

Does Dhulikhel Hospital need a trauma center?

A two month survey



Family on motorbike in Nepal, photo: Håvard Rosseland

Graduate thesis

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Abstract

Background: Most epidemiologic research in low-income countries tends to focus on diseases, however, one of the leading causes of death is traumatic injuries, especially traumatic brain injury (TBI) and spinal injury. Few studies on trauma and neurotrauma have been conducted in Nepal.

Objective: To investigate the epidemiology of all physical traumas at Dhulikhel Hospital (DH), with special attention to TBI and spinal injury.

Materials and methods: This is a cross sectional descriptive study which included all trauma patients registered at the Emergency department (ED) at DH between February 1st 2016 and April 4th 2016, and is an extension of a survey from 2011. Information about demographics, mechanism of injury, time of injury, location of injury, Glasgow Coma Scale (GCS), Loss of Consciousness, treatment and transfer of patients was recorded. CT images of head and spine and spinal x-rays were assessed for classification.

Results: 726 patients were included in the study. Mean age was 31.7 years and 54.1 % \leq 30 years old. The male to female ratio was 1.83. 32.6 % contacted the ED with a history of head trauma; 19.8 % had moderate head injuries and 8.4 % had severe head injuries according to the Head injury severity scale (HISS). 18 % of the head traumas were referred for neurosurgical evaluation and management outside DH. In 80 cases CT imaging of the head was evaluated, out of which 11.3 % showed intracranial pathology.

Conclusion: From 2011 to 2016 there has been an 80% increase of trauma patients at DH. The proportion of head injuries is large, and moderate or severe head injuries are frequent. Many of the head injuries are referred for neurosurgical evaluation and management outside DH. Our data show high frequency of trauma, especially head injuries, indicating that it would be reasonable to establish a neurosurgical unit at a trauma center at DH.

Preface

The first and second authors have contributed equally to this thesis.

We would like to thank our supervisors Øystein P. Nygaard, Tore Solberg, Rohit Shrestha, Dipak Shrestha, Sanu Shrestha for advice, guidance and team work.

Introduction and background

Most epidemiologic research in low-income countries tends to focus on diseases, especially infectious diseases and nutrition, while traumas have traditionally been neglected (1). In 2000, WHO reported that various traumatic injuries account for 3 of the 5 leading causes of death in the age group of 15-44 years in middle and low-income countries (2). A review article on neurotrauma from 2015 states that “within the spectrum of trauma-related injuries, traumatic brain injury (TBI) and spinal injury are the largest causes of death and disability” (3), and that TBI has large negative social and economic effects, not only for the patients and their families, but also for the whole society.

There are few reports on the epidemiology of trauma in Nepal. One study from 2010 concluded that “In Nepal, trauma-related injury contributes significantly to disability and is the third leading cause of death” (4). In WHO’s *World report on disability* from 2011 it is estimated that the prevalence of disability in Nepal is high (21.7 %) (5), but the exact proportion of trauma-related disability is unknown.

A study from 2013, comprising 4199 trauma patients at Dhulikhel Hospital (DH) and its outreach centers confirmed WHO’s report, showing that injuries were most frequent in the age group of 15-49 years (6). Falls and road traffic accidents (RTAs) were the most common injury mechanisms for patients evaluated at DH, while falls were most common at the outreach centers. Only a handful of studies concerning neurotrauma have been conducted in Nepal. A student thesis from 2011 showed that 50 % of trauma cases were aged ≤ 25 years at DH (7). Most of the patients had orthopedic injuries, diagnosed by x-ray. Since no CT-machine or neurosurgeons were available at DH at that time, severely injured patients had to be referred to other hospitals.

The student thesis from 2011 found that nearly 20 % of the trauma cases had head injuries, and nearly 10 % had injuries to the spine (7). Another study from Nepal in 2011 found that in a study population of 2921 patients, 33.8 % had head injuries (8). A study from 2006 on a Nepalese pediatric population concluded that 96 % of the neurotrauma cases were head injuries (9).

DH has recently acquired a new CT-machine, funded by the World Bank and the Royal Norwegian Embassy in Kathmandu. This may have led to a change in the spectrum of trauma patients seen at DH and how they are managed. Patients with TBI and spinal injury were previously frequently referred to other hospitals, mainly due to a need for CT and neurosurgical evaluation.

The aim of the present study is to focus on TBI and spine injuries among trauma patients reaching DH over a period of two months, to investigate if the trauma epidemiology of all physical traumas at DH has changed over the years. The results could be used for evaluating resources needed at a trauma center with a neurosurgical unit, now being planned at DH. Furthermore the study may contribute to better prevention and treatment of injuries in Kavre and surrounding areas of Nepal.



