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KEYNOTE LECTURE I

Approach to the management of recurrent wheeze in children

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While there have been important advances in our understanding of wheezing in children and better available evidence on the various therapeutic options, the essential steps in managing children with recurrent wheeze have not changed. The most critical step is ensuring the correct diagnosis. This involves both differentiating what is and isn't asthma and distinguishing episodic viral induced wheeze from multi-trigger/atopic wheeze particularly in early childhood, as while these can both be considered part of the "asthma" spectrum, they do require different management approaches. Common areas of misdiagnosis of asthma include children presenting with recurrent cough and those with exercise induced dyspnoea. While a good clinical history and response to a trial of treatment are still most important in establishing a diagnosis, a chest x-ray and lung function testing (in the older child) may be useful adjuncts particularly in determining the need for further specific investigations Once a diagnosis of asthma is established the next step is to assess its severity. It is important to distinguish the severity of an acute episode which dictates the level of reliever therapy required and the interval severity or "pattern of asthma" which determines the need for and type of preventer therapy. The main-stay of reliever therapy is still beta-2-agonists. While the addition of oral corticosteroids have proven benefit in the management of acute asthma particularly for moderate to severe episodes, their role in the management of children with mild to moderate episodes of viral induced wheeze has recently been questioned, with the suggestion that they be reserved only for episodes severe enough to require hospital admission. The role of intermittent inhaled corticosteroids (ICS) and leukotriene receptor antagonists (LTRAs) remains unclear. While ICS remain the first line preventer therapy for children with moderate-severe persistent asthma, a trial of LTRAs is the preferred initial option in children with frequent intermittent or mild persistent asthma, as they appear to be more effective than ICS in children with viral induced wheeze and do not have the systemic side effects associated with ICS use. While the addition of long acting beta agonists to ICS in the form of combination therapy is currently the most commonly prescribed preventer in many countries, it is clear that it is being inappropriately prescribed in most of these children, and other options such as the addition of an LTRA or an increase in ICS dose may be just as appropriate in that small percentage of children not controlled with an LTRA or low dose ICS. In particular the addition of LTRA is the preferred add on option in children with ongoing exercise related asthma. Other important aspects of asthma management include the choice of an appropriate inhaler device, addressing adherence issues, education including a written asthma action plan, and consideration of non-pharmacological approaches. However it is important to remember that the 3 most common causes of "difficult to control" asthma in children remain incorrect diagnosis, poor adherence or poor inhaler technique.

CRITICAL CARE SYMPOSIUM I

Hospitalized children with 2009 influenza A (H1N1) infection in mainland China

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Clinical data of 810 severely or critically ill patients with laboratory-confirmed 2009 influenza A (H1N1) infection were collected from 17 hospitals in mainland China, from September 2009 to February 2010. Five hundred and eight (62.7%) were male, 302 (37.3%) female; the median age was 43 months, 260 (32.1%) were 5 years of age or older; 148 (18.5%) had underlying chronic disease.

The common presenting symptoms were fever (96.3%), cough (93.7%), sputum (42.8%), runny nose (36.3%), wheezing (27.0%), stuffiness 192 (23.7%), dyspnea (20.1%), sore throat (18.1%), vomiting (16.0%), irritability (9.8%), lethargy (7.9) and seizures (4.0%). The common laboratory abnormalities were abnormal results of white blood cells counts (46.5%), elevations of LDH (42.7%), elevations of CRP (37.8%), elevations of AST (31.7%) and elevations of CK (21.5%). Clinical complications included pneumonia 586 (72.3%), encephalopathy/ encephalitis 49 (6.0%), and myocarditis 30 (3.7%).

