

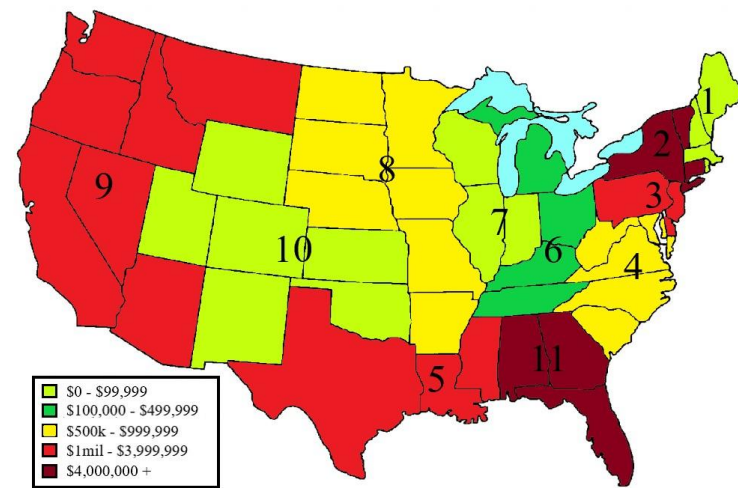
Courthouses and Craniotomies: Medical Malpractice Indemnity Payments and Litigation Verdicts in Skull Base and Cerebrovascular Neurosurgical Practice in the 21st Century

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Introduction

Neurosurgery is an increasingly litigious field, and in skull base surgery, where critical neuroanatomical structures are encountered in most operations, the cost of litigation may be an inevitable consequence of entering the arena. It is estimated that over 20% of neurosurgeons nationwide encounter some form of malpractice claim during their careers, a statistic that underscores the pressing need for a deeper understanding of the factors contributing to such claims and their implications for patient care. Skull base and cerebrovascular surgeries often entail a high degree of complexity, involving intricate maneuvers near critical neurovascular structures. Moreover, the pathologies encountered in skull base surgery present their own set of challenges in terms of surgical resection, functional preservation, and postoperative outcomes 4. In past research, investigators have investigated malpractice rates of both spine cases and cranial cases, but no one has specifically examined the malpractice rates associated with skull base and endovascular cases.

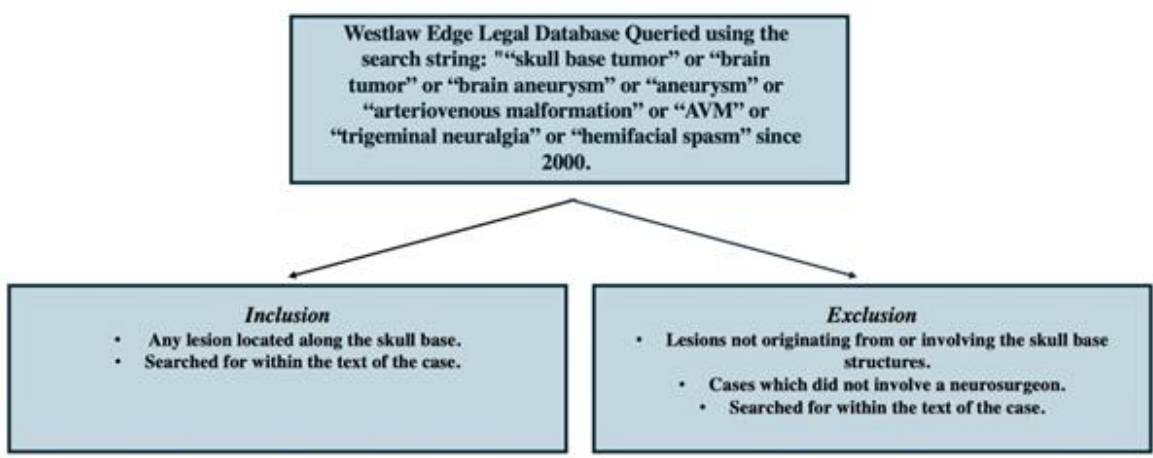
Labeled US heat map of US Circuit Courts and range of amount paid in indemnity payments over the 21st Century



Through analysis of case histories, legal precedents, and institutional data, we aim to offer a comprehensive portrait of the malpractice landscape to empower neurosurgeons and trainees with the knowledge and insights needed to navigate the complexities of skull base neurosurgery.

