Malpractice Litigation After Surgical Injury of the Spinal Accessory Nerve

An Evidence-Based Analysis

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Objective: To review the background, case characteristics, and outcomes of malpractice litigation resulting from surgical injury of the spinal accessory nerve.

Design: Retrospective review of indemnity insurance cases (part 1) and court trials (part 2) between January 1, 1985, and January 1, 2007. In part 1, records of the Medical Liability Mutual Insurance Company identified 41 lawsuits in New York State; part 2 was a review of a national legal database (WestLaw) that identified 81 court trials. Case details were analyzed, and awards were adjusted for inflation.

Results: For part 1, of 41 indemnity insurance cases, 39 (95%) involved a posterior triangle lymph node biopsy. Defendants were mainly general surgeons and otolaryngologists. Most lawsuits against surgeons (22 of 34 [65%]) were settled before trial, and only 4 of 34 (12%) were discontinued. Of these 34 cases, 28 (82%) ultimately compensated the plaintiff. The mean inflation-adjusted pre-trial settlement was $264,395, and the mean settlement at trial was $443,538. Cases reaching trial received significantly higher settlements (P = .01). For part 2, 81 cases of alleged surgical injury to the spinal accessory nerve were identified. Defendant physicians were mainly general surgeons and otolaryngologists. Most operations were cervical lymph node biopsies (55 [68%]), followed by sebaceous cyst excisions (6 [7%]), neck dissections (4 [5%]), and other procedures (12 [15%]). Morbidity included weakness (81 patients [100%]), pain (30 patients [37%]), inability to work (20 patients [25%]), need for a nerve repair procedure (16 patients [20%]), deformity (9 patients [11%]), and numbness (4 patients [5%]). Types of malpractice alleged included negligent surgical technique (79 cases [98%]), lack of informed consent (17 cases [21%]), and failure to diagnose the injury (16 cases [20%]). Thirty-seven cases (46%) were decided for the defendant, 32 (40%) were decided for the plaintiff, and 12 (15%) were settled (percentages do not total 100 because of rounding). The mean inflation-adjusted settlement was $356,132, and the mean jury award was $515,968. Jury awards were significantly higher than settlements (P = .003).

Conclusions: Unintended injury to the spinal accessory nerve after head and neck surgery is a significant source of malpractice litigation. Timely diagnosis and treatment of this complication are essential. Regardless of whether the medical community considers careful surgical technique and nerve preservation to be the standard of care, the legal system clearly treats it as such, awarding compensation in 82% of cases. Strategies for optimal surgical care and litigation risk reduction are discussed.


THE SPINAL ACCESSORY nerve, or cranial nerve XI, is at risk of injury in surgery involving the posterior triangle (level V), superior neck (level IIb), and the lateral skull base. Loss of accessory nerve function results in loss of innervation of the trapezius muscle and, consequently, a syndrome of progressive shoulder disability and chronic pain. Nerve injury is estimated to occur after 3% to 8% of posterior triangle lymph node biopsies and is a surgical risk in other procedures, including neck dissection, carotid endarterectomy, and face-lift surgery. Although intentional sacrifice of the accessory nerve is sometimes planned, an iatrogenic nerve injury may also occur inadvertently. In most cases, unintentional nerve injury is preventable. Also contributing to patient morbidity, surgeons generally do not recognize this injury promptly, jeopardizing surgical repair that might otherwise ameliorate some morbidity.

It is, therefore, no surprise that inadvertent accessory nerve injury, usually preventable and potentially debilitating, is an important source of malpractice litigation. The contemporary medical malpractice debate has been suffused with rhetoric and competing claims,
with tort reformists complaining of burdensome frivolous lawsuits and trial attorneys complaining of the prevalence of medical errors requiring legal redress.\textsuperscript{8,9}

There is a distinct need for an evidence-based analysis of malpractice litigation, particularly in surgery, which is estimated to account for up to 75\% of adverse events in the health care system.\textsuperscript{10}

Unintentional injuries to the accessory nerve provide a useful case study in malpractice litigation. These are a homogeneous group of legal cases, in which injury of one nerve, during a series of similar surgical procedures, results in a group of patients with similar morbidity. This study examined the background and outcomes of malpractice lawsuits alleging impaired spinal accessory nerve function after neck surgery, focusing on the closed cases of a liability insurance company and national civil court trials.

