

Trauma

# The risk of malpractice litigation in care to head-injury patients in comparison with other high-risk patient groups: an inpatient-based epidemiological study in Taiwan

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## Abstract

**Background:** The purpose of this study was to assess the risk of being sued in district courts for care to head-injury patients from the perspective of epidemiology.

**Methods:** This research was designed to be a retrospective population-based cohort study. We researched the incidences of litigations arising from head-injury inpatients under neurosurgical care, all neurosurgical inpatients, and birth inpatients in Taiwan, and computed their relative risks. The study period was from 1998 to 2002.

**Results:** The average annual incidence rate of becoming a plaintiff for head-injury neurosurgical inpatients was 15 per million; for all neurosurgical inpatients 11.8 per million; and for birth patients 33.5 per million. The relative risk comparing head-injured neurosurgical inpatients against all neurosurgical inpatients was 1.27; whereas comparing head-injury neurosurgical inpatients against birth inpatients was 0.45, and comparing all neurosurgical inpatients against birth inpatients, 0.35.

**Conclusions:** The findings of our population-based study indicate that for the inpatient populations, whether head-injury patients or not, neurosurgeons in Taiwan are facing a relatively lower rate of litigation in comparison with those treating birth patients. Nonetheless, head-injury patients still pose a major challenge in the ED, and misdiagnosis remains the major complaint of plaintiffs in subsequent litigations.

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## Keywords:

Head injury; Medical malpractice; Litigation; Cohort study; Incidence; Relative risk

## 1. Introduction

In January 2005, Little Chiu, then a 4-year-old girl, was slammed against a wall by her reckless father and became brain dead eventually. Two doctors were subsequently reprimanded by the Physician Disciplinary Committee of the DOH and indicted by the prosecutor for professional negligence. The public discontent was caused by the

failure of the chief resident of neurosurgery and the on-call neurosurgeon to see the child in person during the midnight consultation by the emergency physicians [3,5,10]. This incident deeply troubled the neurosurgical specialists in Taiwan. They worried that all the punishments imposed an undue burden and would lead to chilling effects on neurosurgery.

In a joint study conducted by the Harvard School of Public Health and Columbia Law School [17], the key informants identified 6 specialties that are at high risk for litigation. Neurosurgery is one of the 6, accompanied by emergency medicine, general surgery, orthopedic surgery, obstetrics/gynecology, and radiology. The majority of professional liability carriers in the United States also designate neurosurgery in the high-risk group [16]. A Turkish study, which examined the opinions given by the courts and public

*Abbreviations:* DOH, Department of Health; ED, emergency department; NHI, National Health Insurance; CT, computed tomography; MRI, magnetic resonance imaging.

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defenders in Turkey, indicated that neurology and neurosurgery were involved in 10.53% of malpractice cases, next to obstetrics/gynecology (16.82%) and general surgery (10.69%) [2]. Relevant research in Taiwan is scarce and was mostly done in the 1990s by questionnaire surveys, which indicated that 44% of physicians had experienced medical disputes, and the high-risk group consisted of anesthesiology, obstetrics/gynecology, orthopedic surgery, and surgery [19], without specifying neurosurgery.

How risky is it for neurosurgeons to care for head-injury patients in terms of the possibility of facing litigation in the courts? According to a US government report, obstetrics/gynecology specialists were involved in 12.4% of the claims closed in 1984 and ranked number 1 among all specialties, whereas neurosurgeons were only involved in 2.6% of the claims and ranked 14th [8]. Childbirth negligence cases continue to be the area where physicians are losing the majority of cases that go to the jury in the United States; for instance, plaintiffs won 60% of these cases in 2002 [1]. However, as there are disproportionate numbers of obstetrics/gynecology patients and neurosurgery patients, the question then becomes how risky are the head-injury patients for neurosurgeons in comparison with other patient populations.

The purpose of this study was to assess the risk of being sued in court for caring for head-injury patients from the perspective of epidemiology. Giving birth has been considered the most risky practice in obstetrics in terms of professional liability which we compared with caring for giving birth to see, relatively speaking, how risky it is for neurosurgeons to care for head-injury patients. Most of the previous researches focus on physician-level analyses. Our research aimed at assessing the risks of encountering litigations in specified patient populations from an epidemiological perspective.

## 2. Materials and methods

This research was designed to be a retrospective cohort study. Our intent was to determine the incidences of lawsuits arising from head-injury inpatients under neurosurgical care, all neurosurgical inpatients, and birth inpatients. The number of inpatients for each category of occurrence that resulted as district court cases for each year was determined.

