Controversies in Spinal Immobilization
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Controversies in Spinal Immobilization:
- Reality & Risks
- Literature
  - Backboards
  - Collars
  - Penetrating
  - Clearance
  - Padding
  - Extrication
- Special considerations
  - Obesity
  - Spinal disorders
- Position statement

Spinal Immobilization – Reality & Risks:
- No evidence that backboards immobilize the spine or improve outcomes
- Many patients are unnecessarily immobilized
- Immobilization is painful
- Immobilized patients incur more radiation
- Immobilization complicates airway maintenance and management
- Self extrication?
Routine spinal immobilization in trauma patients: what are the advantages and disadvantages?

Abstract

Routine spinal immobilization for trauma patients has become established in developed countries throughout the world. Cervical spinal injury is, however, relatively rare in trauma patients, and immobilization practices were developed largely without firm supporting evidence. In recent years, published evidence has suggested that spinal immobilization may in some cases be harmful. The purpose of this article is to critically review the evidence and the implications for trauma patient management and outcomes. We searched MEDLINE, the Cochrane Database, Index Medicus and similar references with a broad search strategy. Relevant results were analysed and critically reviewed in the context of trauma patient management. Our findings present a growing body of evidence that routine spinal immobilization is often unnecessary or even harmful. We conclude that immobilization has not been shown to contribute to morbidity and mortality in some patients and the practice warrants further investigation.

Penetrating Trauma

- There are no data to suggest that spinal immobilization in patients with penetrating trauma is the need to lie in a prone position due to spinal problems.

Penetrating Trauma

- Spinal immobilization may be performed after penetrating injury when it is found that there is a definite threat of injury to the patient's condition.

Penetrating Trauma

- Spinal immobilization should be done on the basis of acute spinal cord injury, and immobilization may be necessary in patients with severe immobilization trauma.

Neurotrauma

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Penetrating Trauma

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Out-of-hospital spinal immobilization: its effect on neurologic injury

Naungnet M.1, Oorts G.2, Vanbelle D.1, Keerl E.1

OBJECTIVE: To examine the effect of emergency immobilization on neurologic outcome in patients who have blunt traumatic spinal injury.

METHODS: A 5-year retrospective chart review was carried out at 2 university hospitals. All patients with acute blunt traumatic spinal or spinal cord injuries transported directly from the injury site to the hospital were included. None of the 136 patients seen at the University of Malta had spinal immobilization during transport, whereas all 134 patients seen at the University of New Mexico did. The 2 hospitals were comparable in physician training and clinical resources. Neurologically injured were assigned to 2 categories, disability or not disabled, by 2 physicians rating independently and blinded to the results of all other rating. Data were analyzed using multivariate logistic regression, with hospital location, patient age, gender, anatomic level of injury, and injury mechanism serving as explanatory variables.

RESULTS: There was less neurologic disability in the unimmobilized Maltese patients (OR 2.28, 95% CI 1.05-4.96, p = 0.04). This corresponds to a 12% chance that immobilization has any benefit at all. Results were similar when the analysis was limited to patients with cervical injuries (OR 1.50, 95% CI 0.94-2.39, p = 0.06).

CONCLUSION: Out-of-hospital immobilization has little or no effect on neurologic outcome in patients with blunt spinal injuries.

Spinal immobilization for trauma patients

Naungnet M.1

OBJECTIVE: To quantify the effect of different methods of spinal immobilization (including immobilization versus no immobilization) on mortality, neurologic disability, spinal stability and adverse effects in trauma patients.

SEARCH STRATEGY: We searched the Cochrane Trauma Group, MEDLINE, EMBASE, CINAHL, PubMed and the National Research Register. We checked reference lists of all articles and contacted experts in the field to identify eligible trials. Manoeuvres of spinal immobilization devices were also searched for and the Cochrane methodological quality checklist used.

SELECTION CRITERIA: Randomized controlled trials comparing immobilization strategies in trauma patients with suspected spinal cord injury. Trials with healthy volunteers were excluded.

