Cranial Reconstruction Following Neurosurgical Procedures: An Analysis of Indications and Timing in Relation to Outcome

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Learning Objectives

By the end of this session, participants should be aware of timing of cranioplasty in relation to outcome following cranial reconstruction.

Introduction

Reconstruction of cranial defects following neurosurgical procedures often presents significant challenges among which include determination of a suitable time for post-craniotomy reconstruction.

This study is a descriptive analysis of outcomes following cranial reconstruction at the Multidisciplinary Adult Cranioplasty Center (MACC).

Methods

Data covering a 5-year period (2013-2018) was obtained from electronic medical records and all patients undergoing cranioplasty operations were identified.

Only patients without history of prior cranioplasty surgery were included for analysis.

Indications and materials for cranioplasty, timing, and outcome were assessed.

Our study had institutional review board approval.

Results

In total, 293 cases were studied.

The mean patient age was 49.15 (SD±16.67) years.

Post-craniotomy cranial reconstruction were performed as single-staged cases in 45.61% and as delayed in 54.39%.

The mean time post-craniotomy to insertion of cranial implant among patients undergoing delayed reconstruction was 6.86 months (range 1-36 months).

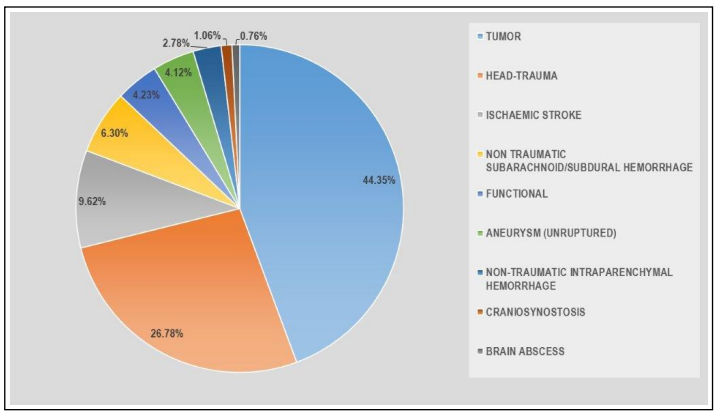
Results (continued)

The majority of cases underwent preceding craniotomy on account of brain tumor pathology (44.35%), head-trauma (26.78%), and ischemic stroke (9.62%).

Among patients undergoing single-staged procedures, those with brain tumor pathology represented the majority (79.29%) followed by patients who underwent craniotomy for functional/stereotactic neurosurgery (9.29%).

For cases undergoing delayed reconstruction, majority had a primary pathology of head-trauma (42.39%), ischemic stroke (17.69%), and non-traumatic subarachnoid hemorrhage (10.77%).

Figure 1: Distribution of all cases undergoing cranioplasty procedures



Results (continued)

The common implants employed in single-staged procedures were titanium-mesh (37.94%), MEDPOR (18.35%), and polyether-ether-ketone (17.43%).

The commonest material employed for delayed reconstruction was poly-methyl-methacrylate i.e. PMMA (63.85%).

Results (continued)

In all, major complications necessitating repeat cranioplasty occurred in 23 cases (9.62%), mostly from dehiscence (26.09%).

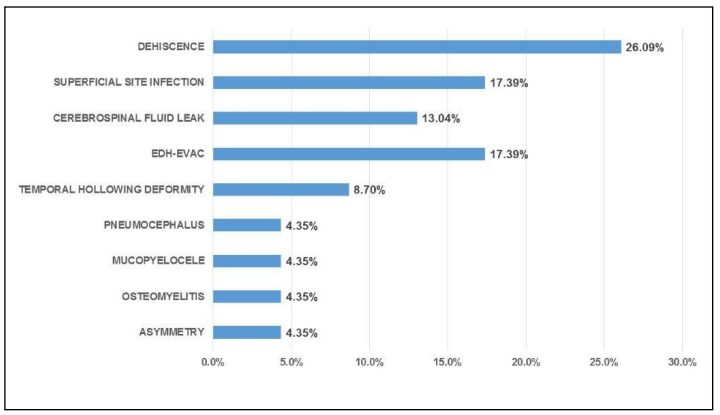


Figure 2: Proportion of major complications among the overall cohort

Results (continued)

There were no significant differences in mean ages of patients among whom complications occurred versus those without complications [53.39 vs. 48.70 years, p=0.20].

There was no significant difference in timing of cranioplasty between patients in whom complications occurred versus without (p=0.65).

Conclusions

Cranial reconstruction following neurosurgical procedures vary in timing and by indication. The delay in reconstruction is not associated with increased likelihood of complications or implant failure.