# Review of Management of Lower Cervical Spine Injury

## Essay

**Submitted For Partial Fulfillment Of The Master Degree In General Surgery.**

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**To my father, to whom I owe everything, and to my siblings, Hazem and Ahmed who will carry our family's legacy.**

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# الملخص العربى


تؤثر الصدمات الشديدة للفقرات العنقية بدرجة كبيرة على الحبل الشوكي مما يؤدى إلى حدوث شلل رباعي أو ضعف و إعاقة في أحد الأطراف الأربعة مسببة مشكلات صحية واجتماعية لمن يتعرضون لهذه الإصابات و على المجتمع ككل.

ويأتي دور الأطباء في العمل على تقليل أثر هذه الصدمات على الحبل الشوكي و بالتالي خفض نسبة المضاعفات الناشئة من إصابة الحبل الشوكي والتعامل معها بأسرع ما يمكن .

وتعد إصابات الفقرات العنقية أكثر حدوثا في الشباب ما بين سن16-30 سنة ،كما تبين أن نسبة الإصابة في الرجال إلى النساء هي 1:4.

وقد لوحظ أن معظم الإصابات تحدث بسبب حوادث الطرق ،حيث تبلغ نسبتها (50%)،أما السقوط من علو فتبلغ نسبته (22 %) ، والمشاجرات ( خاصة حوادث الطلق الناري ) (14%)،وكذلك إصابات الملاعب و الرياضة و نسبتها(14%) ..

ووجد أن 3%-25% من إصابات الفقرات العنقية والحبل الشوكي تحدث أثناء نقل المريض وعمل الأسعافات الأوليه. .

ولهذا للوقاية من إصابات الفقرات العنقية والحبل الشوكي لابد من أمرين

أولا:العمل على تقليل معدل الحوادث.

ثانيا:أذا تم وقوع الحادث يجب التعامل معه بطريقة صحية سليمة أثناء النقل وعمل الأسعافات الأوليه بحيث ينقل المريض كوحدة واحدة مع تثبيت الرأس والرقبة ووضع رقبة للمريض. (Neck Collar)

وفى الحوادث نتوقع حدوث إصابات الفقرات العنقية حتى يثبت غير ذلك بواسطة الفحص الأكلينيكى والأشعات وبعد الأطمئنان على العلامات الحيوية الأساسية يتم نقل المريض ألى أقرب مستشفى أو مركز مؤهل متوافر به الأمكانيات اللازمة للعناية بهذة الحالات من أجراء الجراحات اللازمة لمثل هذة الحالات .

ومن الأشياء الضرورية والأساسية فى إصابات الفقرات العنقية والحبل الشوكي أعطاء دواء (سوليو ميدرول) الكورتيزون خلال الثمانى الساعات الأولى من الحادث ويستحسن خلال الثلاث الساعات الأولى وذلك لتقليل أثر الأصابة على الحبل الشوكى والمحافظة على كمية الدم الواصلة أليه وهذا يؤدى ألى تحسن الحالات بصورة جيدة عن الحالات التى لم تعطى الكورتيزون.

ويتم فحص المريض أثناء الحادث وتحديد مستوى الأصابة ويتم مراجعة الفحص لتحديد مدى التحسن والتأخر فى حالة المريض .

وبعد استقرار حالة المريض وعمل الفحوصات اللازمة وتشخيصها يتم أزالة الضغط عن الحبل الشوكى بأسرع مايمكن وتكون هناك موازنة بين فوائد وأضرار الجراحة السريعة بالنسبة للمريض ومدى تأثير الضغط علىالحبل الشوكى ومعدل الأصابات المصاحبة وضررها على المريض.

