

# Diagnostic and therapeutic approaches in rehabilitation correlated to a case of tetraparesis (with predominance of paraparesis) after severe CCT - bifronto - basal and bitemporal contusion.

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## Abstract

**Introduction.** Cranio-cerebral trauma (CCT) can be defined as a brain damage caused by an external factor. It may or may not penetrate the skull. Examples of CCT causing sources can be: car accidents, falls (from height or same level), blows with blunt objects, shooting, etc. The diagnosis is generally easy to establish through anamnesis with the patient or witnesses, then by tomography. Having the patient's consent and The Teaching Emergency Hospital "Bagdasar-Arseni" Ethic committee's approval, N.O. 17464 per 14.06.2019, this article presents the evolution of a 32-year-old male, tetraparetic with predominance of paraparesis, bradylalia and cerebrastenia (with significant improvement) and disgraphy, following a severe CCT - bifronto-basal and bitemporal contusion. Operated temporo-parieto-occipital fracture (right parietal decompression flap) - all by falling off the horse (affirmative). Joint stiffness in the knees (by Pellegrin-Shida heterotopic periosteal calcifications). Total post-traumatic optic atrophy RE and partial optic atrophy LE. Multiple bedsores. Neurogenic bladder (carrier of indwelling urinary catheter). UTI with Proteus Mirabilis (etiologically treated) was admitted in the Neurorehabilitation Clinic of the Teaching Emergency Hospital "Bagdasar-Arseni" (TEHBA) for tetraparesis motor deficit, retention sphincter disorders, locomotor and severe auto-care dysfunctions, specialized recovery and nursing treatment with favorable development. **Discussion:** The peculiarity of this case is the good evolution of a patient with severe CCT and multiple associated complications. Last but not least, we can highlight how the CCT was produced, namely by falling off the horse. This tells a lot about the importance of the precautions and equipment needed during a sport, in our case wearing a helmet.

**Key words:** cerebral cranial trauma, tetraparesis, paraparesis, recovery,

## Introduction

Traumatic brain injury (TBI) is a nondegenerative, noncongenital insult to the brain from an external force, possibly leading to permanent or temporary impairment of cognitive, physical, and psychosocial functions, with an associated diminished or altered state of consciousness (1).

TBI classification by:

- Causes<sup>2</sup>: car accidents, blows to the head, sport injuries, falls or accidents, physical violence
- Evolution: acute < 3 days, subacute < 3 weeks, chronic > 3 weeks
- Pathogenesis: primary lesions, secondary injuries
- Severity (MAYO TBI SEVERITY CLASSIFICATION SYSTEM<sup>3</sup>): symptomatic (possible) TBI, mild (probable) TBI, moderate-severe (definite) TBI

Tetraplegia is the term used to describe spinal cord injuries or lesions in the cervical region. People with tetraplegia have compromise of motor/sensory functions to their upper limbs as well as to the lower limbs<sup>4</sup>.

**Case report:** A 32-year-old male patient with severe TBI, by falling off a horse on 01.01.2019, with bifronto-basal and bilateral temporal contusion, temporo-parieto-occipital fracture surgically treated - decompressive left parietal flap, neurogenic bladder (carrier of indwelling urinary catheter), suppressed on 08.04.2019.

He was admitted to the Neurorehabilitation Clinic of the Teaching Emergency Hospital "Bagdasar-Arseni" for: tetraplegia motor deficit, locomotor dysfunction and severe auto-care, specialized recovery and nursing treatment.

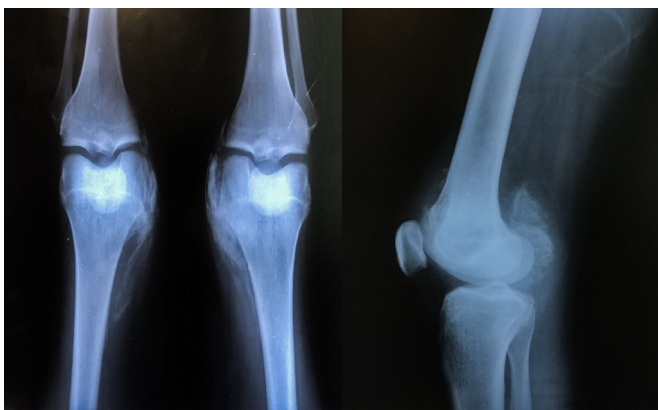
The physical examination showed the following: skin pressure ulcer stage II in left parieto-occipital area, healed post-tracheostomy scar, pressure ulcers stage II-III located on left knee, right calf and heels, osteoarticular system: bifronto-basal and bilateral temporal contusion, left temporo-parieto-occipital fracture surgically treated - decompressive left parietal flap, bilateral knee joint stiffness, respiratory system: 18 breaths per minute, SpO<sub>2</sub> 96% spontaneous, CV system: BP 120 / 90mmHg, HR= 107 bpm, sinus rhythm, excretory system: former

carrier of indwelling urinary catheter(suppressed on 08.04.2019).

Neuro-myo-arthro-kinetic clinical examination (NMAK): cooperative and temporo-spatial oriented patient, cranial nerves: vision disorders, present pupillary light reflex, without swallowing difficulties, bradylalia, dyslalia, bradypsychia and crying easily, showed no signs of meningeal irritation, sensory dysfunction in the lower limbs, muscle strength 3/5 in the upper limbs; lower limbs cannot be tested because of the joint stiffness, osteotendinous reflex (OTR) increased at the upper limbs, right more than left.

