

# Epilepsy in Mongolia

M Uuriintuya, D Ulziibayar, D Bayarmaa

*Department of Neurology, Health Science University of Mongolia, Shastin Clinical Hospital of Ulaanbaatar, Mongolia*

## Abstract

Mongolia is located in Central Asia and the population is 2.4 million. The prevalence of epilepsy was estimated at 2.73 men and 2.28 women per 1,000 populations. There are 188 neurologists, 10 EEGs (5 digital and 5 analog EEGs), 7 CT scans and one MRI in Mongolia. A cohort study of 210 patients from the State Central Hospital showed that head injury was the most common etiology. Eighty two percent of patients were taking carbamazepine. Health insurance subsidizes the cost of carbamazepine and valproic acid. On the other hand, there was high drop out for patients without health insurance and those from rural areas. Patients from the rural areas also face financial and accessibility problems in the investigations of EEG and CT scan.

## INTRODUCTION

The age compositions of the Mongolian populations are: 0-14 years (38%), 15-60 years (62%), and over more than 60 years (5.4%). Almost 60.2% of the population lives in the capital city of Ulaanbaatar. While under the era of socialist regime, health services was subsidized fully by the government and was provided free to the residents. Since 1990, Mongolia has adopted market oriented economy, private health system was permitted, and health insurance was started in 1994. Currently, mining industry plays dominant role in the national economy. By 2005, mining sector accounts for 15% of national gross domestic product, 65% of manufacturing industry, and 50% of exports. By 2006, gross domestic product of Mongolia is more than USD 800 per person.

## PHYSICIANS AND NEUROLOGISTS

There are one public and 5 private medical school in Mongolia. The duration of undergraduate medical program is 6 years. Though these medical schools produce 200-300 graduates every year, only 10-15% are able to obtain a work position. There are 27 physicians, 32 nurses and 72 hospital beds per 10,000 populations in Mongolia. There are a total of 188 practicing neurologists in Mongolia. Prior training or certification in internal medicine is not a prerequisite to training in neurology. The duration of training for a neurologist is relatively short at one year. Thus, Mongolia has adequate number of physicians and neurologists though the period of training is short by international standard.<sup>1</sup>

## PREVALENCE AND CAUSE OF EPILEPSY

The prevalence of epilepsy in Ulaanbaatar is estimated to be 2.73 men and 2.28 women per 1,000 populations.<sup>2</sup> A number of studies to improve the diagnosis and treatment of epilepsy were carried out in the last ten years.<sup>2,3</sup>

The following study was done during 2003-2004 in the State Central Hospital, the main teaching hospital for the Health Science University, Ulaanbaatar. This involved 210 epilepsy patients, 128 males and 82 females aged 3 to 70 years.<sup>4</sup> Table 1 shows the age distribution of the patients according to sex. As shown, the peak age was 15 to 34 years. Those aged more than 65 years only accounted for 3% of the patients. This probably reflects the young mean age of the Mongolian populations.

Table 2 lists the etiological causes of epilepsy according to age distribution. As shown, the causes of epilepsy were: head injury (39%), perinatal trauma (21%), neuro-infection (9.5%), cerebrovascular diseases (5.2 %), brain tumor (4.3%), and cryptogenic (21%).

The average age when the seizure commenced was 22 years. In 79 patients (38%), the duration of epilepsy was more than 10 years. In 25 patients (12%), the duration was one year. The mean duration of seizure was 13 ± 10 years.

About 143 (68%) patients had partial seizures, 60 (28.6%) patients had generalized seizures, 6 (2.9%) patients had generalized absence seizures and 1(1.9%) patient had myoclonic seizures. A total of 80.9% patients had EEG. Most patients had EEG repeated once yearly. Epileptiform

**Table 1. Characteristics of a cohort of epilepsy patients from State Central Hospital, Ulaanbaatar (2003-2004)**

	3-15 years	15-34 years	35-64 years	over 65 years	Total No.	percent
Male	14	64	46	3	127	61
Female	5	45	32	1	83	39
Total no.	19	109	78	4	210	
Percent	9	52	37	2		100