159 (19.6%) patients were admitted to an ICU, 88 (10.9%) patients required mechanical ventilation. 665 (82.1%) patients received oseltamivir treatment, 164 (20.2%) received within 48 hours after the onset of symptoms. Two hundred and eighty-two (34.8%) received systemic corticosteroids treatment, 205 (25.3%) received IVIG treatment. All patients received antibiotics before admission or on admission. Seven eighty-eight (97.3%) patients were recovered or improved at discharge; 19 (2.3%) died. Among the 19 decedents, the median age was 54.8 months, and 8 (42.1%) of them were 5 years of age or older. Ten died from severe pneumonia and ARDS, of whom 5 patients complicated with encephalopathy/encephalitis; 8 died from encephalopathy/encephalitis; 1 died from secondary fungal meningitis. There were no significant differences in the median age, median time from onset of illness to admission, underlying chronic disease, and initiation of antiviral therapy within 48 hours of onset of the illness, between patients who died and patients who survived. Severely ill patients with H1N1 infection in mainland China may have a wide involvement of system and organs. The severe cases and deaths concentrate in previously healthy older children, and the most common causes of death are severe viral pneumonia, ARDS, and encephalopathy/encephalitis. The leukocytosis, neutrophilia, lymphopenia and elevations of CRP are high risk factors for critically illness and death. The beneficial effects of antibiotics, corticosteroid and IVIG in critical cases with 2009 influenza A (H1N1) infection have not been established in this report.

Severe H1N1 infection in PICU – an update

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Since SARS in 2003, the public and health authority are more aware of the outbreaks of severe viral infections. The identification of swine mutant strain H1N1 in 2009 with pandemic outbreak generated global concerns that the disease will have high prevalence and mortality as majority of the population was immune naive to the new strain. The demand for children and adult intensive care facilities will become so high that it will collapse. Fortunately, situation is not as worse as expected. However, apart from those in the extreme age groups and in patients with co-existing morbidity, significant number of relatively healthy patients with H1N1 infection did develop severe pneumonia requiring intensive care. In 2009, there were around 13 patients admitted to PICU, most of had pre-existing morbidity including severe mental handicapped with cerebral palsy, chronic lung disease etc. Mortality was low with only 1 documented death. The situation is similar in 2011, we have 19 cases serious cases reported and the 2 death were again had with severe pre-existing disease. New strategies are now available to improve the chance of recovery. These include the use of anti-viral medications, use of N-acetylcysteine to decrease cytokine release, hyperimmune globulin and extracorporeal membrane oxygenation (ECMO). ECMO support for severe respiratory failure was not established in 2009 and was only used ac hoc by a few centres. By 2011, it now a recommended practice in adult with no severe pre-existing morbidity. Of the more than 20 adults on ECMO, survival is more than 90%. Paediatric ECMO service is also started but demand is not high. In conclusion, incidence of severe H1N1 patients requiring PICU admission is not high. Most recovered and the mortality mainly involved those with severe co-existing morbidity.

CRITICAL CARE SYMPOSIUM II

B-type natriuretic peptide: an emerging biomarker in paediatric critical care

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In 1988 Sudoh and colleagues described a novel natriuretic peptide in porcine brain. Subsequent studies found that brain natriuretic peptide was most abundant in the heart, and thus it was termed B-type natriuretic peptide (BNP). The release of BNP is triggered in large part by myocyte stretch and BNP levels are easily quantified by several commercially available assays. Thus, over the past decade numerous investigations sought to determine the clinical utility of BNP and together have now firmly established a role for BNP as a biomarker

for diagnosis, prognostication, and management of adults with cardiac diseases. However, far fewer data are available on the role of BNP in the management of critically ill neonates, infants and children. Our recent studies suggest that BNP can predict outcome in paediatric patients for cardiac surgery, in premature neonates with patent ductus arteriosus, in paediatric septic patients and in paediatric patients with acute lung injury. Thus, the purpose of this talk is to provide a brief review of these data with the goal of introducing the role of BNP in the intensive care of paediatric patients. For now the available data clearly demonstrate that BNP has emerged as a novel biomarker with great potential for the care of critically ill paediatric patients.

