Acute Care

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Lecture Topics

- The importance of timely trauma care
- Developing and evaluating an acute trauma care system
- Trauma care in the developing world
- Responses to trauma
- Case study in acute care
Section A

The Importance of Timely Trauma Care

Maria Segui-Gomez, MD, ScD
Objective

- Restore person’s quality of life
Time of Death

- Most deaths occur at the scene (e.g., MV fatalities)
- One-third within an hour, one-third within a month, one-third within a year
- The “golden hour”

*Source: Luchter, 1999*
Trauma Care Issues

- Acute trauma care:
  - Early case identification
  - Pre-hospital care: Delivery and transport to hospital
  - Trauma care system development
  - Triage criteria
- Rehabilitation efforts
- Financial arrangements
Early Case Identification

- Communication infrastructure
  - Telecommunication
  - Access
- Triage criteria
Pre-Hospital Care:
Delivery and Transport to Hospital

“Scoop and Run” vs. “Stay and Treat”
Pre-Hospital Care: Delivery and Transport to Hospital

“Scoop and Run” vs. “Stay and Treat”

- EMTs and paramedics vs. physicians
- Ground vs. air transport
Trauma Care System Development

- Characterization of trauma centers (hospital specialization)
  - Definition of minimums
  - Verification system
Trauma Care System Development

- Development of regional (state and national) trauma systems
  - Designation
  - Who wants to participate and who doesn’t?
Triage Criteria

- At different levels:
  - Scene
  - Hospital
  - Rehabilitation
- Standardized protocols
  - E.g., Advanced Trauma Life Support

Source: Mock, et al. 1999
Trauma Rehabilitation Care

- Plan it early into acute care
- Challenging in less resourceful environments
  - Money
  - Technology
Financial Arrangements

Patient Level

- Payment method
  - Fee for service
  - Insurance
    - Trauma patients as uninsured (younger and/or lower socio-economic level)
    - Tort/non-fault
Financial Arrangements

Patient Level
- Payment method
  - Effect on physicians/hospitals

System Level
Section B

Developing and Evaluating an Acute Trauma Care System

Maria Segui-Gomez, MD, ScD
In the U.S.

Advances in:

- Medical understanding of injuries and capabilities to treat them
- Development of system of care
  - Faster and better pre-hospital transport
  - Emergency medicine and trauma surgery as specialties
  - Promulgation of Advanced Trauma Life Support
  - Development of trauma centers/systems

Source: Mock and Jurkovich, 1999
The Players

- The role of trauma surgeons vs. orthopedists, neurosurgeons, plastic surgeons, maxillofacial surgery, internist (blunt injuries)
  - The growth of emergency medicine as a specialty

- The political power of professional organizations (e.g., Committee on Trauma of the American College of Surgeons, American Association of Trauma Surgeons)
In Less Resourceful Environments . . .

- Development of infrastructure
  - Collaborate with other sectors to improve communication and transport
  - Establish information systems that identify nature, causes, and severity of injury at all levels of care
In Less Resourceful Environments . . .

- Ensure professionals and community competence
  - Develop standard injury assessment and treatment routines
  - Have professionals from more sophisticated centers do intensive courses in less sophisticated centers
  - Provide basic training at the community level: first aid, assessment, and management
In Less Resourceful Environments . . .

- Organize and maintain sustainable supply systems
  - Develop and update supply lists
  - Establish distribution systems that equitably supply all levels of health services
  - Develop simple and durable equipment (e.g., limb replacement)

Source: Barss, et al., 1998
Evaluating the System

Data sources:
- Outpatient databases
- EMS databases
- Emergency dept. databases
- Hospital databases:
  - Inpatients:
  - Trauma registries
  - Rehabilitation
  - Outpatients

Data elements:
- Outcomes
- Injury type, severity, treatment, (including mortality and length of stay), pre-injury condition
Section C

Trauma Care in the Developing World

Adnan Hyder, MD, PhD
% of Patients Dying According to Site of Death
Within the Trauma Systems in Ghana, Mexico, and the U.S.
Pre-Hospital Time for Patients who Arrived within 24 Hours of their Injury
Utilization of Formal Medical Services for Non-Fatal Injuries

In Urban vs. Rural Ghana (All Injured)

% of Injured Patients Seeking Care

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Care</td>
<td>32</td>
<td>49</td>
</tr>
<tr>
<td>Hospital</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>Clinic</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: Mock C.N., et al., J Trauma 1997; 42: 504-511
Utilization of Formal Medical Services for Non-Fatal Injuries
In Urban vs. Rural Ghana (Severely Injured)

% of Injured Patients Seeking Care

No Care Hospital Clinic

Urban Rural Urban Rural Urban Rural

17 26 60 38 23 36

Utilization of Formal Medical Services for Non-Fatal Injuries
In an Urban Area in Ghana by Socioeconomic Status (All Injured)

Utilization of Formal Medical Services for Non-Fatal Injuries
In an Urban Area in Ghana by Socioeconomic Status (Severely Injured)

Source: Mock C.N., et al., J Trauma 1997; 42: 504-511
## Utilization of Medical Services

*In an Urban Area, Ghana, Based on Type of Injury*

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>No Care %</th>
<th>Hospital %</th>
<th>Clinic %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>10</td>
<td>69</td>
<td>21</td>
</tr>
<tr>
<td>Burns</td>
<td>30</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>Assaults</td>
<td>16</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Falls</td>
<td>47</td>
<td>31</td>
<td>22</td>
</tr>
<tr>
<td>Snake Bite</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Non-intentional Penetrating</td>
<td>34</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td>Non-intentional Blunt</td>
<td>40</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>
Utilization of Medical Services

