Reviewer's report

Title: Lumbar Puncture as Possible Cause of Sudden Paradoxical Herniation in Patient with Previous Decompressive Craniectomy: Report of Two Cases

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Reviewer: Nicola Acciarri

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The Authors present the cases of two patients with previous traumatic brain injury, submitted to decompressive craniectomy; both patients developed a late hydrocephalus and were submitted to a Lumbar Puncture (LP) during their hospitalization, unfortunately exhibiting a sudden cerebellar herniation in the spinal canal after this maneuver.

The Authors describe the mechanisms involved in the genesis of this complication, that sometimes may be observed in patients with post traumatic brain damage and hydrocephalus.

After a careful revision of the paper, I have to say that in this moment the manuscript is not suitable for a publication, but it could be with modifications, since the argument, although is not new, may be of interest for young Neurologists and young Neurosurgeons.

Below, my observations.

1) The first observation is on the language. As Italian, I'm the less entitled to say it, but the manuscript requires a linguistic review by an English mother language reviser.

2) The second observation to the paper is on the Title: .....A case Report...while Authors are reporting Two cases. Then: Title is peremptory....Lumbar Puncture provokes Acute Onset...etc etc

I think the Title should be proposed in a different manner; for example: "Lumbar Puncture as possible cause of sudden cerebellar herniation in patients with previous decompressive craniectomy. Report of two cases".
3) In the Abstract the Authors are saying "Lumbare Puncture is always performed…..".
I think it's better to say "…..is often performed…..". Furthermore, LP is more commonly performed in the suspect of Subarchnoid hemorrhage in some patients, not only in patients with suspected infection of Cerebro-spinal Fluid (CSF), or hydrocephalus.

4) The Authors are writing always "paradoxical herniation", without to explain what does it mean, and what is the difference with a common cerebellar herniation, for example.
Herniation of what? The Authors should clarify in the manuscript what they are saying.
In my eyes, it should be useful to add briefly in the Introduction what is a paradoxical herniation, and why is different from a Chiari Malformation

5) The Introduction of manuscript is starting with an argument that is not requested: the paper is on the paradoxical herniation, and not on the Guidelines of management of head trauma.
Maybe is enough to explain what is a decompressive craniectomy in case of Traumatic Brain Injury (TBI).

6) The Authors describe the cases of two patients with Glasgow Coma Scale (GCS) of 3. In my Hospital, patients with GCS 3 are nearly dead, or anyway not suitable for a surgical procedure, that commonly is delivered when GCS is at least 5-6 or more.
Are Authors sure the patients had GCS 3 when were submitted to the surgical procedures?

7) What does it mean bilateral anisocoria? We commonly consider anisocoria when a pupil is different from the other. Maybe the Authors saw bilateral mydriasis, with difference in diameter of pupils.

8) In first case, the Authors are reporting that patient remained without a cranioplasty until the last follow up check, for five years?
I think that something of wrong there was in the management of the patient, after the lumbar puncture, because the basic problem of the patient was properly the missing skull flap.

9) In the second case, Authors are describing "…intracranial hematoma cleaning…". Which hematoma? In which cerebral lobe, and in which side?. Authors are so accurate in describing the degree of pupillary dilation, while They don't say what kind of cerebral hematoma , and in which location.

10) In the first case, and in the discussion Authors are reporting the term " sink flap". Why they don't describe briefly what is a "Sinking flap syndrome" in the discussion, when they recorded Nakamura et Al?

11) In the Discussion, string 112, Reference Viela : the name is wrong. Vilela is the right one.

12) Finally, some personal considerations: in patients like Authors reported, the complication of paradoxical herniation is clearly possible, and not unexpected.

The pathophysiology of paradoxical herniation has been postulated to be secondary to a large craniectomy defect exposing the intracranial contents to the external positive atmospheric pressure. With a reduction in intracranial pressure postsurgery, the intracranial contents deviate under a pressure gradient away from the site of craniectomy. Therein lies the reason why CSF drainage procedures are uncommonly performed in patients post craniectomy, unless under exceptional circumstances.

Therefore, Authors should put in their manuscript a clear message of warning, suggesting to do not perform LP if not strictly necessary.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

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I recommend additional statistical review

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