. In nondeath outcomes, the mode of delivery was evenly divided between vaginal and cesarean deliveries. The patients delivered by cesarean section had significantly worse severity of injury scores. The mean SIS for the vaginal delivery group was 4.5 compared with 7.2 for the

<table>
<thead>
<tr>
<th>(Score)</th>
<th>Injury</th>
<th>Vaginal delivery</th>
<th>Cesarean section</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>(0)</td>
<td>No obvious injury</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>(1)</td>
<td>Emotional injury</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>(2)</td>
<td>Temporary insignificant (lacerations, dental damage)</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(3)</td>
<td>Temporary minor (burns, prolonged recovery)</td>
<td>0</td>
<td>2</td>
<td>2</td>
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<tr>
<td>(4)</td>
<td>Temporary major (nerve damage)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(5)</td>
<td>Permanent minor (damage to organs, decreased vision)</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>(6)</td>
<td>Permanent significant (loss of an eye, deafness)</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>(7)</td>
<td>Permanent major (paraplegia, loss of limb, brain damage)</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(8)</td>
<td>Grave (severe brain damage, quadriplegia)</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>(9)</td>
<td>Death</td>
<td>1</td>
<td>19</td>
<td>20</td>
</tr>
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</table>

Table 2. Severity of injury scoring system (N=41)
cesarean section group (see Table 2). General anesthesia was administered in 19 (46%) of the claims, an epidural technique in 16 (39%), spinal anesthetics were provided in 5 (12%), and 1 (2%) of the claims represented monitored anesthetic care (Table 3). The claims involving general anesthesia had a higher mean SIS, 7.7 compared with 5.7 for regional techniques. Regional anesthesia was associated with significantly fewer deaths than general anesthesia in the present study. These findings emphasize the increased risk that general anesthesia has for the OB patient. These results are supported by the following studies: (1) A study of maternal deaths from 1985 to 1990 that estimated the case fatality rate for general anesthesia to be 16.7 (95% confidence interval, 12.9-21.8) times that for regional anesthesia, 6 (2) the ASA study that found that claims involving general anesthesia were associated with more severe injuries and larger payments than were claims involving regional anesthesia, 7 and (3) a study for the period in 1991 to 1993 showing that all of the direct anesthetic deaths associated with cesarean section in the United Kingdom occurred in women who received general anesthesia.21

The median payout for the anesthesiaprovider was $7,000.00 (range, $0.00-$1,250,000.00). The median payout for patients receiving general anesthesia was $26,000.00 vs $7,000.00 for regional anesthesia. The median payout for vaginal deliveries was $3,566.50 compared with $13,000.00 for cesarean section deliveries. In 23 (56%) of the claims, the CRNA was judged to have possibly contributed to the adverse event (see Table 1). The median payment was significantly higher ($135,000.00) for claims in which the adverse outcome was deemed preventable than for those determined to be nonpreventable ($2,525.00).

Neonatal death was the most common complication, occurring in 11 (27%) of the claims filed against nurse anesthetists. Only 1 of the 11 deaths could be attributed directly to the care given by the anesthesia provider. This case involved a cesarean section on an obese patient who arrested almost immediately following the administration of a spinal anesthetic. The patient could not be intubated, and the baby was born with low Apgar scores and died shortly after birth. The other neonatal deaths were attributed to placental abruption (n = 3), uterine rupture (n = 2), delay in anesthesia response time (n = 2), and intraventricular hemorrhage following an attempted high forceps delivery (n = 1). Two infants were stillborn and the anesthesia providers were involved in resuscitation efforts.

Maternal death was the second most frequent complication, occurring in 9 (22%) of the OB claim files. The anesthetic management may have contributed to the basis of the claim in all of the cases. The most common cause of death in these patients was failure to secure an airway. In 4 (44%) of the claims involving maternal mortality, failed intubation was ultimately responsible for the death. Repeated attempts to secure an airway (> 3) and a failure to pursue optimal alternative methods of ventilation were common factors in these cases. The basis of 1 claim was an undiagnosed esophageal intubation that was discovered on autopsy. In 2 of the claims, general anesthesia was implemented because regional anesthesia was inadequate for the cesarean section. In 1 case, general anesthesia was selected for an elective cesarean section.

