1. Introduction

Epilepsy affects approximately 50,000,000 people worldwide and 1-2 percent of these patients are children [1]. Studies show that in one-third of new onset epilepsy patients, seizures will become refractory to medical management [2]. Recurrent seizures [3] and the medications used to control them [4] can be harmful to the developing brain in children. Epilepsy surgery has the potential to control seizures, improve patient quality of life and reduce the average of 57.2 miles to receive care at Children’s Hospital of Oakland. From 2009-2012, a total of sixty-two epilepsy surgeries were performed. This included twenty-six VNS implantations and thirty-six complex cranial procedures (Table 2). The average miles a patient traveled throughout 2009-2012 was approximately 52 miles.

2. Methods

We retrospectively reviewed clinical charts, medication regimens, imaging data, neuropsychologic testing, operative reports and pathology specimens for all children undergoing epilepsy surgery at Children’s Hospital of Oakland between 2001 and 2012. In order to classify each patient’s seizure outcomes, the Engel and International League Against Epilepsy (ILAE) classification systems were used. These systems are based on patient seizure frequencies and time intervals. Neuropsychology testing was performed by a dedicated pediatric neuropsychologist and consisted of: full scale intelligence quotient (IQ), processing index, and working memory. Tissue removed during surgery was analyzed by a neuropathologist. Specimens that were determined to be focal ischemia were further subclassified according to the ILAE classification systems.

3. Results

Ninety-nine epilepsy surgeries were performed at CHO from 2001 to 2012 (Figure 1). From 2001-2008, a total of thirty-seven epilepsy surgeries were performed. Of the thirty-seven epilepsy patients, thirty-three were identified as ILAE IIa. 4 and IIb. With balloon cells. Isolated lesion of dyslamination (FCD) was further subclassified according to the ILAE classification systems.

4. Discussion

This study illustrates how the creation of a specialty team dedicated to the treatment of pediatric epilepsy surgery can dramatically increase the volume and complexity of cases performed. Our comparison data showed that case numbers more than doubled after the arrival of such a team. Moreover, the types of surgeries performed changed from the implantation of a seizure control device called a vagal nerve stimulator (a device with a cure rate of approximately 50%) to include complex cranial procedures such as craniotomies, lobectomies, and hemispherectomies. Common causes of medically-refractory pediatric epilepsy amenable to surgery include tumors, malformations due to abnormal cortical development, vascular abnormalities and certain epileptic syndromes. In the present study, the majority of patients had focal cortical dysplasia, most of which were ILAE Type III (50%), followed by Type I 45%. Most patients did well after epilepsy surgery with 45% achieving Engel Class I and 50% ILAE Class I. Seizure freedom rates are typically high (usually 50-80%) following tailored focal resection, lesionsectomy, and hemispherectomy in other studies [5] and our results are consistent with these findings.

In addition to seizure outcome rates, we looked at neuropsychologic testing for our patients. Ivani et al demonstrated that motor functions, developmental age, language skills and socio-psychologic function improved following surgery in children with epilepsy [6]. Our results also demonstrate similar outcomes. For pre- and post-operative memory, full scale IQ, processing index and test results improved as a result of surgery. Fig. 3-5. Neuropsychology Data: shows the examination of each patient’s skills after neurosurgery.

5. Conclusion

The addition of a multidisciplinary specialty team to treat pediatric epilepsy can have a profound positive impact on the nature of patient care, even at smaller, non-university-based children’s hospitals. Case numbers can increase, surgery complexity can be enhanced and excellent seizure and psychosocial outcomes can result.

Acknowledgements

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References

[4] Spencer SS, Berg AT, Vickrey BG, Sperling MR, Bazil CW, Shinnar S, Langfitt JT, Walczak TS, Pacia SV. Recurrent seizures [3] and the medications used to control them [4] can be harmful to the developing brain in children. Epilepsy surgery has the potential to control seizures, improve patient quality of life and reduce the average of 57.2 miles to receive care at Children’s Hospital of Oakland. From 2009-2012, a total of sixty-two epilepsy surgeries were performed. This included twenty-six VNS implantations and thirty-six complex cranial procedures (Table 2). The average miles a patient traveled throughout 2009-2012 was approximately 52 miles.

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