The incidence rates were derived from dividing the number of specific lawsuits by the number of predefined categories of inpatients for each year. Whether there was a significant difference among the mean incidences of the 3 groups was tested by Student *t* test. The relative risks of looming litigation later on in each category of inpatients were computed by comparing the respective incidences.

The study period was set to be from 1998 to 2002 after taking data availability into account. The study materials included the inpatient reimbursement claim dataset of the NHI from 1998 to 2002. Because NHI is a mandatory health insurance, nearly 100% of all diseases, injuries, and births are treated by health care providers under contract with NHI. Therefore, we were able to ascertain the occurrences of all inpatient admissions of the desired parameters. The principal diagnoses with ICD-9-CM diagnosis codes 800-804, 850-854, and 873 were included in the head-injury inpatient population.

Whether the case progressed to court was ascertained by looking into the district court decision database of the Judicial Yuan from August 1999 to November 2005. The Judicial Yuan is the highest governmental office in charge of judiciary affairs, and it started publishing court decisions in August 1999. We traced back to the year of the occurrence in the court's decision. Only those decisions between 1998 and 2002 were included in our analyses.

According to Florida's experience on medical professional liability insurance claims, there is, on average, a 1.2-year gap between occurrence and reporting [9]. It took, on average, 75.16 days to close a criminal trial and 85.97 days to close a civil trial at the district court level in Taiwan in 2004 [11]. A 2- to 3-year time lag between the occurrence of an unsatisfactory medical event and the first court judgment is a reasonable expectation according to the initial database exploration. If the same occurrence gave rise to more than 1 litigation in this study, only 1 was counted.

## 3. Results

From 1998 to 2002, the annual number of inpatients in the whole nation averaged 2 700 000. Of this number, there were on average 251 894 births with an average cesarean section rate of 33.5%. On the other hand, neurosurgeons take care of an average of 69 275.6 inpatients annually. Of

Table 1  
Descriptive statistics of target categories of inpatients by year

	1998	1999	2000	2001	2002	Average
Total inpatients nationwide	2 455 960	2 590 140	2 690 847	2 814 986	2 945 904	2 699 567.4
Total births	247 220	258 849	279 024	240 964	233 413	251 894
Natural birth	163 900	172 293	185 423	160 730	155 259	167 521
Cesarean section	83 320	86 556	93 601	80 234	78 154	84 373
Total head injury inpatients	98 880	96 557	89 845	87 262	82 923	91 093.4
Total neurosurgical inpatients	56 840	66 724	69 827	74 157	78 830	69 275.6
Head injury	21 840	26 442	26 620	26 592	27 927	25 884.2
Non-head injury	35 000	40 282	43 207	47 565	50 903	43 391.4

Table 2  
Descriptive statistics of litigations arising from target categories of inpatients by year

	1998	1999	2000	2001	2002	Average
Litigation related births	11	11	7	4	9	8.4
Criminal litigation	7	7	4	2	3	4.6
Civil litigation	4	4	3	2	6	3.8
Total births	247 220	258 849	279 024	240 964	233 413	251 894
Incidence of litigation-related births	0.0000445	0.0000425	0.0000251	0.0000166	0.0000386	0.0000335
Litigation-related head injury neurosurgical inpatients	0	0	1	1	0	0.4
Criminal litigation	0	0	1	0	0	0.2
Civil litigation	0	0	0	1	0	0.2
Total neurosurgical head injury inpatients	21 840	26 442	26 620	26 592	27 927	25 884.2
Incidence of litigation-related head injury neurosurgical inpatients	0	0	0.0000376	0.0000376	0	0.000015
Litigation-related neurosurgical inpatients	1	0	1	2	0	0.8
Criminal litigation	1	0	1	1	0	0.6
Civil litigation	0	0	0	1	0	0.2
Total neurosurgical inpatients	56 840	66 724	69 827	74 157	78 830	69 275.6
Incidence of litigation-related neurosurgical inpatients	0.0000176	0	0.0000143	0.000027	0	0.0000118

this number, 25 884.2 were head-injury–related admissions, which accounts for 37.4% of total neurosurgical inpatient admissions. There were, on average, 91 093.4 head-injury inpatients annually, which indicates that more than two thirds of head-injury patients were cared for by physicians other than neurosurgeons. The descriptive statistics of the inpatient populations are summarized in Table 1.

