Cranioplasty for hydrocephalus prevention after decompressive craniectomy

After decompressive craniectomy, the occurrence of hydrocephalus is reported with varying incidences (10–45%) mainly due to differences in diagnostic criteria [1) 2) 3) 4)].

The management of Hydrocephalus after decompressive craniectomy in need of cranial reconstruction can be challenging and thus is not precisely defined. The debate mainly revolves around the timing of cerebrospinal fluid shunt with respect to the cranioplasty [5)].

To prevent decompressive craniectomy complications, such as sinking skin flap syndrome, studies suggested early cranioplasty (CP). However, several groups reported higher complication rates in early cranioplasty. In a single-center observational cohort, study cranioplasty has high complication rates, 23%. Contrary to recent systematic reviews, it was associated with more cranioplasty complications (41%), explained by the higher incidence of pre-CP cerebrospinal fluid flow disturbance and acute subdural hematoma as etiology of DC. CP in such patients should therefore be performed with the highest caution. [6)].

Delayed time to cranioplasty is linked with the development of persistent hydrocephalus, necessitating permanent CSF diversion in some patients. Waziri et al., propose that early cranioplasty, when possible, may restore normal intracranial pressure dynamics and prevent the need for permanent CSF diversion [7)].

Ozoner et al. showed that early cranioplasty within 2 months after decompressive craniectomy was associated with a lower rate of posttraumatic hydrocephalus [8)]

The goal of the study of Sethi et al. was to ascertain the efficacy, safety, and comparability of ultra-early cranioplasty (CP; defined here as <30 days from the original craniectomy) to conventional cranioplasty (defined here as >30 days from the original craniectomy). A retrospective review of CPs performed between January 2016 and July 2020 was performed. Craniectomies initially performed at other institutions were excluded. Seventy-seven CPs were included in the study. Ultra-early CP was defined as CP performed within 30 days of craniectomy whereas conventional CP occurred after 30 days. Post-operative wound infection rates, rate of return to the operating room (OR) with or without bone flap removal, operative length, and rate of post-CP hydrocephalus were compared between the two groups. Thirty-nine and 38 patients were included in the ultra-early and conventional CP groups, respectively. The average number of days to CP in the ultra-early group was 17.70 ± 7.75 days compared to 95.70 ± 65.60 days in the conventional group. The mean Glasgow Coma Scale upon arrival to the emergency room was 7.28 ± 3.90 and 6.92 ± 4.14 for the ultra-early and conventional groups, respectively. The operative time was shorter in the ultra-early cohort than that in the conventional cohort (ultra-early, 2.40 ± 0.71 h; conventional, 3.00 ± 1.63 h; $p = 0.0336$). The

incidence of post-CP hydrocephalus was also lower in the ultra-early cohort (ultra-early, 10.3%; conventional, 31.6%; p = 0.026). No statistically significant differences were observed regarding post-operative infection, return to the OR, or bone flap removal. The study shows that ultra-early CP can significantly reduce the rate of post-CP hydrocephalus, as well as operative time in comparison to conventional CP. However, the timing of CP post-DC should remain a patient-centered consideration [9].

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