

The Neurologist and Patient Safety

Thomas H. Glick, MD

Background: The objective of this article is to acquaint neurologists with the current status of evidence and opinion on patient safety in neurology. Research data on errors and preventable adverse events (harm from medical management) in neurology are sparse, with little light being cast thus far on the vulnerabilities of individual neurologists and neurologic office practices. However, areas of particular concern and lines of appropriate action are now becoming apparent.

Review Summary: This review draws on the few studies of neurologic malpractice claims, inpatient incident reports and chart reviews, and articles and abstracts in the journal literature. These are placed in the context of the general epidemiology of medical errors, adverse events, and approaches to remediation.

Conclusion: Accurate and timely diagnosis in all its aspects represents the single largest category of error. Most neurologists have their first interaction with a patient and family at the time of a critical illness, underlining the importance of improved communication, not only with them but with other caregivers. Systems of information transfer, such as those enabling timely imaging reports, are critical. Better consultative follow-up may be pivotal. Education in patient safety competencies and closer supervision of trainees can be expected to improve protection. Venues, such as emergency departments, in which relevant knowledge and skills may be insufficient to maximize patient safety, deserve particular attention.

Key Words: patient safety, errors, risk management, neurology, adverse events

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Patient safety emerged into the glare of public and professional attention following the Institute of Medicine (IOM) report published in 1999, *To Err Is Human*,¹ which cast a dark shadow on our effectiveness in protecting patients from harmful errors. The occurrence of errors had been well-known, of course, but scarcely acknowledged publicly and certainly not confronted nationally until landmark studies

(which informed and supported the IOM report) were carried out by the Harvard Medical Practice Study in New York state² and in Colorado and Utah³ in the 1980s and 1990s (following a less well-publicized study in California in the 1970s).⁴ Since then, the medical profession, including neurologic organizations and clinicians, has been grappling with defining the dimensions of the problem and what to do about it.

One theme is the need to invest in and use better systems to counteract the potential “to err” of doctors and other health professionals who are fallible in their knowledge, memory, skills, attitudes, and conduct. Traditionally, better education of physicians appeared to be the obvious remedy, but education, while still very important in some respects, has proved to be insufficient to prevent harm in the patient population. “Systems changes” can obviate and compensate. Another theme is the need to change the so-called “shame and blame” culture. This discourages neurologists and others from sharing instances of patient harm with colleagues for discussion and collaborative, preventive measures. And always hovering nearby is the threat of litigation and the associated burden of malpractice insurance premiums. This threat can either concentrate our attention on patient safety or distract us by substituting inappropriate “defensive medicine.”

Neurologists have often expressed uncertainty as to how much of a problem of inadvertent harm really exists in the care of neurologic patients: Is the responsibility widespread or the result of actions of a small number of “bad apples?” Do malpractice indemnity payments reflect negligence and do claims of negligence reflect real patient harm and preventable errors? Is safer practice within the grasp of individual neurologists and practice groups or the responsibility of large institutions? Getting a handle on the true epidemiology of harmful errors constitutes one pressing need. Another, clearly paramount, need is to work with existing information, generic tools, and educational opportunities to intervene quickly and constructively to reduce vulnerability and eliminate hazardous practices.

In the following sections I highlight some features of the patient safety problem with an illustrative case example, provide a brief overview of patient safety in general, and describe currently existing sources of information relevant to neurology. Also, I critically review specific, neurologic data

From the Department of Neurology, Harvard Medical School, The Division of Neurology, The Cambridge Health Alliance, Cambridge, Massachusetts.

Reprints: Thomas H. Glick, MD, 1493 Cambridge Street, Cambridge, MA 02139. E-mail: thomas_glick@hms.harvard.edu.

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with respect to credibility and implications. A brief round-up of additional aspects, such as systems approaches, the “culture” of responding to mistakes, patient safety education, the role of communication, and the contributions of technology, follows. Finally, with the expectation that the reader will recognize patient safety as an important dimension of practice and teaching, I summarize ways that neurologists individually, and in collaboration, can contribute.

CASE EXAMPLE: UNSAFE AT ANY EXPERTISE

A 43-year-old man switched his care for seizures to a new neurologist, “Neurologist B,” who was a well-known professor with a practice in a teaching hospital clinic. After 2 visits and a follow-up 6 months later, the patient disappeared from this practice. Eight years later he sued Neurologist B for missing a brain tumor. The suit was withdrawn, but the patient safety issues remained.