Thoracic ultrasound for pulmonologist

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Imaging is a important for clinical diagnosis, it is especially important for pulmonologist because pulmonologists need information about the morphological characteristic of the organs within the thoracic cavity. Radiological methods used to be the standard modality for pulmonologic imaging. Among the many radiologic methods, plain chest X-ray is the most popular means in clinical practice for diseases within the chest. However, the radiational exposure impose many patients and health care professionals to additional risk. Sonography, being a non-invasive method with high portability and operational easiness, may serve as a useful tool for imaging purpose. During the past 10 more years, we have been using sonography for imaging of the lesions within the thoracic cavity. Through the thoracic sonography with increasing intensity and familiarity, we have found thoracic sonography is indeed a useful imaging tool providing diagnostic aid for the evaluation of patients and also is useful to derive the therapeutic planning for these patients As pulmonologists caring paediatric patients, we have been evaluating the following situations using sonography to aid diagnosis and treatment for these patients with diseases in the thoracic cavity.

1) Cardiovascular diseases: For definite diagnoses, paediatric cardiologists will be doing echocardiography. However, paediatric pulmonologists should be able to perform heart sonography for evaluation of cardiac function and pericardial effusion; for more advanced paediatric thoracic sonography practitioner, probably the status of neck vessels should also be includes in the list of evaluation.
2) Pleural effusion: Paediatric thoracic sonographic examination should start with evaluation of fluid accumulation in the pleural space. The site (left versus right), distribution (loculated versus general), amount (small versus large) and nature (clear versus debris-containing) of the fluid should be thoroughly evaluated. The nature of the pleural membrane also is the target of evaluation.
3) Pathological versus artifacts on paediatric sonographic imaging: Normally, when the sonographic beam emitting from the transducer penetrating the skin, subcutaneous tissue muscular-fascia layer (the pleural membrane) and the lung will be then reflected back. The pleural then will again reflect back the beam to and fro causing a small vertical cluster of lines, known as A-line. If the A-line appears thick and numerous, changes of characteristics of lung tissue should be suspected. Pulmonary edema usually accounts for the leading cause for such change. B-line is another transverse artifact normally present in the chest sonographic image. It is due to ribone-related artifact when the relative large transducer emits ultrasound across the intercostal space and the ribs. B-line should not be confused with abnormal lesions in pulmonary parenchyma.
4) Bronchus and small airway the lung tissue: Normally, only a few scattered bronchus and small airway will appear in the lung of parenchyma due to the poor echogenicity of airfilled lung parenchyma. However, when the bronchus and small airway is associated with lesions with mucosal edema (such as bronchiolitis), a prominent contrast will appeared for the fluid-rich mosa with adjacent lagers of airway and lung parenchyma, resulting in so-called sonographic air-brochogram.
5) Other lesions within the lung parenchyma and anterior mediastium: Thoracic sonography will also depict the solid lesions within the anterior mediastium and lung parenchyma, the mass may be large as big tumor or small as pneumonic patches. Mass with solid or cystic nature will show good contrast for sonographic imaging.

In summary, for paediatric pulmonologist, thoracic ultrasound provides a useful non-radiation, highly portable tool for the evaluation of a wide range of pathological entities within the thoracic cavity.

SLEEP SYMPOSIUM

Obstructive sleep apnoea syndrome in Hong Kong children

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This presentation will provide an overview of childhood obstructive sleep apnoea syndrome (OSAS) in Hong Kong. Epidemiology data show that about 5% of children in Hong Kong suffer from OSAS. The prevalence appears to be higher than most international data reported. The current paediatric sleep service in Hong Kong obviously fall short to meet the high demand. Majority of children with OSAS are being diagnosed with OSAS in the mild range. Controversies exist regarding the cut-off for diagnosis and the threshold for treatment. Understanding of the natural history of OSAS and its morbidities will provide us with information as to how best to manage children with OSAS. Local data suggest that most children with OSAS will persist or progress. There is also preliminary data suggesting that cardiovascular changes associated with mild OSAS will perpetuate if OSAS is left untreated. Adenotonsillectomy (AT) remains the mainstay of treatment. Our experience showed that most children with OSAS treated with AT resulted in significant improvement in apnoea-hypopnea index (AHI) and reduction blood pressure load. However, only less than half achieved cure. Follow-up with polysomnography is important.

