Hydrocephalus after decompressive craniectomy risk factors

- Post-traumatic hydrocephalus after decompressive craniectomy: a multidimensional analysis of clinical, radiological, and surgical risk factors
- Timing Matters: A Comprehensive Meta-Analysis on the Optimal Period for Cranioplasty After Severe Traumatic Brain Injury
- Clinical Analysis of causes and preventive measures of complications after decompressive craniectomy for Craniocerebral Trauma
- Risk factors for surgery-related cerebral infarction after aneurysmal subarachnoid hemorrhage
- Predictors of complications following alloplastic cranioplasty in trauma patients: A multi-center retrospective study
- Hydrocephalus Renders Ventricular or Subarachnoid Drainage as an Efficacies Cure for Decompressive Craniectomy-Induced Subdural Effusion After Traumatic Brain Injury
- Chronic, Shunt-Dependent Hydrocephalus in Aneurysmal Subarachnoid Hemorrhage: Incidence, Risk Factors, Clinical Phenotypes, and Outcome
- Post-craniectomy hydrocephalus in adult traumatic brain injury patients: a systematic review and meta-analysis of risk factors and outcome

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Several hydrocephalus predictors were identified; these included distance from the midline, hygroma, age, injury severity, subarachnoid or intraventricular hemorrhage, delayed time to craniotomy, repeated operation, and duraplasty. However, results differed among studies. The impact of DC on hydrocephalus remains controversial [1].

It is demonstrated that the occurrence of posttraumatic hydrocephalus (PTH) is high in patients with large decompressive craniectomy (DC). Patients with low GCS and bilateral decompression tend to develop PTH after DC. Duraplasty in DC might facilitate reducing the occurrence of PTH. Patients with PTH concomitant skull defects should be managed deliberately to restore the anatomical and physiological integrity so as to facilitate the neurological resuscitation [2].

A study suggests that PTH development is multifactorial and shows that PTH is not that rare. Fotakopoulos et al showed a correlation between craniectomy size and the incidence of PTH [3].

They analyzed the area of craniotomy and the distance of the craniotomy from the midline. Results showed that patients who had undergone craniectomies with a superior limit less than 25 mm from the midline had a markedly increased risk of developing hydrocephalus. They hypothesized, based on the Starling resistor concept, that during each cardiac cycle in which extracellular fluid is produced during systole and absorbed in diastole, an imbalance between the production and absorption of extracellular fluid in favor of absorption would cause a decrease in brain parenchyma volume and consequently increase the size of the ventricles [4].

The presence of interhemispheric hygroma IHHs was a predictive radiological sign of hydrocephalus development within the first 6 months of DC in patients with severe head injury [5].

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hydrocephalus: a review. Arq Neuropsiquiatr. 2014 Sep;72(9):715-20. Review. PubMed PMID: 25252237.

2) Shi SS, Zhang GL, Zeng T, Lin YF. Posttraumatic hydrocephalus associated with decompressive cranial defect in severe brain-injured patients. Chin J Traumatol. 2011;14(6):343-7. PubMed PMID: 22152137.

3) Fotakopoulos G, Tsianaka E, Siasios G, Vagkopoulos K, Fountas K. Posttraumatic Hydrocephalus after Decompressive Craniectomy in 126 Patients with Severe Traumatic Brain Injury. J Neurol Surg A Cent Eur Neurosurg. 2016 Mar;77(2):88-92. doi: 10.1055/s-0035-1558411. Epub 2015 Sep 9. PubMed PMID: 26351868.

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5) Kaen A, Jimenez-Roldan L, Alday R, Gomez PA, Lagares A, Alén JF, Lobato RD. Interhemispheric hygroma after decompressive craniectomy: does it predict posttraumatic hydrocephalus? J Neurosurg. 2010 Dec;113(6):1287-93. doi: 10.3171/2010.4.JNS10132. Epub 2010 May 21. PubMed PMID: 20486895.