THE 16TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

Clinical case Study of a Patient Treated for a Craniocerebral Wound by Shooting

Emre Sarikaya[1], Diana Jimbu[2], Cristina Geanta[3], Bratu Catalin[4], Ion Bordeianu[5]

Abstract: Suicide and attempted suicide are a major cause of death worldwide, with the highest percentage being male at a young age. In Romania, suicide by shooting has a low incidence rate due to restricted access to firearms. A clinical case study was performed on a 27-year-old patient, hospitalized and treated at the Neurosurgery Department of the County Emergency Clinical Hospital, Constanta for a craniocerebral wound by shooting, following a suicide attempt. The patient was brought to the emergency department for a shot craniocerebral wound, with a submental entry point and a left frontal exit point. The patient's condition was good, he was conscious, cooperative, without neurological deficits present. Examination of the craniocerebral CT reveals left frontal intraparenchymal hematoma, small right frontal contusions, supratentorial subarachnoid hemorrhage, left frontal-parieto-temporal subdural hematoma blade and left facial and left fronto-parietal left hemimachial fractures, with comminution at the level from left frontal and maxillary hemosinus left frontal-temporal epicranial hematoma, bilateral submandibular subcutaneous emphysema and pneumocephaly. It is operated surgically, performing a scylectomy and repairing the dural defect with a favorable post-operative evolution.

Keywords: cranio-cerebral wound; brain laceration; suicide

Introduction

Suicide or attempted suicide is the act of a person causing his or her own death or attempting to do so.

Suicide is often committed out of desperation, the cause of which is often attributed to a mental illness such as depression, bipolar disorder, schizophrenia, alcoholism or drug addiction (Hawton & van Heeringen, 2009, pp. 1372–1381). It often plays a role and stressors such as financial problems or problems arising in interpersonal relationships.

Between 800,000 and one million people commit suicide each year, making it the tenth leading cause of death worldwide (Hawton & van Heeringen, 2009, pp. 1372–1381; Värnik, 2012, pp. 760–771). The percentage is higher in men than in women, with men three to four times more likely to commit suicide

[1] Faculty of Medicine, Ovidius University of Constanta, Romania, Address: Campus, University Alley, no. 1, Corp. B, Constanta, Romania, Corresponding author: srk.emre@yahoo.com.
[2] Faculty of Medicine, Ovidius University of Constanta, Romania, Address: Campus, University Alley, no. 1, Corp. B, Constanta, Romania, E-mail: diana.jimbu@yahoo.com.
[3] County Hospital of Constanta, Romania, Address: 145 Tomis Blvd, Constanța 900591, Romania, E-mail: geanta.cristina@yahoo.com
[4] Faculty of Pharmacy, Ovidius University of Constanta, Romania, Address: Campus, University Alley, no. 1, Corp. B, Constanta, Romania.
[5] Faculty of Medicine, Ovidius University of Constanta, Romania, Address: Campus, University Alley, no. 1, Corp. B, Constanta, Romania, E-mail: ion.bordeianu@yahoo.com.

than women (Meier, Marshall & Robert, 2008, p. 169). Between 10 and 20 million non-fatal suicide attempts take place each year (Bertolote & Fleischmann, 2002). Attempts are more common in young people and women.

The main methods of suicide vary by country. The main methods in different regions include hanging, pesticide poisoning and shooting (Yip, 2012, p. 379). These differences are considered to be due in part to the availability of different methods (Ajdacic-Gross, Weiss, Ring et al. 2008, p. 86).

In Romania, due to the restricted access to firearms, suicide and suicide attempt have a lower rate of occurrence compared to other states and compared to other methods present in Romania (Karch, 2011, pp. 1–49).

In most cases, suicide attempts by shooting have as location the cephalic extremity, producing secondary craniocerebral wounds with different locations and different interests and injuries of intracranial structures as a result of the extension of the lesion that is not limited to the trajectory of the projectile. and the explosion effect or pressure wave resulting from the dissipation of the energy developed by the detection of the high-velocity bullet[1].

Case Report

A 22-year-old patient with no personal pathological history presents for a shot craniocerebral wound following a suicide attempt. Neurologically, at admission, the patient is conscious, cooperating, GCS = 15, no signs of meningeal irritation, no cranial nerve deficits, no motor deficits, bilateral symmetrical ROT (+), bilateral CPR in flexion, with intense frontal headache, highlighting -the bullet inlet (under chin) and the outlet (frontal left)

Examination of the craniocerebral CT reveals: intranevral hematological accumulation with maximum axial diameters of 14/9 mm and cranio-caudal diameters of 48 mm, with perilesional edema, located left paramedian frontal that associates bone fragments with maximum diameters of 2/7 mm, hemorrhagic contusions right frontal infracentimetric, left frontal-parieto-temporal subdural hematoma blade with a maximum thickness of 4 mm, supratentorial subarachnoid hemorrhage, pneumocephaly, left facial hemimasive fractures and left fronto-parietal left, with left frontal comminution, left frontal hemisphere, bilateral submandibular subcutaneous emphysema (fig. 1- 5).

