Hemicraniectomy for Massive Basal Ganglia Hemorrhage

By Kiwon Lee, MD [2], Neeraj Badjatia, MD [3], Joseph Neimat, MD [4], and Guy Rordorf, MD [5]

ABSTRACT Patients with large intracerebral hemorrhages (ICHs) and low initial Glasgow Coma Scale (GCS) scores have high mortality rates. Hemicraniectomy has been lifesaving for patients with severe strokes, traumatic brain injuries, and aneurysmal subarachnoid hemorrhages with brain infarction related to vasospasm. However, this type of surgery has not been commonly performed as a standard therapy for deep ICHs involving the basal ganglia. We report the use of decompressive hemicraniectomy and partial hematoma evacuation as a lifesaving treatment for clinically deteriorating patients with spontaneous, deep ICHs. METHODS Four patients who presented with right-sided hypertensive basal ganglia hemorrhage (2 men and 2 women) were followed up for 6 months after decompressive hemicraniectomy and partial hematoma resection. All were white persons with a median age of 54 on presentation and mean and median arterial pressures of 115.42 plus/minus 17.58 and 106.50 mm Hg, respectively. The mean GCS scores on admission, before surgery, and postoperatively were 12.00 plus/minus 2.94, 5.75 plus/minus 1.89, and 12.75 plus/minus 2.06, respectively. The median GCS scores on admission, before surgery, and postoperatively were 12.00, 6.50, and 12.50, respectively. The mean hematoma volume on admission, by ABC/2 measurement (length 2 width 2 height/2) using axial CT of the head, was 54.75 cm3 plus/minus 25.14. RESULTS Despite adequate control of blood pressure and absence of coagulopathy, expansion of hematoma developed in all patients within 48 hours of presentation, with mean and median volumes of 88.00 cm3 plus/minus 7.26 and 87.50 cm3 and clinically and radiographically evident uncal herniation. In addition, malignant cerebral edema with intracranial hypertension (IH) refractory to medical therapies (including mannitol, hypertonic saline, and hyperventilation) developed. External ventricular drainage systems were placed without any improvement in IH. All patients underwent right-sided hemicraniectomy with duraplasty and partial hematoma evacuation. In each case, post-procedure CT of the brain showed successful decompression with significantly less midline shift and improved intracranial pressure management. Median Modified Rankin Scale scores at 60 days and 6 months were 5 and 4. CONCLUSIONS Hemicraniectomy with partial hematoma resection for patients with clinical deterioration caused by massive basal ganglia ICH can be a lifesaving intervention. Further study is needed to understand its effects on survival and long-term outcome. — In the past decade, there have been an increased number of reports of hemicraniectomies performed for large hemispheric injuries, with accumulating literature supporting its use for improvement in outcome.1-7 Increased mortality and morbidity have been reported in elderly patients, suggesting that age is a crucial factor when considering whether to use this procedure.3,8 This is especially true in the setting of large ischemic stroke in the middle cerebral artery territory. Similar findings are observed in cases of intracerebral hemorrhage (ICH), including acute subdural hematoma, 9-12 subarachnoid hemorrhage, 13,14 and lobar ICH.15 The basal ganglia are frequent locations for spontaneous ICH, especially in patients with underlying hypertension.16,17 Because of the deep location of the hemorrhage, surgical approaches are not common nor have they been frequently reported. The International Surgical Trial in Intracerebral Haemorrhage (STICH) compared early surgery with initial conservative medical management. No difference in overall benefit from early surgery was seen between the 2 treatment protocols.18 Six-month mortality rates and the Glasgow Coma Scale (GCS) scores did not differ between the 2 study groups. Uncertainty still exists about the best treatment option for massive basal ganglia hemmorhages with low initial GCS scores, which historically lead to extremely poor outcomes with high mortality rates.19 Large basal ganglia hemorrhages with a hematoma volume greater than 60 cm3 on CT and a GCS score of 8 or less have been reported to be associated with a 30-day mortality rate of up to 91% with conservative management.19 In this series, we report the survival rate and 6-month outcome of patients with large-volume (greater than 60 cm3) basal ganglia hemorrhages in whom hemicraniectomy, anterior temporal lobectomy, and partial hematoma resection were performed. Four patients admitted to the Neuroscience ICU of the Massachusetts General Hospital between June 2004 and January 2005 were prospectively observed. Chart review, as well as
