Safety and Feasibility of Ventriculostomy Placement and Intracranial Pressure Monitoring for Management of Global Brain Edema in Acute Liver Failure Requiring Orthotopic Liver Transplantation

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Introduction

- Brain edema accounts for 30% ~ 80% of death in patients with fulminant hepatic failure (FHF)
- ICP monitoring is necessary, but how?
- Controversial role of external ventricular drain in patients with FHF –
  - Is CSF drainage feasible in these patients with small ventricles?
  - Can it be done safely in these patients with very abnormal clotting studies (i.e. elevated PT)
  - Is it effective in controlling ICP?
Disclosures

- No financial disclosures
Method

- All patients with diagnosis of FHF by King’s College Criteria who received EVD from October 2000 to May 2012
- Primary outcome: intra-hospital mortality
- Secondary outcome:
  - success rate of EVD placement
  - intra-op and post-op rate of intracranial hemorrhage
  - post-op clinical neurological status
Results

- 17 patients
- EVD successfully placed in all 17 patients in the OR using STEALTH stereotactic guidance
- 1 small tract hemorrhage which was clinically insignificant
- Mean ICP at time of insertion = 46 cm H2O
- ICP controlled (<20 cm H2O) with CSF drainage
- 15/17 patients had successful transplants without neurologic sequelae
- 2 patients did not survive to transplant despite ICP control
ICP in Patient #2

Pre Liver Transplantation

Post Liver Transplantation

ICP (mmHg)
Discussion

- Multidisciplinary team approach to FHF patients with brain edema who requires EVD placement
- Image-guided placement of external ventricular drain may help to improve accuracy of EVD placement
- EVD can be successfully placed in patients with ALF and very abnormal clotting studies without significant hemorrhage risk
- EVD drainage can successfully control ICP in most patients resulting in more patients making it to a successful liver transplant
Summary

- EVD placement was feasible and CSF drainage was effective in helping to control ICP
- Direct comparison between other non-invasive ICP monitoring vs. ventriculostomy
  - Survival rates
  - Long-term neurological outcomes
  - Percentage of silent intracranial hypertensive episodes
  - More information benefit or harm the patients?
- Larger series to evaluate the benefits of CSF drainage
- Optimizing post-operative care