

several previous studies, it has been proven that pre-medication screening of HLA-B\*1502 helps to prevent the incidence of SJS-TEN in Asian countries including Thailand, Malaysia, India, and Taiwan before the use of carbamazepine (CBZ). We further seek to find whether the screening can reduce the incidence of all drug-related skin allergies with the use of CBZ.

**Methods:** From 2010 to 2013, we screened the purified DNA for testing the presence of HLA-B\*1502 allele for all the patients before the use of CBZ. Those without the HLA-B\*1502 allele were prescribed with CBZ while those with the allele not. We followed up these patients taking CBZ the presence of skin rash in the OPD. We also used the historical incidence of CBZ-induced SJS-TEN and skin rash through the National Health Insurance Research Database (NHIRD) in 2002 as a control group.

**Results:** Of the total 66 recruited patients, 59 out of 66 (90.4% of the total) are HLA-B\*1502 negative, while 7 (10.6%) patients are positive. Among the HLA-negative ones, 5/59 patients (6.7%) developed drug-related skin rash. No SJS-TEN was noted in both groups. The baseline ratio of SJS-TEN out of patients taken CBZ from NHIRD is 0.23% (123/50917), while the ratio of skin rash is 2.83% (1441/50917) ( $p < 0.01$ ).

**Conclusions:** The screening of HLA-B\*1502 not only reduce the incidence of carbamazepine-induced SJS-TEN, but also reduce the incidence of drug-related allergic skin rash. The screening with negative result cannot exclude the risk of allergic skin rash, which must be noticed during the treatment.

## 125 A Prospective One-Year Study of the Medium-Chain Triglyceride Oil Diet Treatment for Refractory Epilepsy

中鏈脂肪酸生酮飲食治療頑固型癲癇病患之一年前瞻性追蹤

Meng-Ying Hsieh, Kuang-Lin Lin, Hwei-Shyong Wang, Po-Cheng Hung, Min-Liang Chou, Jaijn-Jim Lin, Wan-Ling Huang

Division of Pediatric Neurology, Chang Gung Children Medical Center and Memorial Hospital, College of Medicine, Chang Gung University, Taoyuan, Taiwan

謝孟穎、林光麟、王輝雄、洪伯誠、周明亮、林建志、黃婉苓

林口長庚兒童醫學中心/林口長庚醫院/長庚大學醫學院兒童神經科

**Background:** Despite advances in the development of anticonvulsants, 20-30% of pediatric epilepsies are still medically refractory. The ketogenic diet is a high-fat, low-carbohydrate and adequate protein diet to mimic the biochemical changes associated with starvation, and has been used as an alternative treatment of refractory epilepsy. This prospective one-year study was designed to evaluate the efficacy and tolerability of the medium-chain triglyceride (MCT) oil diet treatment in refractory epilepsy patients in a medical center.

**Methods:** From February 2012 to October 2013, patients

with refractory epilepsy were enrolled to start on the MCT oil diet. All the patients were fasted in the hospital for 48 hours and the MCT oil diet was gradually initiated under the surveillance of the dietitian. The MCT oil diet was designed on a full prescription for carbohydrate in 19%, protein in 10% of total energy and long-chain triglyceride (LCT) usually in 21% of total energy to keep total fat percentage (MCT + LCT) not exceed 71% of total energy. The MCT in the diet was gradually started up to 40-60% of total energy according to clinical tolerance. The clinical condition and effectiveness of those patients on MCT oil diet are prospectively followed each month. Baseline seizure frequencies were collected from parent seizure calendars before initiating and after the diet. Baseline chemistries, lipid profiles and metabolic survey before the diet to exclude inborn error of metabolism were also collected. Patients were excluded if they stop taking the MCT oil diet. Reasons for discontinuation and adverse events were recorded. Follow-up outpatient assessment and a standardized form completed by parents were used to assess the tolerability of the diet. Ketosis was assessed by twice-daily home urine testing and by measurement of blood ketone concentrations at clinic appointments. Weight and height were recorded at all hospital visits. The cardiac and abdominal sonography and bone densitometry were also assessed in each 6 months interval serial follow-up.

