Complications following Cranioplasty: Incidence and Predictors in 348 Cases.

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Introduction

Cranioplasty has been associated with improvent in neurological, psychological and social performance in patients with craniectomy. The factors that contribute to peri-procedural complications, including patients-specific and surgical-specific factors need to be thoroughly assessed. Our aim is to evaluate risk factors that predispose to an increased risk of cranioplasty complications and mortality.

Methods

We conducted a retrospective review of all patients at our institution that underwent cranioplasty following craniectomy for stroke, subarachnoid hemorrhage, epidural hematoma, subdural hematoma, and trauma from January 2000 to December 2011. We tested the following predictors: age, gender, race, diabetic status, hypertensive status, tobacco use, reason for craniectomy, urgency status of the craniectomy (urgent vs. elective), graft type (synthetic vs autologous), and location of cranioplasty. The cranioplasty complications included: reoperation for hematoma, hydrocephalus post-cranioplasty, cranioplasty graf infection, and post-cranioplasty seizures. We also evaluated how one complication might affect the rate of another. A multivariate logistic regression analysis was performed.

Results

Three hundred forty-eight patients were included in the study. The overall complication rate was 31.32% (109/348). The mortality rate was 3.16%. Predictors of overall complications in multivariate analysis were hypertension (OR=1.92, p=0.005), increasing age (OR=1.02, p=0.029) and hemorrhagic stroke (OR=3.84, p<0.001). Predictors of mortality in multivariate analysis were diabetes mellitus (OR=7.55, P=0.012), craniectomy for stroke or S.A.H (OR=5.083, p=0.033), post-cranioplasty seizures (OR=5.40, p=0.028) and repeated surgery for hematoma evacuation (OR=13.00, p=0.020). Multivariate analysis was also applied to predict the variables that affect the seizures rate, the need for reopearation for hematoma complication, the development of hydrocephalus, and the development of infection.

Conclusions

The predictors of morbidity and mortality after cranioplasty should be incorporated in the clinical decision-making algorithm. Control of patient's risk factor and early recognition of complications remains essential.

Learning Objectives

Cranioplasty complications include infections, hydrocephalus, multiple operations, seizures and even death. The independent predictors of mortality were diabetes, post-cranioplasty seizure, reoperation for hematoma evacuation, and therapeutic indication for stroke or SAH. Male gender predisposed to seizures and additional operations. African-American race also seemed to play a role in the development of hematoma requiring operation. Other important findings were the association of bilateral convexity cranioplasty with infections. Finally, old age was a predictor of post-cranioplasty seizures