The patient provided no records of his prior care, despite requests at the first and subsequent visits. He did not arrange for a primary care physician, as advised (which represented standard protocol in this practice). Lacking information on prior imaging at the second visit, Neurologist B ordered a cranial MRI and scheduled a follow-up appointment. The outside imaging facility made no contact by phone or mailed report, although the scan showed a hemispheric mass lesion. The only report was included in the X-ray envelope containing copies of the films mailed to, but never seen by, Neurologist B, who had no tracking system for ordered tests or a handling protocol for receipt of outside images or test reports. (The film envelope was mislaid in a storage closet.) The patient failed to keep his follow-up appointment. Six months later when the patient reappeared, his chart was not available. At that visit, the patient did not inquire about the MRI result. Neurologist B had by then forgotten that the scan had been ordered, and the patient’s seizure control, the only apparent clinical problem, was stable; his anticonvulsant medications were continued. The patient again disappeared from this clinic. (When the suit was filed 8 years later, the primary brain tumor had enlarged, but expert opinion may have contended that the patient had done better with nontreatment than might have been expected with earlier intervention.) For whatever reason, the suit was withdrawn, although clearly there had been major errors, and possibly some patient harm.

Patient safety responsibility (quite aside from any legal responsibility) lay, in part, at the feet of Neurologist B, who erred in forgetting that the MRI had been ordered and in not persisting in accessing earlier provider records within the hospital. Outside records also were not obtained (prior to HIPAA federal privacy regulations, which may now further constrain timely access in a nonelectronic environment). Neither the clinic system nor Neurologist B, personally, had a tracking mechanism for patient and test follow-ups. The

clinic and the medical records department failed to make the patient’s chart available when needed. The systems issues also involved the inadequate communications procedure of the outside imaging facility. Finally, did the patient bear some responsibility for not keeping the follow-up appointment after the test and not inquiring about the test result at the later visit or over subsequent years? When the patient’s record was reviewed, it was clear that Neurologist B was very concerned about the quality of medical communication with the patient, disconnects in the doctor–patient relationship, and the patient’s general difficulty in using the health care system effectively, including establishment of a relationship with a primary physician who might have been helpful in overcoming these barriers. Thus, there were red flags from the very beginning that should have provided warning of vulnerability from a patient safety and risk management viewpoint. When the claim was filed, Neurologist B reacted with shame, not sharing the incident with any colleagues except the chief of service; also with resentment at the generic systems failures; and, finally, with self-directed blame and with anger at the patient.

While some additional, important facets of patient safety are not exemplified by this case, many of the important ones are, as reflected in the subsequent sections. Neurologist B, in dealing with this case even after withdrawal of the claim, came to understand that the issue of patient safety was not remote, but was in the neurologist’s own court, to use a nonjudicial metaphor. Many observers would say that the individual neurologist’s greatest leverage for patient safety consists in simply becoming engaged in using existing, preventive tools in the context of recognized vulnerabilities.

THE NATIONAL SCENE: A GENERAL OVERVIEW OF MEDICAL ERRORS AND ADVERSE EVENTS

The IOM report on patient safety extrapolated data to suggest an incidence of up to 100,000 preventable deaths per year in the United States due to inadequate protection of patients. The investigators in New York² and in Utah and Colorado,³ whose work informed and supported the IOM estimate, analyzed patient records for *adverse events*, defined as patient harm resulting from medical care (not from the illness itself). In addition, they imputed *negligence* in 28 to 33% of the adverse events. (From a purely patient safety point of view, it may be better to use the term “preventable” rather than “negligent.” The latter, although it implies preventability, is a legal term, and a legal finding of negligence does not confirm medical preventability. Even so, preventability is a matter of judgment, ideally in this context the judgment of expert, professional reviewers.) *Iatrogenic events* include, in addition to preventable adverse events, known and (currently) unavoidable complications of medical practice (such as toxic neuropathies from certain cancer chemotherapies).

Considerable controversy has ensued⁵⁻⁷ regarding the IOM estimates of preventable deaths and whether the patient safety focus should be more on errors or on adverse events per se.^{8,9} Errors in medical care may result at times in adverse events, but in other instances additional checks, interventions, or sheer luck prevent patient harm. Such incidents have been regarded as “near misses,” as in aviation, from which valuable concepts and lessons have been drawn.¹⁰ Neither concentrating solely on errors nor on adverse events is sufficient. Actual adverse events, even if fully reported, do not address the much larger number of errors (which are harder to document in many instances) and that, if uncorrected as a pattern, will surely lead to further adverse events. On the other hand, focusing on errors alone may neglect the bottom line of patient safety: harm done to patients.

