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Speakers include medical practitioners and current users of HIE technology, from both local & overseas medical institutes. They will share their experience on using HIE systems. There will also be a demonstration of current technology available in Hong Kong that was developed by local IT professionals.

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### Topics\*

- How Public meets Private? An Overseas Experience
- Pilot Experience of PPI in Private Sector
- DIY Information System in Private Sector
- An Initial Experience - Sharing Medical Images in Private Radiology Clinic

*\*Subject to confirmation*

**Date : 27 May 2009 (Wed)**

**Time : 2:00pm - 6:00pm**

**Venue: HKCEC Meeting Room S421**

**Fee : HK\$800**

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## The Cover Shot



### Guardian Angel

A caring sister gave a stern look as if she was trying to fend her dear brother off danger when a strangely attired photographer aimed his gadgets at them - an unexpected reaction on their beautiful young faces, yet gave all the spirit there on this image. They were startled perhaps by modern technology which had been so remote to them. But as pristine as their living environment was their spotless minds from the pollution of modernity, there might indeed be a good reason for her to be protective of her young brother after all!

The picture was taken with a Nikkor 105 mm /f2.5 on a Nikon D70 as I was at a site in Yunnan (雲南) trying to capture the way of life for the minorities in rural mountainous China. The surprise for the young girl was fleeting but the gratification they gave me in this picture will surely be long lasting.

### Dr. Dawson Fong

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## Paediatric Epilepsy - The Hong Kong Update

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Dr. Chok-wan CHAN

Epilepsy has always been a world-wide problem for all age groups, but particularly so for children and adolescents. The prevalence is estimated to be about 4.1 per 1000 children in the population. As far as the aetiology of childhood epilepsy is concerned, it is important to emphasise that factors related to labour and delivery appear to contribute very little to the causation of seizure disorders nowadays while maldevelopment appears to be a much more important aetiological mechanism. Many epilepsies of early childhood remain unexplained by a wide variety of possible prenatal and perinatal factors. Contemporaneously, the burgeoning information coming from the application of molecular biology to genetic research is providing new facts about the primary or idiopathic epilepsies and their place in the human genome.

*Theoretical advances* in the field of epilepsy concern concept and terminology. The concept of the epilepsies, rather than epilepsy, is gaining widespread recognition. Seizures must be seen as a behavioural manifestation of an enormously diverse group of underlying states of brain dysfunction rather than having a single cause. Such a viewpoint gives proportion to one's expectations about the epilepsies. If there is no single epilepsy then there cannot be a single cause or cure. A major advance in epileptology has been the recognition of syndromes with distinct aetiology, clinical features, treatment, and prognosis. There is no better example of the importance of syndrome classification than juvenile myoclonic epilepsy, which accounts for up to 10% of all cases of epilepsy at all ages yet, despite having clinical and EEG features which should lead to easy identification, the rate of misdiagnosis of this condition remains high.

With reference to terminology, the growing use of the International Classification of Seizures and of the Epilepsies and Epileptic Syndromes has promoted clarity of thinking and communication among those working with patients with epilepsy and in research. Increasing use of combined videotape and EEG recording of clinical seizures is affording further refinements in the categorisation of seizures.

Epileptic seizures result from the sudden, excessive electrical discharges of large aggregates of neurons, and the clinical components are determined by the site of origin of the discharges and by their pattern of spread. Epileptogenesis is a term which refers to the dynamic process underlying the development of epilepsy. It depends on the predisposition of neuronal aggregates to discharge when stimulated and on synchronisation of firing within the neuronal substrate. Prevention of epilepsy requires a better understanding of the neuronal basis of epileptogenicity. Very little is known about the mechanisms that suppress ictal events during the interictal state, limit their spread once they begin, and ultimately terminate them. Identification and characterisation of these natural seizure-suppressing mechanisms should make possible the therapeutic manipulation of these endogenous neuronal processes for the benefit of the patient with epilepsy. Recent concepts concerning the action of the NMDA receptor-cation channel complex provide a mechanism by



which recurrent epileptiform events could induce widespread enduring alterations in neuronal function. The successful cloning of a glutamate receptor in the rat brain should lead on to the identification of the structure of human glutamate receptors and to the development of therapeutic agents to block these receptors.

New methods of brain scanning have revolutionised neurology and have provided a handmaiden for the EEG in epileptology, by adding the delineation of brain structure to the electrical measurement of brain function. Advances in magnetic resonance imaging (MRI) techniques have led to improvements in the detection of lesions in patients with epilepsy and new insights into the aetiology of the epilepsies. Use of volumetric data acquisition in MRI, a technique that generates fine sections of high anatomical resolution, has revealed a high frequency of embryofoetal lesions in extratemporal epilepsies. These include the neuronal migration disorders which are particularly important in childhood as causes of epilepsy and which have a characteristic distribution. The cortical dysplasia, such as macrogyria and polymicrogyria, and areas of gliosis and atrophy can be defined. A high frequency of hippocampal lesions in temporal lobe epilepsy has been revealed. These developments have given a new impetus to the surgical treatment of epilepsy. Functional imaging, as provided by positron emission tomography (PET) and single photon emission tomography (SPECT), gives additional information about neocortical metabolism but functional MR imaging may supplant these in studying neuronal metabolism in epilepsy.

The widespread availability and use of accurate techniques for measuring the levels of *antiepileptic* drugs in blood remain one of the most significant advances in the management of epilepsy of the past 20 years. Many variables affect how these drugs are utilised by infants and children and there is also marked interindividual variation in drug-eliminating capacity. Hence the dosing of antiepileptic drugs on the basis of the patient's weight is unreliable in paediatrics and drug levels do help to overcome this problem. The availability of rapid methods of assay using very small volumes of blood represents an important advance. However, although measuring the concentrations of antiepileptic drugs can help the physician regulate therapy, these assays should not be used as a substitute for clinical judgment. The management of patients with epilepsy remains firmly rooted in clinical assessment. Certain patients will be controlled at relatively low concentrations of antiepileptic drugs while others will require concentrations well above the 'therapeutic range' to control their seizures. Paediatricians should bear these points in mind when treating different childhood epilepsies, and should always regard the child as an individual patient and not as a laboratory index. Forthcoming research goals for childhood epilepsy should include the following:

1. Determine the basic cellular mechanisms of epilepsy.
2. Characterise the genetic susceptibility of epilepsy.
3. Develop new antiepileptic drugs.
4. Study further the efficacy of surgery for epilepsy.
5. Identify types of behavioural abnormalities associated with epilepsy and attempt to develop specific therapies for these.

6. Devise technical innovations including development of new lightweight ambulatory monitoring devices to warn patients of impending seizures, self regulating drug delivery systems, and more sophisticated imaging methods to measure brain structure and function.

Masland (1992) has advocated what he terms 'holistic epileptology' in order to create a more general awareness that only by dealing with all aspects of the problem of epilepsy can effective remediation be provided. He points out that those providing remedial services are too often preoccupied with one or other aspects of the patient's problem and do not consider the patient's total needs. The physician, who is usually the primary source of support, tends to concentrate on the medical aspect. Working apart from the social support system, it is easy for him or her to ignore other elements of the patient's total needs. There is increasing emphasis in epileptology that disabilities of persons with epilepsy stem less from the seizures than from the reaction of society to their epilepsy. For some, learning difficulties, school problems, anxiety and depression, impairment of self-image, restriction in employment, limitation of driving and poor social relations may be more devastating than is the occurrence of even frequent seizures. It behoves clinicians to look at the totality of the problem rather than concentrating on seizure control only.

Lennox (1960) wrote: 'A convulsion is a beacon light in medical Symptomatology. The path lighted by its rays reaches to the far limits of recorded medical history.' Never before has there been such intense international interest in epilepsy as there is today - in fundamental research, in the aetiology and clinical presentation of the disorder, in treatment and, above all, in the possibility of prevention.

The physician who deals with children in whatever capacity is in the forefront of the battle against epilepsy, since the majority of the potentially brain-damaging conditions occur in the paediatric age group and because the great majority of patients with epilepsy develop their initial symptoms before 18 years of age. An attempt, inevitably incomplete because of the scope and complexity of the subject, should be contemplated to provide the essential information to enable clinicians to help children with epilepsy so that they would be able to attain their highest levels of potential in life and so that we can achieve the noble goal of "Healthy Children for a Healthy World"!

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# What is the Consequence of Children with Medically Intractable Epilepsy? What are the Treatment Options?



**Dr. Wai-kwong CHAK**

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Dr. Wai-kwong CHAK

*This article has been selected by the Editorial Board of the Hong Kong Medical Diary for participants in the CME programme of the Medical Council of Hong Kong (MCHK) to complete the following self-assessment questions in order to be awarded one CME credit under the programme upon returning the completed answer sheet to the Federation Secretariat on or before 31 May 2009.*

## Introduction

Seizure occurs in as many as 5% of children and epilepsy (recurrent, unprovoked seizures) occurs in 0.5 - 1% of children. More than three-quarters of individuals with epilepsy have their onset in childhood or adolescence. Seizure disorders are one of the most common groups of paediatric neurological condition. The majority of epilepsies in childhood are benign syndromes in which children experience infrequent seizures over a short period, usually with the need for no or little antiepileptic medication. A prospective long term (average follow up period of 37 years) population based study in 144 patients (first seizure < 16 year) with epilepsy showed 67% of them have gone into terminal remission with seizure-free period of > 5 years. However, in the remaining 33% of them, their epilepsy did not remit. 14% of them have on and off remissions and relapses; 19% of them have no remission at all.<sup>17</sup> From a local cross-sectional epidemiological study in NTW cluster in 1997, 14% of paediatric patients with active epilepsy were found to be medically intractable.<sup>11</sup> The definition of intractable epilepsy is uncontrolled seizures that occur with the average frequency of at least one seizure per month over a period of 2 years or more, despite treatment with at least 2-3 different anti-epileptic drugs administered on its own or in combination. Drugs have to be pushed to the maximum tolerated doses and non-compliance has to be ruled out. In our daily clinical practice, medically intractable epilepsy is not uncommon and it is a very challenging problem that we are faced with. Does the discovery of new anticonvulsant drugs help children with intractable epilepsy? There is lack of large scale drug trials in children. The result of more large scale adult drug trials in comparing the new and old anti-epileptic drugs showing both new and old drugs have similar efficacy in controlling seizure, but new anti-epileptic drugs appear to have advantages related to safety, long term side effects.<sup>1, 2, 16, 18</sup> According to the NICE guideline, the newer Anti-epileptic drugs which include Gabapentin, Lamotrigine, Oxcarbazepine, Topiramate, Levetiracetam and Vigabatrin (as an adjunctive therapy for partial seizures), within their licensed indications, are recommended for the management of epilepsy in children who have not benefited from treatment with the older antiepileptic drugs such as Carbamazepine or Sodium Valproate, or for whom the older antiepileptic

drugs are unsuitable because of various reasons including possible drug-to-drug interaction and childbearing potential. Although in refractory patients, newer anti-epileptic drugs can reduce seizure frequency when added to pre-existing anti-epileptic drugs, it is still rare for previously refractory patients to become seizure-free.<sup>7</sup>

## The Possible Consequences of Uncontrolled Epilepsy

Apart from causing seizure, uncontrolled epilepsy could affect normal brain development and cause long-term cognitive impairment. One study showed that intellectual dysfunction (defined as IQ < 79) was present in 57% of children with temporal lobe epilepsy.<sup>3</sup> Age at onset of epilepsy is the best predictor of intellectual dysfunction.<sup>3</sup> Another study showed that children with epilepsy did show a significantly less gain in Full Scale IQ over 1½ year follow up when compared with normal children and suggested that there is a process of mental deterioration shortly after the onset of epilepsy.<sup>15</sup> Another study showed that there is long-term reduction in the white matter of the brain in those children who have chronic temporal lobe epilepsy. The reduction of white matter in the brain is associated with long-term neuropsychological impairment.<sup>9</sup>

## The Current Evidence of Epilepsy Surgery

Epilepsy surgery, including cortical resection, single or multi-lobectomy, and /or disconnection procedures, is an important alternative to drug therapy in selected patients. The goal of epilepsy surgery by resecting or disconnecting the epileptogenic focus is to make the patient seizure-free with no requirement for anti-epileptic medication. However in some patients this goal may not be fully achieved and the aim is to decrease the frequency and severity of the most disabling seizures.

Apart from resective surgery which could be curative, there are palliative surgeries for those patients who are not candidate for resective surgery because of absence of an identifiable focus. The palliative surgeries include corpus callosotomy and vagal nerve stimulation.