PULMONOLOGY SYMPOSIUM I

The clinical study of interstitial lung disease in children of China

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Objective: Interstitial lung disease in children represent a heterogeneous group of disorders of both known and unknown causes. This study aimed to better understand the causes of the disease in children and to provide information on the current approach to diagnosis and management of the disease.
Method: Through the Paediatric Diffuse Parenchymal Lung Disease/Paediatric Interstitial Lung Disease Cooperative Group of China, 93 cases of interstitial lung disease of children from 11 hospitals were collected with the same questionnaire in 2009. Respiratory tract secretions were obtained for bacterial culture. Respiratory virus antigen examination, mycoplasma antibody, EB virus, cytomegalovirus and herpes simplex viruses antibody detection were performed. Hemosiderin cell was tested in the sputum, gastric juice and BALF. The CT or HRCT of the lung and blood – gas analysis. Fourteen cases underwent lung biopsy and 25 cases underwent bronchomicrocopy. Data were then pooled and discussed through a series of meetings.
Result: 53 cases were male, 40 were female and their age ranged from 8 months to 14 years. Ninety-nine cases were diagnosed as Bronchiolitis obliterans; 39 cases of idiopathic pulmonary hemosiderosis; 7 cases of idiopathic interstitial pneumonia with unknown causes, of whom 4 cases of non specific interstitial pneumonia, 1 case of acute interstitial pneumonia and 1 case of lymphocytic interstitial pneumonia, 1 case of idiopathic pulmonary fibrosis, 2 cases of secondary interstitial lung disease, one secondary to SLE, one to human immunodefieieney virus (HIV) infection, 2 cases of hypersensitivity pneumonitis, 2 cases of pulmonary alveolar proteinosis, 1 case of bronchiolitis obliterans organizing pneumonia, 1 case of lipoid pneumonia, 1 case of diffuse panbronchiolitis, 1 case of microlithiasisalveolarispulmonum. Forty-two cases had cough, 24 of them also had tachypnoea, 8 cases had clubbing. High resolution CT showed that 56 cases had ground, glass opacification, 30 cases had mosaic appearance, 1 case had diffuse micronodular opacities, 1 case had diffuse reticulonodular opacities and cysts.
Conclusion: Interstitial lung disease in children is a heterogeneous group of disorders. In this study eleven diagnoses are made, the top third diagnoses are BO, IPH and IIP respectively.

Childhood spontaneous pneumomediastinum in Taiwan

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Introduction: Spontaneous pneumomediastinum (SPM), while rare, is probably underestimated in children. Treatment targets on the underlying disease and trigger factors. The study aimed in analysis different etiology in different age groups.
Patients and Methods: Total 37 children with SPM were analyzed from two medical centers in middle Taiwan from 1994 to 2007.

Results: Incidence of SPM in children was 1:11,726 patients at Department of Paediatric Emergency in middle Taiwan. Bimodal peak in incidence occurred in those under 7 and in those aged 15-18 years old. The Characteristic symptoms were dyspnea (64.9%), followed by chest pain (62.2%) and neck pain (40.5%), common specific physical signs were subcutaneous emphysema (SCE) (67.6%) and Hammer's sign (13.5%). Trigger factors were infection (43.2%), asthma (21.0%), esophageal rupture (5.4%), foreign body aspiration (2.7%) and diabetic ketoacidosis (2.7%). Idiopathic SPM accounted for 35.1% of patients with mean age 14.1 years. In age distribution, preschoolers (<7 years old) got SPM mostly due to lower respiratory tract infection. In adolescents, the most common etiologies were asthma and pper respiratory tract infection. Mean hospitalization was 6.4 days. Although 17 (46.0%) patients needed intensive care, nearly all had complete resolution in chest radiography before discharge.

Conclusion: Clinician should keep alert to incidence of SPM from these symptoms. Etiologies varied with age and treatment must target on factors and underlying disease.

PULMONOLOGY SYMPOSIUM II

Etiology of childhood nonspecific chronic cough in China

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Objective: To evaluate the causes of nonspecific chronic cough in children of China, and investigate the predictors for risk of typical asthma onset from cough variant asthma (CVA).

