InciSioN Policy Document

The Role of Global Surgery in Trauma Care

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Introduction

Trauma is a major cause of morbidity and mortality worldwide. Incidents such as unintentional injuries, road traffic accidents, interpersonal and self-injury contribute to the growing burden of trauma. Trauma systems require the coordination of several interconnected processes including pre-hospital emergency response, intra-hospital trauma capacity and resources, and post-trauma surveillance. Within these systems, the role of the surgical care is discussed infrequently. On World Trauma Day 2019, the International Student Surgical Network (InciSioN) affirms that surgery is a vital component of delivering robust trauma care around the world, and thus should receive adequate investment during international, national and local global health trauma planning.

InciSioN's Position

InciSioN strongly believes that all patients regardless of race, ethnicity, country of birth, religion and background, should have access to high quality, robust trauma surgical care. Access to trauma surgery services should be independent of in-country location, with particular emphasis on widening access to rural communities. Trauma surgery care should be affordable, timely, legal and free of stigma and discrimination.

Call to Action

Therefore, InciSioN calls for:

Governments to:

- Integrate comprehensive plans to strengthen trauma surgery services with national health and surgical systems initiatives
- Provide adequate infrastructure to develop pre-hospital emergency response systems
- Invest in research that quantifies the burden of unmet trauma within own country
- Promote application of preventive measures (such as better road infrastructure) in order to decrease the burden of trauma

Medical Faculties and Teaching Institutions to:

- Provide robust curricula pertaining to global surgery, trauma care and the role of surgery in trauma care
- Support young academics and students in carrying out research addressing trauma burden and disparities around the world
- Develop collaborative partnerships with institutions from LMICs and HICs to facilitate bi-directional exchange of opportunities and information.

International Institutions and Non-Governmental Organisations (NGOs) to:

- Collaborate with each other in order to fill gaps in trauma care systems
- Facilitate cross-disciplinary partnerships between various healthcare sectors to advance trauma care policy and development
- Every year on World Trauma Day, call for action on the national and international stage in order to highlight the ongoing disparities that exist.

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Healthcare Sectors to:

- Promote diverse leadership in positions whereby trauma care can be reformed and improved
- Work to build trauma workforce capacity on the local and national level
- Invest in training frontline trauma healthcare practitioners on a regular basis
- Implement ongoing monitoring and evaluation of local trauma systems, with annual reviews and improvements as required
- Encourage and award hospitals or staff that have performed exceptionally in trauma surgery as a source of motivation to other health facilities.

Scientific Journals to:

- Where applicable, encourage representation of trauma care professionals on journal editorial boards
- Provide open access funding support for research pertaining to global trauma surgery, and young global surgery researchers
- Publish robust research studies pertaining to trauma care systems around the world.

InciSioN National Working Groups to:

- Advocate for widened access to trauma surgery to medical students at the national and international level
- Provide educational opportunities (i.e. conferences, speaker series, etc..) on the topic of global trauma surgery
- Conduct research in order to evaluate the burden of trauma care and the role of surgery within their own communities

Background

What is trauma?

Trauma refers to a process of injury, a major cause of morbidity and mortality around the world. Trauma care seeks to attempt to manage and treat such injuries, often through healthcare systems. A trauma care system can be defined as “an organized and coordinated effort in a defined geographic area to deliver the full spectrum of care to an injured patient.”[1] In 2004, the World Health Organization (WHO) published *Guidelines for Essential Trauma Care*, highlighting the breadth of trauma systems ranging from adequate trauma infrastructure to specialist trauma healthcare professionals (HCPs).[2]

What constitutes the main burden of trauma worldwide?

The Global Burden of Disease study is an annual project that serves to quantify the patterns of key diseases found around the world.[3] In 2013, a subgroup of trauma researchers tactfully isolated injury-related cases from the GBD dataset, in an attempt to quantify the global burden of injury.[4] From these results, the healthcare community was able to gather the most common injuries worldwide. These include:

- Unintentional injuries i.e. falls, drowning, fire, poison
- Road traffic and other transport accidents
- Intentional harm i.e. self-harm, interpersonal violence
- War and disaster

Physical trauma is one of the most common reasons for emergency department visits worldwide.[5] In the US, trauma is the leading cause of deaths for people aged 46 years old and below.[6] Statistics pertaining to trauma may be invariantly higher in LMICs due to the possible risk factors available in such countries. LMICs for example, have inadequate

infrastructure such as traffic lights, with the available infrastructure not functioning as per standard. This, coupled with the excessive vehicular speeds, inappropriate use of goods vehicles for public transport as well as excessive loading have increased the rate of road traffic fatalities in such countries. There is also less focus on use of safety equipment such as googles, safety helmets and boots, lack of safety training as well as low levels of safety practices which result to trauma in the workplace.[7] Trauma among toddlers is also common, partially contributed to poor arrangement of furniture within the household as well as insufficient safety proofing and hazard removal.[8] An increased rate of conflict and war, war related sexual violence[9] and domestic violence has also led to increased incidence of trauma.

