# Do Not Own the Procedure, Own the Disease

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## The Changing Scenario

Head injury is the leading cause of morbidity, mortality, and socioeconomic loss in India and other developing countries. The Indian data show that nearly 1.5 to 2 million persons are injured yearly, with nearly a million patients succumbing to the effects of traumatic brain and/or spine injury.[1] In America, more than 1 million cases of traumatic brain injury have been reported annually.[2] In developing nations, cases of traumatic brain and spine injury have been increasing each year. With this ever-increasing number of head-injured patients, there are a limited number of neurosurgeons. India has approximately 1,800 neurosurgeons for catering to the needs of 1.27 billion population.[1]

The availability of neurosurgeons who are interested in trauma care is also decreasing continuously due to various reasons Some of these include a stressful environment, long hours of work, a poor compensation, medicolegal issues, a lack of gratifying results in severely head-injured patients, and a very poor network of social, economic, stepdown, and rehabilitative support; therefore, the ultimately responsibility of the extremely sick patient who is unlikely to improve significantly only lies with the neurosurgeon. The existing mismatch between the patients and the number of neurosurgeons, especially in rural areas, has led to the envisaging of the concept of nonneurosurgeons caring for head-injured patients.

The National Trauma Data Bank study found that head injury is reported in only 30% of trauma patients, of whom 95% receive nonoperative management.[3] These data indicate that these mild-to-moderate head-injured patients may be managed or are being managed by nonneurosurgeons. The study by the Society of Neurological Surgeons Liability Insurance Task Force reported that 88% of the private neurosurgeons are taking far less trauma calls in an emergency situation than they were conducting a few years ago.[4] In the government setup also, neurosurgeons are often not immediately available to treat head-injured patients, especially in hospitals in rural areas and at level 2 and 1 trauma centers. Even a developed country like the United States is not immune to this issue, with 42% of the hospitals reporting problems with neurosurgical on-call coverage.[5] This has resulted in a transfer of patients to a higher center even from level 2 trauma centers, where neurosurgery facility should have been present. This leads to a delay in imparting adequate care.

This situation is further complicated by a recent increase in medicolegal issues during the management of these cases, which has further increased referral to higher centers. The management of these cases is demanding and often requires duties at odd hours, which is usually not preferred by senior surgeons. Several private hospitals in the peripheral areas of cities and major towns have on-call neurosurgeons managing trauma victims. The increasing violence against doctors in the country has, however, resulted in most neurosurgeons avoiding the acceptance of very severely injured patients due to which the primary treatment of these patients gets delayed because of their being referred to the higher centers.

## The Expanding Role of Trauma Surgeons

Recently, the new specialty of "trauma surgery" has come into the picture. In this branch, surgeons are exclusively being trained to manage trauma patients comprehensively, with the focus being on improving the outcome of trauma patients who present at the multitudes of trauma centers mushrooming in the country. In various forums, it is being discussed that due to the nonavailability of neurosurgeons in rural areas and level 2 or lower trauma centers, trauma surgeons or general surgeons should be allowed to operate on head-injured patients. This concept is proposed with the expectation that the patients will get operated early and will not require a transfer to a higher center. As a concept, it looks very enticing, considering that patients may get operated at a peripheral hospital where a neurosurgeon may not be available. Thus, trained and appropriately credentialed trauma surgeons may also be certified to perform neurotrauma cases. This proposal is also strengthened by the fact that often intensivists are managing patients with severe head injury and patients who have sustained polytrauma with severe head injury but do not require an operative intervention. Rinker et al conducted a study in a rural setting and concluded that "an early craniotomy for expanding epidural and subdural hematomas by properly trained surgeons may save lives and reduce

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morbidity in properly selected cases when timely access to a neurosurgeon is not possible." A simple decompressive craniectomy may also be performed effectively by nonneurosurgical trauma surgeons.[6]

