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Cervical Splinting Offers a New Paradigm in EMS

X Collar encourages a new method for practicing c-spine management

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Even before EMS was established, rescue personnel have used their best efforts to save patients by means of current techniques and equipment available. Since its infancy, emergency medicine has evolved thanks to continued improvements in the methods and tools necessary to meet the needs of critical patients in challenging conditions.

One such evolution is Cervical Movement Restriction (CMR). A series of steps and multiple personnel are required to perform c-spine immobilization procedures on a single trauma patient with potential cervical spinal injury. This important procedure must wait to be performed until EMS providers and rescue crews have addressed other priorities like scene safety, patient assessment, triage (if multiple patients), ABCs, treatment of the most critical patients, extrication (if limited or no access) and many other issues.

Searching for the Best Care

The need to improve the way c-spine management has been performed became evident to me after applying hundreds, if not thousands, of conventional c-collars on patients. As an EMS provider performing this BLS procedure, I always reassured and instructed patients to be still while informing them that the collar would work as a reminder not to move, all the while knowing the devices we were using worked marginally at best. My frustration grew as I began to question the efficiency of the devices and procedures used, and if we were actually providing the best care possible for our critical patients. I was compelled to do something that would enhance the way we approached c-spine management, expedite treatment and improve the outcomes of trauma patients.

There were several problems that needed to be addressed in order to substantially improve the practice of this procedure. The first problem we faced with conventional c-collars was that they work by wedging hard plastic between both of the trapezius muscles and around the base of the cranium to restrict motion of the patient's head. This action, upon the presence of a fracture or ligamentous injury, inevitably has the tendency to separate the head from the body, therefore extending the neck and potentially creating distraction of the cervical spine. As a result, EMS providers could involuntarily worsen existing injuries, causing irreversible neurological damage, internal decapitation and even death. (See clinical study by: Ben-Galim P, Dreiangel N, Mattox KL, et al.

Extrication collars can result in abnormal separation between vertebrae in the presence of a dissociative injury, *Journal of Trauma-Injury, Infection, and Critical Care* 60:2 447-450, August 2010).

Secondly, the techniques currently used need improvement since they were developed within the inadequate limitations of conventional c-collars and other equipment used. Most c-spine management protocols mandate that providers place trauma patients with suspected cervical spinal injuries into the in-line neutral position unless they complain of pain or discomfort. This contradicts the principles of avoiding movement to prevent further injury. We should not need to wait until our patients complain of pain upon movement to stop our efforts of re-aligning their heads.

Why is the Neck Different?

Basic first aid and common sense teaches us to splint broken bones and injured joints in the position found or "position of comfort" to avoid further injury. Why don't we treat the neck the same way? Why do we move our patients' heads before stabilization and transport? Why do we place our ambulatory patients on full spinal boards in cases where we only have the suspicion of a cervical spinal injury? When asking these and many other questions to every EMS provider and doctor I know, I was unable to obtain a satisfactory or compelling answer.

As an EMS professional, I became even more frustrated when perceiving these shortcomings as I witnessed patients in need waiting to be treated while their conditions worsened. I got tired of watching injured children and adults being able to rotate and nod their heads while trapped inside crashed vehicles as they ignored our instructions to sit still. I became determined to create something that would help us do better. I felt the need for a better tool and method that could allow each patient to be treated sooner, and in a manner that would follow the principles we learn during training for other EMS and rescue techniques. Today, the inadequacies of c-spine devices and methods are more evident than ever and they have opened a field of discussion concerning how to make improvements on the existing state of protocols.

Back to Basics

This is how, with the help of other EMS professionals, we opted to take a logical approach and go back to basics by implementing the concept of splinting. We achieved this by designing a device to secure the head to the torso of the patient on two points anterior and two posterior, above C-1 and below C-7. Thus, the concept of cervical splinting (CS) was born. Unlike conventional methods, CS technology uses a new method of application to avoid any potential distraction of the cervical spine, while minimizing unnecessary movement at the site of the injury. Using this technology a single rescuer can splint the patient's head in the position found, thus preventing the possibility of worsening his or her condition or causing internal decapitation.

Cervical splinting not only improves quality of patient care, but also gives EMS professionals new capabilities and several advantages increasing the effectiveness of our field work. A CS device is designed to be used on both adult and pediatric patients. It is adjusted on the patient during application to obtain a customized fit, thus eliminating the use of fingers to approximate size of conventional devices to the size of the patient (a very inaccurate procedure being used as the starting point to apply current CIDs). CS also eliminates the occurrence of ill-fitted c-collars which lack the capabilities to adjust both vertically and bilaterally, and have been clinically proven to do more harm than good.

During CS, a single rescuer can simultaneously control c-spine and customize the splinting system to the patient's size and position instead of requiring multiple personnel to initiate treatment on trauma patients. This is a critical

advantage at the scene of MCIs or MVIs. Furthermore, once CS has been performed on a patient, the level of stabilization obtained is higher than while holding manual c-spine, thus allowing providers to effectively perform early treatment on multiple patients and to address other priorities at the scene of the accident.

A New Paradigm

Prior to now, matching all of these capabilities could have only been achieved through the use of additional manpower, extra equipment, additional time and substantial improvisation. As it ensures higher patient safety, expedited treatment and better outcomes, CS is now becoming a new paradigm for the management of cervical spinal injuries in the field of EMS.

We encourage emergency providers to further investigate this topic both for an educational aspect and in improve in their own procedures towards the quality of patient care. For videos and more information, please visit www.xcollar.com.

Martin Rizo Patron is the inventor of the "XCollar Plus" and "NeXsplint Plus" Cervical Spinal Splinting Systems and the president-founder of Emegear LLC manufacturing and distribution company. Working with EMS professionals worldwide, he leads the research and training development for the C-spine splinting technology. Martin worked for more than six years as a firefighter, EMT-D for the Santa Barbara County Fire Department in California. Prior to joining the U.S. military in 1993, he worked as a beach patrol lifeguard in Miami, FL. He has been involved in different capacities with emergency responses, rescue and salvage operations for 22 years. He is a retired U.S. Army deep sea diver, certified by the U.S. Navy at the Naval Diving Salvage Training Center (NDSTC) in Panama City, FL. Contact him at mrizopatron@xcollar.com.