Multiple Issues with Multiple Trauma

Today’s Speakers

• Scott Goll, Senior Vice President, Paradigm Management Services
• Dr. Edward A. Stokel, MD, Orthopedic Surgeon and Paradigm Medical Director
Welcome

Thank you for joining us for our 2010 webinar series. Replays of past webinars are available for viewing at www.paradigmcorp.com.

- Volatility and Complexity in Burn Injury Claims
- Drug Management and Narcotics Abuse in Workers Compensation
- Multiple Issues with Multiple Traumas
- What Employers Should Know About Complex Cases
First a few housekeeping points....

- Slides will advance automatically
- Question & Answer period at end
- You may submit questions at any time
  - Click the “Q&A” button in the upper right
  - Type a question into the lower section of the Q&A panel that appears
  - Ask All Panelists and be sure to click “Send”
  - If we cannot answer during the session, we will e-mail you
- Replay will be available – look for our e-mail
- When the webinar ends, a short survey will pop up
  - There will be a CCMC section which must be completed to receive Continuing Education credits (certificate takes several days)
- If you experience computer broadcast audio problems, please use the dial in number posted in the Chat panel on the right
Multiple Trauma Definition

Multiple trauma is defined as an injury that causes simultaneous damage to multiple organ systems.

Primary Causes of Multiple Trauma Injuries

- Motor vehicle accidents
- Falls
- Explosions
- Common denominator – high energy!
In the US, trauma is the leading cause of death under the age of 44 and a major cause of death across all age groups.

- 12% of all in-patients are trauma (higher in trauma centers)
- 25,731 deaths annually
- Second only to heart conditions as a percent of total health expenditures
- $75 billion loss in income annually

Source: ACS-NTDB 2009 Annual Report; US DHHS, Agency for Health Research and Quality
Multiple Trauma Statistics

The cases that are classified as “multiple trauma” represent one-fifth of all trauma cases and are significantly more severe in nature than discrete traumas.

Trauma vs. Multiple Trauma Comparisons

Multiple Trauma Case Distribution by Severity

Source: ACS-NTDB 2009 Annual Report

- 61% of all deaths from trauma are due to multiple trauma injuries
- Medical treatment for multiple trauma involves 2-3 times longer:
  - ventilator days
  - intensive care unit days
  - overall (length of stay) hospital days

128,613 Cases

Very Severe 41%

Severe 59%
Cost Volatility in Multiple Trauma

The degree of severity greatly influences the costs of multiple trauma during the acute phase of recovery, generally defined as the first 18-20 months.

The average medical expenses are high, but if complications emerge, the costs can be significant.

<table>
<thead>
<tr>
<th>Complexity*</th>
<th>Average Cost $$</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>$175,999</td>
</tr>
<tr>
<td>4</td>
<td>$305,549</td>
</tr>
<tr>
<td>5</td>
<td>$503,629</td>
</tr>
<tr>
<td>6</td>
<td>$949,245</td>
</tr>
</tbody>
</table>

Source: Paradigm mean values for medical costs years 2002-2008 adjusted for inflation (methodology likely understates risk exposure)

* Complexity is a Paradigm Management Services proprietary scale assigned after a multivariate regression analysis.
Level 1: Minimal treatment, 2: Routine treatment, 3: Low-intensity treatment with predictable end points, 4: High-intensity treatment with indication for prolonged treatment or delayed recovery 5: Severe- unusually complicated with challenging end points to treatment, 6: Extremely severe- most complex requiring greatest amount of treatment with end points highly challenging and at risk for non-achievement.
Volatility Drivers

What makes these claims so costly is their complexity and volatility.

- **Multiple providers** – typically between 8-10
- **Multiple locations** – typically 4 -5
- **Many handoffs** – one of attending doctors top complaints: “I don’t know if my notes are getting to the next provider in the chain”
- **Higher rate of potential medical errors** – driven by sheer volume and complexity of care needs
- **Lack of provider expertise depth** in non-Center of Excellence locations
- **Fragile medical condition** – nearly every organ system impacted
- **Multitude of high impact risks** – suboptimal surgical results, infection, delayed wound healing, chronic pain
- **Increased impact of co-morbid conditions** – depression, obesity, etc.
- **Long term compromise** – the impact of multi system trauma has the potential to increasingly compromise health and function over time
Today we are very privileged to have one of the nation’s leading authorities on multiple trauma injuries, Dr. Edward Stokel.

Edward A. Stokel, MD

Dr. Stokel is a nationally recognized orthopedic surgeon, researcher and scholar. He specializes in general orthopedics, complex hand surgery and complex limb salvage. He has served as a Paradigm Medical Director for the past 12 years and has contributed to the management of over 450 complex workers compensation injuries.

Dr. Stokel attended medical school at the University of Michigan and received his advanced medical training through the Department of Orthopedic Surgery at Henry Ford Hospital in Detroit, Michigan, Adult Reconstruction Services at New England Baptist Hospital in Boston and Combined Hand and Microvascular Surgery at the University of Washington in Seattle.