Dhulikhel Hospital. Photo: Håvard Rosseland

Method

This cross sectional descriptive study was conducted between February 1st 2016 and April 4th 2016 at the DH, which is located in the Kavre province in Nepal. It is an extension of the survey reported by Tyridal in 2011 (7).

All patients registered with physical trauma at the Emergency Department (ED) were included. The surveyors (doctors and medical students) registered all trauma patients using one standardized registration form in English (“Emergency assessment and treatment record”) (attachment 1), thus no translation of the forms was necessary. The form was already in use in the ED, as part of the medical records at the hospital. Thus, this study did not require any additional data collection, investigations or treatments.

The variables registered in the “The Emergency assessment and treatment record” are summarized in table 1.

Variables recorded			
Personal information:	Age	Sex	
Time schedule:	Time at presentation	Time since injury	
Transport information	Mode of transport	Accompanied by	
Injury information:	Mechanism of injury	Type of injury	Location of injury
Triage:	GCS*		
Initial history and physical assessment:	LoC**	Amnesia	
Radiology:	Procedure	Result	
Plan and advice:	Treatment	Admission or Discharge	Transfer information
Mortality	Cause of death		

Table 1: Variables registered in the “Emergency and treatment record”: * GCS= Glasgow Coma Scale; **LoC = Loss of consciousness

The protocols and records at the surgical department, and the admission protocol of the hospital were also assessed to gather additional information about whether the patients were admitted and underwent surgery.

Classification of spinal injuries

To classify the spinal injuries, the “International Spinal Cord Injury Vertebral Injury, Basic Data Set Form” (attachment 2) (10), was used. It describes spinal injuries in a standardized manner to minimize intra- and inter-observer variability. It is used to collect information about:

- Mechanism of injury; penetrating or blunt
- Spinal level of injury (location)
- Injury of the vertebrae
- Injury of the disco-ligamentous complex
- Traumatic translation

The classification system is primarily based on CT imaging. However, because few patients underwent CT-scanning, the majority of the spine injuries had to be classified by use of plain x-rays, by a dedicated radiologist using all accessible images.

Classification of head injuries

TBIs were classified clinically using the Head Injury Severity Scale (HISS) (table 2), which is based on the Glasgow Coma Scale (GCS) (11, 12). The scale gives a score based on the patients’ motor, verbal and eye response, and gives an indication about the patients’ level of consciousness.

HISS category	Minimal	Mild	Moderate	Severe
Clinical characteristics	GCS= 15, and no LoC* or amnesia	GCS= 14-15 and Brief LoC (<5 min), or amnesia	GCS= 9-13, or LoC (≥5 min), or focal neurologic deficit	GCS <9

Table 2: *LoC = Loss of consciousness, GCS= Glasgow Coma Scale

For radiological classification of the head injuries, CT-scans were evaluated by one radiologist, using both the Marshall (table 3) and Rotterdam (table 4) classification systems, ensuring that all types of brain injuries could be captured in the study (13, 14). Both scales are based on morphological changes seen on CT scans, and can be used to assess injury severity and prognosis.

The Marshall classification, introduced in **1991**, classifies TBI into six categories as shown in Table 3.

Marshall classification	
Category	Definition
Diffuse Injury I (no visible pathology)	No visible intracranial pathology seen on CT scan
Diffuse Injury II	Cisterns are present with midline shift 0–5 mm and/or lesion densities present no high- or mixed-density lesion > 25 cm ³ may include bone fragments and foreign bodies
Diffuse Injury III (swelling)	Cisterns compressed or absent with midline shift 0–5 mm, no high- or mixed-density lesion > 25 cm ³
Diffuse Injury IV (shift)	Midline shift > 5 mm, no high- or mixed-density lesion > 25 cm ³
Evacuated mass lesion V	Any lesion surgically evacuated
Non- evacuated mass lesion VI	High- or mixed-density lesion > 25 cm ³ , not surgically evacuated

Table 3: Marshall classification of CT images.

Rotterdam CT score			
Basal cisterns	0: Normal	1: Compressed	2: Absent
Midline shift	0: No shift or ≤5 mm	1: Shift > 5 mm	
Epidural mass lesion	0: Present	1: Absent	
Intraventricular blood or traumatic SAH*	0: Absent	1: Present	
The final score is the sum of the scoring items + 1			

The Rotterdam CT score classifies TBI from 1-6 based on four categories (table 4). The higher scores are correlated to higher 6 months post-injury mortality.

Table 4. Rotterdam score of CT images. SAH = Subarachnoid hemorrhage*

Definition of injuries

Head injury cases were defined as patients with a history of head trauma and/or symptoms of head injury explainable by trauma and/or injury to head diagnosed by a physician. Spinal injuries were defined as patients with a history of injury to the spinal column on CT or x-ray images. In our definition, patients with more than one organ system injured were multiple injured patients, regardless of the severity and type of the injuries. Any soft tissue injury (STI), including injury to internal organs, was considered an STI.

The study was approved by Regional Committees for Medical and Health Research Ethics (REC, 2015/2302) in Norway, and the Institutional Review Committee of Kathmandu University School of Medical Sciences/Dhulikhel hospital (IRC-KUSMS 17/16).

The data was organized in Microsoft Excel and analyzed in IBM SPSS 23.



Emergency department at DH. Photo: Håvard Rosseland

Results

Demographics

A total of 726 patients were included in the study; figure 1 gives an overview of the patients. During the two months, a mean (range) of 11.3 (2-39) patients were evaluated every 24 hours at the ED for traumatic injuries. The male to female ratio was 1.83 (460 M/251 F) and the mean age (range) was 31.7 years (5 months-100 years). 54.1 % were ≤ 30 years old (Figure 2).

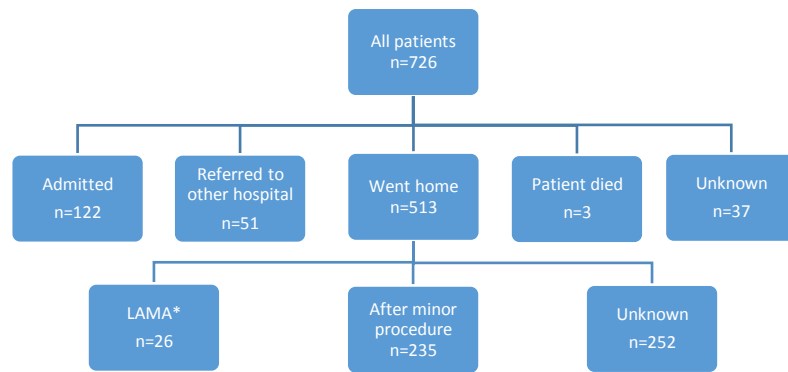


Figure 1: Overview of registered patients. *LAMA = Left against medical advice

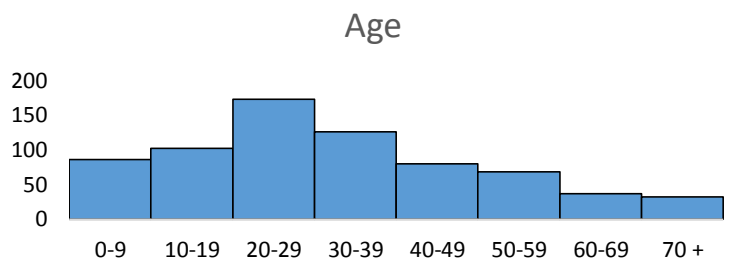


Figure 2: Age distribution

Variable:	Missing:
Gender	n=15 (2.1 %)
Age	n=22 (3.0 %)
Admission	n=115 (15.8 %)
Surgery	n=120 (16.5 %)
CT	n=18 (2.5 %)
Time since accident	n=326 (44.9 %)
Mechanism of injury	n=10 (1.4 %)
GCS*	n=51 (23.2 %)
LoC*	n= 35 (16.0 %)
Type of injury**	n= 7 (7.7 %)

Table 5: Variables and number of missing. *GCS and LoC are within the patients with head injuries, **within surgical patients

Missing data

Missing information during data collection was a problem. Some of the most important missing information is summarized in table 5.

Mechanism of injury

The most common injury mechanisms were falls 292 (40.8 %) followed by RTAs 238 (33.2 %) and physical assault 56 (7.8 %). In more than half the cases of RTAs, 82 (52.6 %), motorbikes were involved.

Type of injury

In total, 881 injuries in 726 patients were diagnosed by physicians. The body parts most commonly injured were the extremities 412 (51.6 %), followed by face 110 (13.7 %) and head 104 (13.0 %).

Most surgical patients had orthopedic injuries; 50 (59.5 %) of the patients had fractures, 19 (22.6 %) STIs in extremities, 5 (6.0 %) dislocations, the remaining patients had various other injuries such as soft tissue injury 6 (7.1 %), internal organ 2 (2.4 %) and thoracic injuries 2 (2.4 %).

