

Epilepsy surgery program in Hong Kong

¹Patrick KWAN, ¹Danny TM CHAN, ²Colin LUI, ³WK CHAK

¹Prince of Wales Hospital, Shatin; ²Queen Elizabeth Hospital, ³Tuen Mun Hospital, Hong Kong

Abstract

We reported the experience of epilepsy surgery program in 3 centers in Hong Kong. They are Prince of Wales Hospital, Queen Elizabeth Hospital and Tuen Mun Hospital. The results of surgery are comparable to best centre elsewhere in the world. Hong Kong has a population of 7 million people with estimated surgical candidates of 3,500. With estimated less than 150 epilepsy surgeries performed in Hong Kong so far, there is room for further development of epilepsy surgery service in Hong Kong.

Hong Kong is a densely populated city with 7 million people. The health care system is mostly supported by public hospitals. Epilepsy surgery operative procedures have been carried out in five hospitals. We report the experience of three of the major centers with active epilepsy surgery programs, namely the Prince of Wales Hospital, Queen Elizabeth Hospital and Tuen Mun Hospital.

The epilepsy surgery program began in these three centers between 1996 and 1998. The prototype of the epilepsy surgery team was composed of enthusiastic epileptologists and neurosurgeons. The maturation of a multi-disciplinary team took several years. Adult and paediatric epileptologists, neurosurgeons, neuro-physiologists, neuroradiologists and neuroanaesthetists are all essential team players.

The Hong Kong Epilepsy Society was established in 2002 and became a Chapter of the International League Against Epilepsy in 2003. It serves as a platform for interested group discussion and as a powerhouse for advancing the cause of epilepsy management in Hong Kong. The society now has over 60 members made up of a variety of expertise, including adult and paediatric neurologists, neurosurgeons, neuro-psychologist and neuroradiologists. Symposia and conferences are regularly held to update advancements in the field.

EPILEPSY SURGERY PROGRAM AT THE PRINCE OF WALES HOSPITAL, QUEEN ELIZABETH HOSPITAL AND TUEN MUN HOSPITAL

Prince of Wales Hospital Epilepsy Surgery Program

The Epilepsy Surgery Program in the Prince of Wales Hospital began in 1996 with a slow learning curve. Gratefully, enthusiasm and experience have enabled significant growth of the program in the recent two years (Figure 1). A monthly combined epilepsy clinic is a meeting place for neurologists and neurosurgeons to decide on the types of surgical intervention. A bimonthly epilepsy case conference keeps the team updated about the results of any investigations and progress in complex cases (i.e. non-concordant cases or non-lesional cases). Up to February 2006, 51 patients, including both children and adults, have undergone epilepsy surgery; 46 of the patients have been followed-up for at least 6 months after operation. There were 21 procedures (either anterior temporal lobectomy with amygdalohippocampectomy or selective amygdalohippocampecty) for hippocampal sclerosis and 23 lesionectomies for a variety of pathologies, including low grade gliomas, cavernomas, and cortical dysplasias. A patient with Rasmussen's encephalitis and one with hemimegalencephaly underwent functional hemispherotomy with excellent results (Fig. 2). One patient received corpus callosotomy. Of the 21 patients operated for hippocampal sclerosis, 16 (76.2%) became seizure free after surgery. Most of them could return to work and were socially

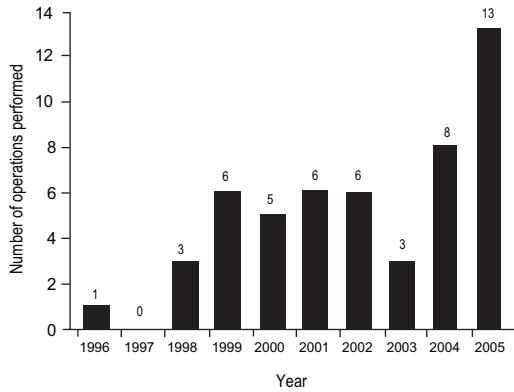


Figure 1: Epilepsy surgery in Prince of Wales Hospital

independent (Fig 3, 4). There were two transient visual field cut and one permanent hemiparesis after surgery. There was no procedure-related mortality so far.

Queen Elizabeth Hospital Epilepsy Surgery Program

The Queen Elizabeth Hospital started the Epilepsy Surgery Program in 1998. A total of 32 patients have undergone surgery. Thirty of them were adults and two were children. The average age of patients was 32 years. There were 11 lesionectomy surgeries for tumors. Twenty one cases were mesial temporal sclerosis with anterior temporal lobectomy and hippocampectomy. Two-third of the patients achieved seizure-free outcome after the operation. Among the 20 hippocampal sclerosis patients, 70% of them achieved seizure-free status.