Patient Safety in Ambulatory Practice and Primary Care

The generation of errors and adverse events in ambulatory practice, the predominant activity in primary care medicine and an important component of neurologic care, is not adequately represented in the data from the Harvard Medical Practice Study in New York state² or the Utah and Colorado³ investigations. They only included, for certain calculations, incidents that occurred during or in relation to hospitalizations and thus did not reflect events entirely limited to the ambulatory realm. Office practice is virgin territory in the epidemiology of neurologic patient safety. Thus, neurologists concerned with errors have looked to primary care for data and for models of research and remedies. Such information is obviously not to be found only in the US, because patient safety is a worldwide challenge. The *British Medical Journal* (along with other journals, professional societies, and agencies) has undertaken a leadership role in reporting and disseminating information, including summaries of US, Australian, and other population-based research.¹¹

As in neurology, primary care researchers have used risk management databases and malpractice claims to capture at least some of the adverse events that occur. One study categorized and interpreted risk management incident reports, filed over 5.5 years by primary care clinics, associated with an academic health center. They attributed 83% of the 35 adverse events to preventable, medical errors.¹² In addition, the database of the Physician Insurers Association of America (PIAA) has been used to scrutinize claims in primary care, of which 23% were deemed negligent.¹³ Of these, 68% were in outpatient settings. Research initiatives of the American Academy of Family Practice are focusing on obtaining patient population-based data from comprehensive reporting of errors and adverse events by all persons involved in medical care interactions at participating practices. This approach is currently being explored in neurology.

Summary reports on patient safety in primary care have chronicled important generic issues,¹⁴ but have not detailed specialty-specific problems, such as neurologic errors in general medical practices. Errors obviously occur in the treatment of primary and secondary neurologic conditions, which represent up to 10% of presenting problems (depending on definition) in internal medicine and family practices. Most neurologic symptoms are first assessed by generalists and other nonneurologists. This places a major obligation on neurologists to initiate and sustain patient safety agendas in their teaching and to collaborate closely with generalists in evaluating process and outcomes. Conversely, increasing interest is being accorded (but without available data) to errors by “principal provider” neurologists in the primary care of patients, while treating their neurologic conditions, such as multiple sclerosis.

Poor understanding of providers' communications probably represents one of the great reservoirs of suboptimal and sometimes hazardous patient care.

Responses of Professional Societies

Even before the IOM report, and increasingly since then, professional societies have recognized the imperative of action. The specialty of anesthesia was an early leader in this domain, showing that concerted effort can have profound success. More recently, other specialties have accepted responsibility for engaging patient safety issues. The American Academy of Neurology has collaborated with the American Medical Association and others to address the problem of patients' health literacy. Poor understanding of providers' communications (including medication instructions, preparation for medical tests, follow-up expectations, and so on) probably represents one of the great reservoirs of suboptimal and sometimes hazardous patient care. Internal medicine organizations and others have worked prominently on curbing and ideally eliminating medication errors. While the particular patient safety tasks for neurologists have not been profiled, many commonalities obviously exist. Medication errors provide a prime example of a generic challenge.

Adverse medication events (often called adverse drug events [ADEs]) due to errors in the prescription, administration, or monitoring of medications have been cited in various studies as accounting for approximately 8 to 19%³ of all preventable adverse events. Medication errors are commonly regarded as “low-hanging fruit” in patient safety, both gen-

erally and in neurology: We can see the problems, they are within our reach, and we can grasp the solutions. Systems changes can prevent most harmful incidents due to faulty prescription and administration of medications, including morbidity from known drug allergies and interactions. Data from the care of neurologic patients demonstrate the need for systems solutions (to be discussed subsequently) in neurologic care venues.

There has been no national reporting system for medical errors, near misses, or adverse events.

Reporting of Adverse Events

Unlike the federally mandated systems in aviation, there has been no national reporting system for medical errors, near misses, or adverse events. While shame and the professional culture that hides it surely contribute to the lack of transparency, probably the fear of litigation is the most potent factor. Within the peer review mechanisms of hospitals and practices, quality assurance information is protected from discovery, but these databases are not available to specialty or other organizations (excepting certain government-certified programs) that could aggregate data into comprehensive pictures of the state of patient safety. The American Academy of Neurology has committed itself, in collaboration with individual neurologists and other organizations at national and state levels, to investigate, aggregate, and act on any credible data that can be accessed.

SOURCES OF DATA ON NEUROLOGIC PATIENT SAFETY

Although the information sources described here have provided little neurology-specific data, fragmentary evidence is being accumulated, and largely anecdotal data can be found in the neurologic and medical literature. Among a limited number of research projects, one study examined errors on an inpatient neurology service.¹⁵ Of 235 errors of all kinds reported over a 4-week period, 168 (71.5%) were “near misses,” whereas 67 (28.5%) impacted patients to some degree. Among these, 5 were due to medication, despite prior introduction of system-based monitoring techniques. The errors were reported daily by personnel (not patients) on the service, including staff neurologists (3 reports), neurology residents (26 reports), nurses (140 reports), and others including support staff. Forty of the errors caused patients some discomfort; 17, prolonged hospital stay; 1 required acute cardiac intervention; and 1, worsening of the patient’s con-

dition arose from a communication problem between the primary physician and the in-patient neurologic care team. Only 1 case is specifically described in which a neurologic error and adverse event occurred (although there may have been others). In this case a single, brief seizure (not on the neurology ward) was misinterpreted as status epilepticus, leading to overmedication that necessitated ICU admission on the neurology service.