91 patients (15.0 %) underwent surgery; none of these were operated for TBI at DH.

122 (18.7 %) patients had multiple injuries. Of these patients, 21 (20.5 %) were admitted and 13 (13.0 %) underwent surgery.

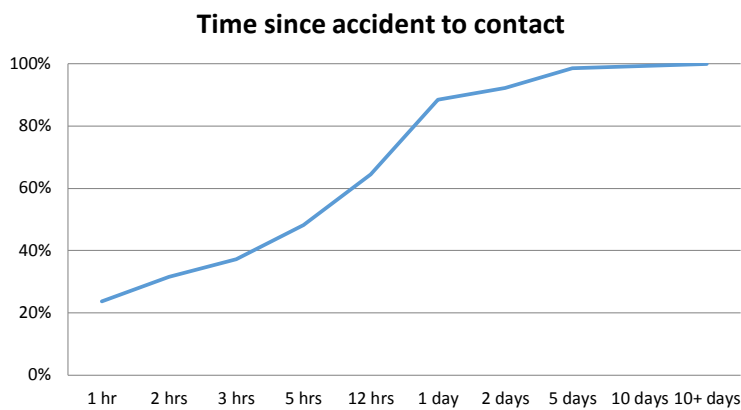


Figure 3: Time since accident to contact with the ED

Time from accident to ED

193 (48.3 %) of the patients contacted the ED within 5 hours of the accident, 354 (88.5 %) within 24 hours (Figure 3). Time from accident to contact with hospital ranged from <15 minutes to >10 days. The busiest hours of the day at the ED were between 12.00-01.00 pm and 05.00-06.00 pm with 9.2 % and 8.6 % of the consultations respectively.

Head injuries

Of the patients evaluated at the ED, 220 (32.6 %) had a history of head trauma, equally distributed among gender. The age group that most frequently presented with head injuries were 20-29 years, n=63 (29.6 %) (mean age 30.9) (figure 4). 92 (70.2 %) patients were classified as minimal, 2 (1.5 %) as mild, 26 (19.8 %) as moderate and 11 (8.4 %) as severe head injuries according to the HISS-classification (figure 5).