Scales: Modified Ashworth = 1 + / 5, Penn = 0/4, GOS-E = 3, Rankin = 4, FAC = 0, FIM motor = 26/91, Cognitive FIM = 20/35 QOL, MMSE, MoCA could not be tested due to intense psycho-emotional disorders.

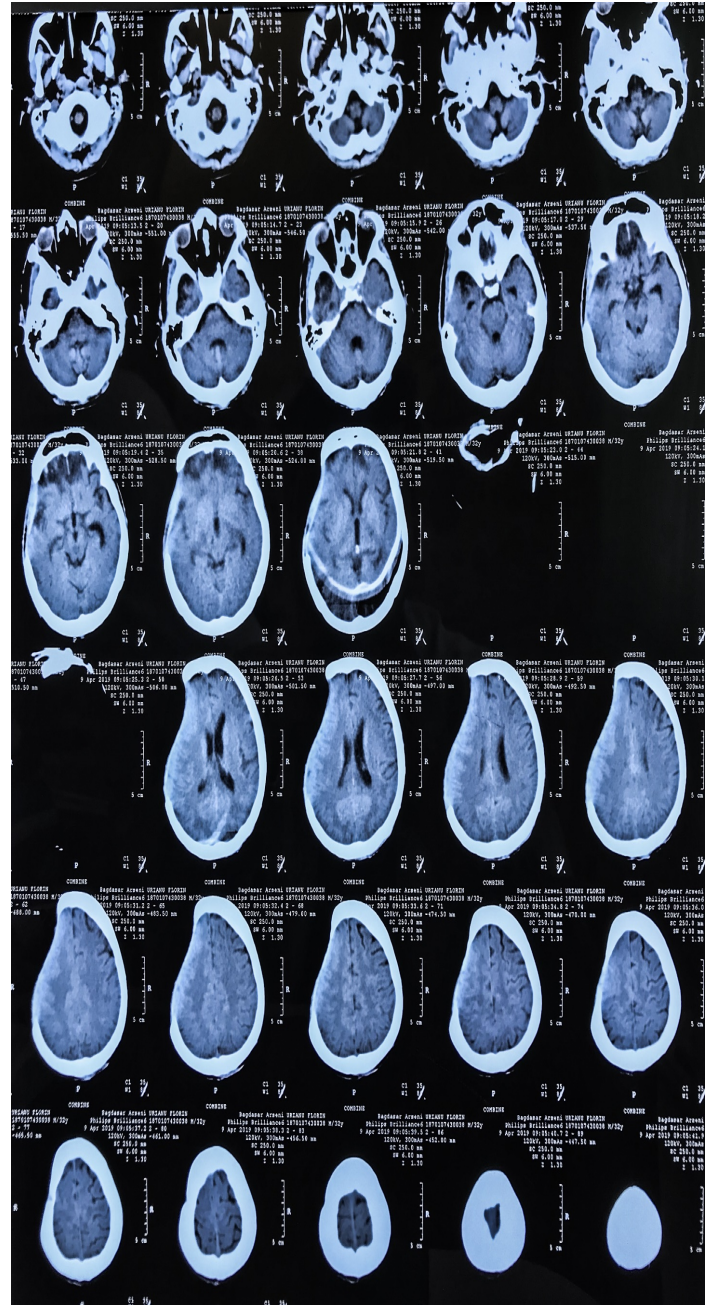
Paraclinical examination: Knee bilateral radiography and brain MRI. In the X-rays, we can notice the heterotopic periosteal calcifications. In the MRI image, we can notice the decompressive flap.



Following the clinical and paraclinical examinations the following diagnoses were established:

- Tetraplegia with paraparesis predominance, severe TBI after bifronto-basal and bilateral temporal contusion
- Left TPO fracture surgically treated (right decompressive parietal flap) – after falling off the horse (01.01.2019)
- Bilateral knee stiffness due to Pellegrin-Shida heterotopic periosteal calcifications
- Healing parieto-occipital pressure ulcers, pressure ulcers stage II-III located on left knee, right calf and heels
- Urethritis with *Proteus Mirabilis* (etiologically treated)

- Total right eye optic post-traumatic atrophy and partial left eye post-traumatic atrophy
- Mild hypercalcemia, hypercholesterolemia, hypertriglyceridemia, normocytic normochromic anemia
- Marked inflammatory biological syndrome



**During hospitalization,** the patient followed anticoagulant treatment, calcium channel blocker beta-blocker, antibiotic treatment, neurotrophic factors, gastric protector, topical NSAIDs, ophthalmic drops, urinary antiseptic also physical therapy and diapluse therapy.

## Evolution.

Over a period of 5 months the patient was admitted 4 times in the Neuromuscular recovery clinic, once in the Neurosurgery clinic, where the decompressive flap was re-operated on 05.06.2019 and once in the Orthopaedics-Traumatology Clinic where the heterotopic ossification of the knees were resected. The evolution from a functional point of view is good: the muscular strength has significantly improved globally, the patient manages to walk without support, but only with the supervision of the kinetherapist between the parallel bars over a distance of 6-8 meters. He can exercise at the pulley counterweight with lower limbs. Stays suspended unaided. The pressure ulcers have healed.

**Prognosis** ad vitam is good, ad functionem with the possibility of incomplete recovery and ad laborem he requires retirement for chronic disease.

**Upon discharge**, it was recommended to continue the recovery treatment at home or in another recovery clinic and, if necessary, be readmitted to our clinic.

## Discutions.

The importance of interdisciplinary and interclinical communication and collaboration

Efforts by physicians who have treated this case have been fully rewarded morally by the patient's particularly favorable progression despite its severe multimorbidity. Last but not least, I would like to mention the importance of wearing the appropriate sports equipment, in our case, a helmet.

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