follow-up review at 1 month, 60 days, and 6 months after the initial admission, was done for each patient. All 4 patients were men and 2 women were white with a mean age of 54 years. All received a diagnosis of spontaneous basal ganglia ICH (right-sided putamen). None had underlying vessel abnormalities, according to CT angiography data. Medical management was the same for all patients, including blood pressure control (systolic blood pressure less than 160 mm Hg), a serum glucose protocol (maintaining serum glucose level between 80 and 100 mg/dL), and treatment for increased intracranial pressure (ICP) (20% IV mannitol, 1 g per kg of body weight, given every 6 hours before surgery). Surgery was performed when the GCS score was less than 8 and hematoma volume greater than 60 cm³. All patients underwent hemicraniectomy, anterior temporal lobectomy, and partial hematoma resection along with large duraplasty. Patients' skull sections were removed and stored in the adipose tissue of the abdomen for future restoration. All patients had significant hematoma expansion within the first 48 hours of admission. In addition, malignant cerebral edema with intracranial hypertension (IH) refractory to medical therapy (including mannitol, hypertonic saline, and hyperventilation) developed. External ventricular drainage systems were placed but the procedure did not foster improvement in IH. Initial median size of the hemorrhages based on axial CT of the head was 63 cm³, with a median GCS score of 12 (Table 1). All patients had continued deterioration in GCS score from admission until surgery. At the time of surgery, all patients had right-sided putaminal ICH with a mean hematoma volume of 88.50 cm³ and a mean GCS score of 5.79 plus/minus 1.89 (Figure). The median hematoma volumes at admission and expanded volumes at 48 hours after admission were 63.00 and 87.50 cm³, respectively (Table 2). In each case, postsurgical CT of the brain showed successful decompression with significantly less midline shift and improved ICP management. After hemicraniectomy, the postoperative neurologic ICU medical management protocol was the same as the preoperative medical management protocol. Functional outcome data (Modified Rankin Scale [MRS] scores) were obtained at 30 days, 60 days, and 6 months after the surgery (Table 3). All patients survived 30 days and 60 days after the initial brain injury, and the median MRS scores at 60 days and 6 months were 5 and 4, respectively. One patient died after 6 months because of aspiration pneumonia and respiratory failure. MANAGEMENT CHALLENGE Management of massive ICH, especially in basal ganglia with low initial GCS scores, continues to be extremely challenging. For cerebellar hemorrhages with mass effects on the brainstem along with compression of fourth ventricle or lobar hemorrhages in young patients with worsening neurologic status, it is generally agreed that emergent decompressive surgery is indicated. Unfortunately, such a consensus does not exist for deep basal ganglia hemorrhages. Inadequate data in this subcategory of patient with ICH make it unclear whether surgery has any role in management. Based on the literature, the natural history of spontaneous basal ganglia ICH with hemorrhage volume greater than 60 cm³ and initial GCS score less than 9 has been reported to have a high 30-day mortality rate with conservative management. In this case series, we focused on whether decompressive hemicraniectomy with partial hematoma resection can be lifesaving. Prespecified subgroup analysis of the STICH trial indicated that patients with initial GCS scores between 5 and 8 and hemorrhages located in the basal ganglia or thalamus with hematoma volume greater than 50 cm³ favored initial conservative management over early surgery for improved outcome. However, the surgical technique that was used in our series involved anterior temporal lobectomy and large duraplasty with removal of the ipsilateral skull section, which differed from simple evacuation of hematoma. This type of surgery is occasionally performed for malignant brain edema and herniation syndrome secondary to major middle cerebral artery infarction but not commonly performed for deep brain hemorrhages. Hemicraniectomy with partial hematoma resection is not routinely performed for spontaneous basal ganglia hemorrhages at our institution. Surgery was performed in this small case series as a humanitarian and potentially lifesaving procedure. We analyzed the outcome of these patients using MRS scores. All patients had survived at 30 days after surgery and had median MRS scores of 5 and 4 at 60 days and 6 months of follow-up. However, none of the patients became functionally independent, which suggests that the quality of life may not be favorable despite aggressive surgical treatment. The mean values for systolic blood pressure, diastolic blood pressure, and mean arterial blood pressure were 172.50 mm Hg, 92.50 mm Hg, and 115.42 mm Hg, respectively, suggesting that inadequately controlled hypertension may have played a role in the pathophysiology of the ICH. There were many limitations in this study. One of these was that we did not have a control group (without surgical intervention) for direct comparison. Also, because of the small sample size and many variables that could potentially affect clinical outcome, it was difficult to draw any firm conclusion. Nevertheless, based on the available literature reporting high mortality rates in this particular patient population, this case series suggests that hemicraniectomy with partial hematoma resection may be a lifesaving...

Source URL: http://www.psychiatrictimes.com/news/hemicraniectomy-massive-basal-ganglia-hemorrhage

Links: