organize treatment plan.

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884
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Immune cells subpopulations in peripheral blood in patients with high-grade gliomas

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Oral e-Poster Presentations - Booth 4: Neuro-Oncology 3 (GBM & malignant gliomas), October 14, 2024, 9:30 AM - 10:10 AM

Background: High-grade gliomas (HGG) are the deadliest type of primary brain tumors. Tumor microenvironment characterization may provide new insights in understanding disease and the balance between inflammatory and suppressor cells and represent a key factor in tumor-microenvironment interaction. This study aims at characterizing peripheral immune cells subpopulations in HGG patients.
Methods: We analyzed peripheral blood mononuclear cells (PBMC) from 57 patients with newly diagnosed HGG who underwent surgery in Neurosurgery department from 2019 to 2023. Blood sample was taken before surgery and PBMC were stored in Institutional Biobank. Clinical and radiological features and steroid dosage at sample time were recorded. For flow cytometry analysis, two panels of antibodies were designed, one for myeloid and one for lymphoid cells. Acquisition was performed with BC CytoFLEX LX and CytExpert software and data were processed with FCS Express 7. Statistical analysis was performed with SPSS 28.
Results: Survival data were available for 52 patients: the mean overall survival (OS) was 15.98 months. A Cox regression analysis was performed to identify any prognostic impact of subpopulations, on which steroids' influence was checked. A small effect was noted for monocytes (HR 1.055, p 0.018) and CD11b+/CD33+ cells including peripheral myeloid-derived suppressor cells (MDSC, HR 1.044 , p 0.055), both influenced by steroids. A stronger effect was noted for immature NK cells (HR 0.198, p 0.029), uninfluenced by steroids. A significant correlation was found between immature NK cells and ECOG performance status (PS), with higher levels in patients with lower ECOG (p 0.029). MDSC and CD8+ T cells were more represented in patients with necrosis on MRI while patients with midline shift showed higher MDSC and lower immature NK cells. FLAIR volume was positively correlated with mature NK while MDSC and mature NK showed a correlation near to significance with the difference between FLAIR and contrast-enhancing volume.
Conclusions: These results are promising in identifying subpopulations in peripheral blood with a putative role in patients' OS. Higher immature NK cells correlate with higher PS at surgery and are associated with increased OS. On the other hand, monocytes and MDSC correlate with radiological parameters such as midline shift, necrosis, and FLAIR volume. Further analysis on larger sample and longer follow-up is required to confirm these promising results.

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953
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History of Cranioplasty: a Long Travel Along Times

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Oral e-Poster Presentations - Booth 3: History, Ethics and Education, October 14, 2024, 9:30 AM - 10:10 AM

Background: Cranioplasty is a common neurosurgical procedure performed to reconstruct cranial defects. It has its ancient roots in Incans period (3000 BC), then Fallopius used gold plates (1532 AD), van Meekeren used the bone graft from a dead dog (1666 AD), and the first use of autologus bone graft is documented by Walther in 1821. World Wars I and II spurred an evolution in cranioplasty materials and surgical techniques with a growing interest in synthetic materials to counter the common complications associated with bone grafts. After that different materials and tools were studied. To the authors knowledge, a recent historical and technical overview of cranioplasty is missing. Aim of the authors is to provide an historical outline, selectively review the current state of knowledge, consider advantages and pitfalls associated with each material and identify new research directions.
Methods: The authors performed a comprehensive search through PubMed and Google Scholar using the following keywords: cranioplasty, history, trauma, xenograft, allograft, alloplast, methylmethacrylate, hydroxyapatite, titanium, custom-made, PEEK implants, ceramics, induced pluripotent stem cells, bone morphogenetic protein, neurosurgical history, surgical technique, reconstruction, neurotechnology.
Results: This study analized how history of cranioplasty intermingles with the historical, cultural and scientific contexts. Since wartime, the exponential increase in the number of craniolacunia together with advancement in technology, tissue engineering and laboratory research led to a paradigm shift from metals to synthetic materials to new cranioplasty tools and techniques within the realm of regenerative medicine and implantable neurotechnology.
Conclusions: Over millennia, indications for decompressive craniectomy have more and more etiologies and the management of craniolacunia has become a very common problem for neurosurgeons. If technical procedure is now established, nowadays research is looking for a lifelong biocompatible material, perfect for restoring normal cosmetics, and ensuring adequate protection for intracranial structures. Efforts must be made in this regard.
Optional Image

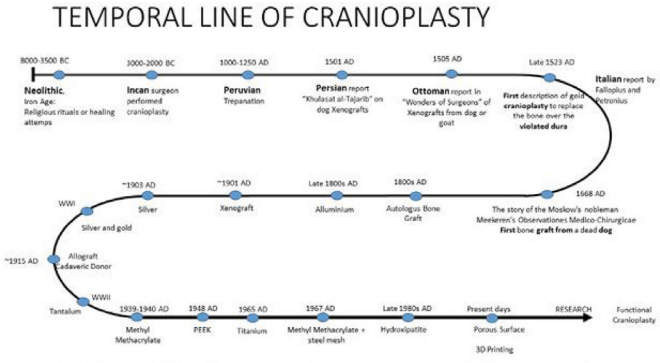

Figure 1. Timeline of the history of cranioplasty: a step-by-step travel from the very beginning to the new technologies

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1308
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Idiopathic Delayed Peri-lead Edema after Deep Brain Stimulation – A Systematic Single Center Analysis

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Oral e-Poster Presentations - Booth 1: Functional & Radiosurgery, October 14, 2024, 9:30 AM - 10:10 AM

Background: Among surgical complications after Deep Brain Stimulation (DBS), idiopathic delayed postoperative peri-lead edema (IDPPE) remains poorly understood. The goal of this study is to investigate its frequency, clinical relevance and identify risk factors based on a monocenter systematic retrospective study.
Methods: We included 47 patients after DBS surgery from February 2020 to August 2022. All patients received an intraoperative high-resolution CT or MRI on the day of surgery and a delayed CT scan one to eight days after electrode implantation to assess peri-lead edema and associated signs of hemorrhage. Clinical follow-up data 12 months after surgery were analyzed.
Results: IDPPE was radiologically diagnosed in 38 patients (80.9%). In 23 cases (48.9%), the edema was accompanied by peri-lead hemorrhage, typically located in subcortical regions. 13 out of 38 patients (34.2%) with peri-lead edema were initially symptomatic (delirium, neurological and neuropsychological deficits). There was no clinical predictor of IDPPE occurrence, however symptomatic