

Clinical Symptoms of Cranium-Cerebral Lesions Caused by the Entrance of Missiles in the Cranium of the Human Body and Nursing Confrontation

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ABSTRACT

The aim of the present inquiring work is the study and the analysis of clinical signs and symptoms of cranium-cerebral lesions, which are caused by the missile's entrance in the human brain. The importance of lesions which are created depends significantly on the zones of missile's way in the interior of cranium proportionally to its speed of entrance into this. The direct nursing and medical intervention are considered very important, because the cranium-cerebral lesions can lead to permanent infirmities. The medical and nursing staff should be suitably educated at the recognition of symptoms, which will place suspicions for existence of cranium-cerebral lesions, as well as at the correct confrontation of cranium-cerebral lesions with suitable handlings. The results of the research showed that the outcome of patients with cranium-cerebral lesion is unexpected and depends significantly on the direct and correct medical and nursing intervention.

Key – Words: cranium-cerebral lesion, entry's wound, exit's wound, hematoma, scale of Glaskovy, zones of missile's way.

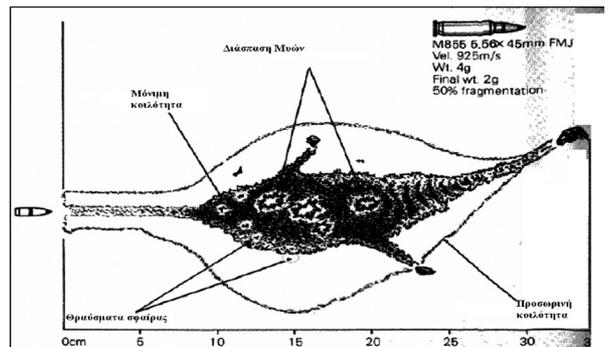
Introduction

The ballistics is the science that deals with the launch, the movement, the behaviour and the results which are caused on the objectives of various types of missiles, like bullets, missiles of artillery, bombs, rockets etc. It is separated into three main stages: (a) internal ballistics, (b) external ballistics, and (c) terminal ballistics (Malcolm J.D., 2006).

The sector of terminal ballistics studies the results that the missile's shock brings about in the human organism. When the missile reaches the human organism, it is caused damage either by the entire missile either by its items (Ann H. Ross, 1995). With the missile's hitting, it is caused the permanent cavity (namely volume of space in the human body that was occupied by tissue, which was destroyed due to the way of missile's entry), while the temporary cavity (namely extension of permanent cavity by virtue of the kinetic energy which is transported in the tissues by the missile) is shaped by the continuous forward acceleration of air immediately afterwards the missile, forcing the cavity to be tensed externally (Picture 1). The shock's waves compress the air and "travel" front from the missile, as well as at the sides and can reach up to 200 atmospheres

pressure (Alexandropoulou C.E. et. al., 2009).

The present work examines the parameters that contribute to the creation of cranium-cerebral lesions due to the "violent" missile's entrance in the human brain. The most important clinical symptoms of damages, which are caused when a missile penetrates the cranium and enters



Picture 1 Creation of temporary and permanent cavity at the missile's entrance in the human body.

into this, are analyzed. Ways of direct medical and nursing intervention are proposed that aim at the prevention of complications of cranium-cerebral lesions, which threaten

directly the life of wounded person, as well as at the complete cure of head's lesions in period of months or even years.

Zones of Missile's Way

After the detonation, the missile's way, proportional to its speed, is discriminated into three zones that vary on the various arms: (a) rupture's zone, (b) perforation's zone and (c) fracture's zone (Murphy G., 1980).

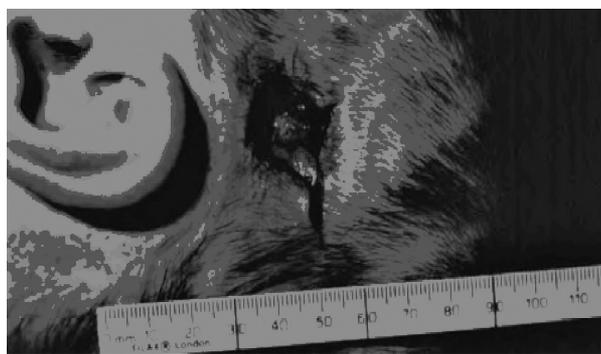
At the rupture's zone, rupture's wounds are created due to the big missile's speed and to the revolving movement, which places in movement the liquids of tissues and as a result the movement propagates circularly and multiples. Consequently, the entry's wound (namely the wound, which is created due to the missile's contact with the human tissues) is equal or smaller than the missile's size (Picture 2), except for wounds that were created from absolute contact or minimum distance. The exit's wound (namely the wound, which is created in the body's interior at the exit of missile from the human body) is much bigger than the missile's size (Picture 3). The duct of wound has figure of truncated cone with the base turned to the exit's orifice. In order to be shaped the rupture's zone, the missile should have speed bigger than 60 m/s (Picture 4).

