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OPTIMAL TIMING AND MATERIAL FOR CRANIOPLASTY

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Relevance. CP is a surgical technique done for the reconstruction of the skullcap removed while proceeding decompressive craniectomy (DC). Cranioplasty improves rehabilitation from a motor and cognitive perspective. However, it may increase the possibility of postoperative complications, such as seizures and infections. Since the timing of cranioplasty is critical and if the time of proceeding the operation is chosen incorrectly it could lead to unfavorable results like infection, cerebral swelling, resorption, post operative blood clot, seizure, and death. In this study, we compared the results of early and late CP after DC and assess the optimal timing and material to perform it.

Aim: the main aim of this report is to find the best timing and material used for proceeding cranioplasty.

Materials and methods. At the City Clinical Emergency Hospital, Minsk, for the purpose of a retrospective analysis all cranioplasty surgeries were considered from period starting 01.01.2020 till 01.01.2023. Which included 77 patients from the neurosurgical department, with different diagnosis tumor 12%, TBI (traumatic brain injury) 74%, abscess 4%, aneurysm 6%, vascular diseases 4%. The analysis showed that 60 (77%) were men and 17 (22%) were women. With the average age of 45 years old, maximum age of 77 years old, and minimum age of 21 years old. In further, cranioplasty was performed for those patients but with various periods of time after the moment of craniectomy was performed, with the use of different flap material which were: Titanium 13 (17%), autograft 14 (18%), and PMMA (3-D individually modeled printed implant) 50 (65%). The end point of the analysis was the amount of complications after cranioplasty and mortality.

Results and their discussion. Depending on the duration between performing cranioplasty and craniectomy, 3 subgroups of patients were identified. Group 1: Cranioplasty was carried out before 3 months after craniectomy (n=29). Group 2: Cranioplasty performed from 3-6 months after craniectomy (n=23). Group 3: Cranioplasty performed after 6 months after craniectomy (n=25). In the first group the amount of re-operations due to complications were 5 (16%) and mortality was (0%). The second group showed the amount of re-operations due to complications were 1 (4%) and mortality was (0%). The third group had the following results according to the amount of re-operations due to complications were 3(12%) and mortality (0%). The reoperation rate using titanium was 1(7%), autograft 1(7%), PMMA 7(14%).

Conclusions: in this research was concluded that the optimal timing for proceeding cranioplasty is from 3 to 6 months and the most suitable material for cranioplasty were autograft and titanium since it showed the highest success rate.