He is a diplomate of the American Board of Orthopaedic Surgery with a Certificate of Added Qualifications in Hand Surgery. Dr. Stokel is a member of the American Society for Surgery of the Hand and the American Academy of Orthopedic Surgeons. Additionally, Dr. Stokel has published and lectured extensively in the areas of orthopedics, as well as on hand and wrist surgery techniques.
Clinical Indicators

Within the medical field, we use two key trauma severity scoring tools.

**Injury Severity Score (ISS)**

1-75 (Lower Better)

<table>
<thead>
<tr>
<th>Score</th>
<th>Calculation</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>X =</td>
<td>X if Minor</td>
<td>Head and neck, including cervical spine</td>
</tr>
<tr>
<td>2 if Moderate</td>
<td>X if Moderate</td>
<td>Face, including the facial skeleton, nose, mouth, eyes and ears</td>
</tr>
<tr>
<td>3 if Serious</td>
<td>X if Serious</td>
<td>Thorax, thoracic spine and diaphragm</td>
</tr>
<tr>
<td>4 if Severe</td>
<td>X if Severe</td>
<td>Abdomen, abdominal organs and lumbar spine</td>
</tr>
<tr>
<td>5 if Critical</td>
<td>X if Critical</td>
<td>Extremities including pelvic skeleton</td>
</tr>
<tr>
<td>6 if Maximum/ Currently Untreatable</td>
<td>X if Maximum/ Currently Untreatable</td>
<td>External soft tissue injury</td>
</tr>
<tr>
<td>Total</td>
<td>Sum of Top three from this column</td>
<td>(X^2 + X^2 + X^2 = \text{ISS Score})</td>
</tr>
</tbody>
</table>

**Glasgow Coma Scale**

(Higher Better)

<table>
<thead>
<tr>
<th>Eye Opening (E)</th>
<th>Individual's Response</th>
<th>Analyzed Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>Opens eyes on own</td>
<td>4</td>
</tr>
<tr>
<td>Speech</td>
<td>Opener's eyes written in a loud voice</td>
<td>1</td>
</tr>
<tr>
<td>Pain</td>
<td>Opens eyes to pain</td>
<td>2</td>
</tr>
<tr>
<td>Pain</td>
<td>Does not open eye</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor Response (M)</th>
<th>Individual's Response</th>
<th>Analyzed Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commands</td>
<td>Follows simple commands</td>
<td>6</td>
</tr>
<tr>
<td>Pain</td>
<td>Pulses examiner's hand away to pain when examiner pinches him</td>
<td>5</td>
</tr>
<tr>
<td>Pain</td>
<td>Pulls a part of body away when examiner pinches him</td>
<td>4</td>
</tr>
<tr>
<td>Pain</td>
<td>Flexes body inappropriately to pain (decompress posturing)</td>
<td>2</td>
</tr>
<tr>
<td>Pain</td>
<td>Body becomes rigid in an extended posture (decompress posturing) to pain</td>
<td>1</td>
</tr>
<tr>
<td>Pain</td>
<td>Has no motor response to pain</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verbal Response (Talking) (V)</th>
<th>Individual's Response</th>
<th>Analyzed Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech</td>
<td>Carries on a conversation correctly and tells examiner where he is, who he is, and the month and year</td>
<td>5</td>
</tr>
<tr>
<td>Speech</td>
<td>Seeks confused and disoriented</td>
<td>4</td>
</tr>
<tr>
<td>Speech</td>
<td>Taps so examiner can understand but makes no sense</td>
<td>3</td>
</tr>
<tr>
<td>Speech</td>
<td>Makes sounds that examiner can't understand</td>
<td>2</td>
</tr>
<tr>
<td>Speech</td>
<td>Makes no noise</td>
<td>1</td>
</tr>
</tbody>
</table>

Coma Score \((E + M + V) = 5\) to 15
Individual Characteristics

Multiple trauma injuries are marked by numerous common characteristics.

- High energy
- Hemodynamically unstable
- CHI (GCS < 9 severe)
- Blunt or penetrating chest/abdominal injury
- Multiple long bone/pelvic fxs, frequently open
- Injury Severity Score >16
- Expensive
Multiple trauma injuries require extensive management and treatment.

Key Phases of Treatment:

- Acute Emergency Management
- Primary Survey
- Resuscitation
- Secondary Survey
- Emergency Management
- Tertiary Survey
- Definitive Acute Mgmt
- Acute IPD Rehab
- OPD Rehab

Special Types of Multiple Trauma Cases:

- Severe Head Injury
- Geriatric
- Pediatric
- Pregnancy
The acute primary survey takes place during the lifesaving first minutes.

