Minimally invasive evacuation of severe intraventricular hemorrhage using the brainpath endoport-assisted microsurgical system

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Poster ID # 1181
Introduction

• Intraventricular hemorrhagic extension (IVH) is an independent predictor of worse outcome following spontaneous intracerebral hemorrhage (ICH)
• IVH volume affects patient prognosis in these patients
• Higher Graeb score (GS) has been associated with an increased likelihood of death
• External ventricular drain (EVD) remains the standard treatment
• Endoport-assisted microsurgical device (EAMD) is a new minimally invasive technique that can be used for evacuation of severe IVH
Methods

• Patients with severe IVH (defined as GS >6, modified GS >20) were selected for surgical treatment using the atraumatic EAMD
• EAMD consists of an outer sheath, and an inner obturator (75 mm tube)
• A 2-cm craniotomy flap is sufficient to allow full access of the EAMD
• EAMD is inserted to the target under neuronavigation through trans-sulcal dissection
• Aspiration of the hematoma is accomplished by visualizing all 4 quadrants in a 360° fashion
• A septostomy is performed, and an EVD can be placed prior to closure
Results

- 3 patients (2 male and 1 female) with a mean age of 54 years were treated surgically
- The mean preoperative GS was 10.0 with an mGS of 23.3. The mean postoperative GS was 4.0 ($P = 0.001$) with an mGS of 10.67 ($P = 0.001$)
- There were no complications related to surgery itself in any of the 3 patients
Results-Illustrative case

- 46-year-old female with history of Factor V Leiden thrombophilia presented with Glasgow coma scale (GCS) of 8
- CT scan showed right frontal lobe ICH (~ 25 cc), IVH extension with GS of 9 and mGS of 24 (Figures A-C)
- CT angiogram of the brain was negative for vascular abnormalities
- EVD was initially placed that eventually failed
- Patient underwent IVH evacuation the next day after admission via a right frontal mini-cranietomy using the 75-mm EAMD
- Postoperative CT scan showed a GS of 3 and mGS of 9 (Figures D-F)
- The patient was discharged on hospital day 23 with a Glasgow outcome scale extended (GOS-E) score of 5
Discussion

- EAMD evacuation has the advantages of a higher hematoma clearance rate, fewer complications, and better outcomes in the treatment of severe IVH, when compared with treatment with an EVD.
- In our mini-series, all patients survived the initial incident after EAMD evacuation of severe IVH with variable disability at follow-up.
- There were no complications related to surgery.
Summary Points

• EAMD facilitated an effective, safe minimally invasive technique for evacuation of severe IVH in patients with hemorrhagic extension secondary to sICH

• EAMD significantly increases the extent of IVH clearance

• EAMD shows the potential to improve long-term patient outcomes