According to a first randomised trial of surgical versus medical treatment in temporal lobe epilepsy, surgery was successful in 58% of operated versus 8% of medically treated adult patients.<sup>21</sup> How about the seizure outcome in paediatric patients after epilepsy surgery? The frequency of seizure-free outcome after epilepsy surgery was similar for infants, children, and adolescents, and is comparable with results from the adult series.<sup>22</sup> Are the results different in different types of surgery? For patients with intractable temporal lobe epilepsy who undergo temporal lobectomy, seizure freedom or marked improvement in seizure control is expected in 50-70% of the patients.<sup>14,22</sup> Lower seizure-free rates of 50- 65 % are reported for epilepsy surgery in extratemporal epilepsy, "non-lesional" epilepsy and childhood partial epilepsies.<sup>22</sup> The efficacy and safety of epilepsy surgery has been assessed by recent studies and clinical trials<sup>14,20,22,23</sup> and it has become an internationally accepted treatment for selected patients with intractable epilepsy.<sup>4</sup>

Apart from seizure outcome, more and more studies show that earlier surgical intervention can result in better developmental outcome (DQ/IQ) especially in those who became seizure-free after surgery.<sup>8</sup> For example, a study shows that there is a catch up in development in catastrophic epilepsy in infancy and young children after surgery<sup>23</sup>; there is an improvement in verbal and perceptual intelligence quotients for children who underwent early temporal lobectomy.<sup>20</sup> More studies illustrated children have better brain plasticity than adults, children with epilepsy have greater functional recovery after temporal lobe surgery when compared with adult patients. When compared to adult TLE patients, TLE children below the age of 16 show a lower risk of postsurgical memory deterioration<sup>12</sup> and within a 3-12 months follow-up, the postoperative memory decline appears to be more reversible in children than in adults.<sup>20</sup> For children to benefit most from epilepsy surgery, in terms of maximising neurological development in the absence of seizures and adaptation to any neurological deficits, surgery should be performed as early as possible.<sup>8, 10, 13, 20</sup>

Apart from the developmental and cognitive outcome, talking about the long term psycho-social outcome, significantly higher levels of education, employment status and independence were found in children and adolescent patients who became seizure-free after surgery.<sup>5</sup>

## The Indication of Referral for Pre-surgical Evaluation

Generally speaking, the indication for referral for presurgical evaluation of paediatric epilepsy patients is similar to those for adult patients. This includes patients fulfil the criteria for medically intractable epilepsy with a potentially identifiable epileptic focus for example a focal lesion on MRI with concordant scalp EEG and congruent results of functional evaluation.

But in children, not only medically intractability of seizure is considered, but also the disability caused by

seizure (including medication side effects) is considered when choosing possible surgical candidates.<sup>4</sup> Compared with adults, the presentation of intractable localisation-related epilepsy is often heterogeneous in childhood. Paediatric patients with hemispheric or unilateral focal aetiologies can have generalised seizures and EEG patterns, progressive neurological disorders and bilateral congenital brain syndromes.<sup>4</sup> Childhood epilepsy that cannot be classified as a clearly defined electro-clinical epilepsy syndrome (ILAE classification)<sup>6</sup> should be referred for pre-surgical evaluation. This includes patients with stereotyped or lateralised seizures or other evidence of focality (that cannot be definitely attributed to idiopathic partial epilepsies) or in whom MRI reveals a lesion amenable to surgical removal. Developmental delay or very young age should not be a contraindication for paediatric epilepsy surgery.<sup>4</sup>

According to the NICE guideline, the diagnosis and management of epilepsy in children within the first few years of life may be extremely challenging. For this reason, children with suspected epilepsy should be referred to tertiary services early, because of the profound developmental, behavioural and psychological effects that may be associated with continuing seizures. Behavioural or developmental regression or inability to identify the epilepsy syndrome in an individual should result in immediate referral to tertiary services.

The surgical remedial epilepsy syndromes are specific aetiologies of epilepsy which are medically unresponsive and could be benefited from epilepsy surgery. They include: Malformation of Cortical Development; Mesial Temporal Sclerosis; Developmental benign brain tumour (DNET, ganglioglioma); Unilateral cerebral vascular injury with or without infarction /proencephalic cyst; Vascular malformation e.g. Cavernous Haemangioma; Tubercular Sclerosis; Sturge-Weber Syndrome; Rasmussen's Encephalitis; Hemi-megalocephaly; Hypothalamic Hamartoma etc.<sup>4</sup>

## Tertiary Level Inter-disciplinary Pre-surgical Assessment in NTWC

Because of the complexity in paediatric medically intractable epilepsy which may be associated with profound developmental, behavioural and psychological effects, a tertiary level inter-disciplinary assessment is mandatory. A comprehensive paediatric pre-surgical evaluation team has been set up in Tuen Mun Hospital since 2006 which entails a multidisciplinary team of experts (paediatricians specialising in epilepsy, neurosurgeons, neuro-radiologists, nuclear medicine physicians, child psychiatrists and neuro-psychologists, occupational therapists). Each patient with intractable epilepsy has undergone detailed pre-surgical evaluation including video EEG, high resolution MRI and neuropsychological assessment. In selected case, PET and ictal SPECT were also performed to identify the epileptogenic focus. Epilepsy surgery was performed when the above investigation results were concordant

The cornerstone of modern management of epilepsy is video-EEG monitoring with scalp electrodes. It has the following clinical purposes: firstly, to clarify the nature of





clinical event (epileptic or non-epileptic) or classify the nature of seizure in order to guide the management; secondly, to localise seizure focus in pre-surgical evaluation for feasibility of epilepsy surgery, whereby seizure characteristics and ictal EEG recordings provide crucial information about the likely site of seizure onset.

In Tuen Mun Hospital, regular inter-disciplinary case conference is held to evaluate each case, each discipline will offer their professional advice and decide whether the patient could be benefited from surgery or not. Overseas expert advice will be sought in any difficult and challenging case to make sure the standard of care is up to international standard. If the patient is not a candidate for surgery, we will try to optimise their medical treatment or try other treatment modalities including ketogenic diet etc. Each epilepsy patient will be followed up post-operatively to monitor the progress, this not only includes the seizure outcome, but more importantly the cognitive, psychological, psychiatric and quality of life outcome.

From 1998 - 2008, 23 children underwent epilepsy surgery in Tuen Mun Hospital. Their age at operation was ranged from 2 -19 years. 48% of them became seizure-free; 26 % of them had seizure reduction; 26% had no change to their seizures. For lesionectomy, 65% of the patients became seizure-free and 18% had seizure frequency reduction after surgery.<sup>24</sup>

## Conclusion

For children with epilepsy not adequately controlled by medication, it is believed that early assessment and changing to a more appropriate treatment offers the best prognosis for seizure control, educational achievement and personal development.

Epilepsy surgery is shown to be safe and an effective way of treatment in selected groups of children and adolescents with intractable epilepsy and they should be considered for surgical evaluation at whatever age or IQ level they manifest with severe, intractable, disabling localisation-related epilepsy.<sup>19,22</sup>

In the old days, people view epilepsy surgery as the last treatment option and delay to have surgery until in adult age. Now evidence shows that in order to achieve the best developmental and cognitive outcome, early referral of suitable patients to have pre-surgical evaluation is mandatory.

There is a qualitative change in the treatment of epilepsy, which not only aims at seizure control, but also at preservation or even improvement of the patient's cognitive performance, his or her psychological situation, and his or her subjectively experienced quality of life. In order to solve this multi-dimensional problem, a close collaboration between different professional experts is essential. I would like to quote what the previous Vice-president of US, Mr Al Gore said to emphasise the importance of inter-disciplinary care of medically intractable epilepsy. He said "If you want to walk faster, you walk by yourself. But if you want to walk farther away, you have to walk together".

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MCHK CME Programme Self-assessment Questions

Please read the article entitled "What is the Consequence of Children with Medically Intractable Epilepsy? What are the Treatment Options?" by Dr. Wai-kwong CHAK and complete the following self-assessment questions. Participants in the MCHK CME Programme will be awarded 1 CME credit under the Programme for returning completed answer sheets via fax (2865 0345) or by mail to the Federation Secretariat on or before 31 May 2009. Answers to questions will be provided in the next issue of The Hong Kong Medical Diary.

Questions 1-10: Please answer T (true) or F (false)

- 1. Epilepsy (recurrent, unprovoked seizures) occurs in 0.5 -1% of children.
2. Less than three-quarters of individuals with epilepsy have their onset in childhood or adolescence.
3. The diagnosis of intractable epilepsy is made only when a patient is unresponsive to all available anticonvulsants.
4. According to the NICE guideline, the newer Anti-epileptic drugs (AED) are recommended for children who have not benefited from treatment with the older antiepileptic drugs or for whom the older AEDs are unsuitable because of various reasons including possible drug-to-drug interaction and childbearing potential.
5. Study shows that the possible consequences of uncontrolled epilepsy includes intellectual dysfunction and long-term neuropsychological impairment.
6. The ultimate goal of epilepsy surgery by resecting or disconnecting the epileptogenic focus is to make the patient seizure-free without AED. However in some patients this goal may not be fully achieved and the aim then is to decrease the frequency and severity of the disabling seizures.
7. According to a first randomised trial of surgical versus medical treatment in temporal lobe epilepsy, surgery was successful in 58% of operated versus 8% of medically treated adult patients.
8. The frequency of seizure-free outcome after epilepsy surgery was similar for infants, children, and adolescents, and is comparable with results from the adult series.
9. Paediatric patients with hemispheric or unilateral focal aetiologies cannot have generalised seizures and EEG patterns, progressive neurological disorders and bilateral congenital brain syndromes.
10. The surgical remedial epilepsy syndromes are specific aetiologies of epilepsy which are medically unresponsive and yet could benefit from epilepsy surgery. They include: Malformation of Cortical Development, Mesial Temporal Sclerosis, Developmental benign brain tumour (DNET, ganglioglioma), Rasmussen's Encephalitis etc.

ANSWER SHEET FOR MAY 2009

Please return the completed answer sheet to the Federation Secretariat on or before 31 May 2009 for documentation. 1 CME point will be awarded for answering the MCHK CME programme (for non-specialists) self-assessment questions.

What is the Consequence of Children with Medically Intractable Epilepsy? What are the Treatment Options?

Dr. Wai-kwong CHAK

MBBS(HK), MRCP(UK), FHKCPaed, FHKAM(Paed)

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Answers to April 2009 Issue

Microtia - How I do it?

- 1. F 2. T 3. T 4. F 5. T 6. F 7. F 8. T 9. T 10. F



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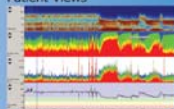
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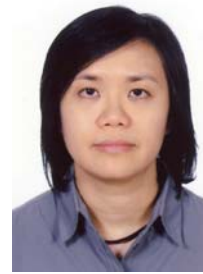
## Neuropsychology: Behavioural Evaluation and Intracarotid Amobarbital Procedure (IAP)

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Dr. Florence Y KWOK



Prof. Tatia MC LEE

The impact of epilepsy on cognitive and emotion functioning has been widely documented<sup>12,13</sup>. It is because of this very reason that clinical neuropsychologists, psychologists specialised in decoding the effect of changes in brain functioning on behaviours, are involved in the management of people with epilepsy.

### Roles of Neuropsychologists

Neuropsychologists conduct comprehensive neuropsychological assessment for people with epilepsy for the understanding of their cognitive strengths and weaknesses and comparison of pre- and post-surgical cognitive functions. Neuropsychologists also assess the emotion status as adjustment difficulties are very common among people suffering from epilepsy that often exerts a negative effect on the academic, vocational and social lives of these people. With thorough understanding of the patients' cognitive status, behavioural alterations, personality characteristics, and adjustment difficulties, neuropsychologists play an important role in planning cognitive rehabilitation and facilitating psychosocial adjustment of people with epilepsy.

In order to achieve the goal of assessing the cognitive and emotional status of people with epilepsy, a neuropsychological assessment is conducted.

### Neuropsychological Assessment

A basic neuropsychological assessment evaluates different cognitive functions, such as intellectual functioning, attention, language, perception and nonverbal functions, memory, and executive functions, in order to test the status of different brain regions. Assessment of emotion functioning is also one of the goals, given the adjustment difficulties presented by people with epilepsy.

A thorough evaluation usually requires six to eight hours of direct contact between the examiner and the patient. By comparing an individual's scores to norms of similar age and educational level, an objective conclusion of cognitive functioning can be drawn. A cognitive profile illustrating the strengths and weaknesses as well as highly specific aspects of brain functions provides an objective baseline to which later assessments can be compared when patients are re-evaluated.

