

Paradigm Shift: From Standard-Driven Protocols to Resource-Driven Guidelines for Neurotrauma Management in Low- and Middle-Income Countries

Tariq Khan¹ Mukhtar Khan¹

¹Department of Neurosurgery, Northwest School of Medicine and Northwest General Hospital, Peshawar, Pakistan

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The project by Rubiano et al known as *BOOTStraP*¹ is part of an effort toward provision of resource-stratified guidelines for the management of neurotrauma in low-resource settings. This article, which is aptly acronymed as “BOOTStraP,” is a landmark work by Rubiano et al, has combined evidence-based guidelines with consensus-based recommendations from experts in trauma management in general and neurotrauma management in particular. The current work stems out from the collaborative efforts of the Colombian Association of Neurosurgery, the World Federation of Neurosurgical Societies (WFNS), and the Global Health Research Group for Neurotrauma (GHRGN) of the National Institute of Health Research (NIHR). The *BOOTStraP* is a timely effort in the context of rising awareness of the dire situation of poor patient outcomes in low- and middle-income countries (LMICs), and we are sure that it will be of help in improving neurotrauma care in the LMICs. One of the unique features of the *BOOTStraP* is that it focuses on all aspects of the needs of different situations in management of neurotrauma, ranging from prevention to advanced neurointensive care for mild-to-severe TBI and TBI in polytrauma settings.

Significant advancements have been made in prevention and care of TBI patients over the last three decades. These advancements are better understanding of TBI pathophysiology, improved therapeutics, accurate monitoring modalities, timely and evidence-based surgical interventions, and novel neurorehabilitation strategies. Collectively, all these advancements have led to improved patient care in the high-income countries (HICs). However, the LMICs clearly lag behind the HICs in both availability of medical resources (workforce, equipment, facilities, transport systems, acute and intensive care, and rehabilitation), as well as implementation of preventive, and surgical care policies.² Delays and lack of timely access to good quality care for neurotrauma patients worsen morbidity and mortality, and this fact becomes important for

time-critical conditions such as neurotrauma.³ One important factor as identified by Kruk et al⁴ in a recently published study was the lack of quality health care. They have even stressed that mere availability of health care access (of a poor quality) may lead to increased morbidity and mortality and have advocated the use of quality health care access as opposed to the mere availability of health care access. The *BOOTStraP* has tried in its entirety to address the issue of improving quality health care provision for TBI patients and not just provision of care. To our understanding, and as evident from several recent studies, the poor outcome of TBI patients in LMICs might be due to a totally different set of requirements which in HICs might not even be perceived to be.^{5,6} One example is the nonavailability of intravenous fluids at far-flung areas in rural LMICs or the lack of a proper rescue and transport system which might not be the case in HICs.⁷ The *BOOTStraP* identifies these barriers and addresses situation-wise solutions, as to what should be done. This indicates that there is a need for a paradigm shift from standard-driven protocol to a standard of care, which is catering for the needs of limited resource settings as well.

It is clear that LMICs lag far-behind the HICs in various aspects of surgical capacity and especially, the neurosurgical workforce.⁸ LMICs have one of the highest incidences of TBI and traumatic spinal cord injury (90% of the global incidence). More than half of the total caseload that a neurosurgeon faces is neurotrauma (TBI and spinal cord injury) that is estimated to be 5 million neurosurgical procedures per year in the LMICs.⁹ However, it is evident that a large number of LMICs either do not have a single neurosurgeon, or are very low in number working at main urban centers. In comparison to this, the HICs have an impressive neurosurgeon-to-patient ratio. The gamut of this disparity of lower resources and higher incidence of neurotrauma falls on the communities and has tremendous global impact in terms of disability

Address for correspondence

Tariq Khan, FRCS, Department of Neurosurgery, Northwest School of Medicine and Northwest General Hospital, Peshawar, Pakistan (e-mail: tariqhashimkhan@hotmail.com).

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and death. The WHO's "Sustainable Development Goal 3.6" states that in order to make a significant global impact, a 50% reduction in injuries and deaths from road traffic injuries (RTIs) will be required by 2030.¹⁰ The BOOTStraP paper is the best example of one step forward in this direction.

During the 68th World Health Assembly in 2015, the member states of the World Health Organization unanimously passed a resolution, which called for "strengthening emergency and essential surgical care and anesthesia as a component to universal health coverage." The report of the Lancet Commission of Global Surgery showed that surgical disease burden was in fact greater than the problem of communicable diseases and can only be solved by strengthening surgical health care in the LMICs.¹¹

Recently, with increasing interest in addressing barriers to health care in LMICs, a major area for study was the lack of resource-stratified guidelines that can be applicable to needs of trauma patients in general and neurotrauma in particular.¹² These resource stratified guidelines are essential for improving the overall strength of the surgical health care system ranging from rescue and prehospital care to acute care and rehabilitation, so that no individual suffers undue disability due to lack of emergency neurotrauma care.

As part of the strides toward strengthening surgical systems, the global movement of provision of national surgical, obstetrics, and anesthesia plans (NSOAPs) was launched in the developing countries. This was followed by launching of provincial or state-level surgical, obstetrics and anesthesia plans (PSOAPs). On a continuum to the commitment of the WFNS and the NIHR GHRGN, and in collaboration with the scholarly cooperation of the Harvard medical school, the United States, and Northwest School of Medicine, Peshawar, Pakistan, the Neurotrauma Committee of WFNS launched the "Comprehensive Policy Recommendations for the Management of Brain & Spine Injuries in Lower & Middle Income Countries (Peshawar recommendations)" and provide the policy makers and stakeholders with the minimal standards needed for care of neurotrauma patients, as well as identifying deficits, in care provision.¹³ These guidelines will also help to present the policy makers a direction toward goals for enhancing the quality of neurotrauma care.

The next step to move toward improvement of neurotrauma care would be the testing phase of the BOOTStraP recommendations, and we are sure that it will help in improving neurotrauma outcomes in LMICs. Once the recommendations are validated externally, we would suggest to translate these in multiple languages, publish it as booklet, and disseminate it to the care providers at various levels involved in care of TBI patients. An additional effort that we must advocate for is the inclusion of the BOOTStraP recommendations within the Peshawar recommendations

framework, so that it can further be the work on quality neurotrauma care.

Conflict of Interest

None declared.

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