Peripartum hemorrhage was responsible for maternal death in 2 of the claims. A previously undiagnosed placenta accreta resulted in acute blood loss in both these incidents. In 1 case, a patient with no prenatal care was admitted to the emergency department with HELLP syndrome and nonreassuring fetal heart tones. The patient was neurologically intact preoperatively and was given general anesthesia for an emergency cesarean section. The patient’s pupils were fixed and dilated at the end of surgery, and she never regained consciousness. Postoperatively, a large intracerebral hemorrhage was diagnosed, and the patient died of complications associated with a severe brain injury. The perioperative management of the patient’s blood pressure by the anesthesia provider was alleged to have contributed to the adverse outcome. One claim represented a patient with eclampsia managed with an epidural for a cesarean section. The patient had a generalized tonic-clonic seizure shortly after delivery and aspirated before an airway could be established. Postoperatively, the parturient developed adult respiratory distress syndrome and died of pulmonary complications related to the aspiration.

There was 1 incident of maternal brain damage due to inability to intubate an obese patient for an elective cesarean section under general anesthesia for a breech presentation. The preoperative assessment noted a potential airway problem. Following the induction of

<table>
<thead>
<tr>
<th>Type of anesthetic</th>
<th>Occurrence of adverse events</th>
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<tbody>
<tr>
<td>General</td>
<td>19</td>
</tr>
<tr>
<td>Epidural</td>
<td>16</td>
</tr>
<tr>
<td>Spinal</td>
<td>5</td>
</tr>
<tr>
<td>Monitored anesthesia care</td>
<td>1</td>
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Table 3. Frequency of adverse events related to type of anesthetic (N=41)
general anesthesia, repeated unsuccessful attempts were made to intubate the patient. During the efforts to secure an airway, the patient experienced a cardiac arrest. The mother suffered severe anoxic brain damage that resulted in a persistent vegetative state.

In 6 (15%) of the claims, infant brain damage was the basis of the complaint. The majority of these claims represented difficult deliveries of infants in distress; 3 of these were forceps and/or vacuum extractions. In 4 of these claims, the anesthesia providers were requested to provide emergency resuscitative measures to the infants. In at least 1 of the cases, the provider also was responsible for the anesthetic care of the mother. An alleged failure to correctly resuscitate or manage the neonatal airway formed the basis of these claims.

Regional anesthesia was implicated in 8 (20%) of the claims and represented a broad spectrum of complaints. There were no outcomes in this study attributed to toxic effects of local anesthesia related to the regional technique. Three patients alleged they had inadequate pain relief and suffered emotional distress. Two of these complaints were in reference to labor epidural anesthetics, and 1 was regarding an inadequate spinal anesthetic for a cesarean section. A lower extremity paresthesia that persisted for 3 months after delivery was the basis for 1 claim. A patient in whom a high block and respiratory distress developed following the dosing of an epidural catheter for a cesarean section alleged she developed posttraumatic stress syndrome from this experience. In a claim in which epidural anesthesia was used for labor pain, the catheter tip was noted to be missing on removal. There was no attempt to locate or remove the catheter tip based on neurosurgical recommendations. Severe pain on insertion of the epidural catheter and subsequent decreased vision formed the basis of another regional anesthetic-related claim.

The diversity of complaints associated with epidural anesthetics was exemplified in the following 2 claims. In one case, Bell palsy developed in a patient after delivery, and the patient claimed that the epidural was responsible. In the second case, the patient’s husband had some anesthesia training and dosed his wife’s epidural catheter with local anesthetic to provide additional pain relief during labor. The patient’s blood pressure decreased, and he treated the hypotension with one half of an ampoule of a medication he believed was epinephrine. The anesthesia provider then came in the patient’s room noted the hypotension and administered the other one half of the ampoule without checking the drug. The medication actually was epinephrine, and the patient experienced visual disturbances as a result of retinal edema caused by severe hypertension.

There were 6 claims that represented a miscellaneous group of complications. Two claims involved neonatal brachial plexus injuries resulting from traumatic births associated with shoulder dystocia. One claim alleged the epidural anesthetic was responsible for the difficult delivery. In another instance, the obstetrician asked the anesthetist to apply fundal pressure to assist with the delivery of the baby. The claim alleged that improper fundal pressure by the anesthesia provider caused the brachial plexus nerve damage. Respiratory problems were the basis of the claims in 2 cases, one resulting from pulmonary edema secondary to eclampsia and the other for a failure of the anesthesia provider to intubate a baby in respiratory distress. Two of the claims represented OB patients who sustained burns related to their anesthetic management. One thermal injury was attributed to a heated intravenous fluid bag placed under the patient and another a faulty temperature monitor that was known to be malfunctioning.

The records contained within the closed claim file were determined to contain enough information to assess the anesthesia care in 33 (80%) of the cases. The anesthetic care was deemed appropriate in 23 (56%) of the OB claims. The median payout for appropriate care was significantly less ($2,866.00) than payments for care determined to be inappropriate ($45,000.00). A lack of vigilance was identified in 62% (8) of the 13 claims in which the anesthesia care was determined to be inappropriate. Payouts for claims in which a lack of vigilance was identified as a contributing factor to the adverse outcome were higher. The median payment was $225,000.00 for cases in which a lack of vigilance on the part of the provider contributed to the adverse outcome. Claims in which a lack of vigilance was not implicated in the adverse event had a median payout of $5,960.00. The damaging event was determined to be preventable by the anesthesia provider in 10 (24%) of the incidents. The reviewers determined that individuals other than the anesthesia providers could have prevented the event in 18 (44%) of the claims. The payment was significantly higher for claims in which the adverse event was determined to be preventable.

**Discussion**

This research revealed that neonatal and maternal death were the leading complications in the AANAF OB claim database. Risk factors for adverse OB outcomes in this sample included obesity, ethnicity, advanced maternal age, general anesthesia, and
cesarean section delivery. The inability to secure an airway was the leading cause of maternal death and brain damage. The importance of anticipating difficult intubations and having the personnel and equipment available to manage these situations was demonstrated in this study. An analysis of the critical pathways taken by the anesthesia provider when confronted with a difficult maternal airway revealed 2 common factors: repeated unsuccessful attempts at intubation and a failure to pursue alternative methods to attain an airway. The correlation between inadequately trained personnel and deaths was demonstrated in a study of anesthesia-related maternal deaths from 1991 to 1993 in the United Kingdom. This study revealed that substandard care, often related to inexperienced personnel, was associated with all but one of the anesthesia-related maternal deaths.

The necessity of recognizing a difficult airway and being prepared with alternative methods of management in an emergency cannot be overemphasized. A study to determine the incidence of failed tracheal intubation found the occurrence almost 8 times higher in the maternal population than in other groups. The difficult airway algorithm approved by the ASA House of Delegates on October 21, 1992, and effective July 1, 1993, provides alternative strategies and options for managing the difficult airway. Protocols for managing the difficult airway in the OB population that incorporate fetal and maternal considerations also have been developed. There is evidence that adverse neonatal outcomes are more dependent on prolonged hypoxia than on an acute hypoxic episode that would occur during attempts to secure an airway. If a difficult airway is encountered before surgical incision, the recommendations are to allow spontaneous ventilation to resume and to proceed with an awake intubation. If the surgery is in progress and the airway cannot be secured, the expedient delivery of the infant, particularly when maternal cardiac arrest seems imminent, provides the best chance of neonatal survival and maternal resuscitation.