Study Design: 451 children (255 boys and 196 girls; age range, 1 to 14 years; mean age 63.8±32.6 months) who had a chronic cough for more than 4 weeks presenting to Asthma Center of Children's Hospital in Chongqing Medical University between June 2008 and October 2010 were recruited into this study. All cases were followed up at the second week, the fourth week and the twelfth week after study enrolment respectively. Totally 105 children with CVA (56 boys and 49 girls; age range between 1 to 11 years old; mean age 4.59±2.17 years) had been studied for 18 months to ascertain whether classic asthma developed or not. Bronchial provocation tests with methacholine were performed to measure the provocative concentration of methacholine causing a 20% fall in FEV1 from prechallenge values (PC20).

Results: Of all the 451 patients, 172 (38.1%) patients received diagnosis of cough variant asthma (CVA), 136 (30.2%) patients were diagnosed cough variant asthma combined with upper airway cough syndrome (CVA+UACS), 77 (17.1%) patients were diagnosed postinfectious cough, 57 (12.6%) patients were diagnosed upper airway cough syndrome (UACS), 3 (0.7%) patients were diagnosed psychogenic cough, the diagnoses were uncertain in 6 (1.3%) of the patients. After 18 months of follow up assessment, 24 cases (22.9%) of the 105 patients with CVA developed wheezing (identify as wheezing-developed patients). Results of logistic analysis showed that allergic to pollen (adjusted OR 5.182, 95% CI 1.123-23.906, P=0.035) were the predictor for wheezing onset from cough variant asthma. No statistically significant differences were found in logPC20 between the wheezing-developed group and the wheezing-free group (P=0.769).

Conclusion: Cough variant asthma (CVA), upper airway cough syndrome (UACS), postinfectious cough were the three most common causes in children with nonspecific chronic cough. Sensitive to pollen may be the risk factors for the development of wheezing in patients with CVA.

Sleep issues in children with chronic disease

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As we know more about sleep problems in medicine, the impact of medical and psychiatric disorders in children that interferes sleep problems became an important problem that needs more study and exploration. And what is interesting is that clinical symptoms of many primary medical, developmental or psychiatric disorders are likely to be exacerbated by co-morbid sleep problems. Thus sleep problems should be carefully evaluated when we treat related diseases and improving sleep can improve clinical outcome as well. Some conditions has a higher risk of sleep problems, such as obesity, neuromuscular disease, craniofacial disorders, mucopolysaccharidoses, down syndrome, cerebral palsy, Prader-Willi syndrome, achondroplasia, Arnold-Chiari malformation and others. We will discuss some important examples and illustrate how sleep patterns and issues can affect the child.

FREE PAPER PRESENTATION

The effect of substance P on asthmatic rat airway smooth muscle cell proliferation, migration and cytoplasmic calcium concentration *in vitro*

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Airway remodeling and airway hyper-responsiveness are prominent features of asthma. Neurogenic inflammation participates in the development of asthma. Neurokinin substance P acts by binding to neurokinin-1 receptor (NK-1R). Airway smooth muscle cells (ASMC) are important effector cells in asthma. Increases in ASMC proliferation, migration, and cytoplasmic Ca^{2+} concentration are critical to airway remodeling and hyper-responsiveness. The effects of substance P on ASMC were investigated in Wistar rats challenged with a previously described asthmatic rat model. To exclude possible influences from other factors, the role of substance P was also investigated in primary cultured rat ASMC. Substance P and WIN62577-induced changes in cytoplasmic Ca^{2+} concentration were observed by fluorescence microscopy and expression of Ca^{2+} homeostasis-regulating genes was assessed with real-time PCR. We found that cytoplasmic Ca^{2+} concentration increased in normal rat ASMC treated with substance P, but decreased in asthmatic rat ASMC treated with WIN62577, an antagonist of NK-1R. Real-time PCR analysis revealed increased *Serca2* mRNA expression but decreased *Ip3r* mRNA expression after WIN62577 treatment in asthmatic rat ASMC. Flow cytometric analysis (FCM) revealed that most asthmatic rat ASMC stayed at G1 phase after combined treatment with WIN62577 and IL-13 in *vitro*. Transwell analysis suggested that ASMC migration was reduced after WIN62577 treatment. Therefore, we conclude that NK-1R is related to asthma mechanisms and a NK-1R antagonist downregulates calcium concentration in asthmatic ASMC by increasing *Serca2* mRNA and decreasing *Ip3r* mRNA expression. The NK-1R antagonist WIN62577 inhibited ASMC IL-13-induced proliferation and ASMC migration in *vitro* and therefore may be a new therapeutic option in asthma.