In a Rural Area, Ghana, Based on Type of Injury

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>No Care %</th>
<th>Hospital %</th>
<th>Clinic %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>29</td>
<td>39</td>
<td>32</td>
</tr>
<tr>
<td>Burns</td>
<td>67</td>
<td>09</td>
<td>24</td>
</tr>
<tr>
<td>Assaults</td>
<td>33</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Falls</td>
<td>59</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Snake Bite</td>
<td>40</td>
<td>27</td>
<td>33</td>
</tr>
<tr>
<td>Non-intentional Penetrating</td>
<td>50</td>
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<td>Non-intentional Blunt</td>
<td>46</td>
<td>27</td>
<td>27</td>
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</tbody>
</table>
Initial Management with Acute Injury

Results from Household Survey in Pakistan

Transport to Emergency Medical Facilities, Egypt

The *mode of transport* for the injured to emergency medical departments was as follows:

- Private cars: 55%
- Public ambulances: 33%
- Work ambulances: 13%

*Source: Haman A.M., et al., Trauma Quart; 14: 261-267*
Transport to Emergency Medical Facilities, Egypt

- The time interval between injury and arrival at the hospital was **36 minutes on average**
- *Those transported with ambulances had the best outcome*

*Source: Haman A.M., et al., Trauma Quart; 14: 261-267*
Section D

Responses to Trauma
Adnan Hyder, MD, PhD
Emergency Medical Services (EMS) Development in Jamaica

- In 1976, the government of Jamaica signed the second World Bank loan for a population project
- A component of this project was to strengthen the emergency medical services

Source: Jacobs L.M., Trauma Quart 1999; 14: 221–225
Emergency Medical Services (EMS) Development in Jamaica

- The first phase included introduction of the Jamaican team to the modern, urban, emergency medical services in the city of Boston
- On return, the team presented the concept of modern emergency medical services to the ministry of health

Source: Jacobs L.M., Trauma Quart 1999; 14: 221–225
Emergency Medical Services (EMS) Development in Jamaica

- Officials from PAHO, Red Cross, defense force, fire department, and ministry of works were involved
- Ministry of health convened a conference and a bilateral workshop between EMS officials in Boston and the work team in Jamaica

Source: Jacobs L.M., Trauma Quart 1999; 14: 221–225
Emergency Medical Services (EMS) Development in Jamaica

- The recommendations from this conference were then agreed upon and served as the core for the formulation of a national policy on emergency services and disaster preparedness.

*Source: Jacobs L.M., Trauma Quart 1999; 14: 221–225*
Questions on Jamaica Model

- Is this the right model for establishing EMS in a developing world?
- Which stakeholders have been left out?
- What would you recommend to a country on EMS?
Role of Advanced Trauma Life Support Program in Trinidad and Tobago

- Developed in 1978
- Intent was to teach small town family physicians a safe approach to the initial service of severely injured patients
- Course adopted by American College of Surgeons (ACS) in 1980

Source: Krantz B.E., Trauma Quart 1999; 14: 323–328
Role of Advanced Trauma Life Support Program in Trinidad and Tobago

- In 1986 a pilot project was done in Trinidad and Tobago with ACS to conduct ATLS there.
- Subsequent reports showed that the entire system of care was enhanced.
- Pre-hospital programs improved; frequency of early intervention using ATLS guidelines increased; and the outcome of patients improved.

Source: Krantz B.E., Trauma Quart 1999; 14: 323–328
Section E

Case Study in Acute Care
Maria Segui-Gomez, MD, ScD
Background

- This manuscript was part of a whole issue of *Trauma Quarterly* devoted to descriptions of Trauma Systems around the world
- For more information, see *Trauma Quarterly* 1999 (14)
The Issues

- Trauma as a health problem
  - Definition of injury
  - Data systems
- Medical response to the problem
  - System characteristics
The Setting

- Republic of Ghana
- West Africa:
  - 93,030 sq. miles
  - 19.7 M pop
  - GDP per capita: $1,310 (U.S.)
  - Health care budget per capita $12 (U.S.)
  - Major industries: mining, lumber, cocoa, light manufacturing

Map adapted by CTLT
Data for Planning

- Death certificates
  - No
- Hospital records
  - Yes
  - But limited hospitalization
- Special survey
  - But limited geographical area

- Motor vehicle crashes, falls, unintentional penetrating (occupational?), important source of injuries
When are the Deaths* Occurring?

<table>
<thead>
<tr>
<th>Location</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Hospital (scene)</td>
<td>81</td>
</tr>
<tr>
<td>ER (or within four hours of arrival at hospital)</td>
<td>5</td>
</tr>
<tr>
<td>Hospital</td>
<td>14</td>
</tr>
</tbody>
</table>

* Survey + hospital data (limited to Kumasi)
## Where is Medical Care Provided*?

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital (ED and inpatient)</td>
<td>60%</td>
<td>38%</td>
</tr>
<tr>
<td>Clinic (outpatient?)</td>
<td>23%</td>
<td>36%</td>
</tr>
<tr>
<td>None</td>
<td>17%</td>
<td>26%</td>
</tr>
</tbody>
</table>

*Of all injuries that resulted in >=1 of restricted activities (including death)*
Sequence of Events

1. Incident and Injury
2. Money?
3. Transport Method?
4. Trust/Want Medical care

- Yes: Medical Care
- No: No Medical Care

Decision:
- Yes: Proceed to Medical Care
- No: Continue with the next step
Once at Medical Care Provider

- Personnel qualification
- Facility appropriateness
- Diagnostic and treatment equipment
- Drug availability
- Financing mechanism
Additional Issues for Consideration

- Poor communication systems
- Poor telecommunication systems
- Health policy agenda dictated by international organizations
Where to Start?

- Where and how would you start an improvement program?