

Neurocritical care unit

Many [neurocritical care](#) patients are [comatose](#) or paralyzed and may suffer injuries in other parts of the body as well.

[Neurocritical care units](#) specialize in managing the unique needs of such patients.

Optimal management of physiological parameters in neurological/neurosurgical [intensive care units](#) (NICUs) is largely unclear as high-quality evidence is lacking.

Periodic evaluation of neurointensive care (NIC) is important. There is a risk that quality of daily care declines and there may also be unrecognized changes in patient characteristics and management.

A large-proportion favorable outcome was maintained despite that patients >60 years with poorer prognosis doubled, indicating that the quality has increased or at least is unchanged. More surgery may have contributed to maintaining the large proportion of favorable outcome. For future improvements, more knowledge about [traumatic brain injury](#) TBI management in the elderly is required ¹⁾.

Critical care [management](#) of [patients](#) with [severe acute brain injury](#) has undergone tremendous advances.

Monitoring

[Neurosurgeons](#) and neurointensivists have a large armamentarium of invasive monitoring devices available to help detect secondary brain injury and guide therapy. No consensus exists regarding patient specific selection of monitoring devices, the placement of devices in relation to injured brain tissue, or the preferred insertion technique.

Collaboration among institutions is necessary to establish practice guidelines for the choice and placement of multimodal monitors. Further advancement in device technology is needed to improve insertion techniques, inter-device compatibility, and device durability. Multimodality data needs to be analyzed to determine the preferable device location ²⁾.

Analgesia in Neurocritical Care

Analgesic delivery data from 173 patients in French, Canadian, American, and Australian and New Zealand ICUs suggest that acetaminophen/paracetamol is the most common first-line analgesic (49.1% of patients); opiates are the “second line” in 31.5% of patients; however, 33% patients received no second agent. In the 2.3% with demyelinating disease, gabapentin was the most likely second analgesic (50.0%). Third-line analgesics were scarce across sites and neuropathologies. Few national or regional differences were found. The analgesic preference rankings noted by the 95 international physicians who completed the survey matched the audits. However, self-reported analgesic prescription rates were much higher than pharmacy records indicate, with self-reported prescribing of both acetaminophen/paracetamol and opiates in 97% of patients and gabapentin in 45% of patients. Third-line analgesic variability appeared to be driven by neuropathology; ibuprofen was preferred for traumatic brain injury, postcraniotomy, and thromboembolic stroke patients, whereas gabapentin/pregabalin were favored in subarachnoid hemorrhage, intracranial hemorrhage,

spine, demyelinating disease, and epileptic patients.

Opiates and acetaminophen are preferred analgesic agents, and gabapentin is a contextual third choice, in neurocritically ill patients. Other agents are rarely prescribed. The discordance in physician self-reports and objective audits suggest that pain management optimization studies are warranted ³⁾.

Sedatives in Neurocritical care

The translation of modern principles of sedation and weaning from mechanical ventilation from general intensive care to neurocritical care has to take into account specific aspects of brain-injured patients. These include interactions with intracranial hypertension, disturbed autoregulation, a higher frequency of seizures and an increased risk of delirium. The advantages of sedation protocols, scoring tools to steer sedation and analgesia and an individualized choice of drugs with emphasis on analgesia gain more interest and importance in neurocritical care as well, but have not been thoroughly investigated so far. When weaning neurological intensive care unit (ICU) patients from the ventilator and approaching extubation it has to be acknowledged that conventional ICU criteria for weaning and extubation can only have an orienting character and that dysphagia is much more frequent in these patients ⁴⁾.

Approximately half of the NCC centers used propofol infusion as the primary sedative, whereas the remaining centers used midazolam infusion, and there was a marked variation in the choice of analgesia in each evaluated year. The NWT was never used in 50% of centers and \geq six times daily in one center from 1999 to 2009. Most differences among the NCC centers remained unchanged over the evaluated 10-year period.

Although Scandinavian countries have similar healthcare systems, there were marked differences among the participating NCC centers in the choice of monitoring tools and sedatives and the routine use of the NWT. These differences likely reflect different clinical management traditions and a lack of evidence-based guidelines in routine NCC ⁵⁾.