[1] https://www.atitimisoara.ro/content/ghiduri/2008/15%20Ghiduri%20de%20management%20al%20pacientilor%20cu%20traumatism%20cranio-cerebral%20grav.pdf.

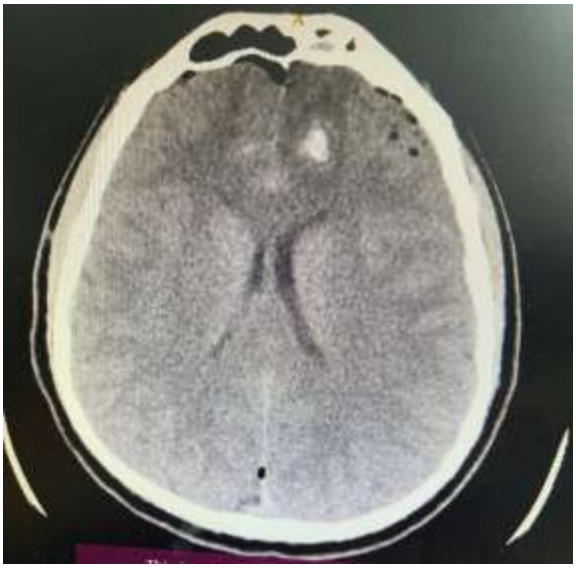

Figure 1. Cerebral CT scan, Axial View, Brain Laceration an Pneumocephaly

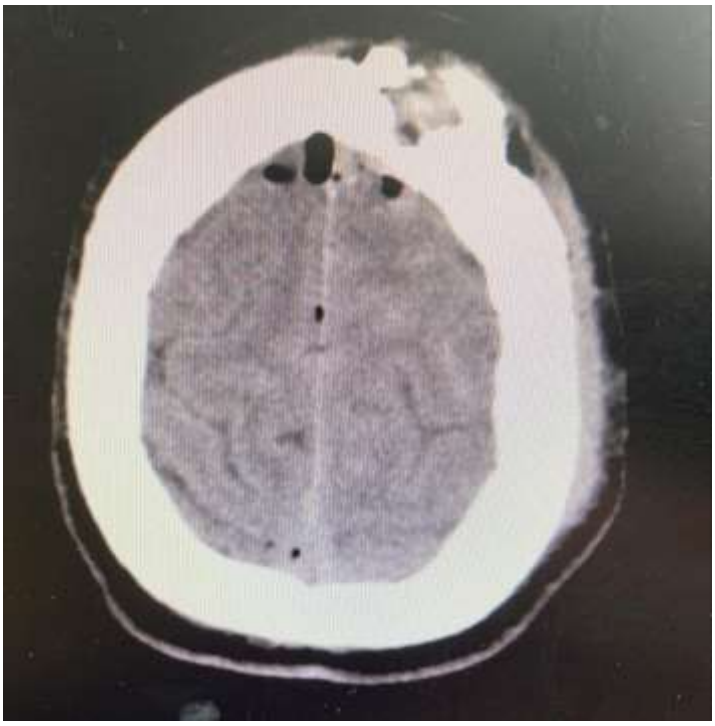

Figure 2. Cerebral CT scan, Axial View, Subarachnoid Hemorrage, Pneumocephaly and Extrusive Fracture of Frontal Bone

