Safe Transfer of Trauma Patients in Spine Precautions: A Teaching Module for the Radiology Department

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Background

Stiff backboards were designed to assist in extrication of patients from motor vehicle collisions. However, they have been used to immobilize trauma patients during extrication, transport, evaluation and treatment. No studies have demonstrated improved outcomes from spinal immobilization on stiff backboards. Furthermore, recent studies have demonstrated significant morbidity and mortality associated with prolonged backboard immobilization, including unnecessary iatrogenic pain (which causes patients to move), skin breakdown at pressure points, increased intracranial pressure, and increased risk of aspiration, among others.

There is a national trend at major trauma centers, such as ours, to remove patients from stiff backboard immediately after the primary survey (within minutes of arrival to the trauma bay). If there is a known or suspected spinal injury the patients are kept in spine precautions, which is maintaining the head and spine in neutral in-line position, flat on a firm bed. The issue then becomes safely transferring these patients, who may have an unstable spinal injury, from their bed to the CT gurney or x-ray table, and back to bed, without the assistance of the stiff backboards.

A multi-disciplinary committee, including radiology, emergency medicine, trauma surgery, ortho-spine surgery, and neuro-spine surgery, was formed to develop a protocol for removing patients from backboards and safely transferring them. It became apparent that there was no formal training or protocol for the radiology technologists regarding safe transfer of these patients.

Purpose

The purpose of this quality assurance (QA) study is to formulate a literature based teaching module, specifically for radiology technologists, on safe transfer of patients in spine precautions who are not on stiff backboards. Our literature based teaching module is designed with the intent of implementing these transfer techniques throughout our institution, and to serve as a model for other institutions as well.

Table 1: Spine Precautions Protocol

•Patients will be removed from the backboard in the ED/trauma bay, during the secondary survey. This is at the discretion of the Emergency/Trauma attending physician.

•Patients who are removed from the backboard and remain in spine precautions require a minimum of 3 staff members for transfers using the slide board technique (more staff members, as needed, if they are obese or have an extremity injury that needs stabilization). If staffing permits the 4 person log-roll technique is preferred.

•These techniques require that the person controlling the head/neck of the patient be a physician, nurse, or paramedic/EMT (not the radiology technologist).

Methods

We conducted a literature search for techniques of transferring patients in spine precautions who are not on stiff backboards. The four-person transfer technique is recommended by Advanced Trauma Life Support (ATLS) and by the British Trauma Society. However, ATLS is a set of guidelines, aimed mainly at hospitals that do not see a large volume of trauma patients. Our hospital, MetroHealth Medical Center (MHMC), is a nationally known level I trauma center, with an Emergency Department (ED) that has approximately 100,000 annual patient visits. MetroHealth Medical Center is also a national leader in trauma research.

When developing this protocol, it was clear to the multidisciplinary committee that the protocol had to function even under the worst-case scenarios, and within resource limitations. On some busy trauma nights, we have seen 22 trauma patients in 8 hours on top of the baseline volume of ED patients. With this in mind, it is prohibitive to use the ATLS recommended four-person technique (Figure 1) on every trauma patient. The two-person slide board technique is described in the literature as a safe transfer method for patients who are in spine precautions. Therefore, with all these factors in mind, the multidisciplinary committee agreed upon a 3-person modified slide board technique (Figure 2) to maximize patient safety and resource utilization. The agreed upon language of the spine precautions protocol is shown in table 1.

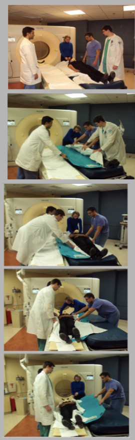
-13 question Pre-test to evaluate the participants' baseline knowledge of spine precautions and safe transfer techniques.
-The main component was a 20-minute PowerPoint presentation, teaching the participants fundamentals of spinal injuries, reasons for removing patients from backboards, and transfer techniques.
-Technique demonstration, where participants performed both techniques and were given immediate feedback.
-A 13 question Post-test to evaluate the participants' comprehension.

Multiple sessions of the teaching module were administered to accommodate for all the shifts within the workday. Basic statistical analysis was used to evaluate the knowledge gained for each participant and the group as a whole. The passing score for both the pre-test and post-test was 75%. The data calculated included average scores and percent correct for both the pre-test and post-test.