A difficult airway algorithm in conjunction with the necessary equipment (laryngeal masks, esophageal/tracheal double-lumen airways, transtracheal jet ventilation, fiberoptic equipment) should be readily available for OB airway management. The successful use of the laryngeal mask in OB patients who could not be intubated has been reported in the literature. Because of the infrequency of OB airway emergencies, a benefit may be derived from holding airway drills at regular intervals. This type of training also could be accomplished by using patient simulators in which airway disaster scenarios could be recreated. Anesthesia educational programs also need to include the difficult airway algorithm as part of OB education. Failed intubations probably will never be eliminated, but the severity of the consequences can be minimized by the implementation of critical pathways.

In 4 (36%) of the 11 claims involving neonatal death, the CRNA was responsible for the airway management and resuscitation of the infant. In several of the cases, the anesthesia provider was not proficient in pediatric resuscitation. In some hospitals represented in the claims, there were no pediatric services onsite to care for the newborn, and, thus, the anesthesia providers were charged with this responsibility in cases of neonatal distress. Proficiency in infant airway management and resuscitation may have improved the ability of these anesthetists to provide care in these emergency situations. Staffing practices that require the anesthetist to provide care for both the mother and infant during delivery may adversely affect patient safety. A 2-year study of maternal mortality in Japan found inadequate anesthesia services, specifically situations in which physicians functioned in multiple capacities (for example, when physicians serve as both the obstetrician and the anesthesiologist) were associated with an increased number of deaths.

The current analysis found that a lack of equipment and a lack of experienced OB personnel are components that contribute to a negative patient care process. The ability of a system to adjust to this type of stress is limited. The critical pathways taken in several claims were influenced by the following factors: the assignment of employees not proficient in OB anesthesia as sole providers in the OB area, failure to have necessary equipment available, a lack of familiarity with the equipment, failure to monitor patients consistent with accepted standards of practice, and failure to accurately analyze the information provided by monitors and adjust the anesthetic care plan accordingly. These factors severely disabled the patient care delivery system and, in many cases, directed it toward failure.

In the OB area, is it crucial to have the equipment and trained anesthetists available to meet the unique demands of this specialized area. Deleterious changes in maternal and fetal status often occur without warning and with devastating consequences if immediate action is not taken. Obstetric anesthesia represents a specialty practice and providers not proficient in this area are limited in their scope of critical thinking when emergencies occur. The OB patient population may have complications associated with pregnancy that require special anesthetic considerations, including HELLP syndrome, pregnancy-induced hypertension, gestational diabetes, and eclampsia. Anesthesia providers must be prepared to recognize and respond
quickly to the unique needs of these patients.

The continued relationship between failed intubation and maternal and neonatal death emphasize the enormity of the consequences that general anesthesia may bear for the OB population. This research found that patients receiving regional anesthesia had significantly fewer deaths and lower severity of injury scores. One study recommended that a prophylactic epidural catheter be placed in patients in whom intubation is judged to be potentially difficult so that regional anesthesia can be used if an emergency surgical delivery is required. The identification and replacement of poorly functioning labor epidural anesthetics, particularly in patients with "suspicious" airways, may decrease the incidence of regional failure if the patient requires a cesarean section. In 2 of the cases of maternal death, general anesthesia was implemented because the regional technique was inadequate. In several claims regarding regional anesthesia, the epidural anesthetic was known to have been functioning marginally during labor.

The majority of infant deaths and brain damage were determined to be non–CRNA-related claims. Uterine rupture and abruption were responsible in half of the infant deaths, and difficult vaginal deliveries in the majority of neonatal brain damage claims. The basis of the complaint against the anesthesia provider in these claims concerned the role the regional technique in the adverse event. A factor that contributed to the dissolution of claims against the providers was the meticulous charting of vital signs following the epidural insertion. This documentation was effective in refuting claims that hypotension caused by the epidural was responsible for the outcome. Two claims against the anesthesia provider were based on alleged delays in anesthesia availability. The ability of the providers involved in these cases to produce documentation of their arrival time supported with hospital policies regarding "on call" employees were used to refute these claims.