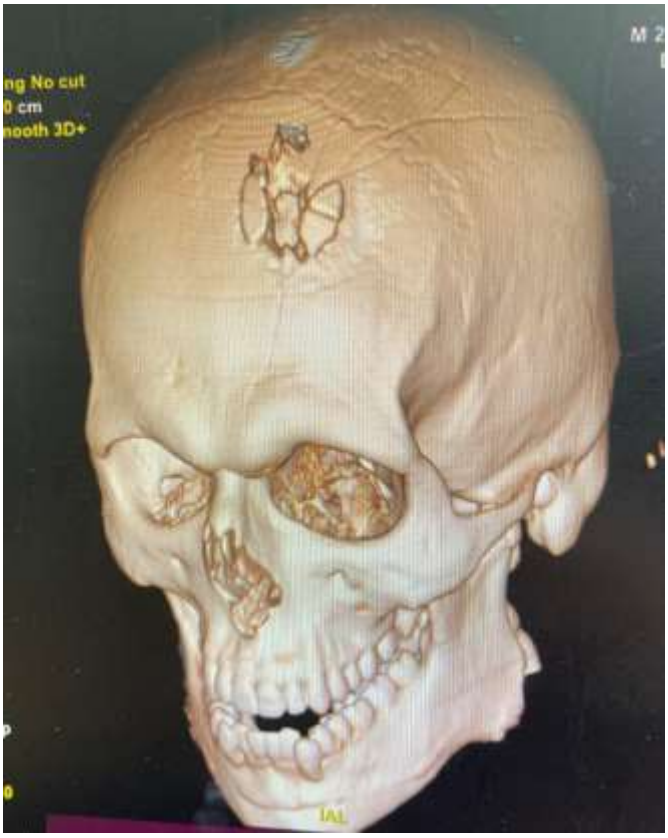

Figure 3. 3D Reonstruction of Cranium, Bullet Frontal Outlet

Figure 4. Cerebral CT scan, Coronal View, Bullet Trajectory with Brain Laceration and Extrusive Frontal Fracture in Bullet Outlet

Figure 5. Cerebral CT scan, Sagital View, Bullet Trajectory with Brain Laceration and Extrusive Frontal Fracture in Bullet Outlet

Patient it is operated in two phases, the biological constants allowing the intervention, initially practicing the surgical toilet of the craniocerebral wound, later, after antibiotic treatment with Meronem, 1 gx 3 / day and Vancomycin 1g x 2 / day, at 4 days practicing surgical treatment of left paramedian frontal cerebral laceration and repair of the dural defect

The post-operative evolution is good clinically and paraclinically, with the remission of the pain symptoms and with the dimensional regression of the hematous accumulations.

Examination of control craniocerebral CT, at 7 days postoperatively, reveals post-resorption edema of hemorrhagic contusions, resorption of subarachnoid hemorrhage, postoperative changes (fig. 6, 7, 8)

At discharge the patient is conscious, cooperative, GCS = 15, without neurological deficits present.