Thus, the detected and reported incidence of adverse, specifically neurologic, outcomes was minimal. (The attentiveness that was presumably stimulated by participation in this study may have contributed to extra effort not to commit neurologic errors; if so, this bias—the alerting effect of mutual observation and accountability—represents one of the desired goals of patient safety from a practical, if not research, viewpoint.) This was a relatively short-term study that also showed how hard it is to sustain a focus on patient safety in that, during a second phase, reporting of incidents diminished markedly. While the results did not turn out to be very edifying with regard to serious neurologic patient safety issues, the study did contribute to the fledgling epidemiology of patient safety on neurology services.

Other investigators have turned to malpractice claims as a source of information. Neurologic cases in Massachusetts were analyzed¹⁶ to ascertain some broad-brush characteristics of the cases in which claims were filed, although acknowledged limitations of these data have been articulated.¹⁷ To date, additional information, available in abstract form, has been presented for claims from one insurer in New York State,¹⁸ and from preliminary information from an ongoing, in-depth study at the Risk Management Foundation (RMF) of the Harvard Medical Institution, Inc.¹⁹ Finally, PIAA has completed a report, undertaken in conjunction with the American Academy of Neurology, on 300 paid claims, based on data reported by member companies.²⁰ PIAA has also reported on their cumulative experience with neurologic claims from 1985 through 2003.²¹

As a general caveat regarding all claims data, the interpretation of malpractice claims information and the conclusions that can be drawn are greatly tempered by the well-known fact that claims are not representative in many ways.¹⁷ Only a small minority of all adverse inpatient events, for example, leads to claims, and only 27% of adverse events judged by the medical investigators to be negligent resulted in claims,² creating an enormous potential bias in extrapolating from claims cases to the universe of harmed patients. Furthermore, errors, both minor and near misses, greatly exceed adverse events, but remain largely unaccounted. Finally, as discussed earlier, the attribution of adverse events to errors—that is, preventability—may not be clear, and certainly the legal finding of negligence (or the anticipation of it, which often leads to monetary settlements) does not necessarily reflect actual errors. Nonetheless, claims are among the few

useful sources, if critically examined, of insight into neurologic errors and adverse events.

All investigations of neurologic malpractice claims have shown that “failure-to-diagnose” is the category of alleged error most commonly involved in suits.

NEUROLOGIC PATIENT SAFETY DATA FROM MALPRACTICE CLAIMS

Failure-to-Diagnose: Mainly CNS and Severe

All investigations of neurologic malpractice claims have shown that “failure-to-diagnose” (FTD) is the category of alleged error most commonly involved in suits. In both the Massachusetts¹⁶ and PIAA (300 paid claims)²⁰ studies, FTD totaled 50 to 60% of claims, although in overall claims between 1985 and 2003 FTD constituted 33%, and in claims closed in 2003 alone the figure was 38%.²¹ Neurologic diagnosis, correct and in a timely fashion, may not represent the most readily preventable source of error in patient care, but there can be no doubt that this is a key issue with many ramifications.

In both of the PIAA reports and the Massachusetts study, CNS cases (designated by initial diagnosis or presenting symptom) predominated over PNS cases, which were mainly disc disease and radiculopathies, vertebral fractures, and nonspecific back disorders. In the PIAA 1985–2003 survey, disc and other non-CNS back disorders were the 2 leading categories, but PNS cases were still in a minority. Preliminary information from one series in New York showed a much higher occurrence of PNS cases, especially involving alleged “reflex sympathetic dystrophy.”¹⁸

CNS cases cluster around serious problems, such as stroke, aneurysm, brain tumor, subdural hematoma, and spinal cord compression from abscess. In the FTD category of the Massachusetts cases, stroke accounted for 30%; spinal cord and root (1 case of Guillain-Barré), 20%; encephalitis and other intracranial infections, 10%; head injury, 8%; and brain tumors, 7%. In the PIAA 300 paid claims study, partial information only is available on presenting symptoms and initial (unconfirmed) diagnosis. In order of frequency in those cases in which this information was retrieved, the leading symptoms were headache, one-sided weakness, change in mental status, visual changes, slurred speech, decreased sensation, neck stiffness, fever, and unresponsiveness, consistent with CNS/cranial involvement. Initial diagnoses, which may have been wrong, included (for cases with data retrieved) approximately 75%

CNS/cranial, including stroke and/or vascular stenosis or occlusion, headache, seizure, cancer, meningitis, paralysis, and aneurysm, versus approximately 25% disc disorders.

