

Lesson learned from early experience in pediatric epilepsy surgery service in Surabaya Indonesia

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Indonesia is a large country with approximately 265 million people. About 70 millions people are at pediatric age.¹ Until 2009, there is only one epilepsy surgery center in Indonesia, located at Semarang - Central Java, that performs surgery for mostly adult patients.^{2,3} In 2009, our center started to perform epilepsy surgery for children with epilepsy. This brief communication presents the development of the newly established pediatric epilepsy surgery center in Surabaya, Indonesia; the limitations and obstacles, the lesson learned from the early experience, and how we manage the difficulties.

We reviewed medical records of all epilepsy surgery cases performed at Dr. Soetomo General Hospital Surabaya from 2009-2016. Pre-operative conference was employed with the team and the family. The team includes pediatric neurologist/epileptologist (PIG), neurosurgeons (WS, HS, MAP, and AT) and neuroradiologist. Pre-operative examination included semiology of the seizure, full neurologic examination, interictal scalp electroencephalography (EEG), brain magnetic resonance imaging (MRI), with specific attention to the area of suspected ictal onset. Surgical procedures were performed by the author (WS) with assistance by HS and AT. Pre-operative and post-operative treatment was by all authors. Regimen and dosing adjustment of anti-epileptic drugs (AED) was by neuropediatrician (PIG). Specimens from operative field were sent to pathology.

Between 2009 and 2016, we performed 19 epilepsy surgeries in children of 3 months old to 16 years olds. The actual surgical candidates were 40 patients but 21 patients refused to proceed to surgery for several reasons. The most common reasons for declining surgery included fear of unbearable complications in 7 cases, financial considerations in 5 patients, and reservations about benefits in 9 patients. Another reason was that they had been given opinion to continue medication for at least 2 years without a chance to get further imaging investigation. The latter reason was considered a misconception by several neurologist or epileptologist that were less open to surgical treatment. All patients that underwent surgery had continuing seizures despite adequate trials of at least 2 antiepileptic drugs. All patients experienced average seizure frequency of more than 10 attacks daily, ranging from 5 to 30 attacks per day. The EEG showed focal (9 cases), hemispheric abnormality (7 cases) and diffuse abnormality (2 cases). The good concordance between EEG and MRI was found in hemispheric lesion as it showed background slow activity and structural abnormality in the culprit hemisphere.

Hemispherotomy was the most common procedures in our institution (in 7 cases) followed by lesionectomy for focal lesions (6 cases), anterior and mesial temporal lobectomy (3 cases), and corpus callosotomy (2 cases). The pathology of focal lesions were focal cortical dysplasia (FCD, 5 cases) and ganglioglioma (1 case). The specimens from hemispheric procedure showed various pathologies including encephalomalacia in 2, gliosis in 3, and dysplasia in 2 cases. Hemispheric lesions mostly presented as syndromic West syndrome, Proteus syndrome, or Rasmussen encephalitis. Majority of the patients underwent functional hemispherotomy resulted in Engel's class Ia and Ib (6 out of 7 cases) and Engel's class II in 1 patients. One patient had to proceed for second surgery due to incomplete corpus callosotomy. After the second surgery, the patient attained Engel's class Ia. Post hemispherotomy temporary hemiparesis occurred in 2 patients for 2 weeks and 2 months respectively, which recovered completely after 2 or 3 months. Other complication included tension hemispheric cyst (1 case), which caused high intracranial pressure. The patient eventually had to go for shunt procedure.

Patient with FCD and localized in single lobe of the brain had Engel's class Ia or Ib. FCD involving multiple part of the brain or less demarcated lesion had lower Engel's class (Engel's class II). The ganglioglioma resulted in Engel's class I after removal. In temporal lobe tumor removal, we employed a less aggressive approach (conserving hippocampus as much as possible) and removed only part of the hippocampus that was invaded by the ganglioglioma. Three-year-follow-up after tumor removal, the patient remains seizure free and tumor recurrence free.

Corpus callosotomy was performed in 2 cases of infantile spasm due to HIE epilepsy as the parents insisted on surgery even after they were informed that the result was not satisfactory. The patients experienced multiple daily seizures (Engel's class IV) despite the surgical procedure.

In conclusion, the key to start pediatric epilepsy surgery program is to assemble the right team with the right people that have similar approach to treating epilepsy. The limitation in facility may be challenging but it is manageable with teamwork and communications.⁴ The satisfactory results, especially in hemispheric lesion and some focal lesions, are gratifying.

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