# رؤية حول طرق علاج إصابات الفقرات العنقية السفلية

***توطئة للحصول علي درجة الماجستير في الجراحة العامة***

*رسالة مقدمة من الطبيب*

مدحت أحمد الطوخى
بكالوريوس الطب و الجراحة

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# Abbreviations

- CNS= central nervous system.
- CSF=cerebrospinal fluid.
- CT= computerized tomography.
- CSI=Cervical Spine Injuries.
- MRI=: magnetic resonant image.
- LCT = lateral corticospinal tract.
- ACT = anterior corticospinal tract.
- PC = posterior column.
- STT = spinothalamic tract .
- NASCIS = National Acute Spinal Cord Injury Study.
- PMMA = Poly Methyl Meth Acrylate cement.
- pp = pinprick.
- temp = temperature.
- vs = vibration sense.
- jps = joint position sense.
- lt = light touch.

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# Introduction

Cervical spine is classified as upper cervical spine C1 and C2, and Lower cervical spine C3 to C7.

**(Nightgale et al., 2002)**

The yearly incidence of the spinal cord trauma ranges from 28 to 50 patients per million people. There are approximately 10000 new cases occurring each year .

An increase in prevalence during the past decade has been attributed mainly to enhanced longevity of spinal injuried patients. Increased survivorship as well as improvement in the neurological outcome have been attributed to enhanced medical, surgical and pre-hospital care.

(**Wilkins , 2005)**

The most important factor associated with the genesis of significant cervical injury is the concomitant occurrence of a serious head or trunk injury .

**(Eismont et al., 2004)**

Optimal treatment of patient with cervical injury relies on an accurate radiological assessment of the traumatic lesions with respect to existing abnormalities and the underlying mechanism of injury.

**( Bach et al .,2001 )**

Cervical spine injuries are frequently associated with compressive damage to neural tissue and consequently poor clinical outcomes. Neurological injury typically occurs from disc, ligamentous or bony occlusion of the spinal canal and intervertebral foraminal spaces dynamically during an injury event or with abnormal alignment and position after the injury event .

**(Nuckley et al., 2002)**

Cervical traction creates a longitudinal pull along the cervical spine which reduces deformity, restores normal anatomic alignment and provides stabilization.

There are essentially three methods of applying cervical traction; the head halter ,cranial tongs and the hallo ring .

(**Wilkins, 2005)**

In contrast to the thoraco-lumbar spine, the cervical spine beers a lower biomechanical load and therefore, anterior stabilization of a fracture is a definitive procedure of a majority of cases. What remains the matter of choice is screw fixation of the body of the vertebra involved.

**(Stulik et al., 2003)**

# Aim of the study

To review the incidence, diagnosis and management of lower cervical injury.

# Development

At birth most vertebrae are composed of three bony regions: the body and two lateral masses, which will constitute the neural arch, these regions correspond to three initial centers of ossification that are joined by hyaline cartilage .The point of union between the body and the arch (pedicles) is known as the neurocentral synchondrosis. This synchondrosis may persist for several years.

In the cervical vertebrae, the lateral ossification centers form a greater amount of the body than they do in the vertebrae of other regions .The fifth, sixth, and seventh cervical vertebrae have additional ossification centers for the costal processes, In the remaining cervical vertebrae, the costal processes ossify by growth of the lateral ossification centers. If the costal processes of the seventh cervical vertebrae remain separate, they will develop into cervical ribs. **(Snell,2001)**

## FORMATION OF THE VERTEBRAE FROM SCLEROTOMES :

During the 4$^{th}$ week of development, cells of the sclerotomes shift their position to surround both the spinal cord and notochord. This positional change is effected by differential growth of the surrounding structures and not by active migration of the sclerotomal cells. This mesenchymal column retains traces of its segmental origin as the sclerotomic blocks are separated by less dense areas containing intersegmental arteries.

During further development, the caudal portion of each sclerotomal segment proliferates extensively and condenses. This proliferation is, so extensive that it proceeds into the subjacent intersegmental tissue and binds the caudal half of one sclerotome to the cephalic half of the subjacent sclerotome. Hence, by incorporation of