EMS Spinal Immobilization

A Trauma Surgeon’s Perspective

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Introduction

Spinal cord injury is a devastating problem
Fear that medical care might worsen injury
Protection of the axial spine is a key concern

Unstable injury assumed
Vigilance maintained until injury excluded
A central element of ATLS approach

Complete immobilization felt to be essential
No good data to support this idea
The “classic” approach

All patients identified as “trauma” immobilized

- Long rigid backboard
- Cervical collar
- Tape, blocks, straps

Kept on board until spine “cleared” at ED

- Often on long board for hours
- All eventually placed in bed, even if unstable
The “classic” approach
Introduction

Inherently difficult problem

Essentially all patients are at risk
Incidence of unstable injury is low
Some patients do get worse under medical care

The key issue:

The “acceptable” rate of missed injury is 0%
But the risk can never really be 0%

Complicated by fear of litigation
Introduction

Specific challenge in human decision making

- Low incidence
- High salience

Rational decision-making often abandoned

- Reliance on belief-based approach
- True risk/benefit data often ignored
- Irrational thresholds applied
Who needs “full spine precautions”?

1. Everybody, mobility of spine is a design flaw
2. Those with a risk of a missed injury > 0%
3. When the Ouija board says they need it
4. Nobody
5. When the patient says they need it
6. When the benefits outweigh the risks
When the patient says they need it

The NEXUS criteria

- Normal level of consciousness
- No intoxication
- No midline tenderness
- No distracting painful injury
  (No focal motor or sensory deficits)

Described in 1992, extensively validated

Sensitivity 99.6%, NPV 99.9% [NEJM 2000]
What if the patient can’t vote?

This is where it gets harder

There are 2 choices

- Immobilize everybody as rigidly as possible
- Make a risk/benefit decision

The important questions:

- How critical is rigid immobilization?
- Does it cost?
- What is the real risks of different approaches?
The missed unstable injury

Long reliance of very poor anecdotal data

What do we know?

Most cord injuries occur at time of injury
Some injuries worsen even with immobilization
Zero risk is not a real-world concept
Missed injuries are not usually catastrophic
Immobilizing patients can cause injury
Immobilization isn’t a security blanket

It may not even help [Cochrane Rev 2001]
5 year retrospective study [Acad Emer Med 1998]

334 spine-injured patients in US (100% collar)
120 spine-injured patients in Malaysia (0% collar)

Neurologic disability lower in Malaysian patients
Estimated < 2% chance that collar beneficial
Other studies show ↑ morbidity/mortality with collar

Airway issues
Decreased ability to assess patient
Missed injury isn’t catastrophic

Prospective study of 253 patients [J Trauma 1987]

38 had injuries missed at initial evaluation
Diagnoses made from 1-36 days later
No major neurologic deficits
New neurologic symptoms in 4 (10%)
The risk/benefit analysis

Patients can tell you if they don’t need anything

Rigid immobilization

- Has no proven efficacy
- Caries significant risk

More practical spine precautions

- Likely no difference, lower risk profile
- Less field time spent
Many, if not most, patients don’t need anything

Patients meeting NEXUS criteria

Penetrating injuries

Awareness of potential spine injury is essential

More balanced approaches make sense

Padded surfaces, avoid excess motion

Don’t force patients into pre-determined positions

Complete evaluation at treating facility
The Loch Ness monster
So why aren’t we done?

It’s hard to prove something couldn’t happen

Stubborn beliefs that aren’t fully rational

Moving the patient might make them worse

Rigid immobilization a risk-free security blanket

Doing something has to be better

An impossible standard of “acceptable” risk
Where are things headed?

Increasing perception that rigid boards are bad

Most EMS agencies have moved away

National standards catching up to practice

Long boards will go the way of MAST

Our love affair with C-collars is weakening

Acceptance of field assessment by EMS

Better understanding of issues

Never going to go away
Summary

You still must be aware of potential spine injury

When should you avoid immobilization altogether?

- Patients that meet NEXUS criteria
- Patients with isolated penetrating injury

When should you use “full spine precautions”?

Never

Unresponsive patients or patients with clinical signs

Limit spinal motion, be aware of maintaining position

Devices must address comfort, access, pressure

Don’t force positioning, especially in older patients