DATA COLLECTION AND ANALYSIS: Two reviewers independently applied eligibility criteria to trial reports and extracted data.

MAIN RESULTS: We found no randomized controlled trials of spinal immobilization strategies in trauma patients.

REVIEWERS CONCLUSIONS: We did not find any randomized controlled trial that met the inclusion criteria. The effect of spinal immobilization on mortality, neurologic injury, spinal stability and adverse effects in trauma patients remain uncertain. Because spinal injury is a major cause of preventable death in trauma patients, and spinal immobilization, particularly of the cervical spine, can contribute to airway compromise, the possibility that immobilization may increase mortality and morbidity cannot be excluded. Large prospective studies are needed to validate the decision criteria for spinal immobilization in trauma patients with high cervical spinal injuries.

CONCLUSION: Randomized controlled trials in trauma patients are required to establish the relative effectiveness of alternative strategies for spinal immobilization.

The effect of spinal immobilization on healthy volunteers.

Chen D., Geller S., Tasman A., Vanmier C.

OBJECTIVE: To determine the effects of standard spinal immobilization on a group of healthy volunteers with respect to induced pain and disorient.

DESIGN: Prospective study.

SETTING: University teaching hospital.

PARTICIPANTS: Twenty-one healthy volunteers with no history of back pain.

INTERVENTION: Subjects were placed in standard backboard immobilization for a 30-minute period. Number and severity of immobile and disorient symptoms were determined.

MEASUREMENTS AND MAIN RESULTS: One hundred percent of subjects developed no pain within the first 30 minutes of immobilization. Occipital headache and nausea, tinnitus, and intermittent pain were the most frequent symptoms. Fifty-five percent of subjects graded their symptoms as moderate to severe. Twenty-nine percent of subjects developed additional symptoms over the next 48 hours.

CONCLUSION: Standard spinal immobilization may be a cause of pain in otherwise healthy subjects.
Emergency Medicine at the University of Washington

Backboard versus mattress split immobilization: a comparison of symptoms generated.  

Chen SC, Godbold JD, Spence J, Chen L.  

Abstract  
The study objective was to compare spinal immobilization techniques to a vacuum mattress-split (VMS) with respect to the incidence of symptoms generated by the immobilization process. We used a prospective, cross-over study in an urban hospital setting. Participants consisted of 37 healthy volunteers without history of back pain or spinal disease. Interventions consisted of two 30-minute periods of immobilization on each of the three techniques. The incidence and severity of any symptoms generated by the immobilization process were recorded. In Phase I, the two groups were assigned randomly to one of the immobilization methods, and the methods of immobilization being randomized. Symptoms and severity were again recorded. Pain symptoms were confined to four anatomic sites: dorsal prominences, lumbar spines, sacrum, and cervical spine. After adjusting for the effect of order of exposure, subjects were 3.68 times more likely to have symptoms when immobilized on a backboard than when immobilized on the VMS. They were 7.56 times more likely to complain of coccygeal pain and 3.97 times more likely to complain of lumbar pain. Severity of coccygeal and lumbar pain was also significantly greater during backboard immobilization. We conclude that, when compared to a VMS, standard backboard immobilization appears to be associated with an increased incidence of symptoms in general and an increased incidence and severity of coccygeal and lumbar pain in particular.

Emergency Medicine at the University of Washington

The effects of prone positioning with and without padding on spinal immobilization of healthy subjects.  

Lam JS, Bittner DJ, Lee, Kwok BK.  

Abstract  
PRONIP: To compare the incidence and severity of pain experienced by healthy volunteers undergoing spinal immobilization in the prone position with and without padded positioning. To compare the incidence of urinary retention when immobilized in the prone position with the incidence of a lumbar compression.  