**METHODS**

This was a retrospective review of medicolegal cases drawn from 2 sources: a private medical liability insurance company in New York State (part 1) and the public records of state and federal civil court trials (part 2). All closed cases between January 1, 1985, and January 1, 2007, were included. All awards were adjusted for inflation and are reported in current 2007 dollars. Intergroup comparisons used the 2-tailed t test, with an a priori level of significance of $P = .05$.

**PART 1: NEW YORK STATE INSURANCE CASES**

The records of the Medical Liability Mutual Insurance Company of New York were reviewed for all claims alleging injury to the spinal accessory nerve. The Medical Liability Mutual Insurance Company of New York is the largest medical liability underwriter in New York State, covering approximately 40\% of physicians practicing in the state. Open cases were excluded. Information was collected concerning the defendant physician or hospital, date of surgery and of case resolution, compensation, type of surgery, alleged injury, and case outcome. Cases discontinued or settled before jury selection were classified as discontinued or settled “before trial.”

**PART 2: NATIONAL COURT TRIALS**

The WestLaw legal database (Thomson-West, Eagan, Minnesota) was used to identify cases alleging iatrogenic injury to the spinal accessory nerve that proceeded to either federal or state civil trial in the United States. A plain-language search for “accessory nerve” in the “all verdicts/settlements” database was performed for the dates previously given. Information was collected concerning the defendant physician or hospital, date of surgery, type of surgery, alleged injury, claims of negligence, jury verdict and award, and settlement details.

The WestLaw verdict reports are authored by jury verdict reporters who summarize case details based on court records and information submitted by trial attorneys. Accordingly, much more information about the legal proceedings was available for part 2 cases, compared with the insurance company records for part 1 cases. However, because there is no standard central information gathering system, not every trial in the United States is reflected in the WestLaw database.

Eight of the insurance cases reviewed in part 1 did reach the trial stage, and some of these cases may have been included in the part 2 WestLaw database. Because we sought to characterize each group of cases separately (and did not combine data from parts 1 and 2), and because these cases contribute important information to each group independently, we did not exclude part 1 cases from inclusion in part 2.

**RESULTS**

Between 1985 and 2007, 41 closed New York State insurance cases were identified from the records of the Medical Liability Mutual Insurance Company of New York. The WestLaw database identified 81 additional civil trials.

**PART 1: NEW YORK STATE INSURANCE CASES**

Of 41 lawsuits, 40 involved excision of a neck mass and 1 involved a peripheral vascular procedure (axillary-subclavian bypass). There were 39 biopsies of cervical lymph nodes and 1 excision of a vascular malformation. All cases alleged shoulder weakness and surgical injury to the spinal accessory nerve.

Defendants included 24 general surgeons (59\%), 5 otolaryngologists (12\%), and 2 each of plastic surgeons, vascular surgeons, and general practitioners (5\% each). One anesthesiologist (2\%) was also sued, as were 5 hospitals (12\%).

All cases against the hospitals and the case against the anesthesiologist were discontinued before trial, leaving 34 cases against the physician performing the procedure. Of these 34 surgeon cases, only 8 (24\%) ultimately reached trial. Most cases, 22 (65\%), were settled before trial. An additional 4 cases (12\%) were discontinued before trial. (Percentages do not total 100 because of rounding.) Of the 8 cases reaching trial, 6 were settled at trial and 2 jury verdicts were returned (both in favor of the defendant physicians) (Figure 1).

If the 2 cases not involving cervical lymph node biopsy are excluded (1 was settled before trial and 1 was settled at trial), the breakdown of outcomes includes 21 pretrial settlements (66\%), 5 settlements at trial (16\%), 4 discontinuances (12\%), and 2 defendant verdicts (6\%). Therefore, 26 of 32 lymph node cases (81\%), or 28 of 34 cases (82\%), were ultimately compensated.
The mean indemnity award for cases settled before trial, adjusted for inflation, was $264,395 (range, $71,500-$512,000) in 2007 dollars. The mean settlement at trial was $443,538 (range, $82,080-$935,000). Awards once the cases reached the trial stage were significantly higher ($P = .01$).