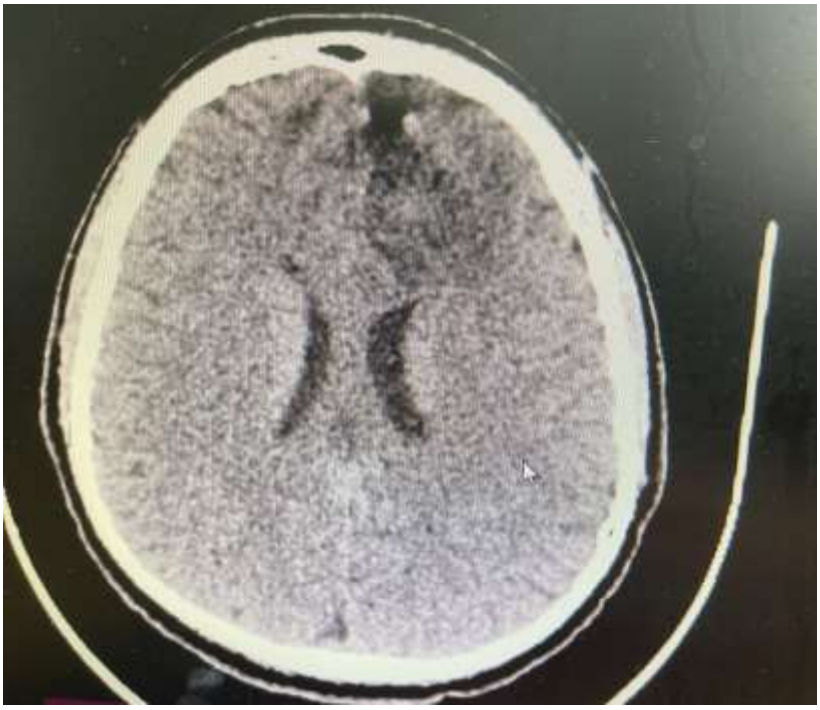

Figure 6. Cerebral CT scan, Axial View, Post-Operatively at 7 Days

Figure 7. Cerebral CT scan, Sagital View, Post-Operatively at 7 Days

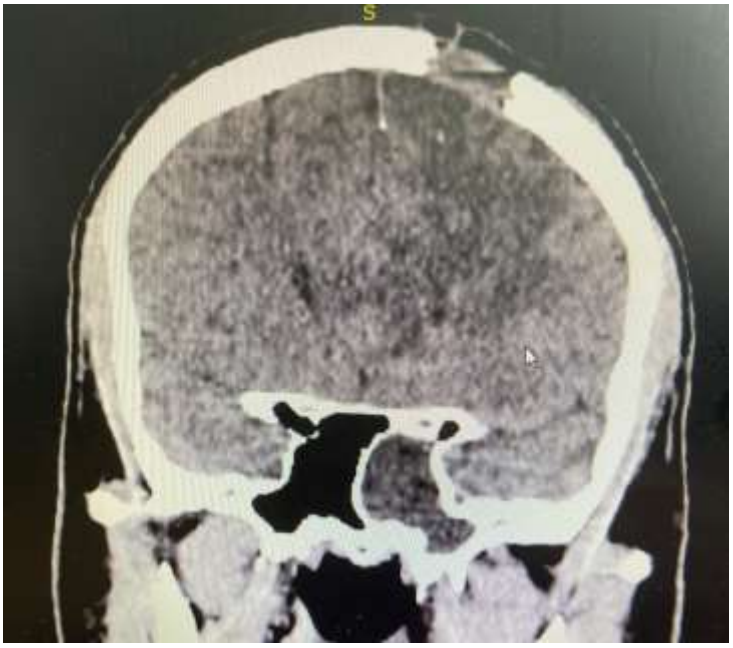

Figure 8. Cerebral CT scan, Coronal View, Post-Operatively at 7 Days

Discussion

Factors influencing the risk of suicide include mental illness, drug abuse, psychological states, cultural, family and social situations, and genetics (Karch, 2011, pp. 1–49).

It has been found that the suicide rate is higher in homes where there are firearms than in others (Miller, 2012).

The mortality rate in case of suicide attempts varies depending on the method: 80-90% shooting, 65-80% drowning, 60-85% hanging, 40-60% exhaust inhalation, 35-60% throwing from a height, asphyxiation with charcoal 40-50%, pesticides 6-75%, drug overdose 1.5-4%. (Ajdacic-Gross, Weiss, Ring et al. 2008, p. 86).

The craniocerebral wounds produced by the penetration of the cranial box by a bullet are not limited only to the trajectory of the projectile, they are accompanied by secondary brain injuries (intraparenchymal hematomas, hemorrhagic contusions, cerebral edema, pneumocephaly, etc.) most often, due to the explosion effect or the pressure wave resulting from the dissipation of the energy developed by the deceleration of the high-velocity bullet.

The therapeutic strategy in case of craniocerebral wounds takes into account the initial resolution of the gap produced by the entrance and exit of the bullet, the timing of surgery for antibiotic prophylaxis and the anatomical delimitation of primary brain damage.

The post-operative evolution depends very much on the patient's condition at admission, the type of gun, the caliber of the bullet, the location of his trajectory and the appearance of complications such as bleeding in the bed of brain injury or the appearance of infection.

Conclusions

The clinical and imaging evolution were favorable post-operatively, these being influenced by the good condition of the patient, at hospitalization and by the prophylaxis of infectious complications.

The timing of the surgery, with anti-infectious prophylaxis and the delimitation of the laceration focus had good results both in the development of the operation and as a postoperative result.

A favorable factor was the exit of the bullet from the cranial box which allowed the operation in 2 phases and a better delimitation of the lacerated parenchyma area.

"This work is supported by the project *ANTREPRENORDOC*, in the framework of Human Resources Development Operational Programme 2014-2020, financed from the European Social Fund under the contract number 36355/23.05.2019 HRD OP /380/6/13 – SMIS Code: 123847."

Referrences

Hawton, K. & van Heeringen, K. (2009). Suicide. *Lancet*. 373 (9672), pp. 1372–1381

Värnik, P. (2012). Suicide in the world. *International Journal of Environmental Research and Public Health*. 9 (3), pp. 760–71

Meier; Marshall B. & Clinard, Robert F. (2008). *Sociology of deviant behavior* (ed. 14th). Belmont, CA: Wadsworth Cengage Learning. p. 169

Bertolote, JM. & Fleischmann, A. (2002). *Suicide and psychiatric diagnosis: a worldwide perspective*. World Psychiatry.

Yip, PS. (2012). Means restriction for suicide prevention. *Lancet*, p. 379.

Ajdacic-Gross, Vladeta; Weiss, MG; Ring, M; et al. (1 septembrie 2008). Methods of suicide: international suicide patters derived from the WHO mortality database. *Bulletin of the World Health Organization*. WHO Press, p. 86.

Karch, DL. (2011 Aug 26). Surveillance for violent deaths—National Violent Death Reporting System, 16 states. *Morbidity and Mortality Weekly Report. Surveillance Summaries*. Washington, D.C., 60 (10), pp. 1–49.

Miller, M. (2012 Apr). Suicide mortality in the United States: the importance of attending to method in understanding population-level disparities in the burden of suicide. *Annual Review of Public Health*.

https://www.atitimisoara.ro/content/ghiduri/2008/15%20Ghiduri%20de%20management%20al%20pacientilor%20cu%20traumatism%20cranio-cerebral%20grav.pdf.