<table>
<thead>
<tr>
<th>A. Airway (includes C-spine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Breathing</td>
</tr>
<tr>
<td>C. Circulation</td>
</tr>
<tr>
<td>D. Digestive System</td>
</tr>
<tr>
<td>E. Excretory System</td>
</tr>
<tr>
<td>F. Fractures</td>
</tr>
</tbody>
</table>
Additionally, resuscitation takes place during the lifesaving first minutes.

- Direct control hemorrhage
- Shock
- Fluid replacement
  - IVF
  - Blood replacement
- Monitor
  - BP
  - Urine Output
  - CVP

Graphic images ahead!
The secondary survey is performed within the first hour.

- Top-Down Focus
- Skull/C-Spine (50% of trauma deaths)
- Neuro – Pupils/GCS
- Chest (25% of trauma deaths)
- Abdomen
- Spine/Pelvis
- Rectal/GU
- Extremity
Acute: Emergency Management

Emergency management takes place in the first hours.

- Intracranial Hemorrhage
- Vascular Hemorrhage (e.g., Arch)
- Exploratory Laparotomy
- Rectal/GU injuries
- Fracture Fixation
After 24 hours a tertiary survey is performed.

- Missed Injuries
- Repeat Exams/Review Results
- Neuro Exams (missed peripheral nerve injuries ~30%)
- Missed Fractures (6-8%)
- Occult Abdominal Bleeding
Definitive Acute Management

During the days and weeks after the injury definitive acute management begins.

- Goal is acute medical stabilization
- Fracture Management (multiple surgeries)
- Wound Coverage
- Complications
Acute IPD Rehabilitation

Acute IPD rehabilitation takes place in the weeks and months afterwards.

- Goal is to maximize individual function
- Pulmonary
- Therapy (PT/OT)
- Diet
- Neuropsychology
- Transfers/Ambulation
- Self Care
OPD Rehabilitation

In the months and years after the injury OPD Rehabilitation takes place.

- Goal is to maximize community function
- ADLs/Psych
- Residential integration
- Community Integration
- Return to work
Acute Complications

With these injuries complications can and do frequently occur.

- Vascular (DVT)
- Delayed Healing
- Pressure Ulcers

- Infection/Sepsis
- Single Organ Failure (e.g., Renal)
- Multi-Organ Failure

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However, there are also a set of complications that are chronic in nature.

- Multiple medical complications
- Difficult residential and community reintegration
- Chronic pain
- Addiction
- Psychological
Which of the following factors has the greatest impact on recovery prognosis?

A. Weight (e.g., obesity)
B. Pre-morbid conditions (e.g., diabetes)
C. Age (e.g., < 65)
D. Gender

Use the Polling Panel on the right to enter your answer now.
Be sure to click “Submit.”
Factors Impacting Prognosis

Answer: Age

Younger patients have the greatest potential for recovery.

- **Age**—younger pts have greatest potential for recovery
  - 60% mortality age >65
  - >90% mortality when GCS < 5 and age >65
- **Severity** (population-based)
  - GCS (prolonged LOC)
  - ISS
- **Hypotension/Hypoxia**
- **Treatment Delay**
  - Prolonged transport
  - Delays in definitive tx due to injuries
- **Outcome Predictors Unreliable**
  - Treat all presuming recovery
Achieving the Best Outcomes

Achieving the best outcomes involves numerous factors.

- Trauma Centers
- Surgical Experts
- Intense Rehabilitation
- Coordination of Multiple Specialties/Services
Distinctive Components Paradigm’s Business Model

The model Paradigm uses speaks directly to the type of coordination that is needed.

Client Environment

Paradigm Medical Hub

Medical Experts
- NWM Onsite Nurses
- Paradigm Clinical Team
- PMD Physicians

Top Providers
- Trauma Centers
- Acute Rehab
- Post-Acute/Outpatient

Custom Built Infrastructure
- Data on 10,000+ Cases
- Analytics/Algorithms
- EBM+ Standards
- Provider Tracking
- Outcome Guarantees

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In the world of trauma, a number of important developments are on the horizon

- **National Trauma Registry**
  - Current NTDB data inadequate
    - 6% Level I and 23% Level II did not report data!
  - Treatment/research/prevention needs to be data driven
  - Outcome measures inadequate
  - Prioritize public policy

- **Regional Trauma Centers**
  - Substantial geographic variation
  - 19 States have no state-wide system
  - “Life or death depends on where your accident happens”

- **Funding**
We hope you will join us for future webinars, and leave knowing the following.

- **Multiple Traumas generate enormous individual/society costs**
- **Multiple Traumas are among the most complex injuries**
- **Best outcomes are achieved with a) trauma centers, b) surgical experts, c) intense rehab and d) skilled coordination**
- **Paradigm has successfully proven the value of our model during the past 20 years**
Question and Answer Session

Please submit your questions for our panelists in the Q&A window on the right.

Today’s speakers:

Scott Goll

Edward A. Stokel, MD

Reminder: If you experience computer broadcast audio problems, please use the following dial-in number:

Toll Free 866-318-8613
Passcode 754-949-58

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