PART 2: NATIONAL COURT TRIALS

A total of 80 state court trials, from 21 states, and 1 federal court trial were identified. Of the 81 plaintiff patients, there were 79 adults and 2 children. Their mean age was 41.8 years, and there were 32 males and 49 females.

As was the case with the New York State cases, most cases were cervical lymph node biopsies (55 cases [68%]). Cases also included 6 sebaceous cysts (7%), 4 neck dissections (5%), and 2 each of face-lift, branchial cleft cyst, lipoma, and unspecified biopsy (3% each). There was 1 case each of melanoma, carotid endarterectomy, sebaceous carcinoma, and scar revision (1% each).

Defendant specialty was available for 68 cases. These included 36 general surgeons (53%), 17 otolaryngologists (25%), 4 plastic surgeons (6%), 4 general practitioners (6%), 2 each of orthopedic surgeons, pediatric surgeons, and vascular surgeons (3% each), and 1 thoracic surgeon (1%) (Figure 2).

Unfortunately, the Westlaw database did not formally record more detailed characteristics of the defendant surgeons, such as practice type (academic vs private), subspecialization (eg, head and neck surgery or endocrine surgery), or fellowship training, and this information was only available through secondary sources for a few of the cases.

Verdict reports included details of alleged negligence. Surgical misadventure or error was claimed in 79 (98%) cases. Lack of informed consent was claimed in 17 (21%) cases, although the details of any preoperative counseling, and documentation thereof, were not available. Failure to diagnose the injury postoperatively was claimed in 16 (20%) cases. Only 1 case alleged nonindicated surgery.

Specific morbidity alleged by the patient included shoulder weakness (81 patients [100%]), chronic pain (30 patients [37%]), inability to work (20 patients [25%]), deformity (9 patients [11%]), numbness (4 patients [5%]), and depression (1 patient [1%]). Sixteen patients (20%) ultimately underwent nerve repair, in most cases by a neurosurgeon.

Of these 81 cases, 12 (15%) were settled during trial. A defendant verdict was returned in 37 cases (46%), and a plaintiff verdict was returned in 32 cases (40%) (percentages do not total 100 because of rounding) (Figure 3). Limited to the 55 cervical lymph node cases, 7 (13%) were settled, 25 (45%) were defendant verdicts, and 23 (42%) were plaintiff verdicts. Therefore, 30 of 55 plaintiffs (55%) in lymph node court cases received monetary awards at trial.

When a settlement was reached, the mean initial demand by the plaintiff (as stated in the complaint) was $700,000. The mean inflation-adjusted settlement was $356,132 (range, $22,281-$622,988) in 2007 dollars. When a verdict for the plaintiff was returned, the mean inflation-adjusted award was $515,968 (range, $50,260-$1,299,720). Jury awards were significantly higher than settlements ($P = .003$) (Figure 4).

Comparing the lymph node cases alleging lack of informed consent with those cases not alleging the same,
Injury to the spinal accessory nerve results in trapezius muscle weakness, disabling the shoulder girdle. Soon after surgery, the patient will notice shoulder pain and weakness on shoulder shrug and arm abduction. Later sequelae may include shoulder droop, an atrophic trapezius muscle, loss of abduction, paresthesias, and adhesive capsulitis causing a frozen shoulder.\(^1\)

Surgeons performing any manner of surgery in the posterior triangle of the neck should maintain a high suspicion for this clinical syndrome, and a timely electromyogram is critical in diagnosis. A neck reexploration for nerve repair will attain best results if performed within 3 to 6 months.\(^5\) With time, wallerian degeneration of the distal nerve segment will eventually make it unexcitable and scar tissue maturation will make nerve identification more difficult. By 18 to 24 months after injury, the denervated muscle will be replaced by fatty connective tissue, making any functional recovery impossible. Unfortunately, the average delay to referral for nerve repair is 14 months.\(^12\)

