Project-plan

Background

Trauma, defined as the clinical entity composed of physical injury and the body's associated response.(1) It is one of the leading causes of mortality and morbidity in the world, representing about 9 % of annual global deaths. Among people under the age of 45 trauma is the most common cause of death. Over the last decade almost 50 million people worldwide have died from trauma.(2).

Not only does trauma represent a large share of the global mortality rate, but studies have also shown a significant difference in outcome depending on where patients are treated. It has for example been shown that trauma patients in Sweden who were treated at a trauma center rather than a non-trauma center have a 41 % lower 30-day adjusted mortality rate. (3)

Some studies indicate that the number of trauma-related deaths that potentially could have been prevented are as high as 20 to over 50 %. (4–6) Preventable deaths varies not only between trauma centers and non-trauma centers. There is a significant difference between high income counties and low and middle income countries (LMICs). It is estimated that 2 million lives could be saved annually if LMICs and high income countries had equal fatality numbers for severe injuries.(7)

Advanced Trauma Life Support and Primary Trauma Care

Several different systems are being used in Trauma care. Such as Advanced Trauma Life Support (ATLS) and Primary Trauma Care (PTC), where ATLS is the more established system. The purpose of these systems is to secure a time-efficient, standardized and structured way of treating trauma patients.(8,9)

ATLS is practiced in over 80 countries and 1 million doctors have gone thru this training.(8)

PTC is also used in over 80 countries, however more frequently in low and middle-income countries. One reason for this could be that the PTC program is free while ATLS is not.(9)

New Injury Severity Score

The NISS is an anatomic severity scale developed to assess multiple-injured patients. The NISS score a patient get is based on the Abbreviated Injury Scale (AIS) points from the injured body regions. The higher NISS score the more serious injury the patients suffers from.(10)

NISS takes injuries in 6 different body regions into account. Those are head/neck, face, chest, abdomen, extremiteis and external. The NISS is the sum of the squares of the highest AIS codes in these regions, meaning that all three injuries can be in the same region or in separate regions. AIS can vary from 1-5, and the NISS from 1-75.(10)

Morbidity and Mortality Conferences

An important part of trauma care evaluation and improvement is Mortality and Morbidity Conferences (M&M). This is a multidisciplinary conference with representatives from all medical specialties and professions in the trauma team. The purpose of M&M is to learn from the care provided, identify opportunities for improvements, and implement corrective actions.(11) As it is not possible to analyze every trauma case in detail audit filters are often used to decide which cases that are to be reviewed at M&M. Such audit filter can be time frames in which a test should be taken or a specific treatment provided.(12).

Trauma Registries

Oppotrunity for improvement

Whether there is opportunity for improvement for a specific case or not is decided during M&M where selected trauma casees are reviewed. Opportunity for improvement (OFI) is defined as when the trauma care for a patient does not match the best practice guidelines in at least one aspect.(13)

OFI can be a more nuanced measure for trauma care improvement than the more established terms preventable deaths and non preventable deaths. This is because there can be OFI in a case where a patient has died, even if the death was not preventable.(14) Furthermore there is no consensus for classification of preventable and non preventable death, leading authors to use different classifications.(15). The term OFI also has the advantage over the term preventable death by sounding more positive and encouraging, preventing review board members from having to classify colleagues patient care as inappropriate.(13)

Trauma subgroups

Since trauma patients is a heterogeneous group, it is important to have a sufficient understanding of OFIs for different trauma subgroups.(16). Some examples of subgroups are men and women, blunt and penetrating trauma, geriatric, major and minor trauma and Traumatic brain injury.(17)

In Sweden almost two thirds of trauma patients are men and just over 60% are in the age between 18-64. For example traumatic injuries from stabbing and shooting violence are more common in men while women are overrepresented in fall traumas. There is a lot of existing data about subgroups regarding transportation time to hospital, NISS score at the Emergency department, rehabilitation, morbidity and mortality rate and so on. (17)

Knowledge gap

Despite having all this data about the trauma patients it is poorly understood whether different subgroups have greater opportunities for improvement (OFI) than others. The most common cause of death after injury is hemorrhage. Among these patients, problem in decision making, technical skills and making decisions between surgery and radiology were some of the areas were OFIs were found.(18) However we do not know whether the same OFI areas apply for the trauma subgroups, or in what frequency.

Aim

In this study we aim to assess the frequency of opportunity for improvement in the following important clinical subgroups: men and women, blunt and penetrating injuries, minor and major trauma, and across body regions injured.

Methods

Study design

This is a registry based cohort study that uses data from two different Swedish trauma registries.

The first registry is the Trauma registry at the Karolinska University Hospital in Solna, which includes about 21000 patients between the years 2012 and 2021.

The second registry is the the trauma Quality Database which is a subset of the trauma registry and includes about 2200 patients selected for review between 2014 and 2021. The trauma care quality database includes details and conclusions from the M&M.

We will link these databases using... By linking these databases together the opportunity for improvement in the trauma subgroups mentioned in the introduction will be assessed.

