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FREQUENCY OF CERVICAL DISLOCATIONS IN A GROUP OF CERVICAL INJURED PATIENTS

BOYUN YARALANMALI HASTA GRUBUNDA SERVİKAL ÇIKIKLARIN SIKLIĞI

Cem ÇOPUROĞLU*, Mert ÖZCAN*, Mert ÇİFTDEMİR*,
Ayşe Ovul ULUSAM, Erol YALNIZ*****

SUMMARY:

Aim: Cervical spine injuries are the most challenging injuries in the vertebral column. Because of the importance of the passing neurologic structures in the cervical spinal column, morbidity and mortality of the injury increases. We aimed to evaluate the frequency of cervical dislocations in a cervical injured patient group.

Patients and Methods: We retrospectively evaluated our cervical injured patient group. The study group included the patients, who were treated in our clinic because of cervical injuries between 1999 and 2009. In a series of cervical injured patients (n:142), cervical dislocations were scoped. Age, gender, trauma type, anatomical localizations and neurological status of the patients were evaluated.

Results: There were 40 cervical dislocations in 142 cervical injured patients. One of them was atlanto-occipital dislocation, 10 C1-2, 3 C2-3, 4 C3-4, 3 C4-5, 10 C5-6, 7 C6-7 and 2 C7-T1 dislocations. Mean age of the patients was 41.2 years (4-76), 27 male, 13 female patients, 5 with minor traumas, 17 with traffic accidents and 18 because of a fall from height.

Conclusions: Cervical dislocations are a big group of cervical injuries. Mostly injured areas are the upper and lower cervical junctional areas which are more mobile.

Key Words: *Cervical spine, Dislocation, Frequency*

Level of Evidence: *Retrospective case series study, Level III*

(*) Assistant Professor, MD, Trakya University Medical Faculty, Department of Orthopaedics and Traumatology, Edirne
(**) Resident in Orthopaedics, MD, Trakya University Medical Faculty, Department of Orthopaedics and Traumatology, Edirne
(***) Professor, MD, Trakya University Medical Faculty, Department of Orthopaedics and Traumatology, Edirne

Yazışma Adresi: *Cem Copuroglu, Trakya Üniversitesi Tıp Fakültesi, Ortopedi ve Travmatoloji Ana Bilim Dalı Sekreterliği 22030 Edirne*
Mail: *cemcopur@hotmail.com*
Phone: *0 284 2357641-4707*
Mobile: *0 532 3361923*

ÖZET:

Amaç: Boyun bölgesi yaralanmaları tüm omurga yaralanmaları içinde en zor yaralanmalardır. Bu bölgeden geçen nörolojik yapıların önemi, yaralanmanın morbidite ve mortalitesini arttırmaktadır. Boyun bölgesi yaralanmalı bir hasta grubu içinde servikal çıkık sıklığını değerlendirmeyi amaçladık.

Hastalar ve Yöntem: Boyun bölgesi yaralanmalı bir grup hastayı geriye dönük olarak inceledik. Çalışma grubunu, bizim kliniğimizde 1999-2009 yılları arasında servikal yaralanma nedeni ile tedavi gören hastalar oluşturdu. Servikal yaralanmalı hasta grubu içinde (n=142), servikal çıkıklar değerlendirildi. Hastaların yaşı, cinsiyeti, travma şekli, yaralanmanın anatomik yerleşimi ve hastaların nörolojik muayeneleri kaydedildi.

Sonuçlar: Servikal yaralanmalı 142 hasta içinde 40 servikal çıkıklı hasta tespit edildi. Bu çıkıkların biri atlanto occipital çıkık idi, 10 C1-2, 3 C2-3, 4 C3-4, 3 C4-5, 10 C5-6, 7 C6-7 ve 2 C7-T1 çıkık tespit edildi. Hastaların yaş ortalaması 41.2 (4-76), 27 erkek, 13 bayan hastadan oluşuyordu. Beş hasta minor yaralanma sonucu, 17 hasta trafik kazası sonucu ve 18 hasta yüksekten düşme sonucu yaralanmıştı.

