Cirugía y Cirujanos. 2015;83(2):94–99

CIRUGÍA y CIRUJANOS
Órgano de difusión científica de la Academia Mexicana de Cirugía
Fundada en 1933
www.amc.org.mx www.elsevier.es/circir

ORIGINAL ARTICLE

Craniocerebral gunshot wounds in civilian population: Analysis of experience in a single centre in Monterrey, México☆

Daniel Martínez-Bustamante, Samuel Pérez-Cárdenas, José Manuel Ortiz-Nieto, Raúl Toledo-Toledo, Ángel Raymundo Martínez-Ponce de León*

Servicio de Neurocirugía y Terapia Endovascular Neurológica, Hospital Universitario Dr. José Eleuterio González, Monterrey, Nuevo León, México

Received 24 April 2014; accepted 1 September 2014

KEYWORDS
Gunshot wound;
Cranial;
Decompressive craniectomy;
Prognosis

Abstract
Background: Gunshot wounds in civilian population of México were quite rare. Currently, conflicts amongst organised crime groups are carried out with weapons, which are considered as exclusive use by the nation's army.
Objectives: Describe the experience of our institution and share results of clinical and radiological factors influencing the prognosis of the patients.
Materials and methods: Observational and retrospective study of patients with cranial gunshot wounds, which penetrated the duramater, treated from January 2009 to January 2013. We considered several demographic variables, Glasgow Coma Scale, upon admission, state of pupils, type of surgery and size of decompression, Glasgow Outcome Score upon discharge, and after 6 months.
Results: Of 68 patients, we excluded those whose duramater was not penetrated, leaving 52 patients. The average age was 28.7 years, and 80.8% were males. All were surgically intervened, with 8% of general mortality. Mortality in the 3–5 points group was 43%, from the 6 to 8 points it was 6%, and no deaths in the 9–15 points. In patients with both pupils fixed, anisocoric and isocoric, mortality was 67%, 7%, and 3%, respectively. Bihemispheric, multilobar and unihemispheric trajectory of the bullet plus ventricular compromise was related to a Glasgow Outcome Score ≤ 3 upon discharge in 90.9% of the cases.

DOI of original article: http://dx.doi.org/10.1016/j.circir.2015.04.002
☆ Please cite this article as: Martínez-Bustamante D, Pérez-Cárdenas S, Ortiz-Nieto JM, Toledo-Toledo R, Martínez-Ponce de León ÁR. Heridas craneales por proyectil de arma de fuego en población civil: análisis de la experiencia de un centro en Monterrey, México. Cir Cir. 2015; 83: 94–99.
* Corresponding author at: Servicio de Neurocirugía y Terapia Endovascular Neurológica, Hospital Universitario Dr. José Eleuterio González, Francisco I. Madero Pte. y Av. Gonzalitos s/n. Col.: Mitras Centro, C.P. 64460 Monterrey, Nuevo León, México. Tel.: +52 81 8346 2698.
E-mail address: danmartz2282@gmail.com (Á.R. Martínez-Ponce de León).

Conclusions: Glasgow Coma Scale upon admission and state of the pupils are the most influential factors in the prognosis. Patients with a Glasgow Coma Scale > 8 < 13 points upon admission, normal pupillary response, without ventricular compromise can benefit with early and aggressive surgical treatment.

PALABRAS CLAVE
Herida por proyectil de arma de fuego;
Craneal;
Craniectomía descompresiva;
Pronóstico

Heridas craneales por proyectil de arma de fuego en población civil: análisis de la experiencia de un centro en Monterrey, México

Resumen
Antecedentes: Las heridas por proyectil de arma de fuego en población civil mexicana eran excepcionales. Actualmente los conflictos entre grupos de delincuencia organizada son con armas consideradas en México como de uso exclusivo del ejército.
Objetivos: Describir nuestra experiencia y compartir el resultado de factores clínicos y radiológicos de influencia en el pronóstico de los pacientes.
Material y métodos: Estudio observacional, retrospectivo de pacientes con herida craneal por proyectil de arma de fuego penetrando duramadre, tratados de enero de 2009 a enero de 2013, considerando variables: demográficas, escala de coma de Glasgow al ingreso, estado pupilar, tipo de operación y tamaño de descompresión, escala de resultados de Glasgow al egreso y a los 6 meses.
Resultados: De 68 pacientes excluimos a aquellos en los que no hubo penetración de duramadre, quedando 52. Edad promedio de 28.7 años, hombres un 80.8%, todos intervenidos quirúrgicamente y con mortalidad general del 8%. La mortalidad del grupo con escala de coma de Glasgow de 3-5 fue del 43%, de 6-8 fue del 6%, y nula con 9-15. En los pacientes con ambas pupilas fijas, anisocóricas e isocóricas, la mortalidad fue del 67, 7 y 3%, respectivamente. Una trayectoria del proyectil bihemisférica, multilobar y unihemisférica más compromiso ventricular se relacionó con escala de resultados de Glasgow en el momento del egreso $\leq$ 3 en el 90.9% de los casos.
Conclusiones: Escala de coma de Glasgow al ingreso y estado pupilar son los factores con mayor influencia en el pronóstico. Pacientes con escala de coma de Glasgow > 8 y < 13 puntos al ingreso, respuesta pupilar normal y sin compromiso ventricular se pueden beneficiar con tratamiento quirúrgico agresivo temprano.

Background

Wounds caused by firearm projectiles in the civil population in the city of Monterrey and its metropolitan area were considered exceptional, and most cases are related to suicide or armed robberies. Currently, conflicts among groups of organised crime involve weapons considered as for the exclusive use of the army in México, with victims being both women and men of all ages and with brain injuries where the kinematic of the trauma is greatly varied, from short distance ''executions'' to ''stray bullets'', injuring people from a long distance (resulting in a greatly varied spectrum of altered states of consciousness upon admission of patients), to intracranial trajectory of the projectile injuring only superficial brain structures, where the type of surgical intervention that will be most beneficial for the patient becomes extremely relevant, since it has been proposed that depending on the aforementioned variables, patients may benefit from aggressive surgical treatment.[1–4]

In 2011, the city of Monterrey ranked 38 among the 50 most violent cities in the world, 12 of which overall are in México.[5] For this reason, the purpose of our study is: to describe the experience of our neurological centre in the treatment of firearm projectile wounds in the cranium and share the result of the factors which contributed to the prognosis, as well as the decision-making regarding the neurosurgical approach based on clinical and imaging factors.

Materials and methods

We carried out a retrospective observational study, consulting the clinical files of patients with cranial firearm projectile wounds admitted into the Neurological Surgery and Neurological Endovascular Therapy of University Hospital Dr José Eleuterio González, from 1 January 2009 to 31 January 2013. All patients were assessed within the first 30 min after admission by the Emergency Department doctor and by a neurosurgeon, who performed a neurological