

DOGMA DETECTIVES CASE # 02-21-13-01: BACKBOARDS BREAKING MY BACK

Is there any definitive evidence that routine use of backboards improves patient outcomes in blunt trauma? Is there any evidence that they can be detrimental?

How about penetrating trauma? Is there any evidence of either benefit or harm in backboarding these patients?

There are no current articles that show a clinical benefit to immobilization of blunt trauma patients. The best study to date on this topic comes from Academic Emergency Medicine and compared the EMS system in New Mexico to a trauma center in Malaysia, where no EMS system existed, but otherwise all other variables (population, hospital volume, hospital resources, injury severity score of the patients) were the same. This 5 year retrospective study of the two populations showed no clinical outcome benefit in backboarding patients. The patients transported by personal vehicle or police car in Malaysia had similar clinical outcomes to those boarded and collared by EMS in New Mexico.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1553-2712.1998.tb02615.x/pdf>

How about penetrating trauma victims? There is clear evidence of **HARM** to patients immobilized that are the victims of penetrating trauma. This study from the Journal of Trauma reviewed more than 40,000 patient encounters and found that immobilized patients had an Odds ratio of death of 2.06 over those not immobilized.

<http://www.ncbi.nlm.nih.gov/pubmed/20065766>

Do collars help to immobilize those with unstable fractures? This article from the Journal of Emergency Medicine studied cadavers with simulated unstable c-spine fractures, and the collar was not sufficient to stabilize the fracture.

<http://www.sciencedirect.com/science/article/pii/S0736467911001715>

This article from the Annals of Emergency Medicine in the 1980s reached a similar conclusion in cadaver studies, showing that any airway maneuver moves the spine, regardless of collar placement.

<http://www.sciencedirect.com/science/article/pii/S0196064484802784>

This article from Prehospital Emergency Care found that backboards increased pain, imaging, and length of hospital stay in children, but did not affect final outcomes.

<http://informahealthcare.com/doi/abs/10.3109/10903127.2012.689925>

How about transport by Police vehicle in lieu of EMS --- a practice common in Philadelphia. A few articles have studied this, and have found that there is not a significant adverse effect, and that it may be beneficial to a majority of the patients. This is a unique situation when trauma centers are often close-by and reflects many studies that show the faster the transport to definitive trauma care, the better the outcome for the patient. We would add the caveat that severe bleeding **MUST** be controlled quickly --- so police should be trained in tourniquet placement and hemorrhage control.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1553-2712.2010.00948.x/full>

So what is the final verdict on backboards, collars, immobilization and EMS? It is clear for penetrating trauma --- DO NOT backboard the patient. As for blunt trauma, the best method of transport has not been fully determined at this point. The use of vacuum mattresses by many agencies in Europe and the UK are promising developments, but these are bulkier devices than backboards. Every effort should be

taken to minimize the use of a backboard when possible.

At this point the best advice is to learn either the NEXUS criteria or the Canadian C-Spine rule ---- both are based on robust studies and provide a safe procedure to selectively defer immobilization. The Canadian Rule is a bit more sensitive than the NEXUS criteria, but NEXUS is a bit more intuitive to learn, and is the most common criteria used by ED personnel in the United States. Both have sensitivity numbers nearing 99%.

<http://www.nejm.org/doi/full/10.1056/NEJMoa031375>

<http://www.nejm.org/doi/full/10.1056/nejm200007133430203>

This is a suggested selective immobilization protocol for EMS providers based on the NEXUS criteria:

- Must be **low speed mechanism of injury** not likely to cause significant spinal injury
- Patient must be **sober** with no alcohol or drugs on board
- Patient must be alert and oriented with a **GCS of 15**
- Patient must have **no distracting injuries**
- Patient must be neurologically intact with **no deficits**
- Patient must have **no midline neck or back tenderness** to palpation
- Patient must have no midline neck or back tenderness with **full ROM in neck**
  - **CAUTION:** This is only checked once all other criteria are met, and must be checked with a slow ROM of neck. Stop immediately if any pain occurs, and immobilize.
- If all of the above criteria are not met, patient must be immobilized. If there is any doubt, immobilize the patient and/or contact medical control

There are articles that also show pre-hospital providers can safely use these techniques.

<http://www.paramedicpractice.com/cgi-bin/go.pl/library/abstract.html?uid=78626>

<http://www.biomedcentral.com/1471-227X/11/1%20?iframe=true&width=100%&height=100%>

We encourage all providers to discuss these articles and findings with their medical directors. Obviously always follow local and state protocols when applicable.