Çıkarımlar: Servikal çıkıklar boyun bölgesi yaralanmalarının büyük bir bölümünü oluştururlar. Daha çok yaralanan bölgeler, daha hareketli olan üst ve alt servikal geçiş bölgeleridir.

Anahtar Kelimeler: *Servikal omurfga, Çıkık, Sıklık*

Kanıt Düzeyi: *Retrospektif klinik çalışma, Düzey III*

INTRODUCTION:

Trauma is the leading injury mechanism and a major public health problem. Cervical spine is injured in 2 % to 3 % of patients who sustain blunt trauma [4,8]. Although the frequency of cervical injuries seems to be low, the potential for neurologic injury and instability makes these injuries challenging. Cervical spine injuries range in severity from minor ligamentous strain or spinous process fracture to complete fracture-dislocation with bone and ligament failure, resulting in severe spinal cord injury [6]. Cervical injuries cause a big amount of economical costs for the countries but the greatest cost is for the patient. The disability after a cervical spinal cord injury is really expensive for the patient because it causes a very disastrous and crippling disease.

Cervical injured patients make a large group of fractures, dislocations, soft tissue injuries and spinal cord injuries without bone involvement. In this large group of patients, we focused on the cervical dislocations of the whole cervical region with or without other injuries and we aimed to evaluate the frequency of cervical dislocations in this cervical injured patient group.

PATIENTS AND METHODS:

This is a retrospective case series study and data were collected from hospitalized cervical injured patients over a ten-year period (Between 1999 and 2009). The patients were treated in our university hospital orthopaedics and traumatology department which accepts patients whose treatment could not be completed at smaller hospitals of our region. Age, gender, trauma type, anatomical localizations and neurological status of the patients were evaluated according to the existing data.

The main inclusion criterion for the study group was cervical dislocations of the whole cervical vertebrae (upper cervical and subaxial cervical spine). Patients having concomitant spine and other extremity injuries were evaluated but the main focus of the study was cervical dislocations. Unilateral or bilateral facet dislocations, fracture-dislocations, occipitoatlantal and atlanto-axial dislocations were included. The study group included 40 patients having cervical dislocations in a group of 142 cervical spine injured patients.

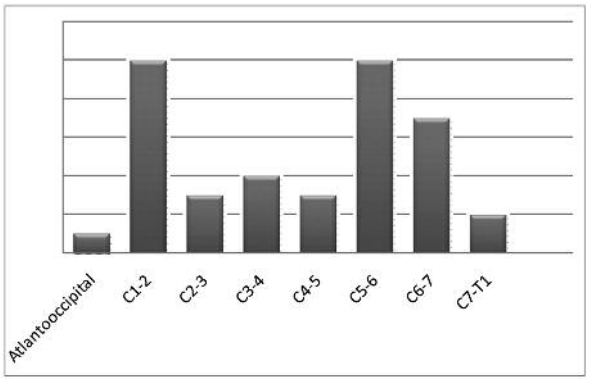
In the evaluation of the neurologic status, we used American Spinal Injury Association (ASIA) Impairment Scale. Type A injury meant complete neurological impairment with no motor or sensory function preserved in the sacral segments. Type B injury is incomplete neurological impairment. Sensory but not motor function is preserved below the neurological level and includes sacral segments S4-S5. Type C injury is also incomplete. Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3. Type D injury is incomplete. Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more. Type E injury meant normal patients with a normal motor and sensory function.

RESULTS:

There were 40 patients, 27 male (67.5 %) and 13 female (32.5 %) with a mean age of 41.2 (range 4 to 76). Because of our hospital being a referral center, our study group included a high percentage of high energy injuries. The leading injury mechanism was fall from height including shallow water diving

injuries (45 %). Second most frequent injury mechanism was road side-traffic accidents (42 %). The rest of the patients were injured by other injury mechanisms such as simple falls or crushes. The frequency of cervical dislocations was examined and the most frequent dislocations were observed in the junctional areas (Table-1). Neurological impairment showed a wide variety (Table-2).

Table - 1. Frequencies of dislocations according to cervical levels.