This predominance of severe cases and outcomes (heavily weighted toward major, permanent deficits and death) leaves no doubt that these claims did not involve negligible events, regardless of whether errors were responsible. However, the mere fact of a serious adverse event being due to diagnostic failure does not reveal the specific nature of the error—whether there was a cognitive lapse or whether a better system of supervision, follow-up, or communication of imaging results, for example, would have prevented the misdiagnosis from turning into an adverse event.

An In-depth Analysis of Neurologic Claims: Failure-to-Diagnose

Derivative and incomplete patient data, abstracted by personnel at the insurance companies, are intrinsically limited in their scope and credibility in cases in which detailed processes of neurologic care are at issue. Therefore, an in-depth review of primary records by neurologists was clearly needed as an essential complement to the PIAA and overall Massachusetts data. Preliminary information from a small, neurology-specific, comprehensive study in process at the Risk Management Foundation (RMF) of the Harvard Medical Institutions, Inc.,¹⁹ adds credible detail from primary medical records and depositions evaluated by neurologists for the sole purpose of better understanding patient safety issues. Twenty-one, or just over half of 39 closed claims presented in the previous abstract were, in the reviewers’ judgment, based on authentic adverse events and appeared to be preventable. Of these 21 claims, two thirds charged FTD. Virtually all the cases were CNS and most were severe, including strokes, subdural hematomas, tumors, and myelopathies.

Ambulatory practices, including free-standing urgent or emergent care venues, as well as hospital emergency departments, will need to adapt procedures and adopt systems that will better safeguard their patients.

Office, Outpatient Clinic, and Emergency Events

Supporting the PIAA findings that a substantial proportion of preventable adverse events occurred in office or clinic settings (at least 37%), the preliminary RMF findings showed a similar proportion of office or clinic cases. With the addi-

tion of emergency department (ED) patients, a majority were nonhospitalized patients. Ambulatory practices, including free-standing urgent or emergent care venues, as well as hospital EDs, will need to adapt procedures and adopt systems that will better safeguard their patients, as epitomized by prescribing and monitoring medications and by information access and exchange.

Many neurologists would surely predict that EDs are vulnerable venues for neurologic errors and adverse events. Relevant factors may include time pressure, distractions, insufficient training of emergency physicians in neurology, lack of immediate availability of neurologic consultation in many EDs, limitations in timely availability of imaging studies, and so on. Data from RMF cases thus far indicate that in over one fifth of cases, the ED was the main venue or a contributory site in which the adverse event occurred. Additional research may suggest an even larger role, particularly if greater disincentives, such as malpractice risk, discourage neurologists from participating in emergency call systems.

A large, nonclaims study in the French literature reported that in cases in which a neurologist was called to perform a neurologic examination in the ED, the diagnosis or treatment was modified in more than 86% of patients.²² Detailed information on preventable adverse events was not specified. In the Massachusetts study, internal medicine and family practice accounted for approximately one third of physicians involved in claims along with neurologists, while emergency medicine accounted for 44%.

Communication, the Patient–Doctor Relationship, and Patient Safety Hazards

According to the PIAA data, virtually all the ED and inpatient cases involved a first meeting of the neurologic consultant and the patient, and usually the contact was limited to the episode of acute care. Overall, 125 of 300 paid claims involved a first meeting of neurologist and patient. Thus, the “window” for communicating effectively and establishing a good physician–patient relationship opened only briefly, which may have affected the care provided, as well as the risk of dissatisfaction leading to litigation.

In the Massachusetts cases, communication problems (although imprecisely defined) seemed to be the main issue in 5% of closed claims. Communication was a significant associated factor in 29% of the PIAA paid claims. In this PIAA report, some failure of patient responsibility was suggested, but apparent lapses in patient compliance were probably due to deficient health literacy, which is a special subset of dysfunctional communication. Poor health literacy manifests itself in diverse ways that affect patient safety, including medication management, instructions for monitoring warning symptoms, and so on. Neurologists as a group, like other providers, are insufficiently attuned to such barriers to effective communication and safe, patient-centered care.

Neurologic Consultation

In a large, prospective study of inpatient consultations, investigators at an academic medical center in 1978 and 1984 studied iatrogenic injury that included potentially preventable adverse events.²³ Iatrogenic causes of neurologic consultation included faulty surgical positioning (presumably nerve compression), falls, and drug intoxications. Angiographic complications of all types were prominent during the era of this study. Of course, the range of consultative problems is much broader, but these data show how intertwined inpatient neurologic care is with general medical and surgical care, necessitating effective communication across disciplines.

In the PIAA paid claims study, 64% of the communication lapses that were associated with the principal cause of the claim were between providers. In the preliminary data from RMF, most of the problems were also between providers, and involved the communication of neurologists with primary physicians, neurosurgeons, psychiatrists, radiologists, and others. Especially in acute inpatient care, expectations for follow-up visits and updated advice by neurologic consultants often exceeded performance. Neurologists, having done a consultation, often assume a reactive posture rather than a proactive one with respect to subsequent input. The reasons are multiple, including time pressures and lack of remuneration, but it appears that preventable risks to the patient, the neurologist, and the primary caregiver may result.