Germany

In Germany dedicated neurological-neurosurgical **critical care** (NCC) is the fastest growing specialty and one of the five big disciplines integrated within the German critical care society (Deutsche Interdisziplinäre Vereinigung für Intensiv- und Notfallmedizin; DIVI). High-quality investigations based on resilient evidence have underlined the need for technical advances, timely optimization of therapeutic procedures, and multidisciplinary team-work to treat those critically ill patients. This evolution has repeatedly raised questions, whether NCC-units should be run independently or better be incorporated within multidisciplinary critical care units, whether treatment variations exist that impact clinical outcome, and whether nowadays NCC-units can operate cost-efficiently? Stroke is the most frequent disease entity treated on NCC-units, one of the most common causes of death in Germany leading to a great socio-economic burden due to long-term disabled patients. The main aim of NCC employs surveillance of structural and functional integrity of the central nervous system as well as the avoidance of secondary brain damage. However, clinical evaluation of these severely injured commonly sedated and mechanically ventilated patients is challenging and highlights the importance of neuromonitoring to detect secondary damaging mechanisms. This multimodal strategy not only requires medical expertise but also enforces the need for specialized teams consisting of

qualified nurses, technical assistants and medical therapists. The present article reviews most recent data and tries to answer the aforementioned questions ⁶⁾.

An e-mail-based questionnaire was distributed to physicians directing German neurological, neurosurgical and neurological/neurosurgical interdisciplinary intensive care units (ICUs). RESULTS: Of the 326 departments 78 answered the questionnaire and of these 53% were university units. The ICUs were either led by neurologists (37%), neurosurgeons (22%), anesthetists (28%) or a combination of these (13%). The mean number of ICU beds was 11.2 and the mean number of intensivists 7.7. Guideline adherence was stated to amount to 75 % by 41 % of the ICUs. Applications of standard procedures was achieved by more than 80 % for several ICU management aspects, while only 5 out of 19 of the respondents routinely used scoring tools in > 60% of the ICUs. The extent of protocol and score applications differed significantly according to hospital status or leading speciality.

This survey suggests an obvious interest in but also an unfulfilled need of guidance in a standardized approach to neurological critical care in Germany. More activity in multicentre clinical research with a neurocritical focus to provide optimization of protocols, scores and guidelines appears to be warranted ⁷⁾.

A survey was made to investigate if standards exist in the use of clinical scores, systemic and cerebral monitoring and the targeting of physiology values and in what way this affects clinical management in German NICUs.

National survey, on-line anonymized questionnaire. German departments stating to run a neurological, neurosurgical or interdisciplinary neurological/neurosurgical intensive care unit were identified by a web-based search of all German hospitals and contacted via email. RESULTS: Responses from 78 German NICUs were obtained. Of 19 proposed clinical/laboratory/radiological scores only 5 were used regularly by >60 %. Bedside neuromonitoring (NM) predominantly consisted of transcranial Doppler sonography (94 %), electroencephalography (92 %) and measurement of intracranial pressure (ICP) (90 %), and was installed if patients had or were threatened by elevated ICP (86 %), had specific diseases like subarachnoid hemorrhage (51 %) or were comatose (35 %). Although mean trigger values for interventions complied with guidelines or wide-spread customs, individual trigger values varied widely, e.g., for hyperglycemia (maximum blood glucose between 120 and 250 mg/dl) or for anemia (minimum hemoglobin values between 5 and 10 g/dl).

Although apparently aiming for standardization in neurocritical care, German NICUs show substantial differences in NM and monitoring-associated interventions. In terms of scoring and monitoring methods, German NICUs seem to be quite conservative. These survey results suggest a need of prospective and randomized interventional trials in neurocritical care to help define standards and target values ⁸⁾

After elective uncomplicated craniotomy in pediatric patients

The object of a study was to address what factors may necessitate the need for intensive care monitoring after elective uncomplicated craniotomy in pediatric patients who are initially managed in a non-intensive care unit setting postoperatively.