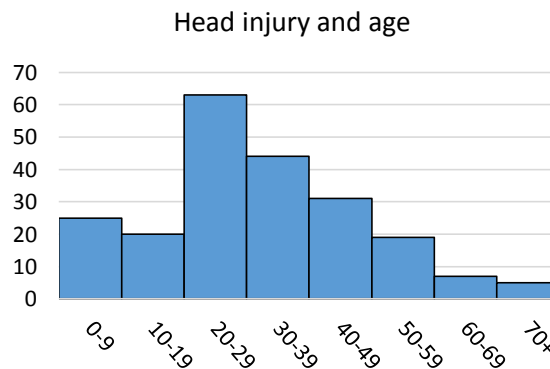


Figure 4: Age distribution among the head injury patients

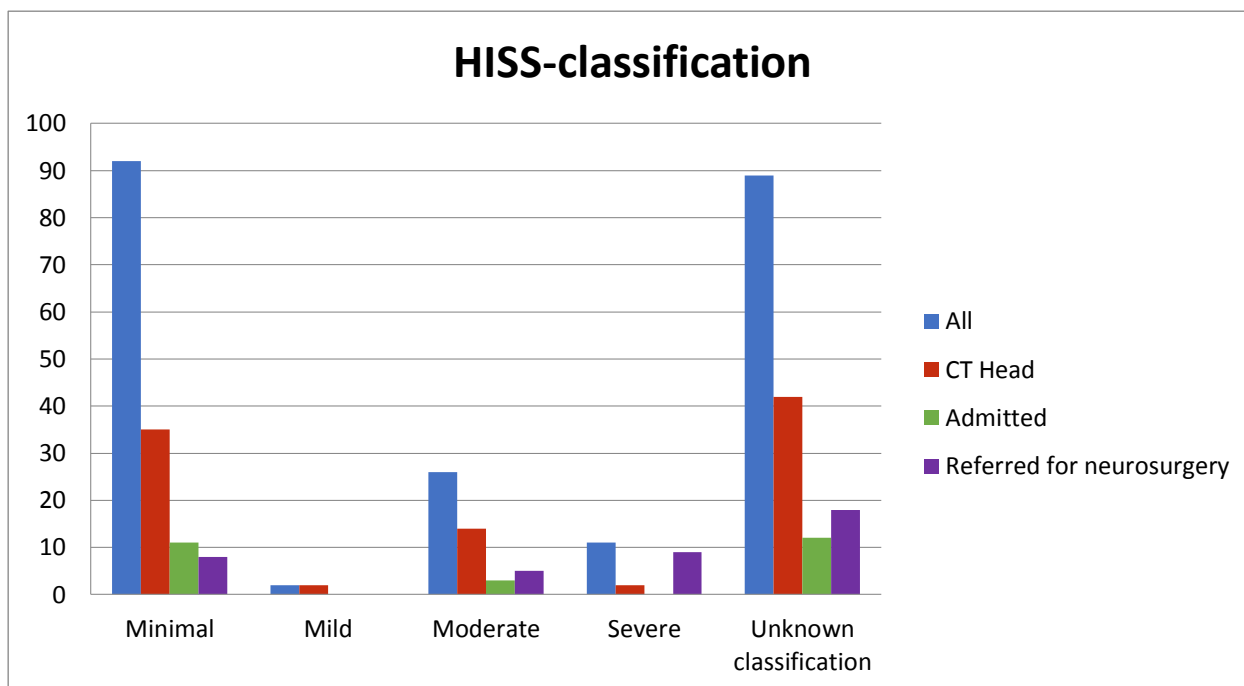


Figure 5: Classification of head injuries according to the HISS

89 cases were not possible to classify by HISS because of lacking data, 37 were missing information about GCS-score, 20 had a LoC of unknown duration, 24 did not have information about LoC, and 8 were missing both GCS and duration of LoC.

Most injuries in the study population as a whole came from fall injuries. However, when it came to head injuries, RTA was the most represented mechanism of injury (figure 6).

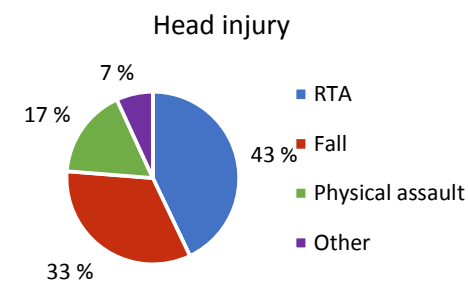


Figure 6: Mechanism of head injury

CT

96 (45.5 %) of the patients with head trauma went to CT imaging, however, only in 80 (37.9 %) of the cases with head injury, images were available for analysis. 14 (17.5 %) of the CT scans were abnormal; 9 (11.3 %) showed intracranial

pathology, of which 5 (6.3 %) also had skull fractures and 5 (6.3 %) had only skull fracture. The type of injuries according to the Marshall and Rotterdam classification are shown in table 6. According to the Rotterdam classification, 5 patients had abnormal

		Marshall score		
		I	II	V/VI
Rotterdam Score	1	75	4	0
	2	0	2	0
	3	0	1	0
	4	0	0	2

Table 6: Head injuries classified by the Marshall and Rotterdam classification systems. Marshall score III and IV are excluded

CT-images, while according to the Marshall classification, 9 patients had abnormal images. 16 (43.2 %) of the 37 patients with moderate or severe head injury according to HISS were evaluated with CT. All the patients with mild or moderate head injuries had normal CT-scans.

Referred cases

Of all 51 patients being referred to other hospitals, 40 (78.4 %) were sent for neurosurgical evaluation and management of head trauma. 14 (63.6 %) of the patients had a HISS-classification of moderate or severe (5 moderate, 9 severe), 8 (36.4 %) had a minimal head injury and 18 (45.0 %) were missing HISS classification. 21 (53.8 %) of the patients that were referred for neurosurgical evaluation underwent CT-imaging before transferal. 14 (46.7 %) had multiple injuries.

Spinal injuries

87 patients (13.2 %) came to the ED with history of spinal trauma. The male to female ratio was 1.18 (47 M/40 F) and the age span was 2-87 (mean age 40.8) (figure 7). 20 (26.0 %) were admitted. Figure 8 shows the distribution of type of injuries.