After an extensive search of the Judicial Yuan database, we found that there were only 2 head-injury inpatients who later sued their neurosurgeons in the district courts in the entire study period. One was treatment related and the other diagnosis related. One sued for civil damages and the other sued for criminal convictions. Even if we look at the entire inpatient population of all neurosurgical departments, there were only 2 more inpatients who sued their neurosurgeons in criminal courts. Both cases had to do with operations on tumors. All 4 decisions at the district court level for both head injuries and non–head injuries, were for the defendant physicians. Therefore, the average annual incidence rate of becoming a plaintiff among neurosurgical head-injury inpatients was 15 of 1 million. And the average annual incidence rate of becoming a plaintiff for all neurosurgical inpatients was 11.8 of 1 million. There was no significant difference between the 2 categories ( $P = .76$ ).

In contrast, there were a total of 42 birth-related litigations from 1998 to 2002. The average annual incidence rate of becoming a plaintiff among birth patients was 33.5 of 1 million. This incidence is significantly higher than that of all neurosurgical inpatients ( $P = .02$ ), but not significantly higher than that of head-injury neurosurgical inpatients ( $P = .12$ ). The detailed year-by-year breakdown is shown in Table 2.

Aside from respective incidences, the relative risk derived from comparing head-injury neurosurgical inpatients against all neurosurgical inpatients was 1.27, which

means head-injury neurosurgical inpatients were 1.27 times as prone to litigation as neurosurgical inpatients considered as a whole. On the other hand, the relative risk derived from comparing head-injury neurosurgical inpatients against birth inpatients is 0.45, which means head-injury neurosurgical inpatients had 45% the risk of suing compared with birth inpatients. In addition, the relative risk derived from comparing all neurosurgical inpatients against birth inpatients was 0.35.

#### 4. Discussion

Unlike physicians working with the American system, physicians in Taiwan are likely to face both civil liabilities and criminal convictions in malpractice lawsuits, and the situation is similar to that in Japan [13]. However, criminal action in Japan is usually reserved for serious cases involving obvious errors [13]. On the contrary, in Taiwan, although the patients and their families have the choice of either suing in the civil court directly or going to the prosecutor to seek an indictment, most plaintiffs opt for the latter for the sake of convenience and economy. If the physician is eventually convicted, he or she will face up to 5 years of imprisonment in the case of a death claim [6] and civil liability will be unavoidable.

Although we initially thought we would find a higher incidence of litigations, there were in fact only 2 head-injury–related litigations in our study period that sued neurosurgeons. One was treatment-related and the other diagnosis-related. Even when we researched the non–head-injury inpatients, we only found 2 more criminal litigations, of which both had to do with operations on tumors. If we simply look at the absolute number of litigations that made their way to Taiwan’s court system, the results are not too bad. Most of the claims should have been either settled out

Table 3

Other head injury litigations recorded in the available judicial database but not included in this study

Year of occurrence	Type of judicial proceedings	Defendant	Plaintiff's assertion	Judgment
1996	Criminal	Emergency physician <sup>a</sup>	Diagnosis related	For defendant
1997	Criminal	Neurosurgeon	Diagnosis related	Against defendant
2001	Civil	Emergency physician	Diagnosis related	For defendant
2002	Civil	Hospital	Fall caused by care negligence	For defendant
2003	Civil	Emergency physician	Diagnosis related	For defendant
2003	Criminal	Neurosurgeon	Diagnosis related	For defendant
2003	Criminal	Oral surgeon	Diagnosis related	For defendant

<sup>a</sup> Emergency physician refers to the physician who sees the plaintiff in the emergency room with unspecified specialty.

of court or denied by the prosecution in Taiwan. The phenomenon of the low number of lawsuits was also observed in Japan, which has a similar court system and culture. The number of medical malpractice suits was around 0.2 per 100 Japanese physicians in the 1990s [13]. It has been argued that this might be attributed to different practice patterns and much fewer lawyers in Japan [7].

However, the occurrence of lawsuits only reflects the “tip of the iceberg.” According to a physician survey funded by the DOH in 1991, 42% of medical malpractice disputes were settled out of court in Taiwan, only 10% were litigated, and the rest remained unresolved throughout [4]. There are several alternative medical dispute resolution mechanisms in Taiwan. Pursuant to the Medical Care Act, the disputing parties can go to the county or city government's DOH to apply for mediation, and the medical affairs review committee of the respective DOH is responsible for administering mediation [12]. For instance, according to the statistics of Taipei City Government, they received 138 medical dispute complaints in 2003; of this number, 30 filed for mediation and 50% were successfully resolved [18]. Various consumers' associations also provide disgruntled patients venues to settle their disputes with healthcare providers. All these alternative medical dispute resolution mechanisms make court appearances less necessary in Taiwan.

