The burden and management of musculoskeletal injuries.

Jean Claude BYIRINGIRO
Introduction

– The injury is a major cause of death and disabilities worldwide.
– Every death from injury is accompanied by many more non-fatal musculoskeletal injuries (MSI) resulting in temporary or permanent disabilities.
– The Global Burden of Disease (GBD) study:
  • MSI found in LMICs are 2 to 5 times that observed in HICs. (1)
In Africa, MSI are underreported:

- Ghana: 0.83% of the population had an injury-related disability and that 78% of such disabilities were due to extremity injuries. (Mock et al., 2003)
- Uganda: 39% victims of road traffic crashes had musculoskeletal injuries (Injury Control Center, 2004)
- Tanzania: Chalya et al. (2012) reported that MSI represented 60.5% of their study population.
Introduction (Cont’d)

In Rwanda,

- A national survey showed that the overall prevalence of musculoskeletal impairment was 5.2% and that 31.3% of the cases had injury-related disabilities. (Atijosan et al, 2008)

- The comprehensive national analysis of emergency and essential surgical capacity concluded to a severe shortage in available resources (Petroze et al, 2012).

- There are no consistent data yet, but it appears to be so sad to see how many people (and mostly young) are overcrowded in emergency and orthopedic wards waiting so long to have their fractures fixed!
Introduction (Cont’d)

• The Rwandan rapidly growing economy with its subsequent motorization exposes much more the country to a heavy burden of MSI as it has been observed in the other developing countries.

• The burden of acute MSI and resulting disabilities may be addressed by the low-cost improvements in orthopedic care and rehabilitation.

• This study aims to highlight the burden of MSI as well as the gaps found in their management to inform further strategies of improving the quality of care given to these frequent injuries.
OBJECTIVES

Use the injury registry data:

1) To determine the proportion of MSI compared to the injury in general.

2) To identify the characteristics of MSI.

3) To describe the management and possible gaps in the management of MSI.

4) To describe the outcomes of MSI.
PATIENTS AND METHODS

• Retrospective descriptive study using data obtained from a prospectively collected Injury Registry database.
• Used the first 20 months of data collection:
  ➢ from March 2011 at CHUK and July 2011 at CHUB up to October 2012.
• Inclusion criteria in the Registry:
  ➢ patients transferred from other hospitals for injuries,
  ➢ patients who died in Emergency from injuries, and
  ➢ patients who are admitted for injuries in Emergency or elsewhere for a period above 24 hours.
PATIENTS AND METHODS (Cont’d)

• Inclusion criteria in our study:
  ➢ Patients with injuries to the neck, spine, pelvis, and extremities were retained for analysis without any discrimination.
  ➢ We targeted fractures, dislocations, sprains and strains, contusions, crushing injuries, open wounds, and traumatic amputations.

• Data were retrieved from an Access 2010 database and analysed using Excel 2010 and SPSS 16.0

• Descriptive statistics were calculated using percentages.

• Inferences were done using the Pearson’s Chi square test with 95% CI
## RESULTS

<table>
<thead>
<tr>
<th></th>
<th>MSI</th>
<th>OTHERS</th>
<th>UNKNOWN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL</td>
<td>953</td>
<td>354</td>
<td>29</td>
<td>1327</td>
</tr>
<tr>
<td></td>
<td>27.4%</td>
<td>9.9%</td>
<td>0.8%</td>
<td>38.1%</td>
</tr>
<tr>
<td>CHUK</td>
<td>1176</td>
<td>931</td>
<td>48</td>
<td>2155</td>
</tr>
<tr>
<td></td>
<td>33.8%</td>
<td>26.7%</td>
<td>1.4%</td>
<td>61.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2129</td>
<td>1276</td>
<td>77</td>
<td>3482</td>
</tr>
<tr>
<td></td>
<td>61.1%</td>
<td>36.6%</td>
<td>2.2%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**MSI were present in 61.1 % of the cases**
RESULTS (Cont’d)

Age groups

Mean age: 32.5 years
Range: 0-95 years
0-35 years: 64.4%
RESULTS (Cont’d)

The majority of patients with MSI were male: 73%
RESULTS (Cont’d)

Extremity injuries were present in **82.9%** of patients with MSI:

**INJURY LOCATION**

- **PELVIS**: 63 (3%)
- **MULTIPLE...**: 99 (4.70%)
- **SPINE**: 138 (6.50%)
- **OPEN WOUNDS**: 163 (7.70%)
- **UPPER_LIMB**: 480 (22.50%)
- **LOWER_LIMB**: 1186 (55.70%)
RESULTS (Cont’d)

- Multiple system injuries, 14.3%
- Isolated MSI, 85.7%
<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTREMITY FRACTURES</td>
<td>1304</td>
<td>74%</td>
</tr>
<tr>
<td>CLOSED</td>
<td>457</td>
<td>26%</td>
</tr>
<tr>
<td>OPEN</td>
<td>74%</td>
<td>26%</td>
</tr>
</tbody>
</table>
RESULTS (Cont’d)

CAUSES OF MSI

- RTA: 44.90%
- FALLS: 40.28%
- BLUNT FORCES: 9.96%
- STABBING/CUTTING: 2.34%
- OTHERS: 2.53%
RESULTS (Cont’d)

MODE OF ARRIVAL OF PATIENTS WITH MSI

![Graph showing mode of arrival of patients with MSI. The x-axis represents different modes of arrival: Ambulance, Private vehicle, SAMU, Police, Motorcycle, Foot, Bicycle, Other. The y-axis represents the number of arrivals. CHUB and CHUK data are shown with different colors.]
RESULTS (Cont’d)

TYPE OF TREATMENT

CONSERVATIVE TREATMENT WAS THE MOST POPULAR TREATMENT: 62.5%

MEAN DELAY TO TREATMENT : 7.3 days ±11.8

- Closed Reduction: 6.4%
- Open Reduction: 8.4%
- Debridement: 14.1%
- Others: 14.9%
- POP/Immobilization: 56.1%
RESULTS (Cont’d)

STATUS AT 2 WEEKS

- Died: 1.6%
- Discharged: 30.8%
- Referred to another health facility: 1.3%
- Still in hospital: 66.2%

Percentage
RESULTS (Cont’d)

STATUS AT ONE MONTH

- Died: 1.1%
- Discharged: 58.9%
- Referred to another health facility: 1.3%
- Still in Hospital: 38.6%
RESULTS (Cont’d)

COMPLICATIONS WITHIN ONE MONTH

- Bleeding requiring transfusion: 0.3%
- Decubitus Ulcer / Pressure Ulcer: 0.2%
- Death: 0.4%
- Other: 0.1%
- Pneumonia: 0.2%
- Re-operation: 0.2%
- Surgical Site Infection: 2.9%
- Urinary Tract Infection: 0.3%
- Unplanned Intubation: 0.1%
- Total number of complications: 0.3%
- None: 5.1%

Total: 94.9%
### RESULTS (Cont’d)

<table>
<thead>
<tr>
<th>Type of Injuries</th>
<th>Status at one month</th>
<th>Total</th>
<th>Pearson Chi-Square test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Died</td>
<td>Discharged</td>
<td>Referred to another health facility</td>
</tr>
<tr>
<td>MSI</td>
<td>1158</td>
<td>11</td>
<td>572</td>
</tr>
<tr>
<td>OTHER INJURIES</td>
<td>986</td>
<td>16</td>
<td>194</td>
</tr>
<tr>
<td>NO CLEAR Dg</td>
<td>69</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2213</td>
<td>27</td>
<td>771</td>
</tr>
</tbody>
</table>

*Monte Carlo significance (2-sided) / 95% Confidence interval
DISCUSSION

In our study:

• **MSI were present in 61.1% of all injured cases**

• **Comparable to US data.**

---

DISCUSSION

Musculoskeletal trauma patients can be classified into three types:

1) isolated, closed injuries that require surgical intervention
   - can be done on an elective basis, and
   - trauma team involvement is optional;

2) multiple fractures of major long bones and/or joints,
   - which requires trauma team resuscitation / exclusion of life-threatening injuries,
   - followed by early fracture stabilization when appropriate;

3) multiple fractures of the spine, major long bones and/or joints associated with multisystem injuries,
   - requires trauma team management and resuscitation as required
   - Damage control orthopedics
   - Definitive fracture fixation as needed
DISCUSSIONS

- Majority of patients are young
- Male patients were predominant
- Most of patients were transferred from District hospitals and came by ambulances, However a great part of patients in CHUK used other means w/o prior screening at the District hospitals

<table>
<thead>
<tr>
<th>AGE</th>
<th>Mean: 32.5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>0-95 years</td>
</tr>
<tr>
<td>0-35 years</td>
<td>64.4%</td>
</tr>
<tr>
<td>sex</td>
<td>Male 73%</td>
</tr>
<tr>
<td>Injury location</td>
<td>Extremity injuries: 82.9%</td>
</tr>
<tr>
<td></td>
<td>Isolated extremity injuries: 85.7%</td>
</tr>
<tr>
<td></td>
<td>Multiple system injuries: 14.3%</td>
</tr>
<tr>
<td></td>
<td>closed fractures: 74% of all extremity injuries</td>
</tr>
<tr>
<td>Causes</td>
<td>RTA: 44.9%</td>
</tr>
<tr>
<td></td>
<td>Falls: 44.9%</td>
</tr>
<tr>
<td>Mode of arrival</td>
<td>Mostly Ambulances (CHUK&amp;CHUB)</td>
</tr>
<tr>
<td></td>
<td>Particularity at CHUK: 36.6% used other means</td>
</tr>
<tr>
<td>Treatment</td>
<td>Orthopedic treatment: 62.5%</td>
</tr>
<tr>
<td></td>
<td>Simple casting: 56.1%</td>
</tr>
<tr>
<td></td>
<td>Closed manipulation under anaesthesia: 6.4%</td>
</tr>
<tr>
<td>Status at 2 weeks</td>
<td>62.2% are still in the hospital</td>
</tr>
<tr>
<td>Status at 1 month</td>
<td>38.6% were still in the hospital</td>
</tr>
<tr>
<td>Complications</td>
<td>94.9% did not have complications</td>
</tr>
</tbody>
</table>
DISCUSSIONS

The majority of patients were treated by conservative treatment: Therefore these patients would be efficiently managed in DH.

Patients are being delayed significantly in hospital because the waiting time is long as the complications seem to be fewer.

<table>
<thead>
<tr>
<th>AGE</th>
<th>Mean: 32.5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range:</td>
<td>0-95 years</td>
</tr>
<tr>
<td>0-35 years</td>
<td>64.4%</td>
</tr>
</tbody>
</table>

| sex       | Male 73%        |

<table>
<thead>
<tr>
<th>Injury location:</th>
<th>Extremity injuries: 82.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated extremity injuries: 85.7%</td>
<td></td>
</tr>
<tr>
<td>Multiple system injuries: 14.3%</td>
<td></td>
</tr>
<tr>
<td>closed fractures: 74% of all extremity injuries</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Causes</th>
<th>RTA: 44.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls:</td>
<td>44.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode of arrival</th>
<th>Mostly Ambulances (CHUK&amp;CHUB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particularity at CHUK: 36.6% used other means</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Orthopedic treatment: 62.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple casting:</td>
<td>56.1%</td>
</tr>
<tr>
<td>Closed manipulation under anaesthesia: 6.4%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status at 2 weeks</th>
<th>62.2% are still in the hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status at 1 month</td>
<td>38.6% were still in the hospital</td>
</tr>
<tr>
<td>Complications</td>
<td>94.9% did not have complications</td>
</tr>
</tbody>
</table>
About the injury registry ability to track MSI:

- Some data were inconsistently available, especially on the specific diagnoses and outcomes at 2 weeks and one month.

- Except these missing data, the injury registry is a good tool to track the MSI and to inspect the performances of a system.
CONCLUSION

• The injury registry is an essential tool to track MSI injuries and their management. By an inside view of the trauma management system, it helps to identify its strengths and weaknesses and would help to address the gaps by adequate strategies. However, efforts should be done to minimize missing data.

• MSI were found to be the commonest injuries managed in the two major referral hospitals in Rwanda (CHUB and CHUK).

• The majority of these injuries are simple and required simple treatment measures such as closed manipulation and POP therefore there is possibility to manage them efficiently at the lower level.
Recommendation

District hospitals should be equipped with enough skills and other resources to deal efficiently with MSI and other injuries.

Referral hospitals should be strengthened to timely deal with MSI to prevent disabilities.

The injury registry should be supported as a good mean to monitor continuously the quality of care of injured patients within a system.
Merci