Neurosurgical scheduling

Neurosurgical scheduling follows a similar process to general surgical scheduling, but with some specific considerations due to the complexity and specialized nature of neurosurgical procedures. Here are some key aspects of neurosurgical scheduling:

Referral and Evaluation: Patients are typically referred to a neurosurgeon by a primary care physician or another specialist. The neurosurgeon evaluates the patient's medical history, conducts a physical examination, and reviews diagnostic imaging (such as MRI or CT scans) to determine the need for neurosurgery.

Preoperative Assessment: The patient undergoes a comprehensive preoperative assessment, which may involve additional neuroimaging studies, neurological evaluations, and consultations with other specialists. This assessment helps the neurosurgeon understand the specific nature of the neurological condition and plan the surgical approach accordingly.

Surgical Consultation: The neurosurgeon discusses the neurosurgical procedure with the patient and explains the potential risks, benefits, and expected outcomes. The patient has the opportunity to ask questions and provide informed consent.

Surgical Team Collaboration: Neurosurgical procedures often involve a multidisciplinary team, including neurosurgeons, neurologists, neuroradiologists, anesthesiologists, and specialized nursing staff. The team collaboratively determines the scheduling, taking into account the complexity of the procedure, the patient's condition, availability of specialized equipment, and the need for postoperative care.

Operating Room Allocation: The scheduling staff assigns an appropriate operating room equipped with specialized neurosurgical instruments and imaging technology. The allocation also considers the estimated duration of the procedure, availability of neuroanesthesia services, and any specific requirements unique to neurosurgery.

Preoperative Preparation: The patient undergoes preoperative preparations, which may include specific neurological assessments, additional diagnostic tests, and consultations with the anesthesiologist for the management of anesthesia during the neurosurgical procedure. The patient is also provided with instructions on preoperative fasting and medications.

Anesthesia Evaluation: A detailed evaluation is conducted by the anesthesiologist to assess the patient's medical history, neurological condition, and anesthesia requirements. This evaluation ensures the safe administration of anesthesia during the surgery and monitors the patient's vital signs throughout the procedure.

Communication with Patient: The scheduling staff communicates the surgery date, time, and preoperative instructions to the patient. They provide detailed information on arrival time, fasting guidelines, medication instructions, and any other specific preparations required before the neurosurgical procedure.

Surgery Day: The patient arrives at the hospital on the scheduled day and undergoes the admission process. The neurosurgical team, including the neurosurgeon, anesthesiologist, nurses, and support staff, ensures that the necessary equipment, neuro-navigation systems, and specialized instruments are available for the procedure.

Postoperative Care: After the neurosurgery, the patient is transferred to the neurointensive care unit (NICU) or a specialized neurosurgical recovery area. Continuous monitoring is provided, focusing on neurological status, pain management, prevention of complications, and early rehabilitation.

Neurosurgical scheduling requires close coordination among the surgical team, imaging and support staff, and other healthcare professionals to ensure optimal patient care and outcomes. The process may also involve prioritizing urgent or emergency cases based on the severity of the neurological condition.

A study addresses neurosurgical scheduling within the Department of Neurosurgery at Aarhus University Hospital (AUH). The department provides neurosurgical care to a population of 1.3 million in central Denmark, and has treatment obligations for specific neurosurgical diseases for the entire country, which has a population of 5.8 million. Efficient utilization of the department's four operating suites is crucial to ensure that patients have timely access to both non-elective and elective neurosurgical procedures. Historically, the elective operating room (OR) schedule was made without consideration of the possible arrival of non-elective patients; consequently, elective surgeries were often cancelled to accommodate those with more urgent indications. The challenge was thus to introduce a structured way of planning for these non-elective surgical procedures that would minimise the need for cancelling elective surgeries without decreasing overall productivity.

Using a mathematical model developed in a previous study at Leiden University Medical Center, the effect of allocating OR time during regular working hours for non-elective neurosurgical procedures at AUH was analysed, so that a weighted trade-off could be made between cancellations of elective patients due to an overflow of non-elective patients and unused OR time due to excessive reservation of time for non-elective patients. This allocation was tested in a six-week pilot study during weeks 24 & 25 and weeks 34-37 of 2020 before being implemented in 2021.

In the 35 weeks following the implementation, the new allocation strategy resulted in a significant 77% decrease in the cancellation of elective neurosurgical procedures when compared with the same time period in 2019, with a significant 16% increase in surgical productivity.

This study shows that with mathematical modelling complex problems in the distribution of neurosurgical OR capacity can be solved, improving both patient safety and the working environment of neurosurgeons and OR staff $^{1)}$

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Zonderland ME, Gudmundsdottir G, Juul N, Bjerregaard C, Schulz Larsen K, von Oettingen G. Allocating operating room capacity to non-elective neurosurgical patients improves access and safety for elective patients at Aarhus University Hospital. Br J Neurosurg. 2023 Jul 5:1-7. doi: 10.1080/02688697.2023.2228916. Epub ahead of print. PMID: 37403673.

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