Methods: Twenty healthy subjects were divided into two groups of 10. Each subject was immobilized supine for a period of 30 minutes in an orthopedic splint and then placed in prone position for a period of 30 minutes. For the control group, they were then placed in the prone position and immobilized for an additional 30 minutes in the prone position on a vacuum mattress without padding. The subjects were asked to void every 30 minutes, and to note any difficulties in voiding. The subjects were asked if they foresaw any difficulty in voiding. The incidence and severity of pain were recorded at 15 minutes and 30 minutes for each testing session. 

Results: Pain was recorded by 0% of subjects following removal from the immobilizer and 46% of the subjects following the immobilizer. Twenty percent of the subjects reported pain after the immobilizer, while 36% of the subjects reported pain after the immobilizer (p<0.05). The subjects were asked to note if they foresaw any difficulty in voiding. Twenty percent of the subjects reported difficulty in voiding. The subjects were asked if they foresaw any difficulty in voiding. Twenty percent of the subjects reported difficulty in voiding. The subjects were asked if they foresaw any difficulty in voiding. Twenty percent of the subjects reported difficulty in voiding. 

Conclusion: Prone positioning with and without padding is not associated with an increase in pain or difficulty in voiding.

Emergency Medicine at the University of Washington

Effect of spinal immobilization devices on pulmonary function in the healthy, non-smoking man.  

Barrett J, Towler R.  

Abstract  
BACKGROUND: We aimed to investigate the effects of spinal immobilization devices on pulmonary functions.  
METHODS: This study was a cross-over trial in healthy volunteer subjects. 80 volunteers were included. We performed a full spirometry in the supine position, and forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and FEV1/FVC were measured in all subjects. Then, Philadelphia type cervical collar (PCC) and Hendrick extension device (KED) were applied to subjects. We measured FVC, REE, PEFR, and FVC/FVC in all subjects in the supine position at the 5th and 90th minutes after application of cervical collar and KED. After a one-hour rest period, subjects were asked to return to the supine position and have FVC, REE, PEFR, and FVC/FVC measured again in all subjects at the 4th and 90th minutes after application of cervical collar and long spinal backboard. 

RESULTS: After application of KED, baseline levels were compared with those at the 5th and 90th minutes. Statistically significant decreases were determined in FVC (p<0.001) and PEFR (p<0.001) after application of KED, but there were no significant differences with cervical collar. After application of the long spinal backboard, a comparison of baseline levels and levels at 5th and 90th minutes demonstrated statistically significant decreases in PEFR (p<0.001) and FVC (p<0.001), but no significant differences with cervical collar. 

CONCLUSION: We determined that both KED and long spinal backboard cause a decrease in pulmonary function.
Reduction in mouth opening with semi-rigid cervical collars.

Glenn OW, Umemura S. (Author Information)

Abstract

BACKGROUND: Reduced mouth opening may be a major contributing factor to the deterioration in the view obtained at laryngoscopy when a semi-rigid cervical collar is in place. We set out to assess the degree to which mouth opening is restricted by cervical collars.

METHODS: We measured maximal inter-incisor distance in 52 volunteers. It was measured again after application of each of three appropriately sized semi-rigid cervical collars (Stediarm, Mint C, and ProCare). The use of the cervical collars was left at the discretion of the investigator.

RESULTS: Inter-incisor distance was significantly reduced by the application of a cervical collar (Pro collar group) [9.7 mm (SD 7.6)], Stediarm group [20 mm (SD 7.6)], and Mint C group [20 mm (SD 6.5)]. There was no statistically significant difference in the degree of reduction in inter-incisor distance between the three groups.

CONCLUSIONS: Application of a semi-rigid cervical collar can significantly reduce mouth opening. This could hinder definitive airway placement. Our results support removing the anterior portion of the collar before attempts at tracheal intubation.

The effect of a rigid collar on intracranial pressure.

