

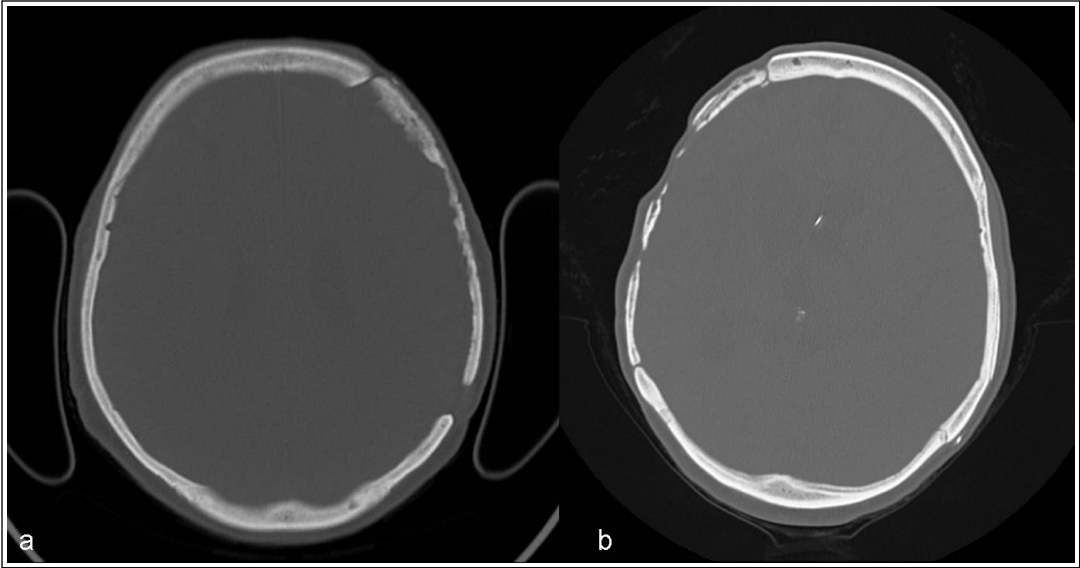
Aseptic bone resorption after autologous bone flap reinsertion following decompressive craniotomy-Risk factors for bone flap necrosis-

Pedro Duenisch MD; Jan Walter MD; Peter Schmidt; Yasser Sakr; Rolff Kalff; Albrecht Waschke; Christian Ewald
Neurosurgical Department, Head: Prof. Dr. med. R. Kalff; Jena University Hospital, Friedrich Schiller University Jena, Germany



Introduction

After consolidation of the cerebral situation the autologous bone flap reinsertion becomes necessary. However, aseptic resorption of the bone flap remains a matter of concern. The aim of our study was to report possible perioperative complications in patients undergoing autologous bone flap reinsertion and to identify the risk factors that may predispose to bone flap resorption in these patients.



Methods

We included all adult patients admitted to our neurosurgical department between 09/1994 and 06/2011 in whom we reinserted a cryoconservated bone flap. Clinical and radiological findings were retrieved retrospectively. The grade of the lysis was classified into two types depending on the extent of the osseous changes. Bone necrosis was defined as aseptic resorption with circumscribed or complete lysis of tabula interna and externa and loss of the bony protection of the brain. To identify the factors predisposing to bone flap necrosis we performed a multivariate analysis with bone necrosis as the dependent variable.

Bone flap necrosis: Image a) Beginning bone flap necrosis; Image b) Lysis of the bone flap

Results

Among 372 patients (mean age: 48.6 ±18.4 years; 57.4% males) who received 414 bone flaps during the observation period, 134 (36.0%) had diffuse traumatic brain injury; 69 (18.5%) subarachnoidal haemorrhage; 58 (15.6%) cerebral infarction; 56 (15.1%) extraaxial bleeding; 43 (11.6%) intracerebral bleeding, and 12 (3.2%) had neoplasm. Bone flap necrosis as long term complication rate occurred in 85 patients (22.8%) and 91 bone flaps, after a median time of 15 months (interquartile range: 15 [10-33]). In a multivariate analysis with bone flap necrosis as the dependent variable, **bone flap fragmentation with two** (Odds ratio (OR) =3.35, 95% confidence interval (CI): 1.59-7.01, **p<0.002**) **or more fragments** (OR=24.00, 95%CI: 10.13-56.84, **p<0.001**), **shunt dependent hydrocephalus** (OR=1.76, 95%CI: 0.99-3.12, **p=0.04**) and a **younger age** (OR=0.98, 95%CI: 0.96-0.99, **p=0.004**) were associated with a higher risk for the development of an aseptic necrosis in these patients.

Aseptic bone resorption

Follow up, month, median (IQ): 15 (10-33)

Type I n = 131

Type II n = 91 (21,9%)

Surgery intervention n = 39
No intervention n = 52

Conclusions

In patients undergoing bone flap reinsertion after craniotomy, aseptic bone necrosis seems to be an underestimated problem during long-term follow up. Especially in younger patients with an estimated good neurological recovery and a fragmented bone flap, an initial allograft should be considered.

Learning Objectives

"By the conclusion of this session, participants should be able to describe that especially in younger patients with an estimated good neurological recovery and a fragmented bone flap, an initial allograft should be considered.