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Epilepsy surgery in China: The history and current development

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Abstract

The earliest activities related to epilepsy surgery in China may be traced to the 1950s and 60s. After a lull during the cultural revolution, there was resurgence of epilepsy surgery from the 1980s, and rapid development from 2000. It is estimated that approximately 150-200 physicians currently practice epilepsy surgery in the country. In year 2005, there were a total of 2,500 cases of epilepsy operated in whole of China, close to half in Beijing, Tianjin, Shanghai, Chongqing and Guangzhou, and a quarter in Beijing. There are three Chinese epilepsy surgery journals, 5 monographs on epilepsy surgery, and "Epilepsy surgery" edited by HO Luders has also been translated into Chinese.

THE HISTORY OF EPILEPSY SURGERY IN CHINA

Although the trepanation in an unearthed skull found in Shandong indicates that surgical treatment of brain disease in China has a history of more than five thousand years, functional neurosurgery for treating diseases such as epilepsy and Parkinson's disease is a recent development. There is no record of epilepsy surgery when all hospital literature and history records before the establishment of People's Republic of China in 1949 were reviewed. The earliest record related to epilepsy surgery in China may be traced to the 1950s and 60s. There were the articles on "traumatic epilepsy" by Professor Guosheng Duan, "hemispherectomy for West syndrome" by Yuquan Shi, and "epilepsy surgery" by Yadu Zhao. In the ensuing twenty years during the cultural revolution, the development of epilepsy surgical was at a standstill.[1,2]

In the 1980s, with the implementation of economic reform and open policy, the development of academic exchange with overseas countries, and increasing availability of new technology, many hospitals restarted scientific research and surgery service on epilepsy. The operations performed included anterior temporal lobe resection, callosotomy, multiple subpial transaction (MST), stereotactic neurosurgery and cerebeller stimulation. During this period, many physicians including Dr. Qifu Tan, Dr. Zonghui Liu, Dr. Bingheng Chen, Dr. Wanshu Jiang and Dr. Ling Li did excellent work.[3-5] They built the foundation for the subsequent development of epilepsy surgery in China.

THE CURRENT DEVELOPMENT OF EPILEPSY SURGERY IN CHINA

The development of epilepsy surgery in China has proceeded very rapidly from the 1990s. The followings is a brief description of the current situation in China.

The epileptogenic foci localization

Precise localization of epileptogenic foci is the prerequisite of many epilepsy surgery procedures. Currently, various techniques and procedures have become increasingly available in the country to determine the epileptogenic foci. These include MRI, SPECT, PET, MEG and electrophysiological monitoring. The introduction of MEG raised the preoperative evaluation of epilepsy to a new level. The invasive and non-invasive EEG monitoring using strip and grid depth electrodes, allows for better definition of irritative and epileptogenic zone, and its relationship to the eloquent cortex.[6]

Basic neuroscience research related to epilepsy surgery

There is also great progress in basic neuroscience research related to epilepsy surgery in the recent years. They include the epilepsy neural

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nets, stereotactic atlas of epileptogenic foci and surrounding tissues. The various epilepsy animal models by chemical and electrical methods help neurosurgeons to prepare different types of operations.[7] The electrophysiological studies of neurons and other cerebral tissues provide the basis of treating intractable epilepsy using electro-stimulation.[8] The chemical studies of neurosynapse and neuroreceptors of the excitable and suppressive neurotransmitters may theoretically support the use of cerebral tissues and neuronal stem cell transplantation to treat refractory epilepsy. The microstructure studies of epileptogenic foci such as amygdalohippocampus tissues may throw light on dual pathology and its relationship to postoperative complications.[9] Neuroimaging studies such as MRI and MR spectroscopy help to clarify the laterality, site and pathology of epileptogenic foci. The anatomical studies of epilepsy surgery approach may increase the safety and reduce the postoperative complications. The method of lower-power electrocoagulation of epileptogenic foci and its related basic science research advocated by the author is a new approach to treat epilepsy in eloquent areas. Preoperative neuropsychiatry evaluation has also improved.[10-12]

Current status of epilepsy surgery in China

Epilepsy surgery in China has grown rapidly in the recent years. Following the foundation of the China Association Against Epilepsy in 2004, a nationwide survey was conducted to estimate the number of epilepsy surgery nationwide. In Beijing, Tianjin, Shanghai, Chongqing and Guangzhou cities, there were only 600 cases of epilepsy surgery before the year 2000. The number increased to 1,100 cases in the five cities in 2005, with a total of 2,500 cases in the whole of China. In Beijing alone, 620 operations were being preformed. The majority were adult temporal lobectomy. Seizure control was Engel class 1 in 75-90% of cases. In the Sixth National Congress of Stereotactic and Functional Neurosurgery in 2004, 2,077 epilepsy surgery cases were reported, 2,029 cases involved craniotomy and 1,057 cases had resection of epileptogenic lesion and neocortex. The total proportion achieving Engel grade I and II was 65-85%. Recently, several hospitals used lower-power bipolar electro-coagulation technique to treat epilepsy in the eloquent cortex. The number treated is 200 cases every year. The proportion achieving Engel grades I and II is around 65%. This indicates that bipolar electro-coagulation has received acceptance from the epilepsy surgery practitioners in China.[11,13] Overall, there are more hospitals starting epilepsy surgery service every year. Hospitals performing epilepsy surgery have been monitored for standard. In Beijing, only three hospitals had a department of epilepsy surgery in the 1990s. There were 9 hospitals with department of epilepsy surgery in 2005. Usually, there would be 2-3 physicians performing basic science and clinical research in these hospitals. Recently, the study on "The basic and clinical studies of intractable epilepsy surgery" was given the second prize in the National Science and Technology Award.[1-3,14]

With the development of neuroimaging and gamma knife, some hospitals have commenced scientific and clinical research on stereotactic radiosurgery for treatment of epilepsy. In 2004, there were 15 Leksell Gamma Knives and twenty OUT-XGD Rotation Gamma Knives being used in China. Currently, the site suitable for epilepsy treatment and appropriate dose remain controversial.

The academic exchange of epilepsy surgery

The China Association of Epilepsy Surgery was established in 1990. It is estimated that approximately 150-200 physicians currently practice epilepsy surgery in the country, they also contribute to the related academic activities. The First National Epilepsy Surgery Workshop was held in 1991. The workshop has since been held four times. Since the First National Stereotactic and Functional Neurosurgery Congress in 1987, the congress has been successfully held six times with focus on epilepsy surgery. The academic exchange between physicians active in epilepsy surgery and those overseas is also increasingly.

To date, there are three journals on epilepsy surgery published in China; the "Chinese Journal of Stereotactic and Functional Neurosurgery", "Journal of Asia Epilepsy", and "Journal of Epilepsy Surgery". These journals reflect the interest on epilepsy surgery in China. The journals are being increasing recognized internationally. There are also chapters on epilepsy surgery in most of the Chinese academic neurosurgery journals. During the last decade, five monographs on epilepsy surgery have been published; they are "Epilepsy surgery", "The Temporal lobe epilepsy", "The temporal lobe epilepsy surgery", and "Neurosurgery and epilepsy". The second edition of "Epilepsy surgery" edited by HO Luders has been translated into Chinese, which serves

to popularize the knowledge of epilepsy surgery in the country. In the past 5 years, specialized training classes have been held 1-2 times annually sponsored by the relevant authorities. At the dawn of the 21st century, both the basic science research and clinical training in epilepsy surgery in China shows accelerated development.

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