DISCUSSION:

Cervical spine injuries account for many disabilities and deaths every year. The cervical spine may be divided into two regions; upper cervical region (occiput-C1-C2) and lower cervical region (C3-C7). The occipitoatlantoaxial complex is a transition zone between the cranium and the spine. The forces generated are complex and may be a reason for a variety of injury patterns. The unique anatomy of the upper cervical spine contributes to the flexibility of the neck. As in the upper cervical spine, stability in the lower cervical spine is enhanced by the circumferential attachments of the anterior, posterior and interspinous ligaments [11].

The vast majority of spinal column and spinal cord injuries occur in patients aged between 15 and 40 years. Children rarely have spinal injuries [9]. Although these injuries occur relatively infrequently, their complex diagnosis and management and the long term patient morbidity demand that specific attention be paid to this group of patients. Interpretation of radiographs in young patients with cervical trauma is challenging. Pseudosubluxation is seen commonly in children who are younger than 8 years of age [9]. The age of our study group ranged between 4 to 76, with a mean of 41.2.

Atlanto-occipital injuries are associated with high energy injuries and are frequently fatal [2]. Traumatic atlanto-occipital dislocation has been described more often in postmortem studies than in clinical reports [5]. Atlanto-occipital dislocation is defined as disruption of the ligaments and other supporting soft tissues as indicated by displacement in either a transverse or vertical direction. Patients with atlanto-occipital dislocations with intact neurologic function have been reported [12]. Atlantooccipital dislocation can be observed in 15 % of children and 6 % in adults [7]. It is reported that they consist of 0.7-1 % of all cervical injuries [3]. Anatomically, the plane of the atlanto-occipital joint is nearly horizontal and the size of the occipital condyles is smaller than it is in adults. In adults, 25 % to

Table -2. Neurological impairment of the patients concerning the etiologies.

Etiology	ASIA Type A	ASIA Type B	ASIA Type C	ASIA Type D	ASIA Type E
Fall from height (n=18)	8 (44%)	3 (17%)	-	3 (17%)	4 (22%)
Road side-traffic accidents (n=17)	6 (35%)	2 (12%)	2 (12%)	-	7 (41%)
Other (n=5)	-	-	-	-	5 (100%)

35 % of cervical injuries belong to the upper cervical spine [10]. This explains the higher prevalence in children as compared with adults [5]. In our series we observed 1 (2.5 %) atlantooccipital subluxation in a 4 year old girl with a minor trauma. She was neurologically intact, with ASIA type E neurologic impairment. We treated her with mento-occipital halter traction for 1 day.

The vertebrae of the subaxial cervical spine share similar anatomy with regard to the anterior and posterior bony elements, intervertebral discs, joint capsules, ligaments and surrounding neurovascular structures. Spinal stability is the most important consideration in the management of subaxial cervical trauma. According to White and Panjabi [13], spinal stability is the ability of the spine under physiologic loads to limit patterns of displacement so as not to damage or irritate the spinal cord or nerve roots, and, in addition, to prevent incapacitating deformity or pain due to structural changes. A wide variety of injury mechanisms cause subaxial cervical spine fracture and dislocations. A wide frequence of subaxial injuries occurs when all cervical injuries are taken into consideration. Three forths (75 %) of all dislocations occur within the subaxial spine, from C3 to C7 [1]. Facet dislocation or fracture-dislocation is caused by flexion and distraction forces, with or without an element of rotation [6]. The facets may be fractured, subluxated or dislocated (locked), either unilaterally or bilaterally. Facet fracture and dislocation injuries represent a spectrum of osteoligamentous pathology ranging from pure ligamentous dislocation to osseous fracture of the facet and/or lateral mass (6). In our series we observed 27 (67.5 %) dislocations in the subaxial spine, as it is almost similar in the literature.

Dislocation at the C7-T1 junction accounted for almost 17% of all injuries (6). We had 2 patients (5 %) with C7-T1 dislocation. One of them was a 58 year old man who fell from height and had C7 spinous process fracture concomitantly. The other patient was a 44 year old man who had bilateral facet dislocation as the result of a traffic accident.

When the whole cervical injuries are taken into consideration (n=142), dislocations in the cervical region makes a big amount (n=40,28%) in our study group. Spine injuries require careful clinical and radiographic evaluation and a high index of suspicion because failure to identify such injuries can lead to progressive deformity and catastrophic neurologic impairment.

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