**Results:** Total 53 patients (27 males and 26 females) were currently enrolled in this study. The average age at the time of diet initiation was 11.35 years old (range, 3 months to 27 years). Before the diet, these patients averaged 47.62 seizures per day of multiple types and averaged 3 different kinds of anticonvulsants (range, 1 to 5 kinds). Thirty-two patients stopped the diet and were discarded in this study. The most common reason for discontinuation is diet refusal and unsatisfied improvement is the second one. Twenty-one patients remained on the diet and 14 of them were followed for one year. Three months after diet initiation, 58.5% ( $n=31$ ) of those starting remained on the diet and 61.7% had a > 50% decrease in seizures, 25.8% ( $n=8$ ) got seizure free. At 6 months, 41.5% ( $n=22$ ) remained on the diet and 68.2% had a >50% decrease in seizures, 45.5% ( $n=10$ ) had seizure free. At 1 year, 26.4% ( $n=14$ ) remained on the diet and 85.7% had a >50% decrease in seizures and 64.3% had seizure free. The most common adverse event was dyslipidemia but there were no known cardiac complications.

**Conclusions:** The results of this initial prospective one-year follow up of MCT oil diet in treating refractory epilepsy patients are promising. It is a safe and effective therapy and can be considered as an alternative therapy for patients with difficult-to-control seizures.

## 126 Correlation of Clinical Symptoms and Urinary Nonylphenol Levels in Children with Attention Deficit Hyperactivity Disorder

注意力不足過動症兒童之臨床症狀與尿液中壬基酚濃度之相關性

Jung-Chieh Du<sup>1</sup>, Chin-Jung Angie Yu<sup>2</sup>, Ting-Fan Chiu<sup>1</sup>, Betau Huang<sup>1,3</sup>, Mei-Lien Chen<sup>2</sup>

Department of Pediatrics, Taipei City Hospital, Zhong-Xiao Branch<sup>1</sup>, Taipei, Taiwan; Institute of Environmental Health Sciences, College of Medicine, National Yang Ming University<sup>2</sup>, Taipei, Taiwan; Department of Medicine, College of Medicine, National Yang Ming University<sup>3</sup>

杜戎玟<sup>1</sup>、游馨榕<sup>2</sup>、邱婷<sup>1</sup>、黃碧桃<sup>1,3</sup>、陳美蓮<sup>2</sup>  
台北市立聯合醫院忠孝院區小兒科<sup>1</sup>；國立陽明大學環境與職業衛生研究所<sup>2</sup>；國立陽明大學醫學系<sup>3</sup>

**Background:** Previous animal studies had revealed that young mice exposed to p-nonylphenol (NP), a kind of alkylphenols, might develop motor hyperactivity at adolescence, probably by inhibiting the growth of dopaminergic neurons. This study was aimed at clarifying the association between p-nonylphenol (NP) exposure and the clinical symptoms of attention-deficit hyperactivity disorder (ADHD) in children.

**Methods:** From July, 2012 to Dec, 2013, all children newly diagnosed as ADHD in Taipei City Hospital, Zhongxiao branch, would be asked to join this study under the permission of their parents. The diagnosis of ADHD was made by pediatric neurologists and/or pediatric psychiatrists, based on the criteria of DSM-IV-TR. The severity of clinical symptoms of ADHD was quantified by SNAP-IV rating scales, including parent-rating and teacher-rating versions. Each participant had received examinations for blood lead level and urinary NP concentration for further analysis.