### General Intelligence

There is considerable evidence indicating that the IQ (intelligence quotient) scores of individuals with epilepsy tend to be skewed toward lower values<sup>7</sup>. As the verbal IQ is highly correlated with school performance, it allows us to use educational achievement to estimate pre-morbid IQ and to detect cognitive decline in patients. The IQ scores can also be used as comparison with performance on specialised tasks to detect specific deficits. The Wechsler Adult Intelligence Scale is commonly used in Hong Kong to assess general intelligence.

### Attention

Attention is a complex cognitive construct that includes the ability to respond to basic sensory stimulation, selectively attend to relevant stimuli while suppressing responses to irrelevant stimuli, and maintain focus on the environment and respond according to the changing task/environmental demands. Attention problems have been reported in people with epilepsy, especially those who suffer from generalised type seizure<sup>26</sup>. As problems with attention can interfere with performance in other cognitive domains, especially memory, the identification of attention problems could help us to better understand how results of other measures be accurately interpreted. Inattention, selective attention, sustained attention, vigilance, divided attention are the common types of attention measured.

### Language

Language tasks measure the functioning of the dominant hemisphere and, when compared with performance on visual spatial tasks, can be used to detect lateralised dysfunction. A typical language assessment for epilepsy includes measures of naming, comprehension, generative fluency, single word reading, sentence repetition and reading<sup>9</sup>.

### Perception and Nonverbal Cognitive Functions

Nonverbal cognition is usually measured by tasks of visual perception and visual spatial ability. Visual perception can be measured by tasks of visual cancellation and visual scanning<sup>14</sup>, as well as drawing of symmetric objects such as a clock face, a daisy or a Greek cross. More complex asymmetric drawing tasks such as the copy condition of the Rey-Osterrieth Complex Figure<sup>17,19</sup> may also be helpful, if the deficit is subtle. The cognitive processing of spatial relationships can be evaluated by both measures that require only mental manipulation of stimuli, and procedures requiring the actual construction of drawings or objects. These measures of visual perceptual and spatial ability



are believed to assess the integrity of left or right parietal lobe or the non-dominant temporal lobe.

### **Memory**

It has been widely recognised that medial temporal lobe structures play an important role in human memory<sup>18,22</sup>. In particular, the hippocampus plays a unique role in human learning and memory, and is essential for the consolidation of novel information for its longer-term processing. Because of the specific role the hippocampus, memory and learning disorders are very common among people whose epileptic foci are within the temporal lobe<sup>16</sup>.

A thorough memory assessment should address each hemisphere with tasks appropriate to its specialisation - verbal learning and memory tasks to evaluate the dominant temporal lobe, and visuo-spatial or visuo-perceptual learning and memory tasks to evaluate the non-dominant temporal lobe. Verbal tasks might use names, word lists, stories or number sequences as stimuli, while non-verbal tasks might use faces, places, music or abstract designs. It is important to select tasks that are as purely verbal, or purely non-verbal, as possible, in order to increase the probability that the tasks challenge primarily one temporal lobe. It is also highly recommended to use tasks that are as similar as possible in structure and procedure when assessing memory functions in the two hemispheres, to allow one to compare the efficacy of one temporal lobe to the other, even within individual patients. Instead of single-exposure tasks, task involving several learning trials is recommended, to rule out reasons other than true learning deficit for poor performance.

### **Executive Functions**

The term "executive functions" has been used to describe a set of cognitive processes, namely initiation, planning, regulation of behaviour, overcoming of habitual responses, attention, working memory, mental flexibility, reasoning, which are necessary for the execution of goal-directed activity. Examination of executive functions in epilepsy is particularly useful for detecting focal deficits associated with frontal lobe epilepsy where attention deficits, impulsivity, motor coordination, and difficulty changing behavioural strategies are common.

Problems with inhibition which is associated with prefrontal cortex and the anterior cingulate cortex damage<sup>10,24</sup> can be examined by using Stoop tests<sup>23</sup>. The ability to switch attention which may be most sensitive to dorsolateral frontal damage<sup>25</sup> can be measured by the Trail Making Test<sup>1</sup>.

Verbal fluency can be measured by semantic tasks requiring patients to produce items by category such as animals or fruits. Non-verbal fluency can be tapped by the Design Fluency test<sup>8</sup>, in which patients are asked to invent abstract designs. Comparing performance on verbal and non-verbal fluency helps detect lateralised frontal lobe dysfunction in patients with focal seizure disorders.

Frontal lobe damage may cause deficits in working memory, and as a result may present with learning or memory difficulties. Working memory deficits could be measured by Digit Span and Spatial Span subtests of the Wechsler Scales. Difficulty recollecting source of

information is another problem which may occur and can be assessed by asking patients to differentiate two sets of stimuli in the recognition trial of memory test.

Planning is a complicated activity, comprising an ability to look ahead, conceive of alternatives, weigh choices, follow rules, inhibit impulses, and sustain attention. Planning can be tested with the various tower tasks (London, Hanoi, and Toronto). This ability has been shown to be related to prefrontal regions, possibly medial and dorsolateral<sup>5</sup>.

The Wisconsin Card Sorting test, which requires the use of working memory, the ability to make inferences and deductions, to switch an ongoing action or adapt to circumstances, and the ability to benefit from feedback, has been widely used to assess concept formation. The Matrix Reasoning and Similarities subtests of Wechsler Adult Intelligence Scale - 3rd version can also assess conceptual reasoning.

Lesions of the orbital surface of the frontal lobes are capable of producing characteristic affective and personality changes<sup>4</sup>, including poor social judgement, disinhibition or social inappropriateness, a tendency to place immediate gratification over long-term consequences of behaviour, or excessive behavioural rigidity.

### **Emotion and Psychosocial Functioning**

It is not uncommon that epilepsy has psychological impact on people suffering from this disease. The unpredictable nature of some epilepsies is likely to produce anxiety in these patients<sup>2</sup>. These patients are also more prone to depression than are those without epilepsy<sup>20</sup>. Furthermore, the self-esteem of epilepsy patients is found to be significantly lower than that in those without the disease<sup>3</sup>. In societies or culture where information and understanding of this disease is limited, people with epilepsy are at risk of experiencing social stigma, prejudice, or even hostility<sup>21</sup>.

A local study<sup>12</sup> found that self-perception and coping strategies are more powerful predictors of psychosocial adjustment in people with epilepsy than are the medical conditions of epilepsy. Seizure frequency was observed to be significantly correlated with self-perception of seizure, and self-perceived seriousness contributed positively to psychological maladjustment, implying that the more severe people with epilepsy think their condition is, the more disturbed they become. Furthermore, coping is another factor that predicts the well-being of people with epilepsy. Emotional- and avoidance-oriented coping strategies are more frequently used to cope with stress than task-oriented coping. While emotional coping positively relates to the severity of psychosocial difficulties, avoidance coping was inversely related to the severity of psychosocial disturbances. Such results could be interpreted to mean that emotional reactions, which may include self-preoccupation or fantasising, actually increase an individual's stress level. Even with avoidance coping, social support received by the epilepsy patients offers an opportunity to them for social diversion and escape, which may result in temporary relief from stress. The authors suggested that emerging importance of social factors as predictors of psychosocial adjustment in

epilepsy highlights the need for developing tailored counselling therapy and social support groups for people with epilepsy.

It is known that epilepsy not only increases the risk of disturbance among these affected individuals, but also has an adverse effect on the health of other family members<sup>6,11,15</sup>. An unpublished local study exploring the factors associated with the quality of life and emotional states of the caregivers of people with epilepsy in Hong Kong found that twenty-two percent of respondents were considered to have severe levels of anxiety and 14% severe level of depression. Three-quarters of the caregivers interviewed had below average scores on the quality of life measure, indicating that the carers' psychosocial adjustment was impaired. Such findings suggest the importance of including systematic measures of people's subjective experiences and perceptions in the study of social and psychological aspects of epilepsy.

## Intracarotid Amobarbital Procedure

In order to determine the hemispheric language dominance and unilateral integrity of memory function, Juhn Wada introduced the intracarotid amobarbital procedure (IAP) in North America in the late 1950s. This procedure forms part of the neuropsychological evaluation performed on patients who will undergo surgical treatment for the uncontrolled epileptic seizures. Sodium Amytal injection was carried out following catheterisation of the internal carotid artery and angiography. Two successive injections were performed, one on each side, so as to achieve hemianaesthesia of the two cerebral hemispheres. The effect is short, and is usually dissipated after about 6 to 8 minutes, depending on the dosage and individual differences. Temporary anaesthetisation of one hemisphere should allow one to apply simple tests to the awake hemisphere alone, and the results of such tests should allow one to predict language and memory functions post-surgery.

Since the IAP is an invasive procedure, it is recommended only for pre-surgical diagnostic evaluation of those surgical candidates who are left handers, or have a family history of left handedness, those who have suffered early trauma in or near speech areas of the left hemisphere, or those with anatomical and functional discordance. Those with significant deficits on verbal and nonverbal memory tests, documented in a noninvasive clinical memory evaluation carried out as part of a basic neuropsychology assessment, or on EEG or other radiological findings are also candidates for an IAP. Moreover, IAP should also be performed in cases where mismatch between EEG and MRI findings, such that an EEG focus is observed in one temporal lobe and significantly small hippocampus is found on the opposite side.

Non-invasive neuroimaging techniques such as PET, functional MRI, and Magnetic Source Imaging are rapidly gaining acceptance as methods of lateralising and localising language cortex. For instance, applications of fMRI in epilepsy has been used to determine hemispheric representation of language and memory functions, predict side of seizure focus and seizure outcome, study the nuances of functional reorganisation

and, most recently, predict cognitive outcome after resection from the dominant temporal lobe. Thus far there has not been any clear evidence that resection of activated voxels obtained in a language protocol indeed correlates with language decline. Furthermore, while fMRI provides detailed information about functional localisation, it is unclear to what extent activated voxels represent networks critical for the performance of a cognitive activity or represent tertiary associated or non-task specific functions that could not be fully "subtracted" out. On the other hand, in cases where an IAP cannot be performed safely or IAP results are ambiguous, using the fMRI methodology for lateralisation of language and memory for surgical planning may be an alternative option. With further research and empirical evidence on the applicability of fMRI for pre-surgical evaluation, and on the validity of carefully designed, well-controlled fMRI testing protocols, fMRI methodology could become a powerful method for functional localisation and for predicting language and memory outcome

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## Psychiatric Aspects of Paediatric Epilepsy

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Dr. Tony TS LAI

Epilepsy is the most common neurological disorder in children with a prevalence of 0.05-1%<sup>1</sup>. Epilepsy itself is a disease of the central nervous system but is also a chronic medical illness. It carries risks of developing emotional, behavioural or mental problems. Studies showed that there is an increased risk of having psychiatric symptoms in patients with epilepsy compared with normal controls<sup>2</sup>. More than 20% of the young population with uncomplicated epilepsy may have some form of psychiatric problem compared with 10% in those who suffer from chronic medical illness. However, more than 50% of children and adolescents with complicated epilepsy may have psychiatric involvement<sup>3</sup>. Among all types of psychiatric illness, anxiety and depression are the most commonly reported psychiatric problem followed by attention deficit and hyperactivity disorder, obsessive compulsive disorder and tics disorder. Patients with epilepsy have higher risk of suicide and deliberate self-harm than general population<sup>4</sup>.

Despite the high prevalence of psychiatric illness among epileptic patients, only a small proportion of them receive formal psychiatric treatment due to various reasons including the social stigma on psychiatric illness and epilepsy<sup>5</sup>. A study by Caplan showed that only one third of the child and adolescent epileptic patients presented with mood symptoms received psychiatric services<sup>6</sup>. This unrecognised and underestimated situation can lead to adverse psychiatric consequences and outcomes in epileptic patients.

The psychiatric symptoms of epileptic patients could be either directly related to the seizure activity (ictal) or with no direct relationship with the seizure (inter-ictal). Mood symptoms may occur in the form of non-specific vague mood changes or a sense of unease during the prodromal period. There could be acute perceptual, mood or behavioural changes during the aura. The nature of the aura could indicate the site of the seizure focus. In patients with temporal lobe epilepsy, they could have rising epigastric aura, *deja vu*, derealisation, oro-alimentary and gestural automatisms, auditory and visual illusions. In patients with frontal lobe epilepsy, they could have motor automatism in the form of fencing posture, speech arrest, bizarre vocalisation or bilateral coordinated limb movements. Patients with parietal lobe focus could have sensory aura in the form of tingling or numbness. Fleeting visual phenomena could occur in patients with occipital lobe epilepsy. In the ictal period, fear is the most common psychiatric presentation. During the inter-ictal

period, patients may have depressed or altered mood. They worry of having further attacks and fear of the uncertainty of both the frequency and severity of the attacks. They may have a lowered self-esteem and confidence, social mal-adjustment and restricted social relationship or even social isolation.