The medical malpractice system has been described as “in crisis,”\(^13\) with litigation-driven increases in insurance premiums and an unknown percentage of baseless lawsuits. On the other hand, a landmark study of 30,000 lawsuits revealed a 3.7% incidence of medical errors, up to 75% are surgical and occur in the operating room.\(^10\)

Until recently, discussion of surgical malpractice has been largely based on ex cathedra statements backed by little data. There is an emerging recognition among physicians that, distinct from the public policy debate on malpractice reform, there is a need for evidence-based analysis of malpractice claims from a medical perspective. Malpractice after surgical complications has been extensively analyzed in the areas of bile duct injury, facial nerve injury, and complications of thyroid and endoscopic sinus surgery.\(^13,15-17\)

The American Society of Anesthesiologists has been particularly active in review of closed medical liability cases.\(^10-20\) These studies are necessary to understand the patterns of care resulting in medical errors and the nonmedical factors leading to successful litigation.

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**COMMENT**

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pany cases as well. The WestLaw legal database does not include all court trials, and the 81 court trials reviewed in this study may not have included all such court cases in the United States. To put this number in context, other researchers have identified 30 court trials over 13 years in thyroid surgery and 68 trials over 21 years in biliary surgery.\textsuperscript{16}

Accessory nerve injuries are a homogeneous group of cases, well suited for medicolegal analysis, in that most patients undergo a similar procedure for a limited set of indications, experience injury to the same nerve, and subsequently develop symptoms that are relatively consistent from patient to patient. Most accessory nerve injuries in this study were the result of cervical lymph node biopsies—39 (95\%) of the indemnity insurance cases and 55 (68\%) of the court trials.

While most surgeons sued in this review were general surgeons and otolaryngologists, surgeons of any specialty who operate in the posterior triangle of the neck were at risk of litigation for this adverse outcome.

Although the Medical Liability Mutual Insurance Company of New York insurance cases reflect only New York State cases, they do help to describe the outcomes of claims not reaching the court system. Nearly two-thirds (66\%) of indemnity claims for cervical lymph node biopsies were settled before trial, and when combined with settlements at trial, most cases (81\%) eventuated in an indemnity payment. Only 12\% of cases were discontinued.

The WestLaw data reflect the quarter of accessory nerve cases that proceed to trial. Most cases (44 of 81 [54\%]) favored the plaintiff with either a settlement or a plaintiff verdict.

While there are no similar surgical studies for comparison, Studdert et al\textsuperscript{8} have reported general medicolegal data from a random sample of 1452 closed malpractice claims. This large review reported an overall compensation rate of 56\%, with 29\% of cases discontinued. When the numbers from the study by Studdert et al are compared with our 34 indemnity cases filed against surgeons, it becomes evident that injury of the accessory nerve carries a high liability risk, with an 81\% overall compensation rate.

The study by Studdert et al\textsuperscript{8} classified the 1452 reviewed cases into 6 categories, based on an independent assessment of the probability a medical error occurred. Cases with less evidence for medical error tended to award compensation between 19\% and 32\% of the time, while cases with "moderate to strong" evidence awarded compensation 72\% of the time and cases with "virtually certain" evidence awarded compensation 84\% of the time.\textsuperscript{8} Our study's outcomes are most consistent with the subgroup of cases deemed to have virtually certain evidence of medical error. Spinal accessory nerve injury is, thus, a significant source not only of litigation but of high-risk litigation, in which the surgeon has a low probability of prevailing.