Davies GL, Osborn HC, Warrick A. (Author Information)

Abstract

Surgical immobilization and the application of a rigid collar to protect the neck forms an integral part of care of the injured. The very nature of their design promotes vasodilation and extension of blood filling the brain and thereby may raise intracranial pressure (ICP). We analyzed this effect prospectively in a series of injured patients using the Stediarm rigid collar, the most popular collar used in the UK. Comparison of ICP before, during, and after collar application showed a significant rise in ICP (P < 0.001), a mean rise in ICP of 4.5 mmHg, with a standard deviation of 4.1 mmHg. Insufficient changes in mean arterial pressure suggested that this effect is a consequence of redistribution of venous drainage rather than obstruction of cerebral perfusion alone. Since head-injured patients with elevated intracranial pressure, who may require cervical spinal immobilization, it is essential that secondary insults producing raised ICP are minimized. Alternative forms of cervical spinal immobilization should be considered if no other means are available to prevent venous drainage through the neck.

The effect of rigid cervical collars on internal jugular vein dimensions.

Boray MTP, Stults DR, Lanier S. (Author Information)

Abstract

OBJECTIVE: Prior research has demonstrated that rigid cervical collars cause an increase in intracranial pressure (ICP). The mechanisms for this effect are unclear and any proposed mechanism involves obstruction of venous supply to the brain. Ultrasound IJV views allow assessment of internal jugular vein dimensions and may yield information regarding the mechanism for the increase in ICP seen with rigid collar application.

METHOD: Thirty-two healthy volunteers underwent real-time examination of the internal jugular vein before and after rigid collar application. Internal jugular vein cross-sectional areas were compared with and without the cervical collar in place.

RESULTS: The cross-sectional area of the internal jugular vein increased significantly (P < 0.0001) after application of the cervical collar. The mean percentage increase in cross-sectional area was 37% (95% confidence interval [CI] = 29% to 45%).

CONCLUSIONS: Internal jugular vein cross-sectional area increases after application of a rigid cervical collar. This supports the hypothesis that venous obstruction in the neck may contribute to the increase in ICP seen after rigid collar application.
Effect of cervical hard collar on intracranial pressure after head injury.

Hotta HJ, Goddard JJ, Orbe AT, Ostrau J.

Abstract

BACKGROUND: Patients suffering head trauma are at high risk of having a concomitant cervical spine injury. A rigid cervical collar is usually applied to each patient until spinal stability is confirmed. Hard collars potentially cause venous outflow obstruction and are a restrictive stimulus, which might cause intracranial pressure (ICP). This study tested the hypothesis that application of a hard collar is associated with an increase in ICP.

METHODS: A prospective series of 51 head-injured patients with a post-resuscitation Glasgow coma scale score of nine or less had ICP measurements before and after cervical hard collar application.

RESULTS: Nine out of 15 patients had a rise in ICP following application of the collar. The difference in pre- and postapplication ICP was statistically significant (P < 0.05).

CONCLUSIONS: Early measurement of the cervical spine in head-injured patients is recommended to minimize the risk of intracranial hypertension related to prolonged cervical spine immobilization with a hard collar.

Increased risk of death with cervical spine immobilization in penetrating cervical trauma.

McKibben WC, Salter RB, Petersen DC, Scott J, Watson JD, McCawley J, Ghanem I.

Abstract

The purpose of this study was to determine if cervical spine immobilization was related to patient morbidity in penetrating cervical trauma. One hundred and ninety-one patient charts from the Louisiana State University Health Sciences Center New Orleans (Charity Hospital, New Orleans) were examined. Charts were identified by searching the Charity Hospital Trauma Registry from 01/6/1994 to 04/1/2000 for all cases of penetrating cervical trauma. Thirty-five patient deaths were identified. Cervical spine immobilization was associated with an increased risk of death (p=0.02), odds ratio 2.77, 95% CI 1.016-6.46.

Spine fractures in patients with ankylosing spinal disorders.

Eckert T, Bronkhorst H, Nevis G, Hall J, Chantaras J, Bellard G.

Abstract

STUDY DESIGN: Retrospective review.