The current research found that complications related directly to the regional technique accounted for 8 (20%) of the claims. The complaints covered a broad spectrum of outcomes. One recommendation based on the information gleaned from this study is the importance of a thorough explanation of the risks and benefits of epidural anesthesia for labor. The use of an epidural anesthetic for labor analgesia is not a risk-free procedure. It is important that patients have realistic expectations of the pain relief that can be provided by this technique. The regular assessment of pain using a reliable scale, such as the visual analog scale, for documenting pain relief should be implemented. When adequate relief is not achieved, reinsertion of the epidural catheter or an alternative modality for pain relief should be considered. Attainment of informed consent and documentation of vital signs and pain relief are important in determining the role of the epidural anesthetic in the adverse outcome.

**Conclusion**

An evaluation of the quality of OB anesthesia using closed claim files offers insight into practice that is unavailable with other methods. The claims reviewed in this study represent a small fraction of all adverse outcomes, and they may not reflect the population of anesthesia-related OB outcomes. This study was dependent on retrospective data, and the accuracy and completeness of the records from which the data were derived were unknown. The information in the files was compiled for the purpose of resolving the claim and not for patient safety research. The correlation between the records and the event may be low due to the dependence on direct participants for documenting the incident. These combined factors limit the generalizability of the research findings.

A significant finding in this study concerned the processes involved in the evolution of OB adverse events. The current analysis revealed that errors committed in these situations were not monolithic constructs; they were caused by a multiplicity of factors. A single individual may have placed the proverbial “last straw” on the adverse event, but in no instance was the basis of any claim an isolated action. This study has revealed the need to evaluate the process—not the individual—when critical errors are committed.

The inclusion of claims in the database reflecting anesthesia care provided by both anesthesiologist and a CRNA suggest that a collaborative research effort may be an appropriate approach to anesthesia safety. Practice recommendations arising from a cooperative effort could be communicated to a broader group of anesthesia providers. The case reviews conducted by the Centers for Disease Control and Prevention’s Pregnancy-Related Mortality Surveillance System cases could be enhanced by the expertise of a nurse anesthetist. The AANA may consider methods to encourage the voluntary reporting of adverse OB events to state or national databases. The establishment of a program similar to Great Britain’s Confidential Enquiries into Maternal Deaths that provides specific details surrounding the maternal mortality is paramount to developing an understanding of the actual rate and cause of maternal deaths.

The evaluation of outcome and hindsight bias on the judgments of the reviewers should be evaluated. The pursuit of an anesthetic plan in direct conflict
with clinical evidence contributed to system failure in several claims. This process was clearly evident in the claims in which continued attempts at intubation were made despite obvious evidence that this plan was failing. Unfortunately, knowledge of the mindset of the anesthesia provider during the adverse event is not retrievable from the closed claim files. The evaluation of human error in these adverse events needs to be expanded to include the interaction of the multiple factors that culminated in the adverse event. The effect of stress and conflicting goals on the occurrence of critical events should be investigated.

A larger sample and the use of multiple insurance carriers are important considerations for future studies. The information extracted from the narrative summary contributed valuable insight into the sequence of events that culminated in the adverse event. An expansion of this portion of the data collection instrument may facilitate the mapping of critical pathways taken by the providers represented in the claims. A qualitative analysis based on interviews of raters following a review of the closed claim files may provide an additional perspective into the analysis of errors. The data that can be gleaned from the analysis of closed claim files hold the promise of contributing valuable knowledge regarding anesthesia malpractice and safety. The AANAF closed claim research team has identified the need to continuously improve the process of evaluating adverse events as the understanding of their cause is expanded.

REFERENCES

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