Total corpus callosotomy with anterior commissurotomy through a mini craniotomy for catastrophic epilepsy in children

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Introduction

• Corpus callosotomy is a palliative procedure
  • Especially for Lennox- Gastaut semiology without localization of drop attacks

• Total callosotomy has improved seizure outcome without adding risk of disconnection syndrome

• Aim of our study: to describe endoscopic or microscopic complete corpus callosotomy combined with anterior and hippocampal commissurotomy through a mini craniotomy
Indications and Complications of Callosotomy/Commissurotomy

- No clearly defined focal onset for the seizures
- Clearly bilateral (primarily frontal) disorders
- Developmental difficulties
- Multiple seizure types (including atonic)
- Acute callosal disconnection symptoms: apathy, urine incontinence, right hemineglect, low-verbal output (mutism) with mean duration of 16 days (range, 8-50 days)
- Permanent complication: 3%

For left hemispheric dominant patients:
- Inability to name objects presented briefly to the left hemifield
- Left hemi-alexia
- Left hemianomia
- Difficulty imitating the hidden other hand
- Unilateral tactile anomia
- Unilateral left agraphia
- Right-hand constructional apraxia
- Alien hand syndrome (intermanual conflict)

Cukiert et al., Epilepsia, 2006
DTI after Total Corpus Callosotomy
Microscopic disconnection of anterior and hippocampal commissures + total corpus callosum
Endoscopic disconnection of anterior and hippocampal commissures + total corpus callosum
Endoscopic disconnection of anterior and hippocampal commissures + total corpus callosum.
Vertical Perithalamic Hemispherotomy
4 y/o girl, Rt hemimegalencephaly
Results

- Patients: 7 (M:F=3:4), mean age=9 years, range 1.7-25 years
- Mean seizure frequency: 20 fits/days (range 1-60)
- Mean intelligence quotient of < 50
- All had presented major seizure with drop attacks
- Surgery was performed by a single neurosurgeon with microscopic (6) or endoscopic (1) approach
- Complications with mean follow-up of 5.5 months (range 1-11 months)
  - Acute transient disconnection: 7, all resolved in two to four weeks
  - Transient diabetes insipidus (HYPOTHALAMUS MANIPULATION): 1 (recovered in 2 months)
  - Bilateral subdural effusion (PREVIOUS CHRONIC SDH WITH SEVERE BRAIN ATROPHY): 1 (S/P subdural-peritoneal shunt)
  - no morality or long-term morbidity
- Drop attacks stopped in all. Seizure frequency/duration decreased >90% in 5 patients and >70% in 2 patients.
- All patients attained better functional levels than presurgical status
- Parental questionnaires reported 100% satisfaction attributed to the control of drop attacks
Discussion

• Complete callosal sectioning is proved more than 90% improvement in drop attacks, but close to 30% of patients relapses in the next few years.

• Our study published in Epilepsia 2019; 60:1126-1136 demonstrated the early recovery of transmission through anterior commissure.

• Therefore, we preserved fornix, massa intermedia, and posterior commissure.

• Disconnection syndrome didn’t interfere with their already severe compromised cognitive status, but epilepsy.

Take Home Messages

• Alleviated the vicious circle of epileptogenic encephalopathy
• Possibility for lateralization of epileptogenic form discharges, esp. frontal lobe epilepsy
  • Candidate for 2nd stage of definite resection surgery
• Improved in cognitive function, quality of life, and parents’ satisfaction
  • Speed of processing: worse
• Commissurotomy didn’t increase the possibility of disconnection syndrome:
  • Younger patients (<11 y/o)
  • Poor cognitive function patients (IQ < 50)
  • Usually transient: recovery in 2 weeks to 2 months
• Long-term F/U is needed to compare with the efficacy of total callosotomy
Team Work Makes No Limit!

Thanks for your attention!

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