Patients with temporal lobe epilepsy have a higher risk of having psychoses, particularly those with more severe and medically intractable symptoms and with left-sided focus<sup>7</sup>.

The aetiology of psychopathology in epileptic patients could be multifactorial in nature including biological, social and psychological. Biologically, it could be directly related to the pathology in the central nervous system. Risk factors include the age of onset, location of the foci, the nature and the severity of the seizure. Studies found that depressive disorder was more common in patients with complex partial seizures particularly with left-sided temporal lobe foci<sup>8</sup>. Social factors include the family adaptation to the illness, over-controlling parenting style, parent-child relationship, the social support of the patient, and the stigma of the general public. Studies found that the lack of knowledge about epilepsy led to distortion and misconception on this illness and heightened the stigma about this disorder<sup>9</sup>. The restriction of normal social activities from the over-protective parents after the diagnosis of epilepsy may greatly affect their social life and associated with higher levels of behavioural problem<sup>10</sup>. Psychological factors included the coping and the attitude of the patients towards the illness. They may have a sense of having no control over seizures and resentment of a loss of independence seen in the need to take medication for the rest of their life.

The diagnosis of psychiatric disorder in children and adolescents is similar to that of adults. However, they could have atypical presentation that made diagnosis difficult. In depressed epileptic patients, they could have deterioration in academic performance, school refusal, separation anxiety, agitation and regressive behaviour instead of typical depressive features of depressed mood, loss of interest, psychomotor retardation and suicidal ideation.

Treatment of depression in child or adolescent epileptic patients is similar to that of adults. Cognitive behavioural treatment and pharmacological treatment are the mainstay of treatment. Tri-cyclic antidepressants failed to show efficacy in the treatment of child and adolescent depressive disorders. The first-line treatment

should be the selective serotonin reuptake inhibitor (SSRI). Fluoxetine showed more favourable results in the treatment of child and adolescent depressive disorders among all SSRIs followed by citalopram and sertraline. However, we should be aware of the drug-drug interaction between psychotropic and anti-epileptic medications particularly antidepressants that inhibit cytochrome P-450 isoenzymes for which anti-epileptic medications are substrates. SSRIs like fluoxetine, sertraline, paroxetine inhibit the metabolism of phenytoin, carbamazepine and phenobarbital and can increase the risk of toxicity. Among all SSRIs, citalopram shows no interaction with anti-epileptic medications and is preferred for the treatment of depressive disorders in epilepsy<sup>11</sup>. Studies indicated that there is an increased in suicidal risk in the use of selective serotonin reuptake inhibitor in child and adolescent population particular in the early stage of treatment. Close monitoring on their mental condition especially in the early stage of treatment is necessary to look for any development of suicidal ideation or behaviour<sup>12</sup>.

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## Dermatological Quiz

### Dermatological Quiz

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Dr. Lai-yin CHONG



*Bilateral linear streaks of verrucous plaques at buttock and posterior thighs*

A 5-year-old girl developed linear streaks of pigmented and rough skin lesions soon after birth. There was no preceding history of blistering. These lesions distributed over both sides of neck, trunk and limbs. They persisted and became more warty since then (Figure). Her developmental milestones were normal and general health was good. Family history was insignificant.

### Questions:

1. What is your diagnosis?
2. Name one important differential diagnosis in her early infancy?
3. What associated abnormalities should be watched out?
4. What are the treatments available?

*(See P.29 for answers)*

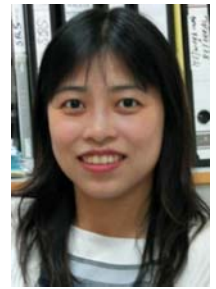




# Psycho-social Impact of Epilepsy and Issues of Stigma

**Ms. Anchor TF HUNG**

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Ms. Anchor TF HUNG

## Introduction

Epilepsy itself is a very common medical condition that may occur among people of all ages, sex and races. Despite seizures may only last for a few seconds or a few minutes, it has much psychosocial repercussions to the patients and their family members<sup>1,2</sup>. As people with epilepsy is a highly diversified and complex group due to different aetiologies, the author will only focus the discussion on those patients without other co-morbidities like physical disability, cerebral palsy and mental retardation. The impact to individuals is also very unique.

## Impact on Children and Adolescents

Education is the most important domain to children and adolescents. Generalised tonic-clonic seizure (Grandmal) is the most noticeable, but threatening form of epilepsy to the classmates and teachers. After the seizure, though the patient will recover soon, he or she will feel very embarrassed due to the 'horrible' gesture during the fit and the disturbance caused to the class.

As some forms of epilepsy are less visible like petit mal, but appear to be rather 'strange' and 'abnormal' such as complex partial seizures, classmates and teachers may interpret the patients as 'not attentive', 'rebellious', 'crazy' as well as having 'emotional and conduct problems'. Some playful classmates may even negatively portray or mock at the patients, resulting in much psychological sufferings of the patients like lowered self-esteem and emotional and behavioural disturbance<sup>2,3</sup>.

Moreover, some patients have under-achievement at schools<sup>3</sup>. It may be due to the impairment of cognitive functions, side effects of medications like drowsiness, frequent absence to schools, poor concentration, and restricted social lives. The disadvantaged academic performance and difficulties in peer relationship limit better education opportunities and career. It is not surprising that depressive symptoms and even suicidal attempts are common among the adolescents<sup>4</sup>.

## Impact on the Parents

The impact of epilepsy also extends to the whole family. It will be extremely difficult for parents to fully admit and accept that their children are diagnosed as having epilepsy. They are overwhelmed by enormous worries

and concern about the child's prognosis, unpredictable nature of epilepsy, the side effects of anti-convulsants and the impairment to the brain functions as well as their future career and marriage.

Among all, one of the difficult things for the parents to accept is the label of epilepsy. In the Chinese literature, epilepsy is written as '癲癇症'. The first character '癲' carries a negative connotation, similar to 'insane' and 'crazy'<sup>5</sup>. And, in the traditional folks, epilepsy is attributed to pregnant mothers' consumption of mutton or blame for one's wrong-doing. These myths exert much guilt and shame to the parents.

Hence, the stigma attached to epilepsy is more debilitating to the parents and the family. These 'differentness', 'discreditable' and 'spoiled identity' cause further stress and burden to the family<sup>5-10</sup>.

On the other hand, the parents have a low sense of efficacy in managing epilepsy. 70% of the parents expressed that they did not know much about epilepsy and 55% showed that they did not know how to address the psychological needs of the children with epilepsy<sup>11</sup>. It may be due to a lot of reasons like literacy level of the parents and availability of information. The prevalence of depressive symptoms among parents of children with epilepsy is 22.6%. High level of parental stress was also reported<sup>11</sup>. Hence, parents need knowledge, skills and support in parenting a child with epilepsy.

## Impact on Adult Patients

One of the most significant impact on adult patients is employment opportunities. The severity of seizure activities, educational attainment and social skills will largely determine their vocational opportunities. Generally speaking, they need to avoid employment with potential risk to their own lives and the public such as driving buses. Certain job natures may trigger seizure activities like night shift work.

For those who are working, patients are inclined to conceal their illness lest they will not be employed or even lose their jobs. Keeping this 'spoiled identity' and 'hidden disability'<sup>5-10</sup> from colleagues and employers is a very stressful and prolonged process. On top of coping with the normal work stress, they are also suffering from the stress of managing their epilepsy identity.

For those who have seizures at the workplace, feeling of embarrassment and guilt would be very strong.

'I urinated in the pantry of my office during a complex partial seizure'. A male patient shared.

'I have unbuttoned my clothes and have sung songs in front of my colleagues. I am so embarrassed'. Another female patient recalled.

They will feel more helpless, rejected and frustrated in the midst of misunderstanding and gossips. Some patients may even lose their jobs directly or indirectly after seizures.

Another major impact on adults is the interpersonal relationship embracing friendship, courtship and marriage. Withdrawal from social lives, fear of rejection and worry over inheritance and pregnancy limit their social support network and establishment of new family support system in the long run.

In addition, both anxiety and depressive symptoms are prevailing among adult patients in both local and overseas studies<sup>12-17</sup>. The chronicity of epilepsy, the unavailability of stable jobs, restricted social lives, lowered self-concept and family conflicts will further affect their quality of life<sup>18</sup>.

### Issues of Stigma (Felt Stigma and Enacted Stigma)

Both the patients and their family members tend to conceal their epilepsy due to their fear of being stigmatised and discriminated. This 'felt stigma' will further exert stress and restrict normal participation in society<sup>5-10</sup>. As released on the International Epilepsy Society Care Day 2008 held in Hong Kong, more than 70% patients and family members opined that the Chinese name of epilepsy misled people to regard epilepsy as mental illness (N=214). More than 40% respondents are concealing their/their family member's epilepsy<sup>19</sup>.



There is inadequate understanding and misconception of epilepsy among the public too. In 2002, 1,128 subjects were interviewed in Hong Kong for their knowledge and attitude towards epilepsy. About 58.2% subjects had heard about epilepsy before<sup>20</sup>. Of these, 52.7% would wrongly put an object into a patient's

mouth during an epileptic seizure to prevent injury of the tongue. 32.2% would not allow their children to marry persons with epilepsy. The lack of understanding among the public will foster a sense of fear, misunderstanding and even discrimination in the community. There are some actual cases of discrimination/enacted stigma<sup>5-10</sup> resulting in termination of employment after epileptic fits in the workplace. Therefore, stigma (both felt and enacted) among the patients<sup>5-10</sup>, family members as well as the public needs to be stamped out.



Prevailing misconceptions of epilepsy among the public

### Interventions

In response to the needs of patients with epilepsy and their family members, Community Rehabilitation Network (CRN) started epilepsy services in 1994. It has been under the subvention of the Social Welfare Department since 1997. Three intervention strategies are important and effective in helping the patients in the community, namely self-management<sup>21</sup>, mutual support and social awareness.

#### Promoting Self-management

It is of paramount importance to enhance the sense of self-efficacy among the patients and their family members through enhancement of self-management skills of epilepsy<sup>21</sup>. Educational talks, first aid workshops and Epilepsy Self-help courses are conducted to enhance the sense of mastery, better compliance and coping capacity towards epilepsy.

#### Enhancing Self-help Groups/Mutual Support

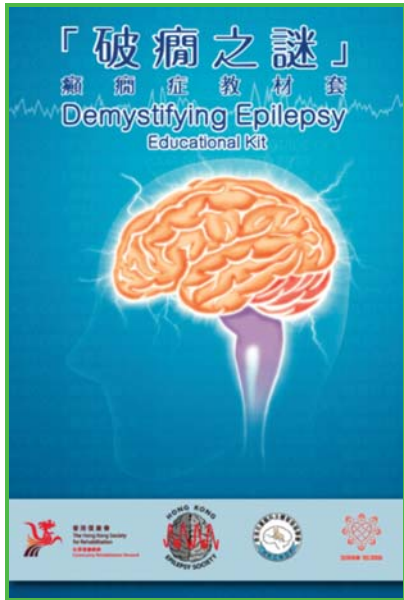
Self-help groups can provide information, support and facilitate growth and change among the patients<sup>22</sup>. Their sense of helplessness can be addressed by feelings of understanding, support and friendship. More positive attitude and supportive network are built among the patients and their family members in need to face their illness instead of avoiding epilepsy. CRN runs support groups for parents, and adults and their family members, in collaboration with the patient self-help group, The Hong Kong Epilepsy Association (香港協癲會) on a territory-wide level.

#### Arousing Social Awareness

Arousing the awareness of the public about epilepsy, combating stigma and fostering a positive environment for the patients are of parallel importance. It will be both important to the patients and the public.



Community education programmes include school education, awareness campaign, Epilepsy Care Day, and production of educational materials like the 'Demystifying Epilepsy' Educational Kit<sup>23</sup>. A more informed public and positive attitude will also help the under-diagnosed patients to seek treatment.



*Demystifying Epilepsy Educational Kit (A tri-lingual set with DVD and booklet) for patients, professional and the public by The Hong Kong Society for Rehabilitation Community Rehabilitation Network, The Hong Kong Epilepsy Society, The Hong Kong Society of Child Neurology and Developmental Paediatrics and The Hong Kong Epilepsy Association.*



*Ms. Mandy Chan shared her experience of living with epilepsy*

## Conclusion

Epilepsy exerts a lot of psychosocial impact to the patients of epilepsy of all ages and their family members. Epilepsy is not only a medical and personal condition, but also a social and public health issue which requires multi-disciplinary and multi-level intervention. Together with the individual treatment by medical professionals, self-management, self-help and social awareness among the patients and the public will also be critical to enhance the quality of lives of patients and to promote a more inclusive society.