Methodology

The authors utilized the Westlaw Edge legal database for data collection. The Westlaw Edge legal database was utilized to extract “Jury Verdict and Settlements” after January 1st, 2000. All US Court Circuits were systematically searched (Supplemental Table 1). Search terms included “skull base tumor” or “brain tumor” or “pituitary” or “brain aneurysm” or “aneurysm” or “arteriovenous malformation” or “AVM” or “trigeminal neuralgia” or “hemifacial spasm.” In order to exclusively include cases related only to skull base or cerebrovascular surgery, court transcript summaries publicly provided on Westlaw Edge were reviewed by the authors. Any pathologies or cases not specifically within these fields of neurosurgery were excluded from further analysis. Cases related to either diagnosis, operative management, or other form of treatment by a neurosurgeon and any other relative specialties were included in analysis. Data collection was performed independently by two authors (DWB and NLA).. Disagreement of case inclusion rarely occurred (3.5%) during data collection, and all issues were resolved by a third author (CLH).

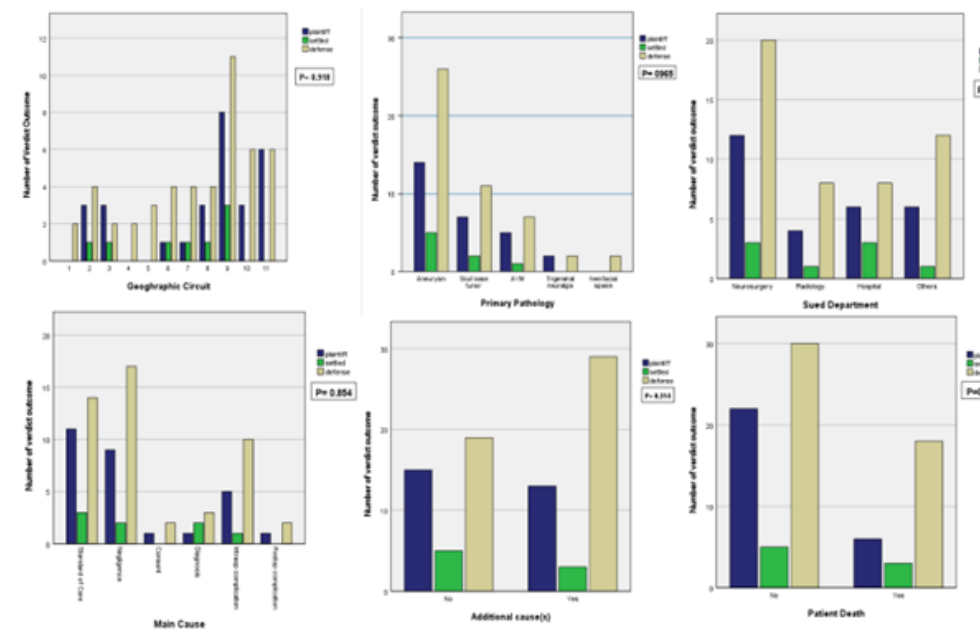


Data regarding the trial date, pathology of case, litigation outcome, amount awarded (if applicable), malpractice allegation, other involved medical specialties, and whether patient death resulted from the alleged malpractice was documented. The pathology types included were those listed in the search terms. Litigation outcome possibilities were either jury verdicts in favor of the plaintiff (patient) or defendant (physician), or settlement. Malpractice allegation was categorized as improper informed consent, misdiagnosis/misread diagnostic imaging, intraoperative complication, post-operative complication, breach of standard of care, or negligence, reflecting broader trends in increasing malpractice case rates in these areas

Results

In total, over 745 malpractice cases were reviewed. A total of 85 cases from 2000-2024 related to skull base or cerebrovascular pathologies were analyzed (Supplementary Table 2). The year 2000 had the highest number of cases (n = 11), and a trend of decline was noticed across the progression of the 21st century (Figure 2). Circuit 9 had the highest number of cases with 22 (26.2%), with a majority of these occurring in the state of California (n = 16). Circuits 2, 8, and 11 also were noted to have a higher incidence of cases with 8 (9.5%), 8 (9.5%), and 12 (14.3%), respectively, with New York (n = 8), Minnesota (n = 5), and Florida (n = 8) holding the majority of cases in their respective circuits. Kruskal-Wallis testing did not reveal any significant association between geographical circuit and amount paid, however (p = 0.42).