Individual trauma results from an event, series of events or set of circumstances experienced by an individual as physically or emotionally harmful or life-threatening with lasting adverse effects on the individual's functioning and mental, physical, social, emotional or spiritual well-being.[10] In this context, people who have experienced trauma are 15 times more likely to attempt suicide, 4 times more likely to become alcoholic, 3 times more likely experience depression and to use antidepressant medication and 2 times more likely to have serious financial problems.[11]

What is trauma surgery?

Trauma surgery is a surgical specialty that uses both operative and non-operative management to treat traumatic injuries, typically in an acute setting.[12,13] Trauma surgery transcends surgical sub-specialties. Whether it is an ophthalmologist performing a removal of a foreign body from the eye, a surgeon suturing the abdomen after blunt injury, a neurosurgeon performing a craniotomy or an orthopedic repairing a fracture, all doctors are placed with the responsibility of effective and efficient health care delivery and restoring good health to victims of trauma. A trauma surgeon generally completes a residency training in general surgery followed by fellowship training in trauma or surgical critical care.[14]

The trauma surgeon is often responsible for prioritizing which of your injuries will be treated first and determining the order of the diagnostic and operative procedures needed.[15] More often than not, areas without trauma surgeons rely on other specialized surgeons such as ophthalmology or general surgery to attend to trauma patients. Trauma surgery is a fast-paced and demanding practice with less preparation time that you may otherwise see in medical subspecialties.[16]

However, inadequate numbers of trained trauma staff has always been a challenge, especially in LMICs. For example, in the United Republic of Congo, there are only 4 neurosurgeons in a population of 74 million, with a 0.005 per 100,000 ratio.[17] Such understaffing in health care may result in increased DALYs despite timely arrival of patients in health facilities. It is also important to have a good emergency department that can easily deal with trauma upon occurrence. This also requires the presence of enough and well-equipped vehicles that will facilitate transport of patients to hospitals. This means that the cost care for trauma victim is quite significant.[18] Funding in health sector covers for such costs in healthcare, therefore a government with such is less likely to have delayed provision of health services upon occurrence of trauma. However, most LMICs are dependent on external parties to cover healthcare.[19] This cripples the economics around medical care and

alternatively, hinders trauma surgery. Developed countries also spend a substantial amount towards trauma. The US for example, spends 671 billion dollars each year towards trauma.[6]

Medical insurance in itself also plays a huge role. More often, the lack of enough money to cover for healthcare by an individual less likens the possibility of one looking for treatment in hospitals.[20] Hence, local treatment of wounds is performed which may further increase the possibility of surgical complications in the future, should the individual choose to seek treatment later. In other cases, the shame associated with victims of domestic violence[20] prevents an individual from seeking appropriate health care.

It is evident therefore, that for trauma surgery to be effective, a lot of parties come into play. First, the need to enable individuals to seek and access health care, by increasing available health institutions and promoting all individuals to access health insurance. Then, to promote good infrastructure that will enable access to the hospital from points at which individuals suffer the trauma, followed by equipping hospitals with transport and adequate staff at all times so as to ensure timely delivery of healthcare to all individuals. But an even better approach is prevention, especially when possible. Conflict resolution, better observation of road rules and regulations with much stricter punishment once violated, resolving crime rate and promoting human rights can all reduce emergency department visits, and possibly lower mortality rates.

What are the disparities that exist in trauma risk and response around the world? What are the challenges faced in trauma response?

Disparities in the risk of traumatic injuries and response to trauma between LMIC's and developed countries exist on multiple levels. Fundamentally, poorer infrastructure (poor road conditions, increased congestion) and a lesser understanding of road safety by the population contributes to a larger risk for motor vehicle accidents in LMIC's.[21] Other sources of traumatic injuries include interpersonal violence and war, both which remain higher in LMICs.[22] Unfortunately, prehospital response remains underdeveloped in LMICs – with issues including lack of availability of a nationwide EMS system (lack of financial resources), lack of trained acute care staff in the ambulance in certain countries, lack of materials, poor road infrastructure and lack of emergency situation awareness by the general public being the most frequently cited obstacles.[21] Whilst preventative measures and prehospital care remain the most important factors in avoidance of acute trauma situations and survivorship respectfully, in-hospital care cannot be neglected as an equally important intervention in such situations.

