

is a viable option for the treatment of drop attacks and other seizures in patients with bihemispheric malformation of cortical development. In the present series, 4 patients had bilateral lesions (tuberous sclerosis and cortical dysplasia) and generalized seizures such as epileptic spasms and tonic seizures at initial presurgical evaluation (patients 2, 3, 5 and 17). Their seizures transformed into asymmetric seizures after callosotomy. Favorable outcomes were achieved after the subsequent surgery in one patient. Callosotomy can therefore be considered as a palliative and diagnostic therapy for patients with bilateral lesions and generalized seizures.

### Repetitive surgeries: complications and surgical interval

In this series, two patients had postoperative hydrocephalus after RSF or HMDS, and one had epidural infection after implantation of subdural electrodes and RSF. Although additional surgical treatment was required for these patients, permanent deficits did not persist. These complications are possible after conventional resective surgery and hemispherotomy (Behrens et al., 1997; Limbrick et al., 2009) and not particular to the stepwise procedure described herein.

Although it ranged widely in the present series, a sufficient interval between callosotomy and subsequent surgery should be required for individual patients. A recent paper documented that callosotomy followed by immediate IEEG study and resective surgery did not achieve favorable outcomes, and suggested delayed IEEG (Silverberg et al., 2010). It is important to confirm that the seizures and EEG findings are stereotypical and reproducible after callosotomy. Patients with suspected partial onset seizures after callosotomy should be repeatedly examined with video-EEG.

### Callosotomy for patients excluded from conventional resective surgery

It is important to note that all patients in this series were excluded from conventional resective surgery mainly due to normal MRI and bilateral EEG findings at initial presurgical evaluation. Most reported outcomes after epilepsy surgery have been conducted with treated patients. However, there should be a considerable number of excluded patients. For instance, Wetjen et al. (2009) reported that 50% of MRI-negative extratemporal resections resulted in a favorable postoperative outcome if the patients had focal ictal EEG onset by invasive monitoring. However, that rate dropped to 27.5% if all implanted patients (including patients that were implanted but ultimately had no resection) were considered (Roper, 2009). Although the precise number is not known, some significant number of patients should be excluded from conventional resective surgery in general. Callosotomy is not only a palliative therapy, but also a diagnostic for "buried" patients. Hopefully, callosotomy will result in improved outcomes through subsequent resective surgeries.

### Conflicts of interest

None of the authors has any conflict of interest to disclose.

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