In searching the Judicial Yuan database, we incidentally found 7 other head-injury cases that were not included in our study either because they were outside the designated time frame or because the lawsuits were not against neurosurgeons. Interestingly, in the majority of these cases, the plaintiffs sued their emergency physicians and their assertions were diagnosis related (Table 3). Most head-injury patients will be rushed to the ED. Physicians who work in the ED regardless of specialties are likely to be the first physicians they encounter. Therefore, it appears that head-injury patients are a higher risk group of patients for the ED doctors than for the neurosurgeons, and the major complaint from the patients or their families is misdiagnosis.

Judging from the above, the first point of contact with head-injury patients will be in the ED. That being said, we recognized the major limitation and assumption of our research: whether we found the accurate head-injury patient population neurosurgeons face. Because emergency doctors take care of most of the head-injury cases in the ED, neurosurgeons will only see ED head-injury patients when

consulted under normal channels. We assume that the cases for which neurosurgeons are consulted, and those subsequently giving rise to litigation against neurosurgeons, most likely become inpatients one way or another. Therefore, the number of head-injury contacts for neurosurgeons as estimated by use of inpatients, although a bit underestimated, should not be far from the real contact numbers.

The other characteristic of our study is that we used the district level judgments as the end point of our follow-up time. In most cases, the plaintiffs can still appeal to the appellate courts and to the Supreme Court. However, for the purpose of this study, the beginning of the neurosurgeons' ordeals will give us an approximation of the risk of this line of practice.

Undoubtedly, a good portion of the claims are either settled out of the judicial system or denied by the prosecution in Taiwan. However, the same phenomenon must have applied to obstetricians. Even if the absolute number of litigations did not give us the real picture of the number of malpractice disputes physicians are facing, the relative-risk approach can serve as a good positioning beacon. Neurosurgeons, although still having a high-risk job, obviously face a lower patient-risk population compared with obstetricians in terms of the propensity for suits, about 35% to 45% the level of birth patients.

Specialists at high risk of litigation tend to practice defensive medicine. There are possibly 2 types of behaviors in defensive medicine: assurance and avoidance. Among the various possible assurance behaviors, neurosurgeons are most likely to order more CTs, MRIs, or x-rays; in terms of avoidance behaviors, they are more likely to stop performing certain procedures [17]. If we look at the data shown in Table 3, it appears that the most important allegation against physicians in head-injury lawsuits is misdiagnosis. Therefore, it makes perfect sense to reason that neurosurgeons are also likely to order more CTs, MRIs, or x-rays as an assurance measure in facing head-injury patients.

Just like the trend in the United States [1,14], in Taiwan there are more medical malpractice litigations over time and the monetary awards are also increasing. According to a physician-level longitudinal study of whether obstetricians will change their threshold for cesarean delivery, the results indicated that obstetricians learned from the experience of suffering malpractice claims; however, it is only in the event of a large claim that obstetricians would increase cesarean



rates [9]. By analogy, whether neurosurgeons will change their practice pattern because of the Little Chiu incident will depend on how much penalty the 2 physicians will ultimately receive in the end.

In addition to the concern of the increased practice of defensive medicine among specialists, we also wonder whether the Little Chiu incident will turn medical graduates away from choosing neurosurgery because of the extensive coverage of the media and the fact that one of the defendants was a neurosurgery resident. According to a longitudinal study conducted in the United States, medical students continued to choose high-risk specialties although they perceived problems in the climate of mounting litigations, and the reasons for their choice were enjoyment and that procedure-oriented specialty offers more effective treatment [15]. Whether this optimism holds true in Taiwan needs more observation.

## 5. Conclusions

Neurosurgery has generally been considered a high-risk specialty. The real risk might be exaggerated every time a high-publicity malpractice litigation happens. The findings of our population-based study indicate that in the inpatient populations, whether they are in the head-injury population or not, neurosurgeons in Taiwan are facing a relatively lower rate of litigation in comparison with physicians caring for birth patients (ie, 45% of the risk level for care to birth patients). However, head-injury patients still pose a major challenge in the ED, and misdiagnosis remains the major complaint of plaintiffs in subsequent litigations.

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