

Establishment of a regional multicenter traumatic spine fracture/dislocation registry

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【Abstract】 Objective: Trauma is one of the leading causes of mortality and morbidity in adults and a major contributor to health care expenditures. Although spine-related injuries constitute a small proportion of trauma cases, they need special consideration due to poor functional outcomes and substantial burden. Despite relatively extensive previous studies on traumatic spinal injuries, there is still obscurity in some aspects of the issue. The purpose of this study is to establish a regional multicenter traumatic spine fracture/dislocation registry.

Methods: This is a prospective case series study, including all patients with acute traumatic spine lesions admitted to a regional multicenter since 2014. Data is extracted based upon a form developed by Sina Trauma and Surgery Research Center, Tehran University of Medical Sciences, Tehran, Iran. Novel electronic data entry software is initiated and data will be entered to the software. Information remains confidential and security

considerations will be taken based on standards of data entry systems.

Results: The results of this study will include age and gender distribution of the patients, causes of injury, location of pain and neurological deficit, the American Spinal Injury Association score and Frankel grade on admission, at discharge, after 6 and 12 months and at the latest annual follow-up, radiologic findings, details of operative procedures and methods of external fixation.

Conclusion: This study will identify prognostic factors that influence the ultimate fate of spine fracture patients and determine short and long-term outcome of different treatment methods. It can lead to a considerable improvement in patient care and will have a great national and transnational impact.

Key words: *Spinal fractures; Registries; Spinal injuries; Prospective studies*

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Trauma is one of the leading causes of mortality and morbidity in adults and a major contributor to health care expenditures. Although spine-related injuries constitute a small proportion of trauma cases,¹ they need special consideration due to poor functional outcomes and substantial burden.²

It is vital to diagnose spinal injuries in a timely manner. However, diagnosis is often delayed

due to a lack of obvious abnormality on physical examination. Thus, identifying the more susceptible demographic groups through epidemiologic studies is beneficial. Furthermore, domestic and regional variations (e.g. patterns and causes of injury) should be taken into account.³ Despite the vast number of previous studies, there is no agreement on the best treatment⁴ for a great number of traumatic spinal injuries⁴ and obscurity still exists in some aspects of the issue. The purpose of this study is to establish a regional multicenter traumatic spine fracture/dislocation registry.

METHODS

Subjects

We will include all patients with acute traumatic spine lesions admitted since 2014 to a regional multicenter (in an inpatient setting specialized in spine care is provided either by neurosurgeons or orthopedic surgeons who specialize in spinal

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surgery). Patients with non-traumatic spine lesions, and those who presented later than 3 weeks after injury will be excluded from the study.

Data collection and measures

Data will be extracted based upon a form developed by Sina Trauma and Surgery Research Center affiliated to Tehran University of Medical Sciences, Tehran, Iran. The form comprises the following data: patients' general information, demographics and past history; date of injury, admission, surgery and follow-ups; cause of injury; initial location of pain and neurological deficit; Frankel grade and the American Spinal Injury Association (ASIA) score; associate injuries; Abbreviated Injury Scale (AIS) and Injury Severity Score (ISS); classification based on the International classification of Diseases (ICD10); radiologic findings; external fixation methods; details of operative treatment including surgical techniques (approaches, implants, bone substitutes and fusion techniques, laminectomy and decompression of the spinal canal) and intraoperative complications; Frankel grade and ASIA score at discharge, after 6 and 12 months and annually thereafter. Novel electronic data entry software will be initiated and data will be entered to the software.

Statistical analysis

Standardized statistical tests (Student's *t*-test, χ^2 test, multivariate data and regression analysis) will be performed using SPSS software version 13.0. *P*-values equal to or less than 0.05 are considered statistically significant.

Ethical considerations

No further interventions other than standard management protocols are performed in the course of treatment of patients enrolled in this study. Therefore, no additional cost is imposed to the participants or health care system. Information remains confidential and security considerations will be taken based on standards of data entry systems.

RESULTS

The results of this study will include age and gender distribution of the patients, causes of injury, location of pain and neurological deficit, ASIA score

and Frankel grade on admission, at discharge, after 6 and 12 months and at the latest annual follow-up, radiologic findings, details of operative procedures and methods of external fixation.

DISCUSSION

The results of this study will identify prognostic factors that influence the ultimate fate of spine fracture patients and determine short and long-term outcomes of different treatment methods. It can lead to a considerable improvement in patient care and will have a great national and transnational impact.

Saadat et al⁵ described the epidemiology of blunt traumatic cervical spine (C-spine) fracture in Iran over a time period of 5 years (between 1999 and 2004). Most cases were identified to be young men sustaining injury in a motor vehicle accident. C-spine fractures represented about one fifth of all spine fractures.

Lowery et al⁶ and Goldberg et al⁷ used the National Emergency X-Radiography Utilization Study (NEXUS) database to characterize the demographics and pattern of C-spine injury among blunt trauma victims undergoing emergency department C-spine radiography. According to Lowery and colleagues' investigation, old age, male sex, and white ethnicity were associated with increased risk of C-spine injury. Goldberg et al indicated the atlantoaxial region to be the most common site of injury in C-spine, followed by the two lowest vertebrae.

A study of 90 cases of cervical unilateral facet injury aimed to identify patient and interventional variables that influence the outcome (i.e. pain and disability) at an average duration of 27.6 months after injury, measured by the North American Spine Society Cervical Pain & Disability Subscale (NASS BP) and the Short Form 36 Physical Component Score (SF PCS) and Bodily Pain (SF BP) subscale. Operatively-treated patients were observed to have better outcome scales than the nonoperatively treated, especially at longer follow-up, despite sustaining more severe injuries. Therefore, the authors strongly recommend surgery in such injuries. In addition, factors like associated injuries,

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