The collaborative follow-through of providers, as a team, probably represents a potent antidote to the almost explosive pace and complexity of inpatient care. Neurologic cases, in which diagnostic failure figures so prominently in malpractice claims, epitomize this vulnerability. Although the concept of patient-centered care may seem by now to be a cliché, focusing on the patient rather than enacting the narrower roles of a discipline really captures the essence of effective collaboration. Consultants and primary providers can interact in a variety of ways helpful to the patient, not limited to offering circumscribed expert opinions defined by their specialties or roles. Frequent examples are internists' elderly, systemically sick patients with delirium being seen in consultation by a neurologist, psychiatrist, and perhaps a nephrologist. Sometimes it is the neurologist who directs attention to endocarditis, rather than assuming that this would occur to the internist or be left to a cardiologic or infectious disease consultant.

In this era of expanded pharmacologic options, systems safeguards can do better overall than individual experience.

SYSTEMS APPROACHES TO IMPROVED PATIENT SAFETY

The matrix of patient care has been likened to Swiss cheese, with its many holes representing opportunities for error. Ordinarily, these holes are not aligned, which would usually prevent an error, like a probe, from passing right through to the surface, where patient harm is inflicted. Thus, in the patient care matrix, errors greatly outnumber adverse events, sometimes spared by luck and sometimes by rational interventions. Systems for medication ordering and monitoring, for example, are means not only of minimizing errors (such as prescribing in the face of a medical contraindication), but also of obviating an adverse event downstream, as in the instance of a pharmacy refusing to fill a prescription for propranolol to treat tremor in a patient with severe asthma.

In addition, even aspects of care that we typically regard as cognitive or attitudinal can be complemented by protective systems. Guidelines or standards for supervision of trainees provide one example: When does the supervisor actually need to see the patient? Who needs to sign off on the trainee's differential diagnosis and management plan, as in an elderly, vasculopathic patient with new vertigo? In the RMF study, residents were named in almost one third of the claims, including the minority of cases in which they bore substantial responsibility.

Many neurologists are by now familiar with the concept, if not the operation, of electronic medical records (EMR)—one of the leading uses of information technology.²⁴ EMRs are not panaceas for patient safety, but ideally put the entire patient database, and relevant support tools, into the hands of every privileged provider. Another high-profile, information management and support tool is CPOE, or computerized physician order entry systems.²⁵ As part of the thrust of CPOE, electronic alerting systems²⁶ have been shown to be effective in diminishing errors that might lead to ADEs. Of the drugs targeted in this study, phenytoin orders caused alerts in 57 of 803 total alerts (7%). Of these, 49 (86%) were deemed to be bona fide opportunities to prevent an ADE. According to reports cited in this source, ADEs occur in 10 to 20% or more of hospitalized patients, of which 28 to 56% have been deemed preventable. One study indicated that 78% of errors causing ADEs are due to failures that could be solved by better information systems. In the RMF analysis, 10% of claims involved preventable errors of medication writing or acute administration. Knowledge of and experience with medications is important but insufficient. In this era of expanded pharmacologic options, systems safeguards can do better overall than individual experience.

Anticoagulant and thrombolytic risks and complications are well-known to neurologists and others. In a study in progress, I found that of 120 neurologic cases admitted to an inpatient medical service, one anticoagulated patient devel-

oped a subdural hematoma and one developed a retroperitoneal hemorrhage with compression neuropathy. Three additional anticoagulated patients had greatly excessive INRs, ranging from 5 to 14, but without ensuing physical harm. Electronic systems may enable modeling of individual patient profiles to warn of the need for closer monitoring of INRs.

CULTURE SHIFT: SHAME AND BLAME

As previously noted, a dominant feature of the patient safety landscape, preventing a clear view of the profile and characteristics of errors and adverse events, has been the professional culture of "shame and blame." Neurologists, like other physicians, acutely feel the shame of making errors and anticipate the blame for doing so—blame blatantly or silently cast by colleagues or supervisors. Worse yet, the incident inevitably raises the specter of litigation that, among other effects, may catapult the shame into the media. Particularly in a cognitive field like neurology, lapses of knowledge and reasoning processes challenge intellectual pride. In the illustrative case example presented earlier, Neurologist B did not feel comfortable in sharing the evident mistakes openly with colleagues, which deprived Neurologist B of the emotional support that might have been offered. More important, this isolation also deprived these colleagues of an awareness of the absence or failure of systems that should have been protecting their patients (and their self-esteem and litigation risk). Whether this culture can shift incrementally, or whether a culture shock is needed, as might be detonated by national reporting of errors and adverse events, remains uncertain.

