Neurology Asia 2010; 15 (Supplement 1) : 60

Surgical results of corpus callosotomy for intractable epilepsy with West syndrome

Hiroshi Baba, Tomonori Ono, Keisuke Toda, Kenji Ono, Shiro Baba

Department of Neurosurgery, National Nagasaki Medical Center

Background and Objective: Infants with West syndrome are at high risk for developing severe mental retardation. Pinard *et al*[1] reported dramatic reduction of spasms in patients with West syndrome after total callosotomy in addition to improvements of psychomotor function, but clinical details related to surgical results are not clarified. From year 2000, corpus callosotomy was performed on 35 children with West syndrome under 5 years old in the National Nagasaki Medical Center. In this study, surgical outcome, postoperative psychomotor change and predictive factors related to surgical outcome were retrospectively analyzed.

Methods: The age at the seizure onset of the 35 patients ranged from 0 to 1.8 years (mean 0.3). Eleven patients had normal developments prior to the onset of epilepsy. All patients had video-EEG monitoring, neuropsychological examination, MRI and inter-ictal ECD SPECT. Patients with resectable lesion on MRI were excluded. Age at surgery ranged from 0.4 to 4.6 years. Anterior corpus callosotomy was performed in 2 patients and total corpus callosotomy in 33 patients. The mean follow-up period was 3 years. For psychological test, Kinder Infant Developmental Scale was used during each follow-up. For assessment of post-operative change of developments, developmental velocity was used, which was calculated from the difference of developmental age before surgery and at each follow-up, divided by the number of follow-up months. Surgical outcome was categorized as seizure free, excellent (> 80% reduction in seizure frequency), good (> 50% reduction in seizure frequency) and poor (no significant change).

Results: During preoperative EEG-video monitoring, 21 patients showed single type of seizure and 14 had multiple types of seizure. Tonic spasm was recorded in all patients except 3, who had tonic seizure. Preoperative mean developmental quotient and developmental age was 20.6 and 5 months, respectively. MRI showed diffuse brain atrophy in 28 patients. Surgical outcome was seizure free in 9 (26%), excellent in 7 (20%), good in 10 (28%) and poor in 9 patients (26%). 74% of patients showed significant improvements after the surgery. Pre-operative prognostic factors were analyzed between the "seizure free/excellent" group and "good/poor" group with multivariate analysis. Late onset of seizure ($p<0.05$), higher preoperative developmental quotient ($p<0.05$) and normal developments before the onset of epilepsy ($p<0.001$) are significant predictive factors for seizure control. In "seizure free/excellent" group, developmental velocity was greater than "good/poor" group at the each follow-up point. Furthermore, in "seizure free/excellent" group, patients with preoperative developmental quotient greater than 20 showed significantly higher developmental velocity (0.41) than those with lower developmental quotient (0.17) at the final follow-up ($p<0.05$).

Conclusion: Physiopathological mechanism of spasm is still unclear and controversial. Brainstem has been proposed as a generator of spasm. Our results support the primary involvement of cortical structures for spasms.[2] Corpus callosotomy was an effective and important therapeutic option in patients with West syndrome. Best results were obtained in patients who had late onset of epilepsy, higher developmental quotient and normal development before the onset of epilepsy. For postoperative improvements of psychomotor function, an early surgery is recommended before severe psychomotor delay develops.

References

1. Pinard JM, Delalande O, Chiron C, *et al*. Callosotomy for epilepsy after West syndrome. *Epilepsia* 1999; 40:1727-34.
2. Avanzini G, Panzica F, Francesschetti S. West syndrome revisited. In: Guzzetta F, Bernardina BD, Guerrini R, eds: Progress in epileptic spasm and West syndrome. John Libbey Eurotext, 2007:15-22.