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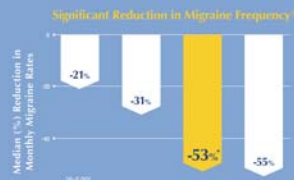
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3. Data on file. Bristol-Myers Squibb Pharmaceutical Inc. 2003.





# Epilepsy Surgery

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Dr. Dawson TS FONG

Patients with epilepsy who bear a definable focus or a discernable epileptic zone are potential candidates for epilepsy surgery.

Every seizure potentially incurs damage to a growing and maturing brain leading to irreparable consequences. The longer it is not well controlled with anti-epileptic drugs (AEDs), the worse we would expect the eventual cognitive development to be.

The simple aim for every kind of epilepsy surgical procedures is to excise the epileptic zone without causing undue morbidity. When complete excision is not possible, disconnecting fibre tracts within the brain helps to limit the spread of attacks and thus its damages. Generally epilepsy surgery can be classified as in Table 1.

**Table 1. Common Surgical Procedures in Epilepsy**

Nature	Procedures
Diagnostic	Intracranial recording with <ul style="list-style-type: none"> <li>• Subdural strip/grid electrodes</li> <li>• Depth electrodes</li> </ul>
Therapeutic	With a defined focus <ul style="list-style-type: none"> <li>• Temporal resection</li> <li>• Selective amygdalo-hippocampectomy</li> <li>• Extratemporal corticectomy</li> <li>• Multiple subpial transection over eloquent areas</li> </ul> Diffuse epileptogenic zone or with multiple foci - Interruption of spread <ul style="list-style-type: none"> <li>• Corpus callosotomy</li> <li>• Functional hemispherotomy/hemispherectomy</li> <li>• Multiple subpial transection</li> </ul> Miscellaneous <ul style="list-style-type: none"> <li>• Vagus Nerve Stimulation</li> </ul>

## Presurgical Evaluation

When medication is not good enough to control the epilepsy and a surgical option is contemplated, a series of evaluation is to be conducted to assess its suitability.

The semiology itself says a lot about the origin of the abnormal discharge. With the advent of neuroimaging, we now have a large array of imaging modalities to confirm the abnormality both anatomically as well as metabolically. Examples include MR, Ictal SPECT, Interictal PET and functional MRI. If we have a concordance, we are generally ready to propose a treatment strategy.

A long history of intractable epilepsy takes a serious toll on the child's education, behaviour and psychosocial development. Thorough neuropsychological and psychiatric assessments are important not only as an integral part of presurgical evaluation but also to set the

baseline for postoperative follow up. Special test like Wada Test - selective intracarotid injection of amobarbital - serves as a functional test to determine the dominance of the hemispheres and 'rehearse' the effect of a temporal lobectomy on the patient's memory.

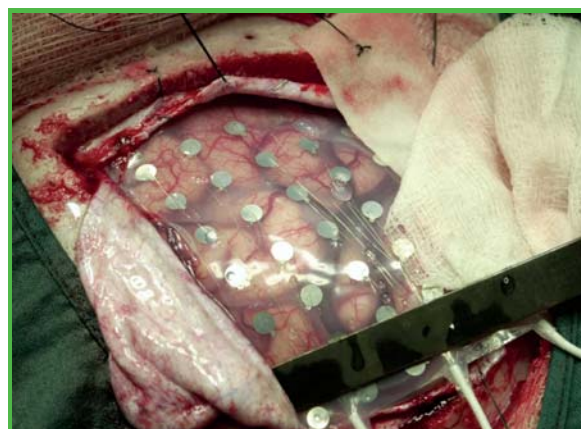
## Intracranial recording

Intracranial recording involves surgical placement of electrodes on the brain surface and serves to further delineate the area of onset and early propagation of a seizure that is suspected but not proven by extracranial EEG. (Figure 1) The strategy of electrodes placement is derived from a plausible hypothesis built on the findings of earlier presurgical evaluations.

It is usually indicated for the determination of lateralisation in 'bitemporal syndrome' which is characterised by the presence of bilateral and equal amounts of interictal anomalies arising in both temporal lobes. In extratemporal epilepsy, a lead of seizure spread could be traced across various lobes because of the direct and clearer pick up on the cerebral surface.

With the electrodes in situ over functional areas, electrical stimulation of the desired leads can help clinicians to define functional areas with high accuracy and the extent of excision of the epileptogenic zone tailored carefully.

Since it is a surgical procedure in itself the decision for an intracranial recording should be made with discretion and taken as a prelude to the actual epilepsy surgery.



**Figure 1. Subdural grid electrode placement - a form of intracranial monitoring**

## Temporal Lobectomy

Temporal Epilepsies (TLEs) are the single most common type of seizure disorder, accounting for about 25% of all epilepsies and approximately 70% of patients referred for surgical consideration.<sup>1-3</sup> The same is true for the paediatric population. Mesial temporal sclerosis (MTS) remains the commonest cause of complex partial seizures of temporal lobe origin in children who eventually undergo temporal lobectomy.<sup>4</sup>

TLEs could further be classified into limbic and lateral TLEs according to the origin of the epileptogenic origin.<sup>5</sup> However such a classification does not give surgeons a definite indication of how extensive the lobectomy should be performed. Since the circuitry of the limbic system might be a common pathway for complex partial seizures, sparing the mesial temporal structures in a lobectomy leads to inferior outcome in seizure control.<sup>3</sup>

Therefore, in practice, temporal lobectomy varies within the extremes of a selective amygdalo-hippocampectomy for MTS and a classical temporal lobectomy for lesions in the lateral cortex. How far back should the lateral temporal cortex be removed often depends on the findings on ECoG. (Figure 2)



Figure 2. Specimen after an anterior temporal lobectomy. The bigger piece is the anterior pole of the temporal lobe and the smaller one the sclerotic hippocampus.

The main worry concerning the removal of the temporal lobe is the effect on memory - verbal on the dominant and visuo-spatial on the non-dominant hemisphere. But in general, these candidates with medically intractable epilepsy would, by the time of surgery, be compromised to some extent in these faculties. If not, plasticity must have shifted these functional areas. Thus, anatomically excising these sclerotic tissues would generally impart no further damages as shown by serial follow ups of patients, local as well as abroad.<sup>7</sup>

Visual field deficit in the form of a quadrantic field defect is often taken as an unavoidable but acceptable side effect because of the damage on the optic radiation, the Meyer's Loop, situated around the superior and lateral aspects of the temporal horn. With the advent of diffusion tensor imaging (DTI), we can now locate the trajectory of the Meyer's Loop and fuse these images onto our neuro-navigation to give us the opportunity of actually avoiding damaging these fibres at operation. From the preliminary study of the author's personal series, we could significantly decrease the probability of a postoperative field defect down to around 11%. (Figure 3)

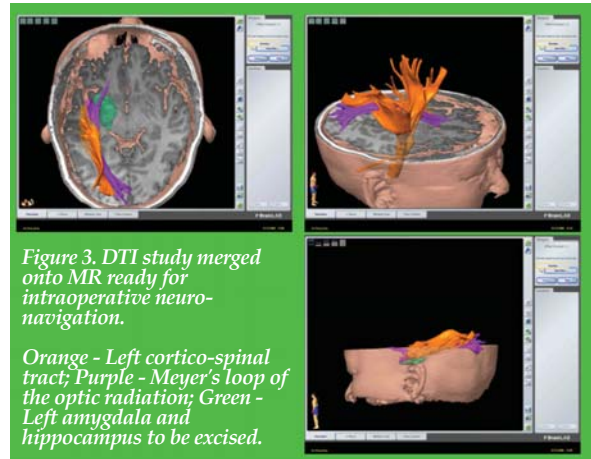


Figure 3. DTI study merged onto MR ready for intraoperative neuro-navigation.

Orange - Left cortico-spinal tract; Purple - Meyer's loop of the optic radiation; Green - Left amygdala and hippocampus to be excised.

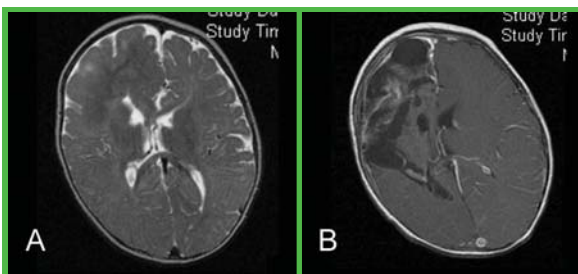
## Extratemporal Excision

Unlike temporal epilepsy that can usually be managed in a standardised manner, once the epileptogenic zone falls outside the temporal lobe, it calls for careful studies not only to identify its exact location but also a safe strategy to take, lest the functional deficit be unacceptable. A common cause for these epilepsies is cortical dysplasia which is grossly normal to the naked eye and could not be differentiated from normal brain. It is therefore equally important to identify the focus and the functional areas in the vicinity. Functional MR helps a great deal for the localisation of these functional areas but for the speech areas in particular, invasive monitoring still serves an important role. With the expertise in neuro-anaesthesiology, neurosurgeons can now operate with patients fully awake. This gives us the best opportunity to map out accurately the functional areas, motor, speech or even sensory, and allows us to come to the best option of excising as much as possible the lesion leaving the functions intact.

## Disconnection Surgery

When the epileptogenic zones are ill-defined or multiple and to excise them all becomes not practicable, disconnecting fibres within the cortex helps to interrupt the spread of discharges and alleviate the effect of an attack.

Rasmussen encephalitis is a condition in which the afflicted develops intractable epilepsy, gradual intellectual deterioration, progressive hemiplegia and atrophy of the cerebral hemispheres. When it was first reported in the 1950's, extensive excision of the affected hemisphere - hemispherectomy - was the surgery offered. But such an extensive surgery carries too much morbidity. Instead we know now it is much safer just to do a peri-insular 'incision' along the lateral ventricle disconnecting the ipsilateral frontal, temporal, parietal and occipital lobes from the diencephalon - functional hemispherotomy.<sup>6</sup> (Figure 4)



A - before surgery

B after a right frontal lobectomy and functional hemispherotomy of the right side

Figure 4. 10-month old boy with tuberous sclerosis and intractable epilepsy

For secondary generalised seizures spreading to the contralateral hemisphere or drop attacks as in Lennox-Gastaut Syndrome, callosotomy is an effective treatment option. Up to two-thirds of the corpus callosum can be safely severed without undue side effects. (Figure 5)

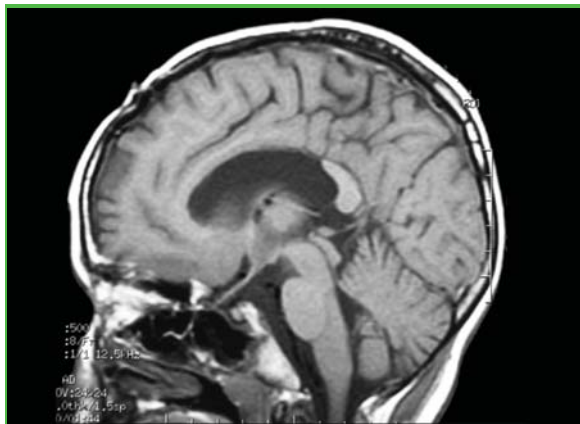


Figure 5. 7-year old girl with Lennox-Gastaut Syndrome after corpus callosotomy

When the seizures arise from the eloquent cortex that could not be excised, multiple subpial transection can limit cortical neuronal synchronisation and seizure spread while preserving cortical function.<sup>7</sup>

## Vagus Nerve Stimulation

For patients with medically refractory epilepsy who are not suitable candidates for surgery hitherto mentioned, vagus nerve stimulation (VNS) might still be considered.

The vagus nerve is well known to have extensive cortical projections and from animal experiments since the 1930s, it does have an effect on EEG pattern. With different frequency and intensity, cortical EEG can be synchronised or desynchronised. The exact mechanism on its effect on epilepsy is still controversial but apart from its effect on electrical discharges, chronic VNS can have a myriad of physiological changes from an increase of neuronal fos; activation of CN structure; increase of regional cerebral blood flow, etc.<sup>8-10</sup>

VNS is effective in reducing epilepsy frequency in more than 50% of cases.<sup>11</sup> However, for young and small children the sizeable stimulator renders it not practicable.