Low patient satisfaction, as evidenced by complaints, has been linked with adverse risk management profiles and may contribute to greater vulnerability to litigation.

SATISFACTION AND SAFETY

Patient satisfaction and patient safety are not equivalent, as neurologists and other physicians well know. However, low patient satisfaction, as evidenced by complaints, has been linked with adverse risk management profiles and may contribute to greater vulnerability to litigation. Data from one large group of practitioners indicated that providers who are identified as having higher patient complaint rates have more "risk management file openings" and presumably higher litigation rates.²⁷ The patient safety question is whether complaints, risk management concerns, or the physician behaviors that spawn them lead to increased adverse

events and poorer outcomes.²⁸ One can imagine that a dysfunctional neurologist–patient relationship contributes not only to patient dissatisfaction and complaints but to physician distraction, as in the illustrative example of Neurologist B described earlier. Further research should clarify any linkages of such unhappy or dysfunctional relationships to patient safety, and especially the patient safety hazard, if any, of the neurologist who is a “bad apple” from a risk management point of view.

PATIENT SAFETY AND RISK MANAGEMENT

In recent decades risk management, litigation, and malpractice premium issues have progressively gravitated toward center stage and actually compete with patient safety concerns in neurology and elsewhere. To what extent might improved risk management advance patient safety? Conversely, will better patient safety substantially reduce the risk of litigation? To address the former question, it may be helpful to think about risk management as having proactive and reactive phases. If there has been an ADE, such as a cerebral hemorrhage from thrombolytic therapy, the neurologist and others will react with full explanations and, if any errors of protocol were involved, with full disclosure. This reactive phase really only affects patient safety insofar as it sensitizes providers to future risks and informs them about any possible proactive measures. Patient safety and risk management align in this proactive phase, as in ensuring, for example, that apparent candidates for thrombolysis do not have stroke mimickers (which would set the stage for an incident of FTD). Similarly, while good communication is an important aspect of the reactive phase, it also helps to ward off adverse events, as in the occurrence of harmful misunderstanding of medication instructions.

While research has not yet confirmed the hope that patient safety initiatives will diminish suits in neurologic cases overall, a favorable effect seems inevitable in certain of the most egregious categories, such as medication errors. Preventable ADEs tend to be open-and-shut cases, both in patient safety accountability and in court. More generally, it would be a mistake to underestimate the red flags that claims wave in front of neurologic patient safety, just because the percentage of negligence has been reported as low. (Seventeen percent of claims were interpreted to show evidence of negligence in the Harvard Medical Practice study.²⁹) The preliminary RMF data on neurologic claims indicates that approximately half the claims involve preventable errors. Moreover, claims that are pursued to trial or settlement overwhelmingly result from serious adverse events. (Surprisingly, many of the claims that are voluntarily withdrawn, for a variety of reasons, as in the “Case of Neurologist B,” likewise are not frivolous, but involve serious and sometimes preventable adverse events).

Training will need to include utilization of information systems and other means of tracking the diagnostic and treatment status of patients across venues to see them “safe at home.”

EDUCATION AND TRAINING FOR NEUROLOGIC PATIENT SAFETY

Neurology training programs are grappling with how best to instill competencies of “systems-based practice” and “practice-based learning and improvement.” They will need to confront the viewpoint that a “systems approach” to patient safety can be overdone. There should be a balance between systems solutions and an element of retained personal responsibility for learning and for accountability for errors.³⁰

One of the potential educational outcomes of describing patterns of neurologic errors and adverse events is to prioritize subject matter in clinical education.¹⁶ Patient safety and other patient outcome evidence should help to guide neurologic learning, especially for students and nonneurologists in this era of the information chain reaction.³¹ From the several sources of claims data, a recurrent item in FTD errors is lack of adequately documented consideration of all relevant differential diagnostic possibilities. This is a cognitive skill that can be bolstered by electronic information sources and implemented as a practice habit. Narrowing down the differential diagnoses to the correct diagnosis becomes one of the functions of follow-through, a feature of effective consultation, as well as direct patient management. This may seem obvious, but pressured throughput truncates this process of reaching sufficient certainty.

“Hand-offs” of care, especially across venues, tend to erode the information base (such as prior baseline neurologic status, or status at time of discharge to another facility). Training will need to include utilization of information systems and other means (eg, telemedicine) of tracking the diagnostic and treatment status of patients across venues to see them “safe at home.”³² Without this follow through, the patient may suffer and the trainee’s learning suffers through lack of authentic “take-home messages.”