A retrospective chart review was undertaken for all patients who underwent elective craniotomy for brain tumor between April of 2007 and April of 2012 and who were directly admitted to the floor postoperatively. Factors such as age, tumor type, craniotomy location, neurological comorbidities, reason for transfer to intensive care unit (ICU) level of care (if applicable), time between admittance to floor and transfer to ICU level of care, and reason for transfer to ICU level of care were assessed. RESULTS Adjusted logistic regression found 2 significant positive predictors of postoperative transfer to the ICU after initial admission to the floor: primitive neuroectodermal tumor pathology (OR 44.10, 95% CI 1.24-1572.16, $p = 0.04$), and repeat craniotomy during the same hospitalization (OR 13.97, 95% CI 1.21-160.66, $p = 0.03$). Conversely, 1 negative factor was found: low-grade glioma pathology (OR 0.05, 95% CI 0.00-0.87, $p = 0.04$).

Select pediatric patients may not require ICU level of care after elective uncomplicated pediatric craniotomy. Additional studies are needed to adequately address which patients would benefit from initial ICU admittance following elective craniotomies for brain tumors ⁹.

Books

2016

Oxford Textbook of Neurocritical Care From Oxford University Press

The Oxford Textbook of Neurocritical Care provides an authoritative and up-to-date summary of the scientific basis, clinical techniques and management [guidelines](#) in this exciting clinical discipline.

It is conceptually divided into three sections.

Section 1 provides an accessible guide to the general principles of [neurophysiology](#) and [neuropharmacology](#), [cardiorespiratory support](#), management of fluids and [intracranial hypertension](#).

Section 2 outlines the use of multiple monitoring modes which are crucial to diagnosis and management.

Section 3 covers the management of the major pathologies encountered during [neurointensive care](#) with an emphasis on evidence-based practice or consensus [guidelines](#) to provide a cohesive and definitive clinical resource.

Authored by an international team of expert practitioners this textbook reflects world-wide practice and guidelines. This volume is published with a concurrent online version, which features access to the full content of the textbook, contains links from the references to primary research journal articles, allows full text searches, and provides access to figures and tables that can be downloaded to PowerPoint RG.

Designed for consultants and trainees in neurocritical care, The Oxford Textbook of Neurocritical Care is also accessible to the general critical care physician and trainees who need a definite and authoritative resource to meet the unique needs of neurocritically ill patients.

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2013

Neurocritical Care in Neurosurgery, An Issue of Neurosurgery Clinics, 1e (The Clinics: Surgery)

By Paul A. Nyquist MD MPH, Mark A. Mirski MD, Rafael J. Tamargo MD

This issue of Neurosurgery Clinics of North America is Guest Edited by Drs. Paul Nyquist, Marek Mirski, and Rafael Tamargo, all from The Johns Hopkins Hospital in Baltimore, Maryland. This issue will cover important topics for the neurosurgeon in the Neurocritical Care Unit, including issues in ventilation in the patient with brain injury, ultrasound, seizures, subarachnoid hemorrhage, microdialysis, and management of brain trauma, acute spinal cord injury, and intracranial hemorrhages.

Product Details

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2010

Handbook of Neurocritical Care: Second Edition From Springer

Neurocritical care as a subspecialty has grown rapidly over the last two decades and has reached a level of distinct maturity with the advent of newer monitoring, diagnostic and therapeutic modalities in a variety of brain and spinal cord injury paradigms. Handbook of Neurocritical Care, Second Edition remains true to the operative tenet that "time is brain" and rapid diagnosis and therapeutic interventions in these challenging patients cannot be overemphasized. The second edition of this important Handbook again serves as a quick, practical reference for those involved in the care of critically ill neurological and neurosurgical patients. The care provided to this subset of critically ill patients continues to be multidisciplinary and includes care rendered from colleagues in emergency medical services, emergency medicine, neurology, neurosurgery, anesthesiology, critical care, nursing and physician assistance. Fully updated, all of the chapters again consist of easy-to-read, bulleted points followed by a list of Key Points and important references allowing for rapid access to vital information critical for fast and timely decision making. The first section covers a myriad of important general principles while the second section addresses the major diagnostic categories of neurocritical care with several new topics; these include, for example, neuroleptic malignant syndrome and malignant hyperthermia, meningitis and encephalitis, and intraventricular hemorrhage. Readers will find the algorithms, tables, and illustrations throughout the book not o

Product Details

Published on: 2010-10-28 Original language: English Number of items: 1 Dimensions: 9.25" h x 1.30" w x 6.10" l, 1.75 pounds Binding: Paperback 554 pages

"This is the second edition of an outline for care of patients with acute neurological illness. ... Trainees in neuroscience and critical care as well as other caregivers are an appropriate audience for this work originating from leading neuroscience programs in the U.S. ... an effective update from the first edition. References and content have been expanded and revised. The obvious strength is the clear presentation of neurological issues" (David J. Dries, Doody's Review Service, June, 2011)

see [Intensive care unit](#).

