STABILIZATION OF THE SPINE IN PATIENTS WITH SUSPECTED CERVICAL SPINE INJURY IN MULAGO HOSPITAL

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ABSTRACT

Background: **Cervical spine injury (CSI) occurs in 5-10% of major trauma patients. Interventions instituted immediately following injury are the greatest determinants of outcome. Cervical spine stabilization immediately following suspicion of CSI, appropriate resuscitation, evaluation and early reduction have been shown to be important in reducing morbidity and mortality.**
Objective: **Establish the current practice as regards the initial stabilization of the spine in patients with suspected CSI and recommend corrective measures if any.**
Design: **Cross-sectional descriptive study carried out between December 2008 and March 2009.**
Setting: **Mulago National Referral and Teaching Hospital, Kampala, Uganda.**
Subjects: **One hundred and five trauma patients. Ninety one were males and 14 females aged 5-69 years.**
Results: **Only 28 (27%) of the patients got some form of cervical spine protection with the bulk getting improvised collars of unknown efficacy. Only 2 (2%) patients had the recommended rigid cervical collar. None had the rest of the spine stabilized.**
Conclusion: **This led to the conclusion that the stabilization of the cervical spine in patients with suspected CSI was suboptimal.**

INTRODUCTION

An initial survey of patients seen in Mulago Hospital showed that various aspects of the initial care afforded to patients with CSI was suboptimal. Cervical spine stabilization immediately following suspicion of CSI, appropriate resuscitation, evaluation and early reduction have been shown to be important in reducing morbidity and mortality.

To improve the care of CSI patients, an evaluation of current practice and institution of corrective measures where needed was proposed.

It is acknowledged that CSI is the most devastating musculoskeletal injury. Its effects have been recognized since the advent of science. Galen, in 177 CE, reported on his experiments in animals and described loss of movement and sensibility below the level of cord transection until breathing stopped at higher levels (1).

Time has not blunted the ill effects of CSI. In the United States, 6000 deaths and 5000 new quadriplegias occur annually as a result of CSI (1). CSI occur in 5 – 10% of all major trauma cases (2). Local incidence is not known. Up to 40% of patients with CSI will develop neurological deficits (1).

As soon as CSI is suspected, the patients cervical spine in particular and the rest of the spine should be stabilized (3,4). Any patient whose cervical spine cannot be cleared clinically should have his or her cervical spine immobilized(5,6). Studies have shown that clinical criteria is predictive of CSI (7-9). These criteria should be used to determine which patient requires stabilization.

Stabilization of the spine should be done at the site of injury before the patient is transported to hospital. This is however not the case most of the time in our setup. In a study on the pre-hospital care of trauma patients, only 0.3% of patients reviewed arrived in Mulago hospital with a cervical collar in place (10).

Cervical spine stabilization is done using various methods the commonest of which is using a rigid cervical collar. The rest of the spine is stabilized using a spine board until the spine is cleared at the earliest practical opportunity (4, 11).

Podosky and Balaff (12) evaluated the effectiveness of different immobilization modalities using gonimetric measures and found that the combination of a rigid collar, sandbags and tape offered the best immobilization. Other studies (12-15) got similar conclusions. The use of a soft collar alone permits 75% of the normal neck movements. A rigid collar permits 30% of normal flexion and extension and up to 50 % of rotation and lateral flexion. A combination of a spine board, sand bags and a rigid collar only allows 5% of the normal neck movements (15).

Stabilization of the spine should be done following the mantra that 'spinal stabilization is a priority, clearance is not'(11).The patient is moved as a whole when there is need to move him/her using the log-rolling technique.

It is important to stabilize not just the cervical spine for two reasons. Firstly, it is not uncommon for spinal injury to occur at both the cervical spine and another location at the same time (16,17). Secondly, there is a risk of the cervical spine becoming the axis of rotation for the rest of the body when it is the only immobilized part of the body especially in unresponsive multiple injured patients (11). For this reason, strapping should be applied to the shoulders, pelvis as well as the head and fixed onto a spine board.

All these measures aim at preventing aggravation of injury in an unstable spine.

MATERIALS AND METHODS

This was a cross-sectional study in which 105 trauma patients with either: neck pain/midline cervical tenderness; neurological deficits referable to the cervical spine; unconsciousness (GCS<15) or who were disoriented in time place and person as a result of head injury or intoxication were recruited.

Patients for whom the initial management was instituted elsewhere and not in Mulago Hospital were excluded.

After the initial stabilization, resuscitation, evaluation and treatment, the timing and modality of cervical spine stabilization as well as that of the rest of the spine were recorded.

One hundred and five patients were recruited into the study. Ninety one (86.7%) were male while 14 (13.3%) were females. The mean age was 30.14 years with a standard deviation of 13.07 years.

RESULTS

Only 28 (27%) of the patients had their cervical spine stabilized with only 2 (2%) being immobilized in the recommended rigid cervical collar. Others were managed as shown in Figures1 - 4.