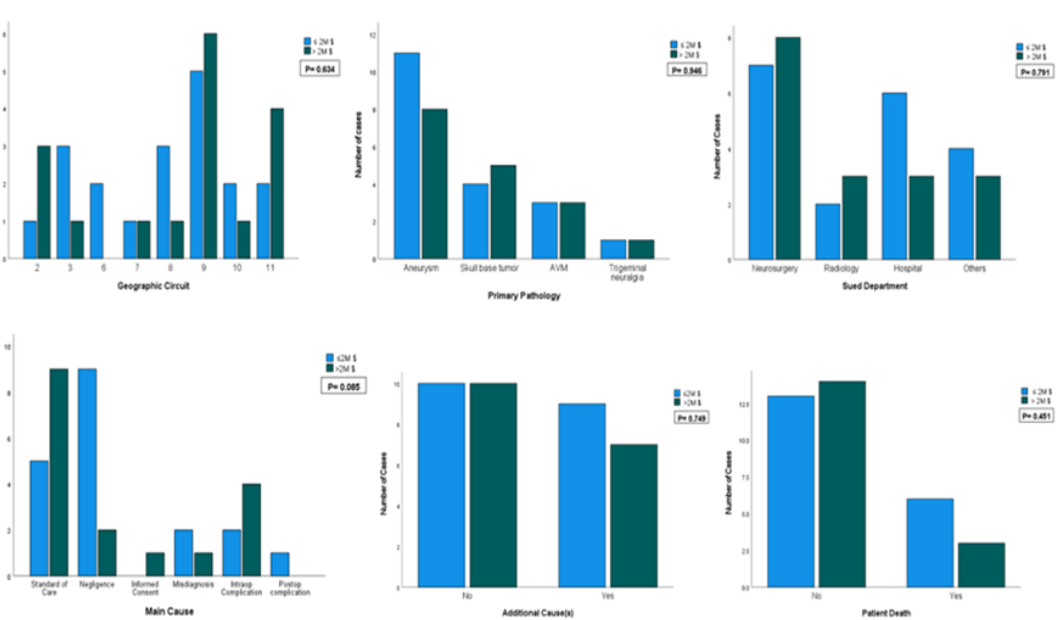
Overall, a defense verdict, or a jury decision in favor of the physician, was awarded in 57.1% of cases (n = 48) while a plaintiff (patient) verdict was awarded in 33.3% of cases (n = 28). Settlement occurred in 9.5% of analyzed cases. A majority of malpractice cases (53.1%) involved aneurysmal pathology. 20 cases (23.8%) involved skull base tumors while 13 (15.5%). Claims were most commonly against the neurological surgery specialty (41.7%) and radiology (15.5%). Additionally, the hospital system to which the physician was involved was sued in 20.2% of cases. The most common reasons for malpractice claims were improper standard of care (71.1%) and negligence (68.9%).



The total amount owed from cases resulting in plaintiff verdict or settlement totaled to \$171,387,558. The highest per single case paid to the plaintiff was \$49,000,000, which occurred in New York (Circuit 2). The median amount paid in plaintiff verdict cases was \$2,000,000 (1 – 6.75) which was not significantly different from the settlement amount of \$1,300,000 (0.4 – 3.99) (p = 0.63). Circuit 11 had the highest payment per malpractice case, with a median of \$5,870,000 (1.91 – 9), followed by Circuit 2 (\$3,200,000) (Figure 3). Of note, Circuits 1, 4, 5 did not have any plaintiff verdicts or settlements despite 7 cases total occurring between these geographical areas.

Results (Cont.)

Furthermore, the primary pathology, main cause, and presence of secondary causes did not increase the likelihood of a decision for or against the healthcare provider. Additionally, the department sued, and the presence of a patient's death does not determine the result of litigation. Neither the primary pathology, main cause, secondary cause, geographic circuit, department sued, nor patient death influence the likelihood of the outcome of litigation based on the amount awarded. In inferential analysis using ANOVA testing, no statistically significant associations were found between the characteristics of cases brought to court and the outcome of litigation. Lastly, 42 patients suffered from neurological deficits post-operatively while 43 did not. The mean value of payment for plaintiffs with neurological deficits was \$6,245,333 while those cases without neurological deficits resulted in a mean payment of \$3,276,197 (p = 0.47).



A comparison of case characteristics and indemnity payments of 21st century skull base and cerebrovascular malpractice cases that resulted in plaintiff verdict. Cases were separated into two distinct groups for comparison based on median indemnity payment of \$2 million..

Conclusions

An average of \$4.6 million in indemnity payments have been paid over the last 24 years related to skull base/cerebrovascular cases in the United States. These insights underscore the need for neurosurgeons to be well-informed about the risks and to advocate for protective measures within their practice environments.