## Result

Due to the diversity of epilepsy syndromes and the variable surgical strategies, it is not easy to state exactly the general effectiveness of surgery in the management of intractable epilepsy. TLE, as the most prevalent type of epilepsy that could be treated surgically, is also the one that has the best response from anterior temporal lobectomy. Engel reported from a multi-centre series of 3579 patients, 2429 (68%) were seizure free and 860 (24%) improved after surgery.<sup>12</sup> Extratemporal epilepsy usually has a lesser success than this. Overall, with the advent of neuroimaging and elaborate presurgical evaluations, the outcome from surgery has considerably improved, in adult and paediatric patients alike.

It is important to note that the control of epilepsy is not the only yardstick for success. Crippling psychological and social consequences of the intractable seizures of earlier years, in many instances leave these patients in a disabled state and their ordeals are far from over.<sup>14</sup>

## Conclusion

For the carefully selected group of patients, epilepsy surgery provides a fair chance of cure by eradicating the cause of the seizure. Morbidity could in many instances be avoided by mapping out the functional and eloquent areas. Since epilepsy has a profound effect on the cognition and development of the individual, a holistic approach by a multi-disciplinary team is important not only in the presurgical evaluation but also after surgery when the patient ventures back into the community. In some instances, the 'burden of normality' - despite seizure-free - incurs new problems that have to be acknowledged early and managed accordingly.

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# Neuroimaging in Paediatric Epilepsy

## Dr. Vincent LAI

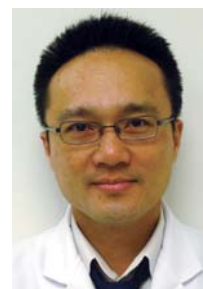
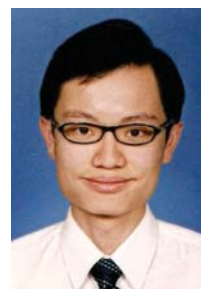
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Dr. Vincent LAI

Dr. Henry KF MAK

## Introduction

Epilepsy is a chronic condition characterised by recurrent seizures unprovoked by an acute systemic or neurologic insult. The prevalence of epilepsy among the Chinese population in Hong Kong had been estimated at 4.5/1000 (0.45%) for children and adolescents<sup>1</sup>, and 1.54/1000 (0.15%) for adults<sup>2</sup>. Yet, upto 36% of these patients suffer refractory epilepsy despite maximal drug treatment or regime<sup>3</sup>, causing significant burden to both the patients and clinicians.

There are different classification systems for epilepsy, commonly according to either anatomy or aetiology. From an anatomic standpoint, epilepsy can be classified into temporal lobe epilepsy (mesial and neocortical) and extra-temporal epilepsy<sup>4</sup>. In contrast to mesial temporal lobe epilepsy which is characterised by hippocampal abnormality, neocortical temporal lobe and extra-temporal epilepsies lack a common pathologic substrate and consist of a wide range of structural anomalies, ranging from gliosis to neuronal migration disorder to neoplasm. According to aetiology, epilepsy can also be grouped into developmental, neoplastic, ischaemic, inflammatory or infective conditions. The most common forms of paediatric epilepsy presenting to surgery are as follows (Table 1).

Table 1

1	Malformation of cortical development
2	Hemimegalencephaly
3	Tuberous sclerosis complex
4	Developmental tumours
5	Hypothalamic hamartoma
6	Hippocampal sclerosis
7	Cavernous malformations
8	Sturge-Weber syndrome
9	Rasmussen's encephalitis
10	Congenital vascular injuries

Neuroimaging becomes important and mandatory in the work up for epilepsy in localisation and lateralisation of the seizure focus. Recent advances, in particular 'high-quality' magnetic resonance (MR) imaging, have increased our understanding of the underlying disease process as well as revolutionised evaluation and management of epilepsy<sup>6</sup>. Neurosurgery is most often considered in medically refractory epilepsy for removal or isolation of the epileptogenic region. Therefore it is crucial to precisely identify epileptogenic foci that are potentially amenable to surgical resection for possible cure, especially in patients with occult neocortical epilepsy.

## Choices of Imaging

A special consideration in the imaging of paediatric epilepsy is the inability of children to cooperate for the long acquisition times required, leading to motion artifact and hence hindering the detection of subtle abnormalities. Audio-video distraction can be attempted but sedation is often required<sup>7</sup>.

MR imaging is fundamental in epilepsy imaging, with its principal role being structural evaluation, providing anatomical and pathologic information. Yet, not all causes can be detected with conventional MR imaging. Use of 'high-quality' MRI with dedicated protocols can depict a relevant abnormality in up to 85% of the patients with partial seizures and candidates for surgical treatment<sup>8</sup>. Indeed, visual analysis alone has only modest sensitivity and specificity. Functional imaging comes into play for the remainder of the patients, which consists of radionuclide imaging (PET-CT and SPECT). Advanced MR imaging techniques (MRS, DTI, fMRI) can also provide functional information but have not been widely tested in the paediatric population<sup>5</sup>.

A correct imaging approach is required, bearing in mind the potential causes of epilepsy amongst different age groups (Table 2) in the population to be imaged, and the likely epileptogenic substrates to be encountered.

Infection and stroke may be diagnostic considerations in neonates. In infants below 1.5 years, hippocampal sclerosis is not a consideration. Between 1.5 years and 50 years, the yield of structural pathology is highest.

Table 2

Causes	Age of onset of seizure (yrs)				
	0-2	3-20	21-40	41-60	>60
Inborn error of metabolism	X				
Cerebral anoxia	X				
Infection	X	X			
Congenital/ developmental malformations	X	X			
Phakomatoses	X	X			
Hippocampal sclerosis		X			
Primary generalised seizure		X			
Vascular malformations		X	X		
Post-traumatic epilepsy		X	X	X	X
Tumours			X	X	X
Stroke				X	X

## Structural MR Imaging

Due to the subtle nature of imaging findings in hippocampal sclerosis and cortical dysplasia, dedicated MRI protocols should be implemented. Conventional MR imaging include spin-echo T1-weighted and T2-weighted sequences. Various other pulse sequences can be obtained to enhance lesion detection. For infants and neonates, inversion recovery and fast spin-echo T2-weighted sequences can optimise distinction between gray and white matters. Fluid-attenuated inversion recovery (FLAIR) sequence suppresses free extracellular CSF, hence increasing tissue contrast at the gray-white junction and detection of subtle white matter changes. 3D volume acquisition of spoiled gradient-echo recalled sequence (SPGR) or magnetisation-prepared rapid gradient-echo sequence (MPRAGE) allows detailed morphological evaluation with use of thin slice (1-1.6mm) reconstruction. Tilted-plane coronal imaging is the cornerstone for evaluation of the hippocampus. Diffusion weighted imaging and gadolinium enhanced sequences would be useful for patients in the older age groups, when stroke and neoplasm are more frequently encountered<sup>10</sup>.

## Functional Imaging

<sup>18</sup>F-FDG Positron Emission Tomography (PET) and PET-CT make use of glucose metabolism for imaging of cerebral activity. An epileptogenic focus will be shown as an area of reduced uptake or hypometabolism. Its unique ability to image cerebral metabolism is virtually limited to the interictal state due to the long uptake time (over 40 minutes) for the radiotracer.

Single Photon Emission Computed Tomography (SPECT) has a complementary role in defining epileptogenic zone (if PET or PET-CT is positive), using <sup>99m</sup>Tc-HMPAO as tracer to assess cerebral blood flow changes during both the ictal and interictal periods. The epileptogenic focus will be depicted as an area of hyperperfusion in the ictal stage, and hypoperfusion in the interictal stage. Ictal SPECT has a higher rate of correct localisation<sup>11</sup> but is often proved difficult to obtain. The critical factor is prompt injection of the radiotracer because a delayed injection will lead to spreading or generalisation of seizure focus.

## Imaging Features of Major Paediatric Epilepsies<sup>12</sup>

### 1. Malformation of Cortical Development

It is one of the commonest surgically treatable epilepsy syndromes in infants and children, accounting for 10-50% of the paediatric epilepsy cases (compared to 4-25% in adult)<sup>13</sup>. MRI has resulted in increased recognition and the most widely used classification consists of four categories:

- (1) abnormal neuronal and glial proliferation or apoptosis,
- (2) abnormal neuronal migration,
- (3) abnormal cortical organisation, and
- (4) malformations of cortical development, not otherwise classified.

Depending on the stage of arrest, a distinct spectrum ranging from focal cortical dysplasia (Figure 1) to profound alteration of cortical architecture occurs. These entities share similar histopathological findings such as cortical dyslamination, neuronal ectopia and bizarre giant cells with neuronal and glial elements. Intrinsic epileptogenicity is associated with these lesions.

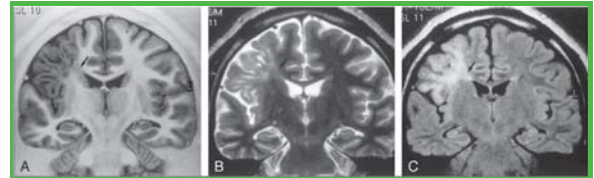


Figure 1

### 2. Hippocampal Sclerosis

The aetiology is controversial and may represent a common outcome of both acquired and developmental processes. It is characterised by gliosis and neuronal loss and as it is related to changes after prolonged febrile seizures, status epilepticus, complicated delivery, and ischaemia, an acquired cause has been postulated. However, a second developmental lesion is seen in 15% of patients, most common being cortical dysplasia.

The two major findings on MRI include hippocampal atrophy and abnormal T2-weighted hyper-intensity. Secondary findings include loss of hippocampal head interdigitations, loss of internal architecture, atrophy of the ipsilateral fornix and mammillary body, atrophy of the collateral white matter between the hippocampus and collateral sulcus, dilatation of the ipsilateral temporal horn, and temporal lobe volume loss (Figure 2).

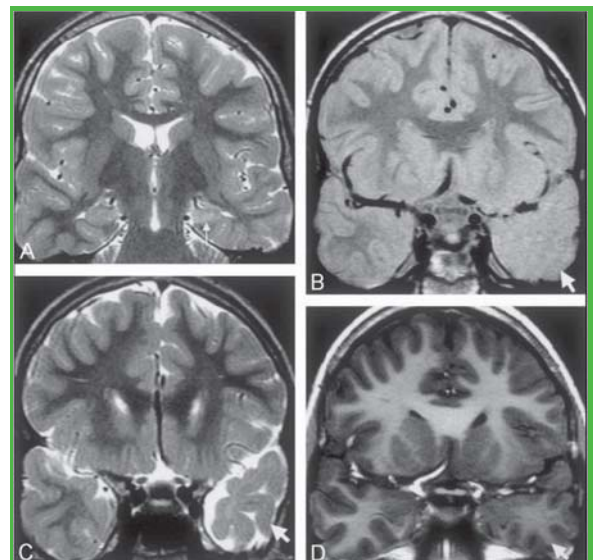


Figure 1

### 3. Phakomatoses

**Tuberous Sclerosis** is an inherited tumour disorder with multi-organ hamartomas, including a spectrum of central nervous system hamartomas containing giant balloon cells. The best diagnostic clue is calcified subependymal nodules (Figure 3) and subependymal giant cell astrocytoma (SGCA) is seen in 15% of patients. Cortical,



subcortical tubers and white matter lesions along lines of neuronal migration are present in 70-95%, with a predilection of the frontal and parietal lobes. The neurologic symptoms tend to correlate with the number of tubers.

**Sturge-Weber Syndrome** is usually a sporadic congenital (but not inherited) malformation in which foetal cortical veins fail to develop normally. The imaging features are the sequelae of progressive venous occlusion and chronic venous ischaemia.



Figure 3

#### 4. Developmental Tumours

**Dysembryoplastic Neuroepithelial Tumour (DNET)** is a benign neuronal or mixed neuronal-glioma tumour. It is a focal, intra-cortical mass superimposed on a background of cortical dysplasia. The classic appearance is a well-demarcated, wedge-shaped "bubbly" intra-cortical mass in the temporal lobe (often involving the amygdala or hippocampus) of a young patient with longstanding partial seizures.

**Hypothalamic Hamartoma** is located in the region of tuber cinereum, characterised clinically by luteinising hormone-releasing hormone (LHRH) dependent central precocious puberty at a very young age, with or without gelastic (laughing) seizures (Figure 4).



Figure 4

#### 5. Miscellaneous

Vascular malformations due to cavernous malformation (Figure 5) and chronic inflammatory disorders such as Rasmussen's encephalitis can be diagnosed by MR imaging.