Figure 1
Cervical spine immobilization

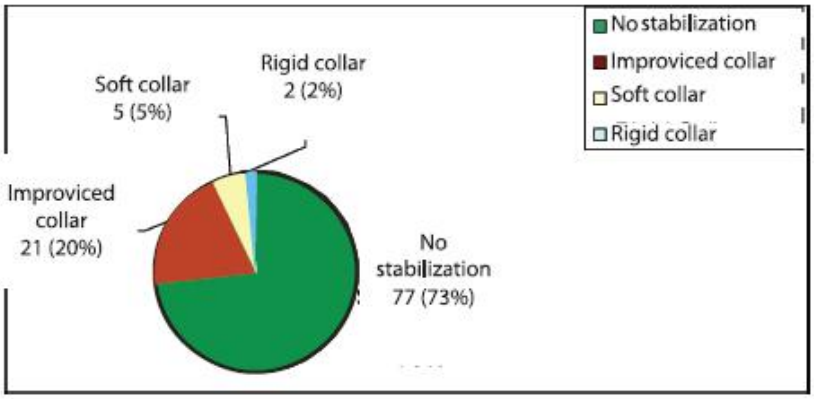

Figure 2
A patient with C3 laminar fractures and bifacet dislocation of C3/C4 has his cervical spine stabilized with a rolled-up bed sheet

Figure 3
A soft collar used to immobilize the cervical spine

Figure 4
An improvised collar applied wrongly

Time lapse from arrival in hospital to cervical spine protection: For the 26 patients who got some form of cervical spine immobilization, Table 1 summarizes the time lapse from the time the patient arrived to when the cervical protection was applied.

Table 1

Time lapse before cervical spine stabilization

Time lapse from arrival to stabilization of cervical spine	Number	Percentage
>30 minutes	2	7.7
30 – 60 minutes	8	30.8
>1 hour	16	61.5

Protection of the rest of the spine: None of the 105 patients had any form of protection for the rest of the spine.

DISCUSSION

Of the 105 patients recruited, the youngest was 5 years old while the oldest was 69 years.The mean age was 30.14 years with a standard deviation of 13.07 years. The median age was 28.0 years and so was the modal age. The most productive age group was found to be the most commonly admitted with suspicion of cervical spine injury with 68.3% of the patients being aged between 20 and 40 years. Most were involved in different economic activities with only 14 (13.3 %) of them being unemployed and 11 (10.5%) being students. Ninety one (86.7 %) were male compared to 14 (13.3%) females. This compares with the finding of a previous study conducted in Mulago hospital targeting trauma patients (10).

All studied patients had been deemed to require cervical spine immobilization as they had features suggestive of cervical spine injury and their cervical spine could not be cleared clinically and should therefore have received cervical spine protection pending clearance (4-6, 11).

This was not the case as the bulk of these patients, 77 patients representing 73.3% of the total, did not have any form of cervical spine protection. They were thus potentially predisposed to aggravation of their injuries. This anomaly needs to be corrected.

Twenty one (20%) had improvised collars. While the efforts of the personnel who fabricated these must be lauded, their efficacy is uncertain. Their use should be limited to the pre-hospital setting when the recommended rigid collar is unavailable.

Five (4.8%) of the patients had soft collars. As documented by Podolsky and Balaff (12) these offer little if any protection and perhaps only serve as a reminder to the patient not to move their neck excessively. Up to 75% of the normal neck movements are possible in persons immobilized with soft collars.

Only 2 (1.9%) of the patients reviewed had the recommended rigid cervical collar (12). This reflects poorly on the quality of care offered to patients with cervical spine injury. It is necessary to therefore improve on this by ensuring that rigid cervical collars are made available in the emergency department.

Time lapse from arrival in hospital to cervical spine protection: Cervical spine protection should be commenced immediately cervical spine injury is suspected preferably at the accident scene. This rarely occurs in our setup owing to poorly established pre-hospital care system (10). It is expected that this anomally is corrected immediately upon arrival in hospital.

The findings of this study show that this was not the case. There was a significant delay between arrival and time of cervical spine protection. Of the paltry 26 patients who received some form of cervical immobilization, only 2 (7.7%) received collars within 30 minutes of arrival in hospital. Only 10 (38.5%) had received collars within the first hour of arrival in hospital.

The patients were therefore still prone to aggravation of their injuries even after arrival in hospital and in many cases after the clinicians had made a diagnosis of cervical spine injury. This trend needs to be corrected.

Efforts were made to provide collars for all the patients who had none at the time of recruitment into this study and to change to rigid collars for those who had improvised collars or soft collars.

Protection of the rest of the spine: Despite knowledge that spinal injury may occur at multiple levels, none of the patients had any protection to the rest of the spine (16, 17). This meant that any patient who might have had an injury at another level was prone to worsening of this injury. In addition to this, protection of only the cervical spine in unresponsive patients may convert it into the axis of rotation for the rest of the body predisposing it to further injury (11).

The genesis of this problem is the lack of appropriate protective devices such as spine boards in the emergency unit.

CONCLUSION AND RECOMMENDATIONS

The protection of the cervical spine as well as the rest of the spine was not satisfactory in the patients reviewed in this study.

It is recommended that; Continuous medical education sessions be organised to train/retrain all emergency staff on the need to stabilize the cervical spine and the rest of the spine as soon as CSI is suspected and adequate stocks of cervical collars, spine boards and sandbags be provided in the emergency department to be used on patient with suspected CSI who arrive at the emergency department without protection of the cervical spine.

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