The results of a single-site project suggest that, by implementing a quiet time protocol in the NCCU, patients obtained higher levels of sleep quality and quantity. The implementation of this protocol did not impact nurses' job satisfaction, suggesting that the quiet time protocol is possible, improves patients care, and does not hinder nurses' job satisfaction ¹⁰⁾.

1)

Lenell S, Nyholm L, Lewén A, Enblad P. Updated periodic evaluation of standardized neurointensive care shows that it is possible to maintain a high level of favorable outcome even with increasing mean age. *Acta Neurochir (Wien)*. 2015 Jan 17. [Epub ahead of print] PubMed PMID: 25591801.

2)

Stuart RM, Schmidt M, Kurtz P, Waziri A, Helbok R, Mayer SA, Lee K, Badjatia N, Hirsch LJ, Connolly ES, Claassen J. [Intracranial multimodal monitoring](#) for acute brain injury: a single institution review of current practices. *Neurocrit Care*. 2010 Apr;12(2):188-98. doi: 10.1007/s12028-010-9330-9. PubMed PMID: 20107926.

3)

Zeiler FA, AlSubaie F, Zeiler K, Bernard F, Skrobik Y. Analgesia in Neurocritical Care: An International Survey and Practice Audit. *Crit Care Med*. 2016 May;44(5):973-80. doi: 10.1097/CCM.0000000000001602. PubMed PMID: 26983164.

4)

Bösel J, Dziawas R. [Sedation and weaning in neurocritical care: can concepts from general critical care be applied?]. *Nervenarzt*. 2012 Dec;83(12):1533-41. doi: 10.1007/s00115-012-3527-4. German. PubMed PMID: 23129066.

5)

Skoglund K, Enblad P, Marklund N. Monitoring and sedation differences in the management of severe head injury and subarachnoid hemorrhage among neurocritical care centers. *J Neurosci Nurs*. 2013 Dec;45(6):360-8. doi: 10.1097/JNN.0b013e3182a3cf4f. PubMed PMID: 24217146.

6)

Kuramatsu JB, Huttner HB, Schwab S. [Specialized neurological neurosurgical intensive care medicine]. *Nervenarzt*. 2016 May 20. [Epub ahead of print] German. PubMed PMID: 27206707.

7)

Bösel J, Kowoll C, Kahmann J, Dziawas R, Schirotzek I, Dohmen C. [Survey study: update on neurological intensive care in Germany 2012: structure, standards and scores in neurological intensive care units]. *Nervenarzt*. 2012 Dec;83(12):1609-18. doi: 10.1007/s00115-012-3541-6. German. PubMed PMID: 23247999.

8)

Kowoll CM, Dohmen C, Kahmann J, Dziawas R, Schirotzek I, Sakowitz OW, Bösel J; For the Initiative of German NeuroIntensive Trial Engagement (IGNITE). Standards of Scoring, Monitoring, and Parameter Targeting in German Neurocritical Care Units: A National Survey. *Neurocrit Care*. 2013 Aug 24. [Epub ahead of print] PubMed PMID: 23979795.

9)

Gabel BC, Martin J, Crawford JR, Levy M. Questioning the need for ICU level of care in pediatric patients following elective uncomplicated craniotomy for brain tumors. *J Neurosurg Pediatr*. 2016 May;17(5):564-8. doi: 10.3171/2015.8.PEDS15191. Epub 2016 Jan 1. PubMed PMID: 26722960.

10)

Stephen A, Olson DM, Stutzman SE. Nurses Perceptions of a Novel Protocol Addressing Uniform

Periods of Minimum Assessment Times. J Neurosci Nurs. 2017 Aug 16. doi: 10.1097/JNN.0000000000000311. [Epub ahead of print] PubMed PMID: 28817501.

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