Setting

The Karolinska University Hospital in Solna, Stockholm, is the leading trauma center in Sweden, and ranked as one of the best hospitals in the world. The hospital is a level 1 trauma center.(19) The Trauma department at the Karolinska University Hospital in Solna handles about 1800 trauma cases every year, out of which about 200 are children. KUH is the primary trauma center for a population of 2,8 million people.(20)

In Sweden there is a national trauma registry (SweTrau) holding records of trauma cases from 48 out of 49 hospitals who recieves major trauma. To meet the inclusions criterias for SweTrau you must be over 15 years of age, been exposed to a traumatic event leading to trauma team activation, or have a NISS over 15 without trauma team activation. (21)

Trauma patients are divided into priority one and two by the paramedics using certain criteria, such as trauma mechanism, GCS points and blood pressure. To Karolinska Solna only those who are classified as a priority one by the pre hospital professionals are admitted. (22)

A trauma priority one is considered directly life threatening. Therefore when arriving to Karolinska Solna every patient is taken care of by a full trauma team. This team consists of a trauma leader who is a general surgeon or a resident in general surgery and an anesthetist with a nurse specialized in anesthesiology. The team also has an orthopedic surgeon, radiologist, radiology nurse, emergency medicine nurse, surgical nurse and assistant nurses.(22)

At KUH all trauma patients are included in the KUH trauma registry. The KUH trauma registry is a part of the Swedish Trauma Registry, with the same eligibility criteria. Audit filters then identify certain trauma cases for whom the care might have deviated from the gold standard treatment based on different criteria. Such criteria are GCS 8 or less but the patient was not intubated, time to CT longer than 20 minutes, time to Surgery and so on. Then a manual selection is done by a nurse, during which some cases are removed from the group of potential OFI cases because obvious reasons for the deviation can be found. The patients who are then left are discussed at a M&M where doctors and nurses from several specialties participate. At this conference every case is reviewed. When OFI is found in a case, that specific OFI is described in the trauma quality database. Then it is recoded as "Yes, at least one OFI identified" or "No, no OFIs identified"

Participants

All patients from KUH trauma registry and from the Trauma Quality Database.

Variables and data sources/measurements

The data from the trauma registries were analyzed for OFI in seperate cohorts. The cohorts were: men and women, blunt and penetrating injuries, minor and major trauma ,and across body regions injured. Gender and age will be continuous variables. The location of injuries will be analyzed based on AIS codes and AIS scores will be used to gruop patients into fitting cohorts. OFI was treated as a binary variable, with "yes" and "no" as the only possible outcome. For the M&M conference to put a "yes" in the OFI section at at least one of the following areas needed to differ from the best practice guidelines for trauma care: emergency department triage; tertiary survey; processing; communication; time to computed tomography; time to surgical intervention; level of physician and nursing competency; level of care; neurosurgical intervention; hospital staff routine; resource management; logistics and technology; overall management and documentation.

Göra en tablell här för inklusion och exklusionskriterier för de olika cohorterna baserat på på AIS scores.

Se elias och hussein

Bias

To prevent research bias all data will be scrambled while used to write the analysis model.

Study size

Quantitative variables

Statistical methods

The stastistical computing program R will be used to analyze the data. Ethical considerations =====

All patients have given consent before added to Swetrau and Trauma Quality Database. As this is a registry based study no interventions were made that could effect the patients. The only risk with this typ of studies is that personal information could leak. In these registries however, all personal data was scrambled to minimize that risk.

Ethical permission has been granted for tis project. Dnr number for this permission is 2021-02541 and 2021-0253.

DET STÅR ATT ALLA GETT MEDGIVANDE FÖR ATT LÄGGAS TILL I SWETRAU PÅ DERAS HEMSIDA. MEN HUR FUNKAR DET MED DE SOM DOG INNAN SAMTYCKE GAVS? Jonatan pratade om att man antog samtycke för de patienterna. Men hittar ingen info om detta.

En skriftlig redogörelse av projektets utveckling

All data är redan insamlad från start och finns tillgängliga i de registry som beskrivs i projektredogörelsen. Datan kommer delas in efter olika trauma-subgrupper. De variabler som kommer användas är "Ja" där det finns "Opportunity for improvement" samt "nej" där det inte finns "opportunity for improvement.

Hittills har jag - Läst in mig på ämnet - Skrivit Introduktion - Påbörjat materiela och metod - Börjat sätta mig in i R som är det program som kommer användas för att sammanställa data.

• Hur data planeras presenteras (t ex tabeller och hur de kan struktureras, diagramtyper, vävnadssnitt, intervjucitat etc)

Datan kommer presenteras i en tabell där de aktuella subgrupperna kommer presenteras samt huruvuda det finns OFI för dessa grupper. Det kommer även redogöras för i vilken utsträckning varje subgrupp har OFI.

• Hur data planeras analyseras; vilka statistiska metoder för jämförelser mellan en eller flera grupper, andra matematiska metoder, kvalitativ analys etc –> Detta skulle jag behöva diskutera med er innan jag kan svara.

Ingen reservplan behövs då all data finns insamlad och risken för att projektet inte går att genomföra somplanerat bedöms minimal.

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