OBJECTIVE: To describe the spine fracture characteristics, current treatments, and their results in patients with ankylosing spinal disorders (ASD), such as ankylosing spondylitis (AS) and diffuse idiopathic skeletal hyperostosis (DISH), with the hypothesis that ASD has a unique spine fracture pattern.

SUMMARY OF BACKGROUND: ASD spine fractures in patients with ASD are unique and have only been described in relatively small case series.

METHODS: Retrospective review of a large consecutive series of patients with spine fractures and ASD over a 3-year period. Fractures were classified according to parameters such as type and number of vertebrae involved, patient age, and mechanism of injury. Predictors of morbidity were analyzed by linear regression. Similitudes between patients with AS and DISH were evaluated by linear regression.

RESULTS: Of the 122 spine fractures in 113 consecutive patients with ASD, the majority were translational extension injuries, most commonly affecting L4-5. Eighty-one percent of the patients had a history of one or more previous back surgeries. Spinal cord injury was present in 39% of the patients, 34% of whom improved by at least 1 American Spinal Injury Association grade. Nineteen percent of patients had delayed diagnosis of their spine fracture, 65% of whom had new neurologic complications. Surgery was performed on 57% of patients, correlating primarily with multilevel posterior instrumentation 3 levels above and below the injury. Eighty-four percent of at least two level instrumentation had a single stage. Seventy-three percent were operated on with age (r=0.005), numera (r=0.005), and low-energy mechanism of injury (P = 0.005); 40% vs. 10% had a higher rate of delayed fracture diagnosis (P = 0.001), but were otherwise similar to DISH patients.

CONCLUSION: Patients with spine fracture and ASD are at high risk for complications and death and should be counseled accordingly. Metabolic patients segmental instrumentation alone effective fracture healing. ASD and DISH patients represent unclear patterns for the outcome of treatment and injury behavior.
In sub-occipital padding necessary to maintain optimal alignment of the unstable spine in the prehospital setting? A preliminary report.

Katrina O’F. Hadfield OR, Conrad WR, Hovda LA.

Abstract

BACKGROUND: Prehospital emergency responders prepare spinal spine-injured adult patients for immobilization and transport to hospital. It is essential that patients be placed in a favorable position. Previously, it was recommended that patients with spinal spine injuries be immobilized in a slightly flexed position using pads placed beneath the head. However, it is unknown how neck flexion creates and protects the unstable spine.

OBJECTIVE: To determine the effects of three different head positions on the alignment of unstable vertebral segments.

METHODS: Five volunteers with a complete segmental instability at the C5 and C6 level were included in the study. The head was either placed directly on the ground (or spine board) or on foam pads. Three conditions were tested: no pad; pads 2.6 cm thick; and pads 4.2 cm thick. Pads were positioned beneath the head to determine their effect on spinal alignment. Anterior-posterior translation, flexion-extension motion, and axial displacement across the unstable segment were compared between conditions.

RESULTS: Although statistical tests failed to identify any significant differences between test conditions, some meaningful results were noted. In general, the “no pad” condition aligned the spine in a position that least receded the tract spine.

CONCLUSIONS: Because the goal of emergency responders is to ensure that the physiological or structural integrity of the spinal cord and spinal column remains, the outcome of this study suggests that the glide may be best achieved using the “no pad” condition. However, it is recommended that more research be conducted to confirm these preliminary findings.

Biomechanical analysis of spinal immobilization during prehospital extraction: a proof of concept study.

Vinh T. Nguyen, J.F. enemies, P. Gammon, N.

Abstract

BACKGROUND: In most countries, road traffic collisions (RTCs) are the main cause of spinal spine injuries. There are several techniques in use for spinal immobilization during prehospital extraction; however, the evidence for these is currently poor.

OBJECTIVE: The objective of this study was to establish which technique provides the minimal deviation of the cervical spine from the neutral spine position during the extraction of the RTC patient using biomechanical analysis techniques.