At the perforation's zone, the rupture's wounds are not created, because the revolving movement of missile is absent. The entry's orifice is equal or smaller than the missile's diameter, while the exit's orifice initially is double

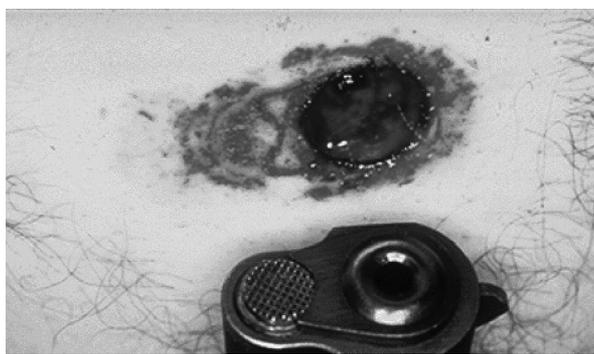
than the entry's orifice, but at the end of perforation's zone the exit's orifice is equalized with the entry's orifice. The duct of wound has cylindrical figure (Druid H. et. al., 2000). The fracture's zone begins from the end of perforation's zone and reaches up to the missile's fall. At this zone the missile maintains small speed and as a result does not cause wounds in the tissues, but simply fracture (Murphy G., 1980).



Picture 3: Depiction of exit's wound, which is bigger than the missile's size.



Picture 2: Depiction of entry's wound, which is equal or smaller than the missile's size.



Picture 4: Depiction of rupture's zone created from missile entrance with a velocity of 60 m/s.

Pathological Physiology of Cranium-Cerebral Lesions

The cranium-cerebral lesions are created when the head gets powerful knock or when in the battlefield a missile penetrates the cranium and enters into this. As a result, the wound can bring about locomotion of brain in the cranium, causing rupture of blood vessels and consequently profuse cerebral haemorrhage (Nteros K. et. al., 1999).

When a compressive fracture of cranium happens, it is possible to be developed hematoma, fracture or rupture of the cerebral tissue with all the inflammatory activities that are presented in each wound. One minor fracture of head can cause concussion. The concussion is term, which is used

in order to describe a closed cranium-cerebral lesion at which there is disturbance of conscience's level of short duration, amnesia relative with the event and headache (Susan C. deWit, 2009).

In the cerebral fracture, the brain's tissues are mauled, the blood is added up from the destroyed blood vessels and it is possible to be developed swelling, which causes increased pressure into the cranium.

The hematoma under the hard meninx is a usual result of cranium-cerebral lesion. The hematoma is swelling from blood. A missile that penetrates the head can cause rupture

of blood vessels, which are found between the thin spider membrane that covers the brain and the hard fibrous meninx. While the blood gushes under the hard meninx, the hematoma is increased in size, pressing the softer spider meninx and the cerebral tissue that the meninx covers (Gardika K.D., 2005).

The hematoma up the hard meninx happens rarely. When it happens, it is caused from rapid leak of blood from the

medium of meninx's artery and as a result the pressure into the cranium is increased. It recommends urgent medical situation. In order to be corrected the damage in the destroyed vessel and to be eased the rapidly developing pressure, before the death befalls by virtue of the increased pressure into the cranium, it must be executed incision at the cranium (Sachini - Kardasi A. et. al., 1993).

Points and Symptoms of Cranium-Cerebral Lesions

The importance of cerebral damage from a cranium-cerebral lesion is evaluated by the symptoms that the patient presents, by the neurological examination and by the chronicle period that was intervened from the moment that the wounded person lost his conscience after the missile's entrance in the brain (Papanikolaou P., 2005). The exterior symptoms of cranium-cerebral lesion are enough obvious. These symptoms are the ecchymosis, the swelling and the haemorrhage. It is possible to be found fractures with ecchymosis or ecchymosis behind the ear. In addition, it can be observed effusion of liquid from the ear or the nose, difficulty in the sense of hearing, paralysis of face's muscles and declination of eyes to a side. The effusion of liquid from the ear or the nose should be examined

further in order to be determined if there is effusion of cerebro-spinal liquid (Perel P. et. al., 2008).

The concussion can cause short disturbance in the physiologic level of conscience, amnesia relative with the event and headache. The cerebral fracture can cause change in the conscience's level and epileptic fit (Steyerberg EW et. al., 2008).

In the points of the hematoma up the hard meninx are included the loss of senses the moment of wound, one short lucid interval that is followed by reduction of conscience's level, headache, nausea and vomiting. The patient should be watched for points that mean increase of pressure into the cranium and for other points that mean damage in the brain (Perel P. et. al., 2008).

Diagnosis and Cure of Cranium-Cerebral Lesions

The Glaskovy's scale (Table 1) is a diagnostic means of recognition of prognosis and of importance of cranium-cerebral lesions and of brain's wounds. As long as bigger is the score, so much better is the prognosis of patient's situation (Malcolm J.D., 2006).