Table 2: Teaching Module: Group Performance

Total # of Technologists Who Took The Teaching Module= 49	
Average Pre-Test Raw Score	= 8.63/13 correct
Average Pre-Test Percentage Score	= 66.4%
% Technologists Passing Pre-Test	= (11/49 techs) = 22.4%
Average Post-Test Score	= 12.5/13 correct
Average Post-Test Percentage	= 96.2%
% Technologists Passing Post-Test	= (49/49 techs) = 100%

Figure 1: ATLS 4-Person Transfer Technique



At least 4 people are needed, and more depending on the patient's weight and the presence of a fractured/splinted limb.

•Position #1: Head of bed

•Position #2: Next to the patient's chest/abdomen, on the same side of the bed the patient is to be turned to

•Position #3: Next to the patient's pelvis/thighs, on the same side of the bed the patient is to be turned to

•Position #4: On the opposite side of the bed the patient is to be turned to

Position #1
Team leader, and initiates transfer
Remains at head of bed

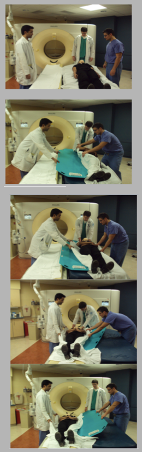
Position #2
Holds patient's opposite shoulder/hip
Lifts 2-3 inches (just enough to get the slide board 1/3 under patient)
Pushes the sheet over slide board onto the CT gurney or X-ray table

Position #3
Assists person #2 lift, by holding opposite hip/knee
Moves to the opposite side when the slide board is under patient
Assists position #4 pull the sheet over slide board onto the CT gurney or X-ray table

Position #4
Places slide board 1/3 under patient
Assists position #3 pull the sheet over slide board onto the CT gurney or X-ray table

• Everyone's responsibility to ensure that the patient's head and entire spine remain in neutral in-line position during transfer
•Lift patient as little as possible (2-3 inches) to place slide board 1/3 under patient
•When lifting patient, do not torque spine. Move head/shoulder/hip/knee together
•When patient on CT/X-ray table, gently pull slide board out to remove
•Reverse procedure when imaging completed to return patient to bed

Figure 2: Protocol 3-person Transfer Technique



At least 3 people are needed, and more depending on the patient's weight and the presence of a fractured/splinted limb.

•Position #1: Head of bed

•Position #2: Next to the patient's chest/abdomen, on the same side of the bed the patient is to be turned to

•Position #3: On the opposite side of the bed the patient is to be turned to

Position #1
Team leader, and initiates transfer
Remains at head of bed

Position #2
Holds patient's opposite shoulder/hip
Lifts 2-3 inches (just enough to get the slide board 1/3 under patient)
Pushes the sheet over the slide board onto the CT gurney or X-ray table

Position #3
Places slide board 1/3 under patient
Pulls the sheet over the slide board onto the CT gurney or X-ray table

• Everyone's responsibility to ensure that the patient's head and entire spine remain in neutral in-line position during transfer
•Lift patient as little as possible (2-3 inches) to place slide board 1/3 under patient
•When lifting patient, do not torque spine. Move head/shoulder/hip together
•When patient on CT/X-ray table, gently pull slide board to remove
•Reverse procedure when imaging completed to return patient to bed

Results

Execution of the teaching module was successful. There was much enthusiasm on the part of the radiology technologists about the teaching module. The results are summarized in table 2. At the time of putting this poster together, 49 technologists, representing the majority of the technologists in the department that interact with trauma patients had taken the teaching module. The intention is to give this module to all the relevant radiology technologists. The technologists that were not included were from nuclear medicine, mammography, and ultrasonography (who are never in a situation where they have to transfer patients in spine precautions). As for the test results, less than a quarter of the participants passed the pre-test. However, all participants passed the post-test and demonstrated proficiency in performing the transfer maneuvers. With the success of this teaching module, the radiology department has asked us to video record it so that it can be administered to new employees in the future.

Conclusion

Stiff backboards were designed to assist in extrication of patients from motor vehicle collisions. However, they have been used to immobilize trauma patients during extrication, transport, evaluation and treatment. No studies have demonstrated improved outcomes from immobilization on stiff backboards. Furthermore, recent studies have demonstrated significant morbidity and mortality associated with prolonged backboard immobilization. There is a national trend in major trauma centers to remove patients from the stiff backboards immediately after the primary survey, and if there is concern for a spinal injury, maintaining them in spine precautions. Our level one trauma center did not have any formal education for the radiology technologists on the proper techniques of safely transferring patients in spine precautions. We developed and successfully administered a teaching module for the technologists about spine precautions and techniques of proper transfer. The participating technologists demonstrated comprehension of spinal precautions and proficiency in transfer techniques. We have been asked to video record this teaching module so that it can be used to teach future new employees. This module is a valuable teaching tool, and can easily be implemented in other hospitals.

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