**Table 2. Relation between cause of epilepsy and age group in the cohort of epilepsy patients from State Central Hospital, Ulaanbaatar (2003-2004)**

	Age group in years								Total
	<15		15-34		35-64		>64		
	No.	%	No.	%	No.	%	No.	%	
Head injury	5	7	59	54.6	18	66.6	-	-	82
Perinatal trauma	35	45.8	10	9.3	-	-	-	-	45
Neuro-infection	13	18	7	6.5	-	-	-	-	20
Cerebro-vascular disease	-	-	3	2.8	7	26.9	1	50	11
Brain tumor	3	4.2	5	4.6	-	-	1	50	9
Cryptogenic	18	25	24	22.2	1	3.7	-	-	43
Total		74		108		26		2	210

changes were seen in 134 (63.8%) patients and non-epileptiform abnormalities were seen in 117 (55.7%) patients.

A total of 96 patients (46%) had CT brain scan. Out of these, 34 patients (35%) showed post-head injury changes. Of the 34 patients, 10 (29%) had widening of subarachnoid space, and 7 (21%) had enlarged ventricle. Twenty five of the 96 patients (26%) undergoing CT brain scan showed changes related to hematoma and aneurysm, and 11 patients (12%) had brain tumor and cysts.

The patients received carbamazepine and valproic acid from health insurance financing. However, patients without health insurance and those living in rural areas could not use the antiepileptic drugs continuously. The antiepileptic drugs used were: carbamazepine (86.2%), primidone (5.2%), valproic acid (4.3%),

phenobarbital (3.3%) and topiramate (0.5 %). Only 23 % of the study patients were taken regularly and continuously the antiepileptic drugs. Knowledge of epilepsy is an important determinants of compliance to treatment.

Our neurosurgeon, Dr P Dondov performed the first epilepsy surgery in 1980. Pneumoencephalography was used in 43 patients to localize the lesion. As this investigation is uncomfortable to the patients, this procedure was discontinued. There has been no progress in surgical treatment in the recent years.

## PRACTICE OF EPILEPSY CARE

There are three levels of health care services in Mongolia. They are primary care services, secondary and tertiary hospitals. The primary care services consist of 228 family group practitioners,

287 soum's hospitals and 31 intersoum's hospitals ("Soum" is the provincial lowest administrative unit in Mongolia). The secondary health care services consist of 12 district hospitals and 18 aimag's hospitals ("Aimag" is the provincial middle administrative unit in Mongolia). The tertiary health care services consist of 3 regional treatment and diagnostic centers and 17 specialized hospitals. Health insurance is compulsory for all Mongolian citizens and voluntary for foreigners.

Medical cares for patients with epilepsy are provided at the secondary and tertiary health care levels. EEG, CT scan and MRI diagnostic services are available only in the capital city of Ulaanbaatar. EEG Diagnostic Mini – Center was established at the Shastin Clinical Hospital in 2005. There are 10 EEG machines, 7 CT scans, and 1 MRI presently in Ulaanbaatar. Costs of these diagnostic procedures are not covered by health insurance. Thus, patients with epilepsy, in particular those living outside the capital city face finance and accessibility problems in the diagnosis of epilepsy, as they may have to travel up to 1,200 km to the capital city. Since 2006, patients with partial seizures has been treated with carbamazepine for the first time in Mongolia by M Uuriintuya. The pharmacokinetic behavior of the drug in Mongolians was also determined. The drug level was determined using TDxFLx immuno-fluorescence autoanalyzer from ABBOTT, USA. For those who became seizure free, the daily average dose of carbamazepine was  $12 \pm 2.3$  mg/kg, the mean daily dose was  $800 \pm 129$ mg, with the blood plasma of  $8.7 \pm 1.2$  ng/ml.<sup>5,6</sup> Serum level concentration of carbamazepine was performed for the first time in Mongolia. Our result clearly demonstrates that is no difference of the response of Carbamazepine between Mongolian patients and patients from other Asian and Western country.<sup>7-9</sup>

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