The diagnostic tests that are usually used for the determination of extent of a cranium-cerebral lesion are the cranium's radiograph, the axial tomography, the magnetic tomography, the tomography of emission of positrons and the electroencephalogram (Prahlow J.A et. al., 1999).

The patient with cranium-cerebral lesion is usually faced conservatively. If the lesion causes increase of pressure into the cranium or if the lesion includes crushing fracture of cranium, it must be realized surgical cleaning of wound and removal of bone's departments from the cerebral tissue or restoration of cranium's fragment in its place. In serious cranium-cerebral lesions, all the existing means are used in order to be prevented the increase of pressure into the cranium (Patel HC et. al., 2002).

The head should be raised at 30 with 45 degrees. This raising helps at the reduction of pressure into the cranium. In addition, the patient should be closely watched for the appearance of neurological points (Papanikolaou P., 2005). It is imported an intravenous line to the patient for the possibility of need of diuretic medicines and for the issuing of liquids. The intravenous liquids are imported very slowly,

in order to not exist overloading with liquids, which will increase the pressure into the cranium. The diuretic medicines are used for the reduction of vessel's volume and for the maintenance of pressure into the cranium as long as lower (Athanasou K.E., 2007).

Table 1: Glaskovy's scale: As long as bigger is the score, so much better is the prognosis of patient's situation.

MOVEMENT OF EYES	SCORE
Automatically	4
In the speech	3
In the pain	2
No movement	1
MOVEMENT OF BODY'S LIMBS	SCORE
He is hearing the orders	6
He locates pain	5
Physiologic bending	4
Defective bending	3
Stretching	2
No movement	1
SPEECH	SCORE
Directed speech	5
Confused speech	4
Ineffective words	3
Gibberish	2
No speech	1

Nursing Confrontation of Cranium-Cerebral Lesions

The nursing intervention is very important for the control and treatment of cranium-cerebral lesions. If the nurse locates leak of cerebro-spinal liquid from the nose, the ear or the open wound, he ought to inform the doctor and take special measures for the prevention of wound's contamination. The precautionary measures include the following:

(a) The patient should remain absolutely laid up with the bed's head raised at 30 until 45 degrees, in order to be promoted the venous channelling from the head.

(b) The ear; by which the liquid effuses, should be covered with sterilized gauze, which should be changed periodically, so as the extent of channelling to be watched.

(c) The patient should be advised not to give his nose a blow and to avoid the contact with the hands. The blow can increase the pressure into the cranium and the contact with the hands can cause the entrance of micro-organisms.

(d) The nurse reminds to the patient that he should not change place in the bed for the prevention of increase of pressure into the cranium (Roupa - Daribaki Z. et. al., 2005). The observation of patient, who is in the department of urgent incidents by virtue of cranium-cerebral lesion and returns in the house, requires specifics instructions. These instructions are given in the family of the wounded person (Table 2)

Table 2: Instructions of patient's care with cranium-cerebral lesion given to his family.

INSTRUCTIONS OF PATIENT'S CARE WITH CRANIUM-CEREBRAL LESION	
<p>FOR THE FIRST 24 HOURS</p> <ol style="list-style-type: none"> 1. The patient should be awaked per 2 hours in order to be confirmed that he is awaked with facility. 2. The patient should be asked where he is, who is his interlocutor, so as to be checked his orientation. 3. Control of eyes with a torch in order to be confirmed if the size is equal and if the eyes react. 4. The patient should avoid the intense activity for 24 hours. 5. Placement of ice-pack at the points where there is swelling 	<p>FOR THE NEXT 48 HOURS</p> <ol style="list-style-type: none"> 1. Patient's observation for change of conscience's level (e.g. drowsiness, difficulty in the awakening, confusion) 2. Observation for vomiting without nausea. 3. Observation for dizziness, loss of balance or fall. 4. Observation for changes in the eye-sight (e.g. diplopia, dazzle of sight). 5. Observation for retrograde movements of eyes. 6. Observation for headache increasing intensity, which is worsened with the removal. 7. Observation for spastic movements of hands or legs that cannot be checked. 8. Observation for changes in the speech or in the ability of finding of words. 9. Observation for unusual behaviour:

Conclusions

According to the analysis that was realised in the previous units, it is obvious that the cranium-cerebral lesions are brain's damages, which are caused by knocks at the head or by the missile's entrance into the cranium. The cranium-cerebral lesions cause loss of conscience for hours or some days, which is followed by loss of memory. The cranium is possible to have fracture and it is possible to be developed hematoma into the cranium, up or under the hard meninx. As a result, these hematomas compress the brain and the pressure into the cranium is increased. The hematomas are recognized by the

neurologists and the neurosurgeons with diagnostic tests that were referred in the previous. The long-lasting outcome of patients with serious cranium-cerebral lesion is unexpected. The recovery is a long process and in some patients the improvement can happen after a lot of months. It is also possible the infirmities to remain forever. In every case, the direct medical and nursing intervention is essential that aims at the prevention of complications of cranium-cerebral lesions, which threaten the life of wounded person, as well as at the complete cure of head's lesions in interval of months or even years.

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