Tuen Mun Hospital Epilepsy Surgery Program

In Tuen Mun Hospital, there was a collection of paediatric epilepsy surgery patients. Evaluation was conducted in patients with refractory epilepsies despite treatment with two appropriate antiepileptic drugs. Eighteen children with medically intractable epilepsy underwent the surgery between 1998 and 2006. The median age at operation was 7 (with a range from 2 to 19 years' old). All patients had structural abnormality on brain MRI.

Two teenagers with mesial temporal sclerosis underwent left-side temporal lobe surgery. Two children with post-viral encephalitic epilepsy underwent right-side temporal lobectomy. Two children with benign temporal tumor-related epilepsy underwent temporal lobectomy. One toddler with porencephalic cyst underwent cortical resection. Six moderate to severe mentally retarded children with frequent generalized convulsion underwent corpus callostomy.

The mean duration of follow-up was 27 months (with a range from 1 month to 8 years).

According to Engel classification, 6 of the 18 patients (33%) achieved seizure-free (2 were mesial temporal sclerosis and 4 were benign tumor). Seven of the 18 patients (39%) experienced worthwhile seizure reduction. There was no mortality; one patient suffered from transient post-operation right-eye ptosis.

In conclusion, epilepsy surgery is safe and effective for selective children and adolescents with medically intractable epilepsy. The operation

Procedure	Pathology	Number
ATL/SAH	Hippocampal sclerosis	21
Lesionectomy	Low grade tumour	11
	DNET	4
	Cavernous haemangioma	4
	Tuberous sclerosis	1
	Contusion	1
	AVM	1
	Malformation of cortical development	1
Hemispherotomy	Rasmussen's encephalitis	1
	Hemimegalencephaly	1
Total		46

ATL: anterior temporal lobectomy; SAH: selective amygdalohippocampectomy; DNET: dysembryoplastic neuroepithelial tumour; AVM: arteriovenous malformation

Figure 2: Types of procedures in Prince of Wales Hospital Epilepsy Surgery Program

Type of procedures (n)	Completely seizure-free	Seizure-free/auras only
Mesial temporal sclerosis (21)	10 (47.6%)	16 (76.2%)
Anterior temporal lobectomy + hippocampectomy		
Right (10)		
Left (6)		
Selective amygdalohippocampectomy (5)		
Lesionectomy +/- hippocampectomy (23)	11 (48%)	14 (61%)
Temporal (14)		
Frontal (9)		
Hemispherectomy/hemispherotomy (2)	2 (100%)	2 (100%)
Total (46)	23 (50%)	32 (70%)

Figure 3: Seizure outcome in Prince of Wales Hospital Epilepsy Surgery Program

Primary outcome: seizure rate at 1 year post-op

ILAE classification	I complete seizure free	II seizure free, aura only	III >50% reduction	IV Up to 50% reduction	V
Prince of Wales Hospital study	10 (47.6%)	6 (28.6%)	4 (19.0%)	1 (4.8%)	0
	76.2%				
Wiebe et al'	64%				

ILAE = International League Against Epilepsy

Secondary outcome

Complications	1 (Visual field defect)		
Return to work	16 (76.2%)		
Anti-convulsants	↓	same	↑
Number	9 (43%) 4 stopped AED (44%)	9 (43%)	3 (9%)

Figure 4: Results of surgery at Prince of Wales Hospital Epilepsy Surgery Program

result is less homogenous and is pathology-related.

FUTURE

We believe that the epilepsy surgery is significantly under-utilized in Hong Kong. With a population of 7 million, it is estimated that there are 35,000 epilepsy patients. Based on data from the literature, it can be estimated that 20% of the patients are refractory to medication, meaning that 7,000 patients should be candidates for pre-surgical evaluation. It can be expected that 3,500 patients (7000 x 50%) are eligible for operation. However, we estimate that less than 150 epilepsy surgeries have been performed in Hong Kong so far.

In terms of hardware, functional imaging equipment (i.e. PET scan and ictal-SPECT) can be advantageous for defining the epileptic focus, particularly for the more difficult cases, but is not readily feasible or available in all the centers. Well equipped in-patient video-EEG facility is still in great shortage. Enthusiastic players would not be satisfied by part-time program. We believe that we still have a long way to go to enable more patients benefit from potentially “curative” epilepsy surgery in Hong Kong. Education of general doctors and medical students will hopefully increase the volume of referrals. To fulfill this aim, discussion to establish a unified quaternary epilepsy surgery service is underway.

REFERENCE

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