Prevalence of otitis media with effusion in children with allergic rhinitis, a cross sectional study

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Otitis media with effusion (OME) may be caused by various factors including eustachian tube dysfunction, inflammatory response as well as atopy. Allergic Rhinitis (AR), a common chronic disorder in children, is associated with swelling of the mucosa and can therefore result in eustachian tube dysfunction. This study aims to compare the prevalence of OME in subjects with and without AR.

Method: Children aged 4-12 were recruited from the clinics at Kwong Wah Hospital, Hong Kong. Subjects recruited were interviewed and a questionnaire filled in regarding nasal obstruction, rhinorrhoea, sneezing, itching of the nose and/or post nasal discharge (ARIR document). The children were then examined by a doctor using a pneumatic otoscopy and a portable tympanometer. Children found to have OME were offered a follow-up visit 3 months later.

Results: 12 out of 159 (7.5%) of the AR group were found to have OME compared with 3 out of 185 (1.6%) in the non-AR group, p 0.016. During the 2nd visit at 3 months, 85.7% of the AR subjects showed resolution of their OME.

Conclusion: Our data showed a significant difference in the prevalence of OME between AR and non-AR subjects. The point prevalence of OME in the community was found to be 1.6%. OME is more likely to occur in children with allergic rhinitis and it may be wiser to manage OME in these individuals differently.

Combined mechanical in-exsufflator and non-invasive ventilation in the treatment of paediatric acute neuromuscular respiratory failure

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Background: The aim of this study was to evaluate efficacy and complications of combined noninvasive ventilation (NIV) and assisted coughing by mechanical in-exsufflator (MIE) for acute respiratory failure (ARF) in children with neuromuscular diseases (NMD).

Methods: This study reviewed consecutive patients with NMD admitted to our paediatric intensive care unit with ARF who received combined use of NIV and MI as the initial treatment during the period of 2007-2010. Treatment success was defined as freedom from tracheal intubation during the event of ARF. Complications of NIV or MIE were recorded. Physiologic indices were also analyzed.
Results: Combined NIV/MIE was used in 14 NMD children (mean age: 7.8 years) with 15 consecutive events of ARF. Treatment success was achieved in 11 events (73%), including 5 patients specifying "Do Not Intubate" request. There was no mortality in this cohort. All patients tolerated NIV and MIE well, with minor complications including skin lesion (n=10) and chest discomfort (n=4). All ARF events were caused by pneumonia, including 14 hypercapnic ARF and one hypoxemic ARF, with a mean PaCO2 of 71.9 mmHg ±19.0 mmHg. In the success group, hypercarbia and acidosis both improved after use of NIV/MIE within 24 h (PaCO2: 69.9±18.4 versus 54.9±11.8 mmHg, $P<0.01$; pH: 7.29±0.06 versus 7.39±0.05, $P<0.01$).
Conclusions: Combined NIV/MIE is a safe and effective approach to rapidly improve physiological indices and decrease the need for intubation in children with NMD and ARF. In particular, this approach may be promising strategy to prolong the survival of the subgroup refusing invasive ventilation.

Ambulatory blood pressure monitoring in Chinese children with snoring

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Objective: Obstructive sleep apnea/hypopnea syndrome (OSAHS) is a common sleep problem. Adult studies have showed that OSAHS is associated with hypertension. Few paediatric studies have been performed on the role of OSAHS in childhood hypertension. The aim of this study is to investigate the association between OSAHS and blood pressure in snoring children.

