What’s New from the Eagles?  
Who the heck are the Eagles?

- Group of Medical Directors of the 50 largest EMS systems in the US, Canada and GB
- Annual conference starting off with a 2 day round table discussion by members
- The group publishes position papers and is influential in the national EMS community
- Last 2 years the use of pre-hospital c-collars has been a very hot topic of discussion
The Case Against C-Collars

Emergency Medicine and Trauma Update
November 2011
Marc Conterato
North Memorial Medical Center
The SCI Problem

~ 14,000 New Spinal Cord Injuries/yr.
82% males
56% between 16-30 yo
60% involve C-spine

Cause:
- MVC 37%
- Violence (penetrating) 28%
- Falls 21%
- Sports 6%
- Other 8%

4-5,000 Die During Initial Event

$417,000 first year expense for quadriplegia
$1,350,000 lifetime expense for quadriplegia

48% uncovered by insurance, 63% unemployed 8 yrs following injury
Background

- C-collar was originally designed as an extrication device, not an immobilization device
- Standard of care in EMS for 30 years
- Basic first aid and common sense teaches us to splint broken bones and injured joints to avoid further injury.
Background

Indications for Cervical Spine Immobilization:

- Clinical Signs and Symptoms
- Mechanism of Injury

- Generally, pre-hospital providers are not allowed to reduce dislocations in the field
- Patients' heads are often moved before stabilization and transport
- No reliable evidence that collars protect against secondary injuries
Let’s say that again..

There is no reliable evidence that c-collars protect against secondary injuries.
Spinal immobilization for trauma patients (Review)
Kwan I, Bunn F, Roberts I, on behalf of the WHO Pre-Hospital Trauma Care Steering Committee

“The effect of spinal immobilization on mortality, neurological injury, spinal stability and adverse effects in trauma patients remains uncertain.”
But, do c-collars cause harm?
Background

Multiple early case reports involving observed spinal cord injury after collars were applied in pts with ankylosing spondylitis

**Exacerbating cervical spine injury by applying a hard collar.** Papadopoulos MC, Chakraborty A, Waldron G, Bell BA: BMJ 1999, **319**:171-

Podolsky

Background

May increase intracranial pressure:

**Rigid cervical collar and intracranial pressure of patients with severe head injury.**

*6 articles reviewed

*All but one reported increases in baseline ICP after application of a rigid cervical collar
Background: May increase intracranial pressure


Background

Is Morbidity/Mortality Induced by Care Givers?

Toscano J. *Prevention of neurological deterioration before admission to a spinal cord injury unit.* Paraplegia. 1988 June;26(3):143-50. Department of Surgery, Austin Hospital, Melbourne, Australia. 32 of 123 pts sustained major neurological deterioration from the time of injury to the time of admission.

Why?

Background


All Blunt Traumatic Spinal Cord Injuries to Univ of New Mexico or University of Malaysia

UNM – ALL patients were spinal immobilized in the field
Univ Malaysia – NO patients were spinal immobilization in the field

Disabling thoracic spine injuries in **21%** of patients with immobilization, but in only **6%** without immobilization.

Disabling lumbar spine/sacral spine injuries in **12%** of patients with immobilization, but in only **2%** without immobilization.

Disabling cervical spine injuries in **30%** of patients with immobilization, but in only **25%** without immobilization.

There was less neurologic disability in the unimmobilized Malaysian patients! (OR 2.03; 95%CL 1.03-3.99; p=0.04)

Conclusion:

“Out of hospital immobilization has little or no effect on neurologic outcome in patients with blunt spinal injuries.”
Current Concern

“We had a sentinel case when during the application of a collar while under fluoroscopy a distraction of cervical vertebrae due to complete circumferential soft tissue disruption was witnessed. The distraction was reversed, the patient was awakened, and was still neurologically intact. Subsequent careful monitoring for patients with soft tissue injuries turned up several with partial circumferential soft tissue disruption and partial distraction injury while c-collar application was attempted in the O.R. ***initial c-spine radiographs failed to suggest any injury!!*** ***SCARY!!***”

-Dr. David Persse, Medical Director, Houston, Texas
Oh, oh, here we go again.....
High Cervical Dissociation (Scope of Problem)


Bucholz RW, et al. Occult cervical spine injuries in fatal traffic accidents. J Trauma. 1979 Oct; 19(10):768-71. 24% of victims of MVC had fatal neck injuries, most dislocations at the atlanto-occipital junction. Half of the cases were not suspected of having spine injuries before the detailed search.
High Cervical Dissociation (Scope)


14 High Cervical Injury, 6 Died
Survivorship ranged from 6 mos to 2 yrs
High Cervical Dissociation (Scope)

Dreiangel et al. Occipitocervical dissociative injuries: common in blunt trauma fatalities and better detected with objective computed tomography-based measurements. The Spine Journal Volume 10, Issue 8, August 2010, Pages 704-707 (Level I Trauma Center) 74 patients who expired w/in 21 days of admission and had CT exams

On review of CT’s: 37 (50%) had one or more major c-spine injury
ONLY ONE WAS DIAGNOSED BEFORE DEATH!
All of this led to research at Baylor
Current Concern


Extrication Collars Can Result in Abnormal Separation Between Vertebrae in the Presence of a Dissociative Injury.

The Journal of Trauma Injury, Infection, and Critical Care, 60:2 447-450, August 2010
Ben-Galim et al

Methodology:

- 9 fresh whole cadavers (64-88 yo, 6F 3M)
- Demonstrated there was no previous neck pathology
- Surgically created a severely unstable injury and it confirmed by fluoroscopic examination
- Left musculature completely intact
- Collars were placed based on standard EMS protocol (Ambu Perfit Ace)
- Displacement was measured by x-ray and CT
Results:

Grossly abnormal increased separation was demonstrated in every cadaver!

(7.3 +/-4.0 mm of separation between C₁ and C₂)
Summary

NO evidence to support current use of C-collars in prehospital medicine

The concern has been around for nearly 30 years:

Ankylosing spondylitis
Increased ICP

Ambulances have neither x-ray machines nor CT scanners.

Current indications for use:
Pain, with or without deficit
Mechanism
Nexus criteria
Summary

Now there is new evidence that they might cause internal decapitation in OCD. This may be the straw that broke the camel’s back (excuse the pun)
What Now?

Different collar designs?

X-collar™
Fasplint™

Use towel rolls with tape or sand bags/blocks with tape. They are light weight, available and inexpensive.

Simply discontinue the use of prehospital C-collars, but...
What Now?

Unilateral action by a Medical Director is medico legally difficult, and could be costly in this very fruitful area of litigation

Thus...
At the 2011 Eagles conference it was decided to confer with the AANS/ AAN, NAEMSP and ACS to attempt to come to a joint agreement/statement in order to discontinue the use of pre-hospital C-collars in the United States.
THANK YOU!