Figure 5

#### Conclusion / Recommendation

Multimodality neuroimaging plays an essential role in noninvasively localising epileptogenic foci in the paediatric population for possible surgical resection. A state-of-the-art MR imaging protocol is needed for structural imaging, which should consist of axial T1-weighted inversion recovery, T2-weighted, diffusion-weighted; coronal FLAIR, T2-weighted and 3D volume-acquired SPGR/MPRAGE T1-weighted sequences. In cases in which the epileptogenic substrate is not identified or non-concordant clinical (ictal EEG and semiology) and structural findings, further evaluation with functional imaging such as ictal SPECT or interictal PET-CT can be performed.

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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p><b>3</b></p> <ul style="list-style-type: none"> <li>Dragon Boat Practice Session</li> </ul>	<p><b>4</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Stress Management (Code no. TC-SM-0901)</li> </ul>	<p><b>5</b></p> <ul style="list-style-type: none"> <li>HKMA CME - New Insights in Treating Depression</li> <li>HKMA Tai Po Network - Lecture Series on Type 2 DM Management (V)</li> <li>Certificate Course on Ward Management II - Managing Resources in Health Service (Code no. TC-WM-0902)</li> <li>Certificate Course on Wound Management (Code no. TC-WC-0901)</li> <li>Certificate Course on Renal Medicine 2009</li> <li>Singing Course</li> </ul>	<p><b>6</b></p> <ul style="list-style-type: none"> <li>HKMA Choir Rehearsal</li> <li>HKMA Orchestra Rehearsal</li> </ul>	<p><b>7</b></p> <ul style="list-style-type: none"> <li>FMSHK Officers' Meeting</li> <li>HKMA Council Meeting</li> </ul>	<p><b>8</b></p> <ul style="list-style-type: none"> <li>HKMA KE Network - Certificate Course in Psychiatry and Psychology for General Practitioners</li> </ul>	<p><b>9</b></p> <ul style="list-style-type: none"> <li>HKMA CME - The Health Seminar on Respiratory Medicine</li> <li>Refresher Course for Health Care Providers 2008/2009 - Immunisation in Childhood</li> </ul>
<p><b>10</b></p> <ul style="list-style-type: none"> <li>Dragon Boat Practice Session</li> <li>HKMA Certificate Course on Family Medicine 2009</li> </ul>	<p><b>11</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Stress Management (Code no. TC-SM-0901)</li> </ul>	<p><b>12</b></p> <ul style="list-style-type: none"> <li>HKMA Tai Po Network - Lecture Series on Type 2 DM Management (VI)</li> <li>Certificate Course on Ward Management Module II - Managing Resources in Health Service (Code no. TC-WM-0902)</li> <li>Certificate Course on Wound Management (Code no. TC-WC-0901)</li> <li>Certificate Course on Renal Medicine 2009</li> <li>Singing Course</li> </ul>	<p><b>13</b></p> <ul style="list-style-type: none"> <li>HKMA Choir Rehearsal</li> <li>HKMA Orchestra Rehearsal</li> <li>Hong Kong Neurosurgical Society Monthly Academic Meeting - Neurosurgical Implication after Radiotherapy for Nasopharyngeal Carcinoma</li> </ul>	<p><b>14</b></p> <ul style="list-style-type: none"> <li>HKMA Structured CME Programme with Hong Kong Sanatorium &amp; Hospital Year 2009 (V) - Minimally Invasive Digestive Tract Surgery</li> <li>Pulmonary Manifestation of a Systemic Disease &amp; Unusual Presentation of an Uncommon Lung Disease</li> </ul>	<p><b>15</b></p> <ul style="list-style-type: none"> <li>HKMA KE Network - Certificate Course in Psychiatry and Psychology for General Practitioners</li> </ul>	<p><b>16</b></p> <ul style="list-style-type: none"> <li>Acupuncture in Pain Management 2009</li> <li>HKMA KE Network - Managing the Abnormal Pap Smear - Update</li> </ul>
<p><b>17</b></p> <ul style="list-style-type: none"> <li>Dragon Boat Practice Session</li> <li>Acupuncture in Pain Management 2009</li> <li>HKMA Squash Tournament</li> </ul>	<p><b>18</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Stress Management (Code no. TC-SM-0901)</li> </ul>	<p><b>19</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Ward Management Module II - Managing Resources in Health Service (Code no. TC-WM-0902)</li> <li>Certificate Course on Wound Management (Code no. TC-WC-0901)</li> <li>Certificate Course on Renal Medicine 2009</li> <li>HKMA YTM Network - Common Skin Problems in General Practice</li> </ul>	<p><b>20</b></p> <ul style="list-style-type: none"> <li>HKMA Choir Rehearsal</li> <li>HKMA Orchestra Rehearsal</li> </ul>	<p><b>21</b></p> <ul style="list-style-type: none"> <li>FMSHK Executive Committee &amp; Council Meeting</li> </ul>	<p><b>22</b></p> <ul style="list-style-type: none"> <li>HKMA KE Network - Certificate Course in Psychiatry and Psychology for General Practitioners</li> <li>Wine Tour to Grace Vineyard</li> </ul>	<p><b>23</b></p> <ul style="list-style-type: none"> <li>Wine Tour to Grace Vineyard</li> </ul>
<p><b>24</b></p> <ul style="list-style-type: none"> <li>Dragon Boat Practice Session</li> <li>Grace Vineyard</li> <li>HKMA Structured CME Programme with PMH Year 2009 (4) - I and HIV Vaccination (I) USG in a Gynaecology Patient and the Management (II) Vaginitis and Management</li> </ul>	<p><b>25</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Stress Management (Code no. TC-SM-0901)</li> <li>Wine Tour to Grace Vineyard</li> </ul>	<p><b>26</b></p> <ul style="list-style-type: none"> <li>Certificate Course on Ward Management (Code no. TC-WC-0901)</li> <li>Certificate Course on Renal Medicine 2009</li> <li>HKMA HKE Network - Common Skin Conditions on Scalp</li> </ul>	<p><b>27</b></p> <ul style="list-style-type: none"> <li>HKMA Choir Rehearsal</li> <li>HKMA Orchestra Rehearsal</li> </ul>	<p><b>28</b></p> <ul style="list-style-type: none"> <li>Tuen Ng Dragon Boat Races</li> </ul>	<p><b>29</b></p> <ul style="list-style-type: none"> <li>HKMA KE Network - Certificate Course in Psychiatry and Psychology for General Practitioners</li> </ul>	<p><b>30</b></p> <ul style="list-style-type: none"> <li>Hong Kong International Dragon Boat Regatta cum Dr. David Fang Cup</li> </ul>
<p><b>31</b></p>						



Date / Time	Function	Enquiry / Remarks
<b>3</b> <b>SUN</b> (10,17,24)	<b>Dragon Boat Practice Session</b> Organised by: The Hong Kong Medical Association, Venue: Sai Kung	Ms. Dora HO Tel: 2527 8285
<b>4</b> <b>MON</b> 6:30 pm - 9:30 pm (11,18,25)	<b>Certificate Course on Stress Management (Code no. TC-SM-0901)</b> Organised by: College of Nursing, Hong Kong	Secretariat Tel: 2572 9255 Fax: 2838 6280 24 CNE Points
<b>5</b> <b>TUE</b> 1:00 pm 1:00 pm (12) 6:30 pm - 9:30 pm (12,19,26) 6:30 pm - 9:30 pm (12,19,26) 7:00 pm - 8:30 pm (12,19,26) 7:00 pm (12)	<b>HKMA CME - New Insights in Treating Depression</b> Organised by: The Hong Kong Medical Association, Chairman: Dr. CHOI Kin, Speaker: Prof. Torgny H. SVENSSON, Venue: Ballroom, 2/F, Langham Hotel, Tsim Sha Tsui, Kowloon <b>HKMA Tai Po Network - Lecture Series on Type 2 DM Management (V) &amp; (VI)</b> Organised by: HKMATai Po Network, Speakers: Various, Venue: Chiuchow Garden Restaurant, Uptown Plaza, Tai Po, New Territories <b>Certificate Course on Ward Management Module II - Managing Resources in Health Service (Code no. TC-WM-0902)</b> Organised by: College of Nursing, Hong Kong <b>Certificate Course on Wound Management (Code no. TC-WC-0901)</b> Organised by: College of Nursing, Hong Kong <b>Certificate Course on Renal Medicine 2009</b> Organised by: The Federation of Medical Societies of Hong Kong and Hong Kong Society of Nephrology, Speakers: Various, Venue: Lecture Hall, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong <b>Singing Course</b> Organised by: The Hong Kong Medical Association, Venue: 油麻地海燕音樂學院	Miss Viviane LAM Tel: 2527 8452 1 CME Point Miss Alice TANG Tel: 2527 8285 Secretariat Tel: 2572 9255 Fax: 2838 6280 24 CNE Points Secretariat Tel: 2572 9255 Fax: 2838 6280 24 CNE Points Ms. Erica HUNG Tel: 2527 8898 Fax: 2865 0345 CME / CNE Points Ms. Dora HO Tel: 2527 8285
<b>6</b> <b>WED</b> 8:00 pm (13,20,27) 8:00 pm (13,20,27)	<b>HKMA Choir Rehearsal</b> Organised by: The Hong Kong Medical Association, Venue: CR1, Hong Kong Cultural Centre <b>HKMA Orchestra Rehearsal</b> Organised by: The Hong Kong Medical Association, Venue: Pui Ching Education Centre	Ms. Candy YUEN Tel: 2527 8285 Ms. Candy YUEN Tel: 2527 8285
<b>7</b> <b>THU</b> 8:00 pm - 10:00 pm 8:00 pm	<b>FMSHK Officers' Meeting</b> Organised by: The Federation of Medical Societies of Hong Kong, Venue: Gallop, 2/F., Hong Kong Jockey Club Club House, Shan Kwong Road, Happy Valley, Hong Kong <b>HKMA Council Meeting</b> Organised by: The Hong Kong Medical Association, Chairman: Dr. H.H. TSE, Venue: HKMA Head Office, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Hong Kong	Ms. Paulina TANG Tel: 2527 8898 Fax: 2865 0345 Ms. Christine WONG Tel: 2527 8285
<b>8</b> <b>FRI</b> 1:30 pm (15,22,29)	<b>HKMA KE Network - Certificate Course in Psychiatry and Psychology for General Practitioners</b> Organised by: HKMA KE Network, Speakers: Various, Venue: United Christian Hospital, Kowloon	Miss Alice TANG Tel: 2527 8285
<b>9</b> <b>SAT</b> 12:30 pm 2:30 pm	<b>HKMA CME - The Health Seminar on Respiratory Medicine</b> Organised by: The Hong Kong Medical Association, Speakers: Dr. Thomas MOK & Dr. POON Yik Ning, Venue: Conference Rooms 1&2, 2/F, Main Building, Kowloon Hospital, 147A Argyle Street, Kowloon <b>Refresher Course for Health Care Providers 2008/ 2009 - Immunisation in Childhood</b> Organised by: The Hong Kong Medical Association and Our Lady of Maryknoll Hospital, Chairman: Dr. Vivian CHAN, Speaker: Dr. KO Po Wan, Venue: Training Room II, 1/F., OPD Block, Our Lady of Maryknoll Hospital, 118 Shatin Pass Road, Wong Tai Sin, Kowloon	Miss Viviane LAM Tel: 2527 8452 2 CME Points Ms. Clara TSANG Tel: 2354 2440 2 CME Points
<b>10</b> <b>SUN</b> 2:00 pm	<b>HKMA Certificate Course on Family Medicine 2009</b> Organised by: The Hong Kong Medical Association, Speakers: Dr. LAI Cing Hon Jeffrey & Dr. LAI Kei Wai, Venue: Lecture Theatre, G/F, Block M, Queen Elizabeth Hospital, Kowloon	Miss Viviane LAM Tel: 2527 8452 3 CME Points
<b>13</b> <b>WED</b> 7:30 am	<b>Hong Kong Neurosurgical Society Monthly Academic Meeting - Neurosurgical Implication after Radiotherapy for Nasopharyngeal Carcinoma</b> Organised by: Hong Kong Neurosurgical Society, Chairman: Dr. Dawson FONG, Speakers: Dr. Benedict TAW, Venue: Seminar Room, G/F, Block A, Queen Elizabeth Hospital, Kowloon	Dr. Y.C. PO Tel: 2990 3788 Fax: 2990 3789 2 CME Points
<b>14</b> <b>THU</b> 2:00 pm 6:30 pm - 8:00 pm	<b>HKMA Structured CME Programme with Hong Kong Sanatorium &amp; Hospital Year 2009 (V) - Minimally Invasive Digestive Tract Surgery</b> Organised by: The Hong Kong Medical Association and Hong Kong Sanatorium & Hospital, Speaker: Dr. SIU Wing Tai, Venue: HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong <b>Pulmonary Manifestation of a Systemic Disease &amp; Unusual Presentation of an Uncommon Lung Disease</b> Organised by: Hong Kong Thoracic Society / ACCP (HK & Macau Chapter), Chairpersons: Dr. Johnny W.M. CHAN & Dr. LING Sai On, Speakers: Various, Venue: LG1, Lecture Room, Ruttonjee Hospital, Wanchai, Hong Kong	Miss Viviane LAM Tel: 2527 8452 1 CME Point Dr. James C.M. HO / Dr. Johnny W.M. CHAN Tel: 2855 4999 Fax: 2872 5828 1 CME Point
<b>16</b> <b>SAT</b> (17) 1:30 pm	<b>Acupuncture in Pain Management 2009</b> Organised by: Hong Kong Association for Integration of Chinese-Western Medicine; Hospital Authority; Guangdong Provincial Academy of Chinese Medical Sciences; Guangdong Provincial Hospital of C.M.; Guangdong Provincial Association of Acupuncture & Moxibustion & Guangdong Provincial Association of Chinese Medicine, Chairmen: Dr. WONG Taam Chi Woon & Prof. ZOU Xu, Speakers: Various, Venue: Hospital Authority Building, 147B Argyle Street, Kowloon <b>HKMA KE Network - Managing the Abnormal Pap Smear - Update</b> Organised by: HKMA KE Network & UCH, Chairman: Dr. LEUNG Man Fuk, Speaker: Dr. CHENG Oi Ling Edith, Venue: Lecture Theatre, G/F, Block P, United Christian Hospital, Kowloon	Miss Jessie CHOW / Miss Y.C. YEUNG Tel: 2871 8897, 2871 8841 / 3119 1858 Fax: 2871 8898 Miss Alice TANG Tel: 2527 8285



