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Letter to Editor

Contusion index - a diagnostic and treatment algorithm for neurointensive care

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Globally, traumatic brain injury is one of the major causes of death in developed countries, with a massive social and economic impact [1]. The majority of these traumatic brain injuries (80%) are considered mild (Glasgow 14–15), 10% are moderate (Glasgow 9–13), and the rest are severe (Glasgow less than 9). These injuries range from mild concussions to extensive bleeding, fractures, and parenchymal injuries. Among the primary traumatic brain injuries are contusions, which need close neurological examination, clinical monitoring, serial brain CT scans, and any changes in the Glasgow coma score.

Traumatic cerebral contusion with single or multiple presentations is frequently found in these patients. This type of injury can be found in coexistence with acute intracerebral, extradural, or subdural hematomas [2]. It is important to clarify that brain parenchymal injury with dura mater integrity is defined as a contusion, as opposed to a laceration, where there is a tangential disruption of bone tissue and the meninges [3]. Biomechanically, contusions are related to multiple kinetic mechanisms such as acceleration and deceleration, with the subsequent development of cerebral edema that can be local or progressive [2].

The pathobiology of cerebral contusions is heterogeneous in its initial stages, characterized by alterations such as punctate hemorrhage, swelling, edema, and areas of necrosis in the initial stages. The pathophysiology of contusions includes changes in cerebral and local blood flow [4].

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The term "contusion index (CI)" was first described by Adams et al in 1982 [5,6]. These results were obtained in pathological specimens by determining the extent and depth of the lesions. The depth of the contusion was measured based on a 0-3 scale; 0: no contusion seen, 1: contusion not involving the full thickness of the cortex, 2: contusion involving the full thickness of the cortex, 3: contusion extending to the white matter [6]. The extent of the contusion was measured based on the 0-3 scale: 0: no contusion, 1: localized contusion, 2: moderately extensive contusion, and 3: extensive contusion [6]. The CI score (0–9) equals the depth of contusion multiplied by the extent of contusion. Patients with CI with a CI of 0 to 4 were treated conservatively. Patients with a CI of 6 were treated surgically, and patients with a CI of 9 were treated conservatively or surgically depending upon the Glascow coma score. In the field of neuroradiology, an index of contusions has been used in clinical series in an interesting way [7,8].

A further modification was suggested by postmortem analysis, where a two-tier system is proposed based upon superficial or deeper injury. Gray matter injury is assigned a 0-3 scale while parenchymal injury is given a scale of 0-4 based on the extensión and depth of the bleed [9].

We consider that cerebral contusions, due to their dynamic pathogenetic nature and varied evolution process, can hardly be evaluated with the Glasgow scale [10,11] alone. Many patients with cerebral contusions find themselves in the universe of patients categorized as "moderate head trauma" using the Glasgow scale. We believe that patients with cerebral contusions without other structural injuries (hematomas that need to be treated by neurosurgery) need to get a case-based decision making and treatment plan.

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