



Weill Cornell Medicine



New York-Presbyterian

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

Carries significant risk

More practical spine precautions

Likely no difference, lower risk profile

Less field time spent

In the balance

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