Methods: Snoring children were recruited from January 2009 to December 2010. Physical examination, including manual blood pressure measurement while awake and asleep, and polysomnography were performed. A child with an apnoea hypopnea index (AHI) greater than 5 hr^{-1} or obstructive apnea index (OAI) greater than 1 hr^{-1} was diagnosed as having OSAHS. Ambulatory blood pressure monitoring (ABPM) was performed for each child. Body mass index (BMI) Z-score, mean ambulatory blood pressure and systolic blood pressure (SBP) load were calculated for each child. Children with a SBP load greater than 25%, associated with both mean ambulatory SBP and clinic SBP greater than the 95th percentile met the criteria for hypertension.
Results: 145 children with snoring were recruited and 107 of them were diagnosed with OSAHS. There were no differences between those with or without OSA in age or gender distribution. However, the non-OSAHS group is higher than the OSAHS children ($P=0.021$). Nine children (8.4%) in the OSAHS group had hypertension, while 1 (2.6%) in the non-OSAHS group had hypertension. The difference of the prevalence of hypertension between the two groups didn't reach significance ($P=0.455$, OR=3.40, 95% CI: 0.42-27.8). However, the OSAHS children had higher mean nighttime systolic and diastolic blood pressure (DBP) as well as blood pressure load than non-OSAHS children (SBP: $P=0.028$, DBP: $P<0.001$ and BP load: $P=0.001$). The mean nighttime heart rate was also significantly increased in the OSAHS group compared to the non-OSAHS group ($P=0.002$). In multivariable regression analysis, when age, gender, BMI Z-score, AHI, OAI, oxygen desaturation index (ODI), minimum oxygen saturation and family history of hypertension were included, the results showed that mean nighttime systolic BP was related to age, BMI Z-score and ODI ($P=0.042$, 0.032, and 0.022 respectively), while mean nighttime diastolic BP was related to BMI Z-score and ODI ($P=0.033$ and 0.035 respectively).
Conclusions: OSAHS children had increased mean nighttime blood pressure and heart rate compared to non-OSAHS children. Frequency of oxygen desaturation and BMI Z-score were related to nighttime blood pressure but minimum oxygen saturation was not.

Human rhinovirus is associated with asthma exacerbation and wheezing respiratory infections in Hong Kong children

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Background: Human rhinovirus (HRV) is the commonest viral cause of respiratory tract infections (RTIs). Our group recently reported that HRV was the major respiratory virus for childhood asthma exacerbations in Hong Kong (Leung TF *et al*. Chest 2010; 137: 348-354). HRV is classified into A, B and C genogroups, and HRV-C genogroup was found to be associated with asthma exacerbation in Caucasians. Relevant data is limited in Asians. This study aimed to elucidate the roles of HRV in local children with asthma exacerbation.

Methods: This cross-sectional, case-control study recruited 128 children hospitalized for asthma exacerbations, and controls consisted of 192 age- and sex-matched children without asthma history who were admitted for respiratory illnesses within the same weeks as our cases. All subjects stayed in the two hospitals with paediatric inpatient service in the New Territories East of Hong Kong. Their clinical data was obtained from computerized hospital record, and nasopharyngeal aspirates (NPAs) were retrieved for HRV detection. Reverse-transcription PCRs were performed with primers that targeted the consensus VP4/VP2 coding regions of HRVs. Positive isolates were then sequenced to determine HRV genogroups.

Results: The mean (SD) age of cases and controls was 5.6 (3.6) years and 5.4 (3.8) years respectively (P=0.601). Three subjects did not have sufficient NPA for analysis. HRV was detected in 107 (84.9%) cases and 63 (33.0%) controls (P<0.0001). Specifically, HRV-C was identified more commonly in cases (69.8%) than controls (18.8%) (P<0.0001). The detection of HRV-A and HRV-B did not differ between these two groups (P>0.15). More subjects with HRV infection needed oxygen supplementation (12.8% versus 2.5%; P=0.004). The length of hospitalization, need for intensive care and mortality did not differ among patients with and without all HRVs (P>0.1 for all). Among the controls, acute bronchiolitis was associated with HRV (P<0.0001), HRV-A (P=0.021) and HRV-C (P=0.003); upper RTI with HRV (P=0.048) and HRV-C (P=0.014); and acute bronchitis with HRV (P=0.038).

Conclusions: HRV and its genogroup C are associated with asthma exacerbation, wheezing lower RTIs and upper RTI in Hong Kong children. HRV-A is also associated with acute bronchiolitis in our controls. These results highlight HRVs to be the major respiratory virus causing childhood wheezing illnesses.

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