

## Neuro-critical Care in Pakistan

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Upon the recently concluded Neurosurgery National Conference in Lahore, at the end of the penultimate session, a debate ensued over the management policies for critically ill patients in the neurosurgical intensive care units of Pakistan. Currently, it was disclosed, the majority of Neurosurgical ICU in Pakistan are managed by the anesthetists, the house on the other hand advocated that neurosurgeons should take over this management.

Pakistan has come a long way in the development of neurosurgery as a specialty. Unfortunately, few areas where we are still at primitive level include the development of neurosurgical ICUs. There is currently more interest in development of state of art operating rooms, rather than basic intensive care units, which few would argue are more important than the operating room. In Pakistan, majority of critically ill neurosurgical patients are managed in partially equipped medical or surgical ISU, managed by medical specialists trained in basic intensive care, or anesthetists who are trained in the management of ventilators but not so much in the management of neurosurgical pathologies. Neurosurgery team members provide only a supporting role in the management of these patients, ordering emergency investigations and making decisions regarding possible interventions.

In developed countries, general anesthetists are no longer a part of neurosurgical patient management outside of the operating room. They were gradually replaced by intensivists, who were later replaced by neuro-intensivists.<sup>1</sup> Critically ill patients with neurological or neurosurgical pathologies, including post operative patients, patients with traumatic brain injuries, spinal cord injuries, subarachnoid hemorrhage, stroke, etc., are managed in specialized neuro-intensive care units, managed by specialized neuro-intensivists. Neuro-critical care is therefore emerging as a complex spe-

cialty, requiring a pre-requisite of neurology or neurosurgical training followed by advanced fellowships in neuro-intensive care.<sup>1</sup> These neuro-intensivists are not only trained in the management of intensive care but are also trained to perform specialized procedures such as ICP and EEG monitoring.<sup>1</sup> With a neurology and / or neurosurgical background, they are also trained in the performance and interpretation of neurological examination, the essence of management of any critically ill patient with neurosurgical pathology. Moreover, they are also trained in the indications and interpretation of neuro-radiology, such as CT scans, MRI scans and angiograms, which is so important in emergency management of these patients. Anesthetists or even intensivists cannot be expected to do all this. Several studies done in already established specialized neuro-intensive care units have clearly shown even further improvement in outcome of patients, simply with the induction of neuro-intensivists.<sup>2-4</sup> We are still a long way from that, still relying on general ICUs and anesthetists to manage these patients.

To shift the paradigm, neurosurgeons have to come forward. Immediate steps can include regular rotations of neurosurgery residents in ICU who will work alongside the anesthetists and / or intensivists. Our neurosurgery residents and young neurosurgeons may also be sent abroad to specialized centers for short term observerships, which generally do not require a foreign medical licensure. Long term planning will have to include sending our intensivists, neurology / neurosurgery residents and young neurosurgeons to specialized centers for advanced training in NICU. Once these trained professionals start returning, the next step will be the establishment of NICUs in Pakistan and specialized training by the foreign trained neuro-intensivists at these centers. It is going to be a fairly long process, but it is absolutely essential, and appears to be the only way forward.

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