Patient education has received relatively little attention compared with the focus on developing the knowledge base of the physician. The patient and family who understand the plan of treatment, written instructions, and other forms of patient education can play a positive role in preventing errors and incipient adverse events, such as early symptoms of phenytoin toxicity³³ or other medication side effects. Health

literacy—the ability of patients to understand instructions and other explanations, and so on—enables them to participate effectively in their own care. Neurologists may not see health literacy education as a personal role, but can encourage it as a health care team task. The traditional educational agenda will need to be broadened to add systems-based skills. As departments adapt resident training programs to achieve mandated competencies, the opportunity for parallel faculty development and training on the ingredients of safe, patient-centered care will also present itself.

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TECHNOLOGY AND PATIENT SAFETY: BEYOND INFORMATION MANAGEMENT

Neurologic patient safety, as well as the quality of acute neurologic care in general, will predictably register stunning success in the future from further advances in biomedical science and technology, in areas such as genetically customized preventive and therapeutic measures. But it is worth reflecting on the boon to patient safety already achieved by the extraordinary advances in imaging. Most of the diagnoses that have been listed as the causes of serious, neurologic adverse events (ischemic stroke, aneurysms, brain tumor, spinal cord compression, etc.) can be well characterized by current imaging techniques. We have only to improve access and integrate the process of imaging, from order to transmitted and reviewed result, to take full advantage of these current modalities in improving patient safety. While there may be some overuse of imaging for defensive medical purposes, this should not obscure the profound benefits of noninvasive diagnostic imaging to detect neurologic conditions before they become deadly or disabling. Similarly, on the treatment side, the marriage of online imaging and neurosurgery represents a distinct advance for patient safety. Finally, learning not only technical skills but teamwork processes through robotic simulation exercises should contribute to safer and higher quality care.

Federal legislation to establish national reporting is still pending political agreement and passage in Congress.

“SAFE HARBORS”: PROTECTED REPORTING OF ERRORS AND ADVERSE EVENTS ON A REGIONAL OR NATIONAL BASIS

At the time of this writing, federal legislation to establish national reporting is still pending political agreement and passage in Congress. The goal is a comprehensive reporting system that would enable much better understanding of the incidence and characteristics of errors and adverse events in neurology, as in all other branches of medicine. It appears probable that data would be voluntarily reported to a designated patient safety organization for analysis and deidentification, and would be protected from discovery in civil suits. Protected reporting has the potential to open the culture of shame to the light of constructive research, discourse, and intervention.

Will this initiative in its final, implemented form succeed in garnering enough voluntary reports to achieve its goal? Unless a large proportion of neurologists opt into a voluntary system, the epidemiology of neurologic errors and adverse events will remain fragmentary and skewed. Large organizations, such as academic medical centers, hospitals, large group practices, and possibly licensing boards and insurance companies could exert leverage on neurologists to participate. Whether the typical neurologic practitioner will feel motivated or “incentivized” to make the leap into this realm of professional disclosure remains uncertain. Most experts in this area seem to agree that full, protected reporting would have a profound, long-term effect on patient safety.

Patient safety is a pressing need for our patients, our professional ethos, and our self-interest.

WHAT NEUROLOGISTS CAN DO FOR PATIENT SAFETY

For neurologists, patient safety is not just a movement, a lobby, or an ideal. Patient safety is a pressing need for our patients, our professional ethos, and our self-interest. Excuses for not committing some time and effort to patient safety are

abundant: At the health policy level there is a viewpoint that a patient safety focus in medicine will distract from larger quality issues, access and other equity concerns, and population needs,³⁴ but others disagree.³⁵ Some of us assume that large institutions will do the heavy lifting. Countering that possibility is the proposition that neurologists “in the trenches” will not only have the most intimate knowledge of what actions make sense, but will best be able to effect change in daily practice if provided with a useful, patient safety “toolbox.” For these clinicians it remains to be seen how much behavior can be changed, with or without performance incentives, such as “pay for quality” or, in fact, “pay for safety.”

Neurologists can start to change the culture, in their practices and in training conferences, to make constructive use of shared experience with errors. Practices can initiate or participate in research on patterns of errors and adverse events, especially in their ambulatory care sites. Individuals can join with colleagues from other disciplines to make inpatient wards, EDs, and multispecialty clinics generically and specifically safer through the implementation of systems changes. In their teaching, neurologists can raise the consciousness of students and residents (and thereby themselves) about individual and collective responsibility for errors, such as FTD.

Some of the key approaches or tools that have been discussed can be summarized as

- Supervision and training in areas of vulnerability, both cognitive and systems based
- Articulation and documentation of differential diagnoses and evidence-based therapy
- Follow-up in consultation, test results, and all communications
- Electronic information management and medication ordering
- Teamwork and communication with colleagues and patients for patient-centered care
- Y? The reason why is that we are dedicated and that we should be leaders in preventing errors and adverse events that harm our patients and help drive the litigation/malpractice premium spiral. Society, governmental bodies, and organized medicine are demanding change. There will be change. We neurologists should be ahead of the curve.

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