**Results:** Total 30 children with ADHD (M/F=25/5, 8.4±2.2 years) and 30 normal children as control subjects (M/F=15/15, 9.2±1.8 years) were enrolled in this study. The average blood lead levels in both groups were similar (1.39±0.64 v.s 1.35±0.56µg/dL,  $p=0.95$ ). However, children with ADHD had significantly higher urinary NP concentration than normal controls (5.62±4.35 v.s 3.32±1.81µg/g cr,  $p=0.006$ ). Although there was no significant correlation found between urinary NP concentration and total SNAP-IV rating scales, either parent-rating or teacher-rating version, a significant correlation still could be observed between urinary NP levels and inattention scores in parent-rating SNAP-IV scales (Spearman  $r=0.37$ ,  $p=0.04$ ,  $n=30$ ). Further analysis for the prenatal history, exercise habits, diet habits and living environments for both groups had showed that ADHD children had less exercise habit (48.3% v.s 63.3%,  $p=0.51$ ) and more drinking habit of bottled milk tea (over 1 bottle per week, 26.7% v.s 3.3%,  $p=0.026$ ) as well as bottled lactic acid beverage (over 1 bottle per week, 40.0% v.s 10.0%,  $p=0.015$ ).

**Conclusions:** Significantly elevated urinary NP levels were found in children with ADHD and probably associated with more severe inattention symptoms. ADHD children had

more drinking habit of dairy beverage, which may increase the exposure of NP. These results implied that exposure to NP may be associated with onset of ADHD, especially inattention symptoms.

## 127 Attention Deficit Hyperactivity Disorder Increases Risk of Bone Fracture: A Population-based Cohort Study

過動注意力不集中會增加骨折之風險：台灣群體之世代研究

Zheng-Nan Chin<sup>1</sup>, Yu-Tzu Chang<sup>1</sup>, I-Ching Chou<sup>1,2</sup>, Haung-Tsung Kuo<sup>1</sup>, Chang-Hai Tsai<sup>1,3</sup>, Chia-Hung Kao<sup>4,5</sup>

Department of Pediatrics, China Medical University Hospital, China Medical University<sup>1</sup>; Graduate Institute of Integrated Medicine, College of Chinese Medicine, China Medical University<sup>2</sup>; Department of Healthcare Administration, Asia University<sup>3</sup>; Graduate Institute of Clinical Medicine Science and School of Medicine, College of Medicine, China Medical University<sup>4</sup>; Department of Nuclear Medicine and PET Center, China Medical University Hospital<sup>5</sup>, Taichung, Taiwan

陳震南<sup>1</sup>、張鈺孜<sup>1</sup>、周宜卿<sup>1,2</sup>、郭煌宗<sup>1</sup>、蔡長海<sup>1,3</sup>、高嘉鴻<sup>4,5</sup>

中國醫藥大學附設醫院小兒神經科<sup>1</sup>；中國醫藥大學中西醫結合研究所<sup>2</sup>；亞洲大學醫務管理系<sup>3</sup>；中國醫藥大學核子醫學科<sup>4</sup>；中國醫藥大學附設醫院核子醫學科<sup>5</sup>

**Background:** Children with attention deficit hyperactivity disorder (ADHD) may maintain marked hyperactivity to injuries. Therefore, this study evaluated the relationship between ADHD and bone fracture in children.

**Methods:** Claims data from the Taiwan National Health Insurance database were used to conduct retrospective cohort analyses. The study cohort contained 3452 patients with ADHD who were frequency matched according to sex, age, urbanization level of residence area, parental occupation, and baseline year with people without ADHD at a ratio of 1:4. A Cox proportional hazard regression analysis was conducted to estimate the effects of ADHD on bone fracture risk.

**Results:** In patients with ADHD, the risk of bone fracture accidents was significantly higher than in patients without ADHD ( $P$  value for log-rank test  $< .0001$ ). After adjusting for potential confounding factors, the ADHD cohort was 1.32 times more likely to have bone fracture accidents than the comparison cohort (hazard ratio, HR = 1.32, 95% confidence interval, CI = 1.17-1.49).

**Conclusions:** Patients with ADHD have a higher risk of experiencing bone fracture accidents. Identifying the risk factors for bone fracture is necessary for implementing prevention.