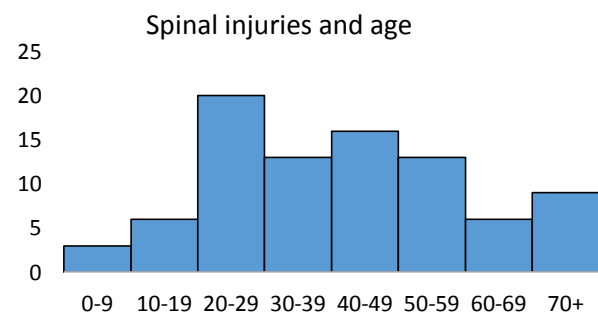


Figure 7: Age distribution among patients with spinal trauma

Type and location of spinal injuries

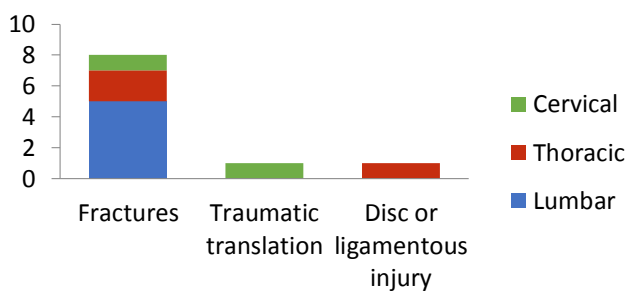


Figure 8: Overview of the pathology found in spinal images

21 cases had spinal images that were accessible for classifying. 2 of them were CT-images, and the remaining were x-rays. Out of the cases available, 8 (38.1 %) had visible pathology. No patients with spinal injuries were referred to other hospitals.

Discussion

During two months a large number of patients (726) were evaluated for traumatic injuries at the ED of DH. 54.1 % were ≤ 30 years old. In 2011, on average 6.3 patients contacted the ED during 24 hours. 5 years later that number had increased by 79.4 % to 11.3 patients. The most common injury mechanisms were falls, followed by RTAs and physical assault. RTA was the most frequent cause among 220 patients who had a history of head trauma. Of these, 28.2% were classified as moderate or severe head injuries. Of 51 patients transferred to other hospitals, 40 (78.4%) were sent for neurosurgical. CT-scans were used to evaluate 96 (45.5 %) of the patients with head trauma.

Increased number of patients

A continuous increase in the emergency trauma cases is likely to outgrow the resources available at the ED of DH.

The reason for such an increase of traumatic injuries in few years at DH may have various reasons. First, there is a new highway from 2015, Bishweshwar Prasad Koirala Highway, passing by the hospital which connects Kathmandu to South East Nepal (15), which may explain the increase of RTAs. Secondly, patients may seek medical advice for less severe injuries. The proportion of trauma patients being admitted has actually decreased from 23.2 % to 20.0 %, which would support this theory. An increase in population and better accessibility could also be an explanation. Lastly, DH may have gained a higher status in Nepal due to better equipment, such as the new CT-machine.

Head injuries

Approximately $\frac{1}{3}$ of the patients came into the ED with a history of head trauma. The large number may be explained by the absence of health safety and environment regulations for farmers and workers and lack of road safety. In our experience, few construction workers use safety equipment, and helmets are rarely used by passengers on motorbikes. Considering RTAs and falls were the most important causes for head injury, these are important factors. Trauma prevention is probably the best way to reduce disability in the younger population due to TBI.

The proportion of moderate and severe head injuries in low income countries is higher than in high income countries (3), this is also the case at DH. During **two months**, 37 (28.2 %) patients had moderate or severe head injury according to HISS. At St. Olavs Hospital in Trondheim, which is a medium sized Norwegian neurosurgical unit, there are only on average 55 similar head injury each year (16). Moreover, many patients with head injuries from the Kavre and other neighboring regions are probably not sent to DH, but to neurosurgical centers more than 1 hour drive further from DH.

CT

Almost half of the patients with a history of head trauma were assessed by CT-imaging. 17.5% were abnormal, 11.3% showed intracranial pathology. Whether this is an appropriate use of resources in a low income country hospital is uncertain. Introduction of clear guidelines for the use of CT in head injuries will be of major importance in more evidence based treatment of head injuries in the future, and may be cost saving.

Referred patients with head injuries

Almost 20 % of the patients presenting with a history of head trauma were referred to other hospitals for neurosurgical evaluation and management because DH lacks necessary resources.

More than half the referred head injury patients had moderate or severe injuries, but there was also a large proportion (36%) with minimal injuries. Exact information about why the patients were referred was not collected, but in some cases there were additional diagnoses, e.g. unspecific seizures.

Spinal injuries

The low proportion of CT scans performed on patients with spinal injuries may reflect that many of these patients were further investigated with CT at a later stage, days after leaving the ED.

Strengths of the study

The study was conducted at the same time of year as the previous study, and with the same observation time. One of the two students were present at the ED nearly every day, collecting forms, checking data quality and talking to doctors at the ED reminding them to fill out the

forms properly. The study also had major support from the head of the ED and the administration at the hospital.