METHODS: A series of two paramedics and four patient-fighters first responded to a simulated patient from a prehospital vehicle using three different extraction techniques. The patient was marked with stereomark markers and analyzed movement between the markers. Data was captured with a high speed infrared motion analysis camera. A 3-D mathematical model was developed from the extracted movement.

RESULTS: Throughout the study, trauma was taken from the patient during self-extraction and movement was recorded at 1.54 m/s of 1.54 m/s to 4.44 m/s by motion capture platforms (MCRT) recording a total movement of 0.35 m and 0.35 m, both resulting in a total movement of 0.35 m. The most deviation recorded during arm extraction was movement of 0.35 m and 0.35 m, both resulting in a total movement of 0.35 m. The most deviation recorded during arm extraction was movement of 0.35 m and 0.35 m, both resulting in a total movement of 0.35 m.

CONCLUSIONS: Conventional extraction techniques result in four times more vertebral spine movement during extraction than confirmed self-extraction. This proof of concept study demonstrates the need for further evaluation of current rescue techniques and the requirement to investigate the clinical and psychological significance of such movement.

Conventional spine motion during extraction.

James JF, Waterson, M., David H, Epperson, M., Smither, D., Thomas, R.S.

Abstract

BACKGROUND: It has been estimated that up to two out of four spinal cord injuries may be significantly worsened during extraction or early treatment after a motor vehicle accident.

OBJECTIVE: The purpose of this study was to analyze the plane motions of the head relative to the trunk during extraction from an automobile in a laboratory setting.

METHODS: Video motion capture was used to quantify the range of motion of the head relative to the trunk in 10 participants as they were extracted from a mock motor vehicle during four different extraction techniques: 1) Unassisted Untransported, 2) Unassisted Transported, 3) Assisted Treated and Protected, and 4) Assisted Treated and Protected with a CC and Kendrick Extraction Device.

RESULTS: The result indicates a significant decrease in movement for all motions when the time taken the vehicle unassisted with DC protection, compared to sitting unassisted and without protection. Decrease in movement were also observed for an event (i.e., food to seat) during extraction with paramedic assistance and protection. However, no movement reduction was observed in another event (i.e., reek or board) with both paramedic assistance and protection.

CONCLUSIONS: In this study, to decrease in neck movement occurred for certain simulation events that included: protection and assistance by the paramedics. Future work should further investigate this finding.
Assessing attitudes toward spinal immobilization.

METHODS: An online survey was conducted from May to July 2011. Participants were drawn from the Howard County Department of Fire and Rescue Services and the Howard County General Hospital ED. The survey included multiple-choice questions and responses on a modified Likert scale. Correlation analysis and descriptive data were used to analyze results.

RESULTS: Comfort using the Kearnie Extrication Device was low among ED providers. Experienced providers were more likely to indicate comfort using the device. Respondents often believed that spinal immobilization is appropriate in the management of penetrating trauma to the chest and abdomen. Recorded use of padding decreased along with the frequency with which providers practice and encounter immobilized patients. Respondents often indicated that they perform spinal immobilization due to the mechanism of injury. Providers who have had training in other methods were more likely to agree that immobilization causes an unnecessary delay in patient care.

CONCLUSIONS: The results demonstrate the need for improved EMS education in the use of the Kearnie Extrication Device, backboard padding, and spinal immobilization in the management of penetrating trauma. The attitudes highlighted in this study are relevant to the implementation of a selective spinal immobilization protocol.

Spiral motion restriction: an educational and implementation program to redefine prehospital spinal assessment and care.

METHODS: The training for SMR emphasized the need to immobilize patients with a significant potential for an unstable cervical spine fracture and to use alternative methods of maintaining spine precautions for those with lower risk. The training addressed the potential complications of the use of the unstable backboard and education was provided about the mechanics of spine injuries. Emergency medical services (EMS) personnel were taught to differentiate between the clinical manifestations of spine trauma among the more common moderate, low risk energy trauma patients and patients with the more common moderate, low risk energy trauma patients. A comprehensive education and outreach program that included all of the EMS providers (fire and private), hospitals, and EMS educational institutions was developed.

