American Association of Neurological Surgeons

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Congress of Neurological Surgeons
Joint Section on Neurotrauma and Critical Care

CNS

Position Statement

on

TEAM-BASED CARE IN NEUROSURGERY

Background

The practice of neurological surgery involves the need to respond emergently to a variety of critical and life-threatening neurological diseases. Early intervention and treatment of neurosurgical emergencies affects outcome. The coverage of hospital emergency departments and inpatient units, in addition to the provision of non-emergent neurosurgical needs of the population, requires a well-trained and responsive neurosurgical work force.

With the implementation of duty hour restrictions for neurosurgical residents who participate in the care of neurosurgical patients in many centers, the training and utilization of neurosurgical mid-level providers — such as physician assistants and nurse practitioners — on the neurosurgical team has increased in recent years. Furthermore, for those institutions in which no residents exist, neurosurgeons have also utilized mid-level providers in their practices, in order to efficiently and effectively meet the neurosurgical needs of their communities.

Mid-level providers working on a neurosurgical service can safely perform certain neurosurgical procedures,[1,2] such as insertion of intraparenchymal intracranial pressure monitors and ventriculostomy catheters or lumbar drains for cerebrospinal fluid drainage. Furthermore, mid-level providers can implement plans prospectively formulated by a neurosurgeon and manage complications and other disease-related subsequent clinical events relative to these procedures. These activities may be performed with indirect supervision. In some communities, specialists other than neurosurgeons have begun to perform certain emergency neurosurgical procedures.

AANS/CNS Position Statement

Optimal patient care and safety are best achieved when surgical disease affecting the nervous system is managed by neurological surgeons. Neurosurgeon-led, team-based neurosurgical care is a safe and viable method of care delivery and is a high-quality response to neurosurgical workforce needs. Such team-based care may involve mid-level providers, such as neurosurgical physician assistants and nurse practitioners. As part of a prospective, overall plan of care, formulated and supervised by a neurological surgeon, and with proper credentialing and performance oversight, certain neurosurgical procedures may be performed by adequately trained neurosurgical mid-level providers. Neurosurgical procedures should not be performed by independent practitioners outside of the specialty.

Rationale

Neurosurgeons are uniquely qualified to provide the full spectrum of care to patients with neurosurgical emergencies. Among these qualifications is expertise in the formulation of diagnoses, clinical decision-making, development of treatment plans, initial stabilization of patients, performance of both operative and bedside neurosurgical procedures, as well as the provision of subsequent critical care, post-operative care, and long-term follow-up care. This unique range and depth of skill is acquired throughout a lengthy neurosurgical training process, with continued expansion throughout the course of a neurosurgical career.

Neurosurgeons receive extensive training in a variety of conditions that can present with emergent needs, including cranial, spinal, and peripheral nerve trauma; intracranial infection; spontaneous cerebral hemorrhage; ruptured intracranial aneurysm; stroke; hydrocephalus; shunt malfunction; brain

and spinal tumor; and spinal cord compression from ruptured disc, hematoma, or infection. In neurosurgical training and practice, the same knowledge and experience employed during the treatment of non-emergency neurosurgical conditions is applied seamlessly to the management of emergencies, including expertise in neurological assessment; neuroanatomy; neuropathology; neurophysiology (e.g., intracranial pressure dynamics, cerebrospinal fluid dynamics, cerebral blood flow and metabolism) and pathophysiology; neuroradiographic interpretation; and spinal biomechanics; as well as knowledge of management of related issues such as seizure, fluid and electrolyte balance, respiratory problems, venous thromboembolism, infections, and nutrition. Although other specialists may have familiarity with one or another of these areas, the integration and management of these conditions requires the expertise of the neurosurgeon and the neurosurgical team.

Neurosurgical mid-level providers can be integral to team-based neurosurgical care. These providers are educated on neurophysiology and neurosurgical disease, and are trained to perform neurological assessments, write orders related to neurosurgical and neurocritical care, perform certain bedside procedures, and assist in neurosurgery operations *in concert with* their supervising neurosurgeons. The work provided by neurosurgical mid-level providers is done after an extensive period of training on a neurosurgical service, under the direct supervision of neurosurgeons, and only with proper credentialing. Similar to a resident in training, neurosurgical mid-level providers perform procedures in a graduated fashion until achieving competence to perform them independently, and then aid the neurosurgeon in the management of the devices and the overall patient condition based upon the data gleaned from these devices. Critical to the safety of the team-based approach is continuity of care and regular communication amongst team members, as well as oversight of competencies and performance by the supervising neurosurgeons, who maintain familiarity with the skill sets of the various team members.

Neurosurgical procedures — including insertion of intraparenchymal intracranial pressure monitors, ventricular drains, and lumbar drains — are routinely safely performed by trained neurosurgical mid-level providers working under the supervision of neurosurgeons. These are often placed as part of the initial or emergency management of the patient, and the workforce must be prepared to provide this service around the clock. Utilization of neurosurgical mid-level providers for the initial assessment and management of emergency neurosurgical patients (including performance of these procedures) helps to ensure the availability of neurosurgeons to care for the population. The devices utilized, some of which are therapeutic, are also tools that guide the overall critical care management of complex neurological system physiology, which demands the input of the neurosurgeon. Furthermore, the neurosurgeon is trained in the management of complications from these procedures, which may be life-threatening. The latter point cannot be overstated, reinforcing the statement that such procedures should not be performed by practitioners outside of the specialty of neurosurgery.

In summary, appropriate care of patients with neurosurgical emergencies is labor- and resource-intensive — during both the initial assessment and stabilization period, and over the ensuing care period of days to weeks, with follow-up care over months to years. Interventions undertaken during the initial management of patients with neurosurgical emergencies require a coordinated neurosurgical approach to care, which may include neurosurgical mid-level practitioners who can safely perform neurosurgical procedures as team members. The need to anticipate and treat potential complications of both the conditions and the procedures requires an organized team-based approach to care with practitioners who are expert at neurosurgical practice, led by neurosurgeons.

References

1. Kaups KL, Parks SN, Morris CL. Intracranial pressure monitor placement by midlevel practitioners. *J Trauma* 1998 Nov;45(5)884-886.
2. Young PJ, Bowling WM. Midlevel practitioners can safely place intracranial pressure monitors. *J Trauma Acute Care Surgery* 2012 Aug;73(2):431-434.