Limitations of the study

Registration forms

To provide both the patient and the hospital with a copy of the patient's record, the doctors used carbon paper to make a copy, but some information was not always copied. In some cases these were important data, such as diagnosis.

The registration form used in the ED was not designed specifically for the study. This presented a challenge because sufficient information about amnesia, time since accident, LoC and duration of LoC had to be collected separately. Handwriting of the doctors in the ED could be difficult to understand even after discussing the interpretation with the doctors in question. This problem contributed significantly to loss of data. Introducing electronic patient records has the potential to improve the flow of important clinical information at DH, clinical audit and research.

Missing data

Missing information on GCS and LoC may have influenced the classification of head injuries. Furthermore, the lack of CT evaluation of spinal injuries made classification of these injuries challenging.

Radiology

The CT-machine was out of order for a period of ten days during the study period. Additionally, the storage systems for storing x-rays and CT-images were limited, so images were sometimes deleted within a few days, resulting in loss of some data.

Compression fractures

During our data collection, 8 patients with spinal injuries had fractures in their spinal column; most of them were compression fractures. Because most of the imaging done of the spine was x-ray, the diagnostic accuracy of spine trauma was most likely low.

Limited time period

The study is a cross sectional study, and the data collection period was only of 2 months. The epidemiology of physical trauma may vary throughout the year, and is probably higher in the rainy season.



Typical busride in Dhulikhel. Photo: Julia Wilsgaard Vannebo

Conclusion

The frequency of physical trauma at DH has increased dramatically over a relatively short period of time (5 years), by approximately 80%. Most of the cases are from the younger population. The proportion of patients with head injuries is large, and moderate or severe head injuries are frequent. DH, without neurosurgical service, received more patients with moderate to severe head injuries in a few months than a Norwegian medium sized neurosurgical unit receives in an entire year. Most of the patients referred from DH to other hospitals in Kathmandu have neurotrauma. The high numbers of neurotrauma patients demonstrates a need for a neurosurgical unit. Introduction of clinical guidelines for the use of CT scan and referral of head injuries could improve the management of neurotrauma at DH.

Attachments

1. Emergency assessment and treatment record
2. International Spinal Cord Injury Vertebral Injury, Basic Data Set Form

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EMERGENCY ASSESSMENT AND TREATMENT RECORD

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DHULIKHEL HOSPITAL KATHMANDU UNIVERSITY HOSPITAL



Regd No.		Date
Name	Age	Sex
Address	Accompanied by	Contact No.
Time at Presentation	Triage Level (1)	(2) (3) (4) (5)

TRIAGE-A

A			<input type="checkbox"/> Obstructed airway <input type="checkbox"/> Stridor			<input type="checkbox"/> No comment
B	O ₂ SAT:	RR:	<input type="checkbox"/> RR>30 or <8 <input type="checkbox"/> SpO ₂ <90% with O ₂	<input type="checkbox"/> RR>25 <input type="checkbox"/> SpO ₂ <90% without O ₂	<input type="checkbox"/> SpO ₂ 90-95% without O ₂	<input type="checkbox"/> RR8-25 <input type="checkbox"/> SpO ₂ <95% without O ₂
C	Pulse:	BP:	<input type="checkbox"/> Pulse > 130r. or >150irs. <input type="checkbox"/> BP <90mm Hg	<input type="checkbox"/> Pulse > 120 or <40	<input type="checkbox"/> Pulse > 110 or <50	<input type="checkbox"/> Pulse 50-110
D	GCS:		<input type="checkbox"/> Unconscious/GCS<9 <input type="checkbox"/> Seizures	<input type="checkbox"/> Somnolence/GSC 9-14	<input type="checkbox"/> Acute desoriented	<input type="checkbox"/> Alert
E	Temp:	Pain <input type="checkbox"/> ESS	<input type="checkbox"/> Temp. >41° or <35° <input type="checkbox"/> ESS	<input type="checkbox"/> Temp. >38.5° <input type="checkbox"/> ESS	<input type="checkbox"/> Temp. 35-38.5° <input type="checkbox"/> ESS
ESS-algorithm RETTS			<input type="checkbox"/> Red priority	<input type="checkbox"/> Orange priority	<input type="checkbox"/> Yellow priority	<input type="checkbox"/> Green priority
NRS-pain		Triage level				

Triage:	Time: Sign:
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Retriage:

<div style="display: flex; justify-content: space-around;"> <div style="width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> </div>	Time: Sign:	<div style="display: flex; justify-content: space-around;"> <div style="width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> </div>	Time: Sign:
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TRIAGE-P

