

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

Functional inclusivity of trauma networks: a pilot study of the North West London Trauma Network



Jared M. Wohlgemut, MBChB, BSc (Hons), MSc, MRCS,^a
 Joseph Davies, BSc (Hons),^b Christopher Aylwin, FRCS,^c
 Jonathan J. Morrison, PhD, FRCS,^d Elaine Cole, PhD,^e
 Nicola Batrick, FRCS, FRCEM,^b Susan I. Brundage, MD, PhD,^f
 and Jan O. Jansen, PhD, FRCS, FFICM^{g,*}

^a Department of Surgery, Aberdeen Royal Infirmary, Aberdeen, UK

^b North West London Trauma Network, Imperial College Healthcare NHS Trust, St. Mary's Hospital, London, UK

^c Trauma Service, Imperial College Healthcare NHS Trust, St. Mary's Hospital, London, UK

^d R Adams Cowley Shock Trauma Center, University of Maryland Medical System, Baltimore, Maryland

^e Centre for Trauma Sciences, Blizard Institute, Queen Mary University of London, London, UK

^f Centre for Trauma Sciences, Queen Mary University of London, London, UK

^g Division of Acute Care Surgery, University of Alabama at Birmingham, Birmingham, Alabama

ARTICLE INFO

Article history:

Received 2 January 2018

Received in revised form

22 April 2018

Accepted 23 May 2018

Available online xxx

Keywords:

Trauma system

Trauma network

Triage

Inclusive

Geospatial

ABSTRACT

Background: Metrics exist to assess and validate trauma system outcomes; however, these are clinically focused and do not evaluate the appropriateness of admission patterns, relative to geography and triage category. We propose the term “functional inclusivity”, defined as the number and proportion of triage-negative, and/or non-severely injured patients, who were injured in proximity to a level II/III trauma center but admitted to a level I facility. The aim of this study was to evaluate this metric in the North West London Trauma Network.

Methods: Retrospective, geospatial, observational analysis of registry data from the North West London Trauma Network. We included all adult (≥ 16 years) patients transported to the level I trauma center at St. Mary's Hospital between 1/1/13–31/12/16. Incident location data were geocoded into longitude/latitude, and drive times were calculated from incident location to each hospital in London's Trauma System, using Google Maps.

Results: Of 2051 patients, 907 (44%) were severely injured (injury severity score [ISS] ≥ 15), and 1144 (56%) were nonseverely injured (ISS 1–15). Seven hundred ninety five of the 1144 nonseverely injured patients (69%) were injured in proximity to a level II/III but taken to the level I facility. A total of 488 (24%) patients were triage-negative, and 229 (47%) of these were injured in proximity to a level II/III, but taken to the level I trauma center.

Conclusions: This study has demonstrated the concept of functional inclusivity in characterizing trauma system performance. Further work is required to establish what

An abstract of this work was presented at the 13th Annual Academic Surgical Congress, January 30–February 1, 2018, Jacksonville, Florida.

* Corresponding author. Division of Acute Care Surgery, University of Alabama at Birmingham, 1922 7th Avenue South, KB 120, Birmingham, AL 35294. Tel.: +1 205 975 3030; fax: +1 205 975 3040.

E-mail address: jjansen@uabmc.edu (J.O. Jansen).

0022-4804/\$ – see front matter © 2018 Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.jss.2018.05.045>

constitutes an acceptable level of functional inclusivity and what the denominator should be, as well as validating and further evaluating the concept of functional inclusivity.

© 2018 Elsevier Inc. All rights reserved.

Introduction

Organized trauma systems are associated with decreased mortality and improved functional outcomes after injury.^{1–3} The organizational philosophy of these systems has changed over time: Early systems focused on establishing high-volume trauma centers, without addressing the geographical population needs as a whole.^{4,5} These “exclusive” systems increased the experience by concentrating case volume in specialist centers and improved outcomes.^{6–9} However, since then, there has been a recognition that all acute care hospitals in a given geographical area should be assigned a role in the care of injured patients, as part of the regional trauma system.¹⁰ The American College of Surgeons’ Committee on Trauma has defined an “inclusive” trauma system as “a system that includes all health-care facilities to the extent that their resources and capabilities allow and in which the patient’s needs are matched to hospital resources and capabilities”.¹¹ Inclusive trauma systems have been shown to improve outcomes, compared to exclusive systems.^{4,5}

Trauma system inclusivity has been quantified in terms of the proportion of acute care hospitals designated as trauma centers within a given region.⁵ However, to our knowledge, no parameters have been described to evaluate whether an inclusive trauma system is functioning in a way which satisfies the ACS-COT definition, ensuring patients’ needs are being matched to hospital resources and capabilities.¹¹ This pilot study introduces a novel method of evaluating this component of trauma system performance, termed the “functional inclusivity”, which evaluates whether patients who do not require high-level trauma center care are being transported to major trauma centers (MTCs), bypassing hospitals which have the resources and capabilities to manage their injuries.

Trauma systems rely on triage to quantify injury burden and decide on the level of care required. Organizationally, patients who are assessed as requiring MTC care should—geographical restrictions permitting—be taken to an MTC (equivalent to a level I trauma center in North America). Patients who are not triaged as requiring MTC care and who are injured in closer proximity to a trauma unit (TU) (equivalent to a level II/III trauma center), should be conveyed to a TU. These decisions do not directly relate to the diagnostic accuracy of triage *per se* but rather the use of resources: The terms “overtriage” and “undertriage” are used to describe an erroneous overestimation or underestimation of the patient’s injury burden, whereas “functional inclusivity” relates to patients who were correctly triaged but taken to an inappropriate destination health-care facility.

This issue can also be phrased in terms of injury severity: given that MTCs are intended to care for patients with severe injuries, defined as an injury severity score¹² (ISS) > 15, it follows that patients with moderate or minor injuries (ISS ≤ 15) should be taken to TUs, if injured in closer proximity to such a unit. However, although useful for resource planning

and research purposes, ISS is calculated in retrospect, and not available at the roadside, and therefore cannot be used to determine patient flow. It is therefore necessary to examine triage both in terms of the triage decision and severity of injury.

The aim of this pilot study was to evaluate the concept of “functional inclusivity”, using the North West London Trauma Network as a case study. The development of regional trauma networks in the United Kingdom has resulted in a 63% reduction in mortality.¹³ In London, survival rates have increased by 50%.¹⁴ However, anecdotal observations have been made about increasing exclusivity of the system, particularly in the North West London Trauma Network. We therefore sought to evaluate changes in functional inclusivity over time. Specifically, the objectives were to evaluate the number and proportion of triage tool negative patients, and nonseverely injured patients, who were injured in proximity to a TU, but nevertheless taken directly to a MTC, over a period of 4 years.

Materials and methods

This is a retrospective, geospatial analysis.

Setting

In April 2010, the greater London area became the first area of the UK to implement a regional trauma system, for a population of 12 million.¹⁵ The London Major Trauma System consists of four operational networks, each with one MTC designated to manage patients with severe injuries, and a number of TUs.¹⁵ The North West London Trauma Network serves a resident population of 2.4 million, but has a daily transient population of 3.9 million including those commuting to work, traveling on sections of Motorways 4 and 25, tourists, and passengers at Heathrow Airport.^{16,17} The North West London Trauma Network consists of one MTC (St. Mary’s Hospital) and six TUs: Hillingdon Hospital, Chelsea and Westminster Hospital, Ealing Hospital, Northwick Park Hospital, Watford General Hospital, and West Middlesex University Hospital.¹⁸

Data sources and inclusion criteria

Data were obtained from the Trauma Audit and Research Network (TARN), the UK’s national trauma registry. Trauma patients whose length of stay exceeds 2 d, who have been admitted to a critical care area, or who have died as a result of their injuries are included in the registry (additional details regarding the TARN entry criteria are available online).¹⁹ We included all trauma patients aged ≥16 years, who were taken by road ambulance, directly from the scene of an incident, to St. Mary’s Hospital MTC, between 1 January 2013 and 31

Download English Version:

<https://daneshyari.com/en/article/8835293>

Download Persian Version:

<https://daneshyari.com/article/8835293>

[Daneshyari.com](https://daneshyari.com)