## The Flip Side of the Concept

The proposal that a trauma surgeon who is only partially trained may be conducting neurosurgical procedures is fraught with dangers. This may lead to severe erosion of standards and open up Pandora's box in which every surgeon indiscriminately starts operating on head-and spine-injured patients. Standardizing and regulating medical practices and intervention are in any case extremely difficult to implement in a diverse country like ours with multiple levels of hospitals and health systems. Permitting inadequately trained surgeons to perform specialized procedures will lead to an immensely high incidence of complications and poor results, not to speak of an immediate spurt in litigations. Decision-making in management especially in borderline cases of head and spine injured cases, who may be potential candidates for surgery, should only be undertaken by an experienced neurosurgeon. The nonoperative management of head-injured patients should also be done in consultation with the neurosurgeon. Every surgeon worth one's salt realizes the "unknown" factors that one may encounter during surgery that may lead to failure of the procedure unless an expert and experienced colleague who is specialized in that area is available to immediately intervene and offer advice. The presence of an experienced team immediately at hand is also essential. Neurosurgery has so many unknown variables during both operative intervention and postoperative intensive care setting that to address all of them in a proper manner, an adequately trained neurosurgeon along with an experienced team is mandatory. No neurosurgery is "simple," and calling it one is an oversimplification of the procedure. To quote an example, there are several nuances in carrying out a decompressive craniectomy while simultaneously removing the extradural or subdural hematoma, treating a contused brain with malignant edema, or sinus injury. These can only be learned in a structured and comprehensive neurosurgical training program and not in short-term training in trauma surgery. Valadka's study reported that only 6.2% of nonneurosurgeon doctors currently insert an intracranial pressure monitor at their hospitals, and only 40% of them agreed that they should be allowed to perform this procedure and that too in with consultation with their neurosurgical colleagues. Only 14% respondents agreed that trauma surgeons should be allowed to perform craniotomies and that too for true emergencies only.[7]

Another problem pertaining to this issue is imparting adequate training, which is not uniform in countries like India. In India, most of the surgical residents hardly get a month of rotation posting in neurosurgery during their MS general surgery training program. Many of the medical colleges of the country do not even have a fully staffed neurosurgical department with a regular academic course in neurosurgery. Providing neurosurgical training to selected candidates who have already completed their MS general surgery is a long-drawn and an arduous exercise; imparting partial training and allocating valuable resources to teach a nonneurosurgical personnel a few procedures just so that he/she may perform a few basic surgeries and not be competent to address all the situations certainly has all the scenarios to compromise patient safety. Performance of neurosurgery also requires adequate and sophisticated equipment and techniques. It is certainly more advisable to upgrade and maintain specified centers than to have neurosurgical procedures proliferating in hospitals that are ill-equipped to partake them.

## The Way Forward

The only way in which the anathema of severe head injury can be properly addressed is by its prevention. Once it has occurred, then its cognitive and physical impairments are devastating and usually only partially reversible. An often unrecognized and neglected issue is the triumvirate of factors on which prevention of severe head injury actually depends, such as an adequate town and road safety planning, a proper and strict implementation of road safety rules and ensuring strict consequences to anyone who infringes them, and creation of awareness about the benefits to individuals in their following safe road-safety practices. There is also a dire need of establishing occupational and rehabilitative services to the victims.

The words of wisdom given by a senior professor were, "Don't own the procedure, own the disease." These words are apt for this situation. Neurotrauma is completely a neurosurgical disease and a neurosurgeon should manage the decision-making and operative aspects. Trauma surgeons and intensive care specialists may share the burden of the intensive care nonsurgical management of the severely head- and spine-injured patients, but the decision-making in these patients is not a static process. It requires dynamic decision-making at regular intervals based on the changing neurological status of the patients (based on a wide range of concurrently occurring clinical factors) and should best be left on neurosurgeons well-versed in all the nuances and changing circumstances that may be encountered. Strengthening infrastructure in rural areas and peripheral trauma centers, increasing the number of resident neurosurgeon seats for training, providing postdoctoral neurotrauma training programs, channeling sufficient funds for research in the clinical aspects of trauma care, having a proper referral system, and spreading a network of telemedicine and video-calling facilities (that is based on proper triage guidelines) is the need of the hour.[8] Equipping the existing infrastructure to make it more conducive for a team of neurosurgeons to step in addresses the needs of not only the neurotrauma patients but also the other patients with neurological illness who are in a dire need of proper medical care. This leads to a valuable concentration of resources in the hands of adequately trained personnel.

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