A	Airways:		<input type="checkbox"/> Obstructed airway			<input type="checkbox"/> No comment
B	O ₂ SAT:	RR:	<input type="checkbox"/> SpO ₂ <input type="checkbox"/> RR	<input type="checkbox"/> SpO ₂ <input type="checkbox"/> RR	<input type="checkbox"/> SpO ₂ <input type="checkbox"/> RR	<input type="checkbox"/> SpO ₂ <input type="checkbox"/> RR
C	Pulse:	BT (map):	<input type="checkbox"/> Pulse	<input type="checkbox"/> Pulse	<input type="checkbox"/> Pulse	<input type="checkbox"/> Pulse
	Pulse korr:	Cap.time:				
D	GCS:	V	<input type="checkbox"/> Unconscious <input type="checkbox"/> Seizures	<input type="checkbox"/> Somnolence <input type="checkbox"/> Tired/unwilling to feed	<input type="checkbox"/> Tired/week <input type="checkbox"/> Alert 0-2 months	<input type="checkbox"/> Alert
E	Temp:	Pain		<input type="checkbox"/> Temp	<input type="checkbox"/> Temp	<input type="checkbox"/> Temp
ESS Retts-p:			<input type="checkbox"/> Red ESS	<input type="checkbox"/> ESS	<input type="checkbox"/> ESS	<input type="checkbox"/> ESS
Triage level			<input type="checkbox"/> Red priority	<input type="checkbox"/> Orange priority	<input type="checkbox"/> Yellow priority	<input type="checkbox"/> Green priority

Other observations:

Retractions:	Moaning <input type="checkbox"/>	Dry skin <input type="checkbox"/>	Skin colour: _____
jug./sub./inter.	Wheezing <input type="checkbox"/>	Sunken eyes <input type="checkbox"/>	_____
Stridor: Expir./inspi	Stuffed nose <input type="checkbox"/>	Dry mucus membrane <input type="checkbox"/>	_____
Cough: Dry/mucus/«barking»	Nasal flaining <input type="checkbox"/>	Sunken fontanelle <input type="checkbox"/>	_____
Rash			_____

Time at treatment:

Weight:

EYE OPENING	MOTOR RESPONSE			VERBAL RESPONSE				MOTOR POWER			
4 Spontaneous	6 Obeys Commands	3 Flexion to pain	5 Orientated	2 Inappropriate sounds		Arm (R)					
3 To voice	5 Localize to pain	2 Extention to pain	4 Disorientated	1 No response		(L)					
2 To pain	4 Withdraws to pain	1 None	3 Incomprehensible words			Leg (R)					
1 None						(L)					
PUPILS			1	2	3	4	5	6	7	8	C-Spine Precautions:
LEFT SizeReaction.....			●	●	●	●	●	●	●	●	
RIGHT SizeReaction.....											

Presenting Complaint 1. 2. 3. 4.

Initial history and physical assessment

Past medical history

Menstrual history LMP _____ Cycle/Period _____

ALLERGIES

PROV. DIAGNOSIS

INVESTIGATION	EMERGENCY PROCEDURE
HB/TC/DC/BLOOD GROUPING BLOOD SUGAR/UREA CREATININE/Na, K+ AMYLASE/SGOT/SGPT/CK-MB ECG/CXR/X-RayABD./KUB USG Others:	

Time	Medicine/IV Fluids	Dose/Route/Frequency	Sign.

Time	T	P	R	BP	O2 Sat.	Urine	Others

Comment/notes/consultation by related Department: _____

Plan/Advice on discharge

Radiology results: _____

Final diagnosis: _____

TRANSFER INFORMATION		
Report to	Given by: Report time:	Transfer to: Time:

Expired: _____ Time: _____
 Cause of death: _____
 Next of kin Notified _____ Relationship/Contact information _____
 Yes No

ER Paramedic _____
 ER Physician _____
 Consultation by _____

International Spinal Cord Injury Vertebral Injury Basic Data Set Form

Penetrating/blunt injury Blunt Penetrating Unknown

Spinal vertebral injury No Yes Unknown

Single or multiple spinal column level injury (-ies)

Single Multiple Unknown

Vertebral Injury (one to be filled in for each level of injury, starting with the most cranial):

Spinal column injury level

vC00-vC07 - Cervical (C0-C7)

vT01-vT12 - Thoracic (T1-T12)

vL01-vL05 - Lumbar (L1-5)

vS01 – vS05 - Sacrum (S1-5)

vX99 - Unknown level

Disc / Posterior ligamentous complex injury

No Yes Unknown

Traumatic translation

No Yes Unknown