RESULTS: Within 4 months of the policy implementation, prehospital care practitioners reduced the use of the backboard by 88%. This was accomplished by a decrease in the number of patients considered for SMR with low kinetic energy and the use of other methods, such as the cervical collar only.

CONCLUSIONS: The implementation of a SMR training program significantly decreases the use of backboards and allows alternative methods of maintaining spine precautions.

What defines a distracting injury in cervical spine assessment?

METHODS: This is a single-year prospective, observational study of admitted, adult blunt trauma patients. All patients underwent cervical spine plain film radiography. Data were collected on all injuries, physical examination findings, radiographic findings, administration, and radiograph reports. Patients with upper and lower torso injuries were compared in their ability completion of pain or radiation tenderness relative to cervical spine fracture.

RESULTS: All 458 patients participated. All patients received cervical radiographs. Of all patients, 12% had a distracting injury diagnosed. All patients with distracting injury and a neck fracture had at least one upper torso injury. None of the 29 patients with a distracting injury isolated to the upper torso and a nondistraction had a cervical spine fracture (p = .007). The frequency of cervical spine fracture among patients with cervical spine tenderness was 15.8% vs 3.9%.

CONCLUSIONS: The National Emergency X-Ray Utilization study definition of a distracting injury may be narrowed. Upper torso injuries may be sufficiently painful to distort from a reliable cervical spine examination. Patients may detect spine tenderness in the presence of isolated upper torso injuries. Patients with spine tenderness warrant imaging.
Clinical clearance of the cervical spine in patients with distracting injuries: Is it time to dispel the myth?

By Rachel K. Saxon, MD, Master of Public Administration, and Erin L. Saxon, MD, MPH, M Med Ed, M Med Phys

Abstract

OBJECTIVE: The purpose of this study was to prospectively assess the sensitivity and specificity of clinical examination for screening of cervical spine injury in awake and alert blunt trauma patients with concomitant "distracting" injuries.

METHODS: During the 24-month period from December 2009 to December 2011, 112 blunt trauma patients older than 13 years were prospectively evaluated with a standardized cervical spine examination protocol by the trauma surgery team at a Level I trauma center. Awake and alert patients with a Glasgow Coma Scale score of 15 (GCS 15) underwent cervical spine clinical examination. Clinical examination was performed regardless of "distracting" injuries. Patients with complete flap injuries were imaged to rule out cervical spine injury. "Distracting injuries," including those clinically cleared and those with complete cervical spine tenderness underwent cervical spine computed tomography (CT) imaging of the entire spine. "Distracting" injuries were defined as any musculoskeletal injuries to the head, neck, spine, and long bone fractures. Patients with minor distracting injuries were not considered to have a "distracting" injury.

RESULTS: During the 24-month study period, 112 blunt trauma patients with GCS 15 and at least one "distracting" injury were evaluated. Ten patients (9%) had at least one cervical spine injury (C1-7). None of the patients with "distracting" injuries had a spinal injury as determined by cervical spine imaging. Twelve patients (11%) were clinically cleared, with one patient (0.9%) diagnosed with a cervical spine injury. This patient had cervical spine tenderness and a normal cervical spine CT imaging. None of the awake and alert blunt trauma patients with "distracting" injuries were missed.

CONCLUSIONS: In the awake and alert blunt trauma patient with "distracting" injuries, clinical examination is a sensitive screening method for cervical spine injury. Radiographic assessment is unnecessary for safe clearance of the asymptomatic cervical spine in awake and alert blunt trauma patients with "distracting" injuries. These findings suggest the concept of "distracting" injury in the awake blunt trauma patient is a useful tool to guide clinical examination for patients with "distracting" injuries alone for significant reduction of both healthcare cost and radiation exposure.