The consequences of disparities in in-hospital care between LMIC's and developed nations have been illustrated by numerous studies. For example, moderate severity injuries resulted in 6x higher mortality rate in LMICs compared to developed nations in one study.[23] Disability from musculoskeletal injuries are also significantly higher in LMIC's compared to developed countries.[24] The WHO guidelines for essential trauma care outlines the various sources of disparity in trauma response as follows:

1) *Physical Resources and medical equipment*

The lack of available material resources required in the trauma response has been illustrated in a number of studies. For example, in northern Ghana, it has been found that most of the region's primary care hospitals lack equipment such as intraosseous needles,

fluid warmers, access to basic imaging modalities (X-ray and ultrasound), endotracheal tubes, cricothyrotomy equipment, laryngoscopes, chest tubes and ventilators.[25] Lack of cardiac monitoring and pulse oximetry exist even at the district and referral hospital levels.[25] Assessments conducted in India and Nepal demonstrated a lack in (1) relatively inexpensive equipment (ex: chest tubes), due to a lack of training on its use, (2) ventilators, due to frequent technical issues and no trained staff to conduct repairs, (3) electricity, mainly in Nepal.[26,27]

2) *Healthcare system organization and administration*

It has been found that in 96% of Northern Ghana's hospitals, there are no trauma guidelines available. Other deficiencies include: no trauma committee (100% of hospitals), no trauma team (99%), no trauma simulation (98%), among others.[25] Assessments of other LMIC's around the world using the World Health Organization/International Association for Trauma and Intensive Care(WHO/IATSIC) guidelines for care of the injured reveals generally poor compliance to the guidelines.[28,29,30]

3) Availability of trained staff

Lack of trained staff at different levels are another important factor for the lack of adequate in-hospital trauma response in LMIC's. For example, in Northern Ghana, there are no acute care specialists, surgeons and anesthesiologists at the primary care hospital level, and no radiologists nor emergency care specialists at the district hospital level.[25] It has been found that traumatic injuries, notably in rural areas of Ghana, often fall in the hands of general practitioners and nurses who are untrained in trauma response and surgery.[30] A cross sectional survey of Emergency and Essential Surgical Care capacity in Cameroon was answered by 12 hospitals and revealed cumulative service provided by only 6 qualified surgeons, 7 qualified obstetrician/gynecologists, and no anesthesiologists.[31]

What research has been done to address the disparities?

Disparities between global healthcare needs (in particular trauma) and the available workforce are due to multiple factors: lack of training, inadequate salary reimbursement, perceptions of a lack of professional status, and the 'brain drain' to more highly developed countries. As an example, Sub-Saharan Africa carries 24% of the global burden of disease but as little as 3% of the world's health workers[32].

Research done to explore these disparities include addressing not just the burden of communicable diseases, but also focusing attention on diseases managed within surgical, anesthesia, and emergency care specialties.[33] Several things can be done to achieve this, including increasing the awareness of existing disparities, as well as stakeholder involvement in the realms of policy and advocacy is vital to improving the current situation. The barriers to providing quality trauma and emergency care worldwide are not insurmountable – but we must work together across disciplines and across borders if we are to raise the bar and negotiate change

Another study has established that we need to explore differences in cause-specific mortality by urban-rural status, especially for penetrating injuries, that are most likely to benefit from rapid delivery of definitive care.[33,34] Specifically, it remains vital for researchers to evaluate the role of distance and travel time as they relate to mortality for rural residents, both for patients receiving care in the ED and for those who die prior to hospital arrival. As a more detailed understanding of the mortality disparity develops between rural and urban areas, researchers should explore differences in mortality within the rural population and examine the role of EMS and trauma center characteristics on trauma outcomes for residents in the former. Currently however, little remains known about the magnitude of urban-rural disparities in injury mortality.[34]

Who are the key stakeholders needed to carry out these solutions?

Many different stakeholders need to be involved if we are to address trauma disparities around the world.

1) *Political organizations:*

Health systems development as well as international collaborations both need to be coordinated by governments and political organizations. Ministries of Health are the key to implement national plans for infrastructural and human resource development for improved surgical trauma care. Non-government political organizations should advocate for improved trauma care.

2) *NGOs:*

Medical and non-medical NGOs should advocate for the establishment of national plans for securing sufficient trauma care for all parts of the community by advocacy and education campaigns, fundraising actions and data collection.

3) *Professional societies/universities:*

Professional societies and universities with their university hospitals are key stakeholders in carrying out the improvement of trauma care. They need to advocate for their patients in collaboration with the Ministries of Health and secure high-quality trauma training for their personnel.

4) *Private funders:*

Private funders can play an important role as well through funding of research projects to assess trauma care and training programs. Funding can also be used for training and employment of trauma staff in places which are not supported by national plans.

5) *Local healthcare teams:*

Local healthcare teams are essential in carrying out trauma care. Health care teams both at community-level healthcare facilities and at specialized centres can promote trauma care for their patients.

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