Date / Time	Function	Enquiry / Remarks
<b>17 SUN</b> 2:00 pm	<b>HKMA Squash Tournament</b> Organised by: The Hong Kong Medical Association, Venue: Kowloon Cricket Club	Ms. Dora HO Tel: 2527 8285
<b>19 TUE</b> 1:45 pm	<b>HKMA YTM Network - Common Skin Problems in General Practice</b> Organised by: HKMA YTM Network, Speaker: Dr. LAM Wai Sun, Venue: Crystal Room 1, Basement 3, Holiday Inn Golden Mile, Tsim Sha Tsui, Kowloon	Mr. Jacob WONG Tel: 2824 0333
<b>21 THU</b> 7:00 pm - 10:00 pm	<b>FMSHK Executive Committee &amp; Council Meeting</b> Organised by: The Federation of Medical Societies of Hong Kong, Venue: Council Chambers, 4/F., Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Paulina TANG Tel: 2527 8898 Fax: 2865 0345
<b>22 FRI</b> (23,24,25)	<b>Wine Tour to Grace Vineyard</b> Organised by: The Hong Kong Medical Association, Tai Yuan (Shanxi), China	Ms. Dora HO Tel: 2527 8285
<b>24 SUN</b> 2:00 pm	<b>HKMA Structured CME Programme with PMH Year 2009 (4 - I) Cervical Smears and HPV Vaccination II) USG in a Gynaecology Patient and the Management III) Vaginitis and Management</b> Organised by: The Hong Kong Medical Association, Speaker: Dr. LEE Lee; Dr. WONG Ying Grace & Dr. FUNG Tze Man Mimi, Venue: G8 Hall, Princess Margaret Hospital, Kowloon	Miss Viviane LAM Tel: 2527 8452 2 CME Points
<b>26 TUE</b> 1:45 pm	<b>HKMA HKE Network - Common Skin Conditions on Scalp</b> Organised by: HKMA HKE Network, Speaker: Dr. YU Ho Tak, Venue: 26/F, Churchill Room, The Park Lane Hotel, Causeway Bay, Hong Kong	Mr. Jacob WONG Tel: 2824 0333
<b>28 THU</b> 8:00 am	<b>Tuen Ng Dragon Boat Races</b> Organised by: The Hong Kong Medical Association, Venue: Sai Kung	Ms. Dora HO Tel: 2527 8285
<b>30 SAT</b>	<b>Hong Kong International Dragon Boat Regatta cum Dr. David Fang Cup</b> Organised by: The Hong Kong Medical Association, Venue: Sai Kung	Ms. Dora HO Tel: 2527 8285

## Meetings

6/6/2009	<b>2nd Annual Scientific Meeting and 3rd Annual General Meeting</b> Organised by: The Hong Kong Society for Paediatric Immunology and Infectious Diseases, Speakers: Dr. Vas NOVELLI & Prof. Nigel KLEIN, Venue: Marco Polo Hong Kong Hotel, Centenary Ballroom, G/F, Harbour City, Tsim Sha Tsui, Kowloon, Enquiry: Ms. Alison SHIEH, Tel: 2599 8848, Fax: 2599 8998, Email: shieha@wyeth.com
18/7/2009	<b>Hong Kong Surgical Forum - Summer 2009: Minimally Invasive Surgery</b> Organised by: Department of Surgery, Li Ka Shing Faculty of Medicine, The University of Hong Kong; Queen Mary Hospital & Hong Kong Chapter of American College of Surgeons, Venue: Underground Lecture Theatre, New Clinical Building, Queen Mary Hospital, Pokfulam, Hong Kong, Enquiry: Forum Secretary, Hong Kong Surgical Forum, Tel: (852) 2855 4885 / (852) 2855 4886, Fax: (852) 2819 3416, E-mail: hksf@hkucc.hku.hk, Web-site: <a href="http://www3.hku.hk/surgery/forum.php">http://www3.hku.hk/surgery/forum.php</a>
8/11/2009	<b>International Symposium on Hepatology 2009 / 22nd Annual Scientific Meeting</b> Organised by: The Hong Kong Association for the Study of Liver Diseases, Venue: Hong Kong Convention and Exhibition Centre, Enquiry: Ms. Melissa LEUNG, CMPMedica Pacific Limited, Tel: 2116 4348, E-mail: melissa.leung@asia.cmpmedica.com

## Courses

18&26/7/2009, 19&27/9/2009, 21&29/11/2009	<b>Pre-Hospital Trauma Life Support (PHTLS) Provider Course</b> Organised by: Department of Surgery, Queen Mary Hospital; Hong Kong Chapter of the American College of Surgeons & Hong Kong St. John Ambulance Association, Venue: St. John Ambulance Association, 2 Macdonnell Road, Mid-Levels, Hong Kong, Enquiry: Hong Kong St. John Ambulance Association, Tel: 2530 8020, Email: assn@stjohn.org.hk, Web site: <a href="http://www.hku.hk/surgery">http://www.hku.hk/surgery</a>
4-5/6/2009	<b>Paediatric Infectious Disease &amp; Immunology Course 2009</b> Organised by: The Hong Kong Society For Paediatric Immunology & Infectious Diseases & Hospital Authority Infectious Disease Centre, Speakers: Various, Venue: Lecture Theatre, H7, Princess Margaret Hospital, Kowloon, Enquiry: idcpdimcourse2009@hotmail.com
4-7/6/2009	<b>WONCA 2009 Conference: Asia-Pacific Regional Conference</b> Organised by: The Hong Kong College of Family Physicians, Venue: Hong Kong Convention and Exhibition Centre, Enquiry: Charlotte / Patrick, Tel: 2528 6618, Email: enquiry@wonca2009.org, Website: <a href="http://www.wonca2009.org">http://www.wonca2009.org</a>
14-16/8/2009, 11-13/9/2009, 20-22/11/2009	<b>Advanced Trauma Life Support (ATLS) Student Course</b> Organised by: Department of Surgery, Queen Mary Hospital & Hong Kong Chapter of the American College of Surgeons, Venue: The Jockey Club Skills Development Centre, C3, Main Block, Queen Mary Hospital, Pokfulam, Hong Kong, Enquiry: Course Administrator, Tel: 2855 4885 / 2855 4886, Fax: 2819 3416, Email: hnsrg@hkucc.hku.hk, Web site: <a href="http://www.hku.hk/surgery">http://www.hku.hk/surgery</a>
11-12/9/2009, 20-21/11/2009	<b>Advanced Trauma Care for Nurses (ATCN) Provider Course</b> Organised by: Department of Surgery, Queen Mary Hospital & Hong Kong Chapter of the American College of Surgeons Venue: The Jockey Club Skills Development Centre, C3, Main Block, Queen Mary Hospital, Pokfulam, Hong Kong Enquiry: Course Administrator Tel: 2855 4885 / 2855 4886 Fax: 2819 3416 Email: hnsrg@hkucc.hku.hk Web site: <a href="http://www.hku.hk/surgery">http://www.hku.hk/surgery</a>
12-13/12/2009	<b>Advanced Medical Life Support (AMLS) Provider Course</b> Organised by: Department of Surgery, Queen Mary Hospital & Hong Kong Chapter of the American College of Surgeons, Venue: The Jockey Club Skills Development Centre, C3, Main Block, Queen Mary Hospital, Pokfulam, Hong Kong, Enquiry: Course Administrator, Tel: 2855 4885 / 2855 4886, Fax: 2819 3416, Email: hnsrg@hkucc.hku.hk Web site: <a href="http://www.hku.hk/surgery">http://www.hku.hk/surgery</a>



## Answer to Dermatological Quiz

1. Linear verrucous epidermal naevi, systematized (also known as Ichthyosis hystrix)

Epidermal naevi are hamartoma-like lesions involving epidermis and papillary dermis, thought to be due to genetic mosaicism. The lesions are presented with linear verrucous pigmented papules and plaques at trunk and limbs distributed along Blaschko's lines.

2. Incontinentia pigmenti

The earliest lesions of linear verrucous epidermal naevi may present as linear streaks of pigmented macular lesions, and confused with incontinentia pigmenti.

3. Most cases of epidermal naevi do not associated with systemic abnormalities. In rare condition called epidermal naevi syndrome, it may associate with neurological or musculoskeletal abnormalities. Infants with multiple and extensive epidermal naevi therefore require a thorough screening for systemic abnormalities in conjunction with the paediatricians.

4. In this patient, treatment is difficult as the involvements are too extensive. For more localized epidermal naevus, carbon dioxide laser ablation or surgical excision can be done. However, although the condition is called epidermal naevus, the hamartoma lesion actually involves both epidermis and at least papillary dermis. Surgical procedures aimed at sole destruction of epidermis, like shave excision, curettage or superficial laser ablation, will invariably end up with recurrence. Deeper destruction or full-thickness excision may be curative, but the resulted scars may not be cosmetically acceptable to the patient. Oral retinoids have been reported in decreasing the thickness of systematized epidermal naevi, but their side-effects do not justify for their long term use.

### Dr. Lai-yin CHONG

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## The Changing Face of Medical/Dental Practice

The Hong Kong general public is now better educated and more aware of their rights. Information is readily available especially via the internet. Trust, respect and loyalty from patients are fading. Medical/Dental practices are more 'business' oriented with the provision of additional services of elective treatments such as slimming and cosmetic surgery. Patients have become customers/consumers. Hong Kong society has become more litigious with patients/customers more readily voicing their dissatisfaction as well as complaining to the relevant authority and/or the press. The availability of "no win, no fee" collection agencies only encourage the patients to sue their doctors without any hesitation. The practice of defensive medicine has now become the norm.



### Seminar Objectives

These two seminars are intended to revisit some of the medico-legal issues. Reference to some of the recent court decisions and the new personal injuries practice directions effective 2<sup>nd</sup> April 2009 will be made.

### Topics

#### Seminar 1

- Duty of Care
- Bolam Test
- Consent
- Confidentiality
- Documentation
- Advertising
- Recent cases

#### Seminar 2

- Complaint handling including mediation
- Medical/Dental Council enquiries
- Civil/Criminal Court procedures
- Factual/expert witness and report writing

<b>Presenter:</b>	Dr. Edward S.Y. Fan (Barrister-at-law) Honorary Assistant Professor, Faculty of Dentistry, University of Hong Kong		
<b>Date&amp; Time:</b>	<b>Seminar 1:</b> Saturday, 06 June 2009 (2:15p.m. to 5:30p.m.) <b>Seminar 2:</b> Saturday, 13 June 2009 (2:15p.m. to 5:30p.m.)		
<b>Venue:</b>	Lecture Hall, 4/F., Duke of Windsor Social Service Bldg., 15 Hennessy Road, Wanchai, HK		
<b>Language:</b>	English		
<b>Fee:</b>	HK\$900.00 (for 2 Seminars)		
<b>Enquiry:</b>	The Secretariat of the Federation of Medical Societies of Hong Kong		
<b>Contact:</b>	Tel: 2527 8898	Fax: 2865 0345	Email: info@fmshk.org