Before surgery in or near the posterior triangle of the neck, all patients should be informed of the risk of accessory nerve injury before informed consent is given. In this study, 21\% of the claims reaching trial alleged lack of informed consent. The informed consent discussion should be carefully documented, because only one-third to one-half of patients retain information on surgical risk after considering the information and deciding to proceed.\textsuperscript{21,22}

At surgery, if the posterior triangle is entered, the surgeon should anticipate the presence of the accessory nerve. Depending on the surgical field, the nerve may or may not be encountered: while the nerve would presumably be identified and preserved during a functional neck dissection inclusive of level V, it might not be encountered in many lymph node biopsies. However, even if the nerve is not encountered, careful surgical techniques can minimize risk to the nerve. Use of blunt dissection and bipolar cautery may be appropriate. Preservation of the nerve requires not only anatomical integrity but functional integrity, which can be compromised if the nerve is stretched or devascularized or if nearby tissue is cauterized. Many patients with accessory nerve injury are found on reexploration to have an intact nerve with intraneural fibrosis.\textsuperscript{3}

Unique to accessory nerve injury, 20\% of patients in this study also sued for failure to diagnose the injury postoperatively. A high level of suspicion for nerve injury should be maintained after all neck surgery. Denial by the operating surgeon of possible injury delays appropriate treatment and may complicate the physician-patient relationship. If a nerve injury is suspected, surgeons best reduce their liability exposure by making a timely diagnosis, taking responsibility for the injury, and referring the patient for physical therapy and possible repair by an experienced peripheral nerve surgeon. Honest and open communication with the patient after this complication is critical.

A medical malpractice claim requires proof of the 4 elements of negligence: (1) the physician had a duty to the patient, (2) the physician breached that duty, (3) the patient was harmed, and (4) the breach was the legal cause of the harm.

Of these 4 elements, it is most difficult to determine whether the surgeon breached a duty to the patient. It is not sufficient to prove that the surgeon's action or inaction caused the injury, but that the surgeon acted negligently in doing so (ie, the action fell below the accepted standard of care). It is controversial whether attempted identification of the accessory nerve during surgery is within the standard of care in all posterior triangle neck surgery. Nevertheless, in this study, the data show that the nerve was identified in only 1 of 55 court trials involving an injury after lymph node biopsy and that even in that case the jury returned a plaintiff verdict.

Even careful preservation of the nerve may not preclude the development of shoulder weakness. Of patients undergoing functional neck dissection inclusive of level V, 25\% will develop clinical shoulder weakness and up to 85\% will demonstrate electromyographic abnormalities.\textsuperscript{23} These symptoms are usually temporary, but may require as long as 18 months to fully resolve.\textsuperscript{24} Although injury may occur despite meticulous technique by an excellent surgeon, a surgeon who attempts to identify and preserve the nerve is likely less vulnerable to allegations of breach of duty.

Regardless of whether surgeons consider careful surgical technique and preservation of the nerve to be the
standard of care, the legal system clearly treats it as such, awarding compensation in 82% of cases. Even in cases that settle and that, therefore, involve no legal determination that a duty was breached, settlement amounts undoubtedly reflect the likelihood that a jury would find such a breach.

Outcomes in malpractice claims do seem to correlate with the probability of error. Nevertheless, 37% of malpractice claims do not involve medical error and 28% of these claims will be compensated. Similar studies have reported 16% to 59% rates of compensation in claims without merit.

There are believed to be many factors influencing the outcome of malpractice litigation, other than the medical facts of the case. In this study, for example, neither the allegation of lack of informed consent nor the allegation of failure to diagnose the injury influenced outcome or award size. The severity of the disability, jurors’ sympathy with the plaintiff, and sympathy with the defendant physician are critical factors in case outcome. The case description of the highest jury award in this series helps illustrate the importance of a sympathetic plaintiff who has experienced a demonstrable injury. Even cases not proceeding to jury trial will be influenced by the predicted response of a jury to the patient and the physician.

In conclusion, spinal accessory nerve injury may cause significant morbidity and is potentially preventable in most cases. The US legal system compensates malpractice claims against surgeons arising from accessory nerve injury at a rate of up to 82%, making it highly unlikely that a surgeon experiencing this complication will prevail in litigation. Regardless of whether the medical community considers preservation of this nerve to be the standard of care, considerations of litigation risk reduction suggest that surgeons should proceed as if it were the standard. Documentation of informed consent, honest communication, and prompt diagnosis and referral in the event of an injury are crucial.

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