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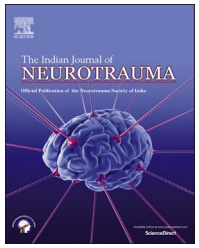

Original Article

Surgical outcome of brain contusions treated by decompressive craniotomy with or without lobectomy at high volume tertiary care trauma centre

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ABSTRACT

Aims and objective: To assess and compare surgical outcome of brain contusions treated by Decompressive craniotomy with or without lobectomy or contusectomy.

Methods: 156 patients of severe TBI, operated for brain contusions from January 2009 through December 2010 were reviewed. The patients with brain contusions >20 cm^3 in volume were included in study. In group A, decompressive craniotomy with lax duraplasty was done; in group B decompressive craniotomy with lax duraplasty along with excision of brain contusion or lobectomy was performed.

Results: There were 101 patients in group A and 55 in group B. Both groups were compared for demographic data, CT findings, GCS, time from injury to surgery, duration of surgery, blood loss, hospital stay, mortality and Glasgow outcome scale. Contusions were larger in group B ($p = 0.0001$). Pupillary reaction was worse in group B ($p = 0.037$). The time from injury to presentation to casualty ($p = 0.0033$) and time from injury to surgery ($p = 0.0008$) was longer in group B. Blood loss ($p = 0.0001$) and duration of surgery ($p = 0.0013$) were higher in group B. Rest other parameters were not significantly different. In group A, mortality rate was 63% and 50% in group B ($p = 0.131$). 28% patients in group A and 42% in group B had good outcome ($p = 0.073$).

Conclusions: Adequate contusectomy or lobectomy is useful in severe TBI with contusions. The results of present series suggest that one should be very aggressive in managing brain contusions to achieve better outcomes.

Abbreviations: CT, Computer tomography; GCS, Glasgow Coma Scale; NSRL, Normal Size Reacting to Light; NRL, Non-Reacting to light.

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1. Introduction

Brain contusions are common sequelae of traumatic brain injury (TBI). They occur in upto 8% of all TBI and 13–35% of severe TBI.[1–4] Most patients have small contusions for which surgical intervention is not required. Surgical intervention is indicated if patient develops neurological deterioration, refractory intracranial pressure or CT scan head show significant mass effect. The standard surgical approach is craniotomy with evacuation of brain contusion. The patients with TBI are surgically managed at our Center with either i) decompressive craniotomy with lax duraplasty only, or ii) decompressive craniotomy with lobectomy or contusectomy and lax duraplasty. The purpose of this study is to access the surgical outcome of patients with brain contusions and to compare two surgical approaches.

2. Material & methods

The clinical records of all operated patients with severe TBI, admitted to our Center, between January 2009 and December 2010, were retrospectively analyzed. Only those patients with cerebral contusions more than 20 cm^3 in volume were included in study. These patients were managed either with i) decompressive craniotomy with lax duraplasty only, or ii) decompressive craniotomy with lobectomy or contusectomy and lax duraplasty. The patients with penetrating injury, brainstem injury, hemodynamic instability, other associated injuries and history of prior neurologic disease or disability were excluded. The choice of surgical approach was non-randomized and at discretion of the attending neurosurgeon.

The following clinical parameters were recorded – demographic data, time of presentation to casualty since injury, time from injury to surgery, preoperative GCS, pupillary reaction and Glasgow outcome score at discharge. Preoperative Noncontrast CT scans were reviewed for contusion volume, subdural hemorrhage, subarachnoid hemorrhage, mass effect and midline shift. Postoperative CT scans were reviewed for any residual contusion, mass effect or midline shift. Intraoperative parameters reviewed were status of brain at opening/closure, duration of surgery, blood loss during surgery and the surgical procedure performed. Postoperative complications, duration of hospital stay and GCS at discharge were recorded.

Data analysis was done using SPSS 11.5 software.

2.1. *Surgical procedure*

The standard decompressive craniotomy procedure was performed by making a question mark skin incision and removal of fronto-temporo-parietal bone (size approximately 10 × 15 cm). Dura was opened by curvilinear incision across the Sylvian fissure within 1 cm of craniotomy window. The dural opening was enlarged by giving side cuts. Subdural hematoma was evacuated, if present. In group A, brain contusions were left untouched and only decompressive craniotomy was done. In group B, either lobectomy of the involved lobe or excision of contused brain was also done in addition to decompressive craniotomy. In both groups, lax duraplasty was done at the end of surgical procedure, using harvested pericranium graft or temporalis fascia graft. The bone flap was replaced in the abdominal subcutaneous tissue.

Generally, lobectomies were performed with regard to the possible consequences of the removal of brain substance. Frontal lobectomies were taken posteriorly no further than the coronal suture superiorly and 5 cm inferiorly. If the frontal lobectomy was performed on the dominant hemisphere, usually, the tissue removal was stopped 1 or 2 cm anterior to the coronal suture. Care was taken to avoid the Sylvian fissure

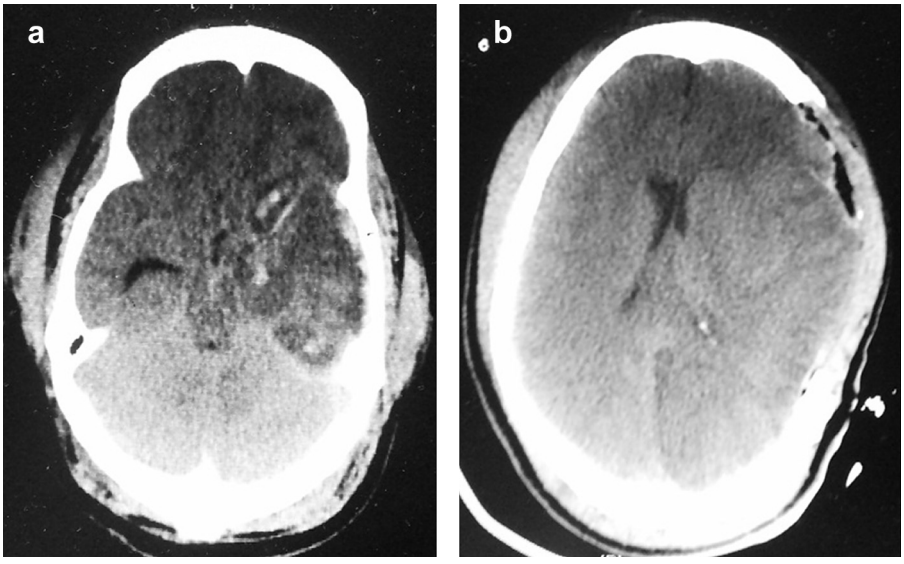

Fig. 1 – a) Preoperative NCCT Head of a patient showing left frontal and temporal contusions with mass effect. b) The patient underwent left frontotemporal decompressive craniectomy with lax duraplasty only. Postoperative NCCT head of the same patient showing decompressive craniectomy with resolving contusions and persisting mass effect.

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