

MONDAY, SEPTEMBER 4TH 2006

A 16 days old girl was referred to our pulmonology clinics for congenital stridor. Within the first days of life she had developed an inspiratory stridor and the initial doctor's diagnosis was laryngomalacia. There were no attacks of overt cyanosis, no swallowing difficulties and no hoarseness. Sub- and intercostal retractions particularly on the left thoracic side were noted. The oxygen saturation at rest was > 95% and dropped to 80% during sleep. Blood gas analysis revealed nocturnal hypercapnia. The x-ray of the thorax showed an elevated position of the right diaphragm. Fluoroscopy revealed a normal movement of the left diaphragm and on the right side an elevation of the anterior portion of the diaphragm during inspiration. A right sided eventration of the diaphragm was diagnosed. Increasingly, the patient developed respiratory insufficiency. Thus, a surgical plication of the diaphragm was performed. Respiration improved immediately and the stridor ceased as well. Six months later, the patient was still stable without stridor.

Eventration of the diaphragm, although a relatively rare clinical entity, has to be considered in all patients with respiratory distress during the neonatal period. Our case report indicates that eventration of the diaphragm can be a cause of congenital stridor. The inefficient thoracic pump in the absence of a stable right diaphragm may have caused a rapid inspiratory breathing pattern (to overcome the upward movement of the abdominal content into the thoracic cage causing pendelluft), in turn leading to laryngeal collapse.

P2857**Diameter of paediatric sized flexible bronchoscopes: when size matters**

Barry M. Linnane¹, Gaudenz M. Hafen¹, Sarath C. Ranganathan^{1,2}. ¹Department of Respiratory Medicine, Royal Children's Hospital, Melbourne, Victoria, Australia; ²Department of Paediatrics, University of Melbourne, Melbourne, Victoria, Australia

Background: A flexible bronchoscope typically gets its designated size from the diameter of the distal tip but this is not always the maximum diameter of the insertion tube.

Aim: The aim of this study was to determine the size and site of the maximum diameter of flexible bronchoscope insertion tubes and to compare standard bronchofiberscopes with newer bronchovideoscopes.

Methods: We assessed 10 bronchoscopes ranging from 2.2mm to 4.9mm external diameter (Olympus®, Tokyo, Japan). Each scope in turn was laid horizontally on an examination bench and measured in random order using an electronic digital calliper. The investigators were blinded to the type and model of each scope. The median, minimum and maximum diameters of the bronchoscopes were calculated. Intra- and inter-observer repeatability and limits of agreement were assessed using the Bland-Altman technique. For each scope, we compared the measured diameters to the stated diameters of the distal tip and insertion tube.

Results: The mean (95% limits of agreement) intra-observer and inter-observer agreement was 0.015 (-0.02, 0.05) mm and -0.021 (-0.12, 0.08) mm respectively. The maximum and median measured diameters were wider than the stated diameter of the distal tip in all the scopes. The maximum discrepancy between the measured and stated diameters ranged from 0.19mm (6.7%) to 0.66mm (22.2%) with a mean of 0.41mm (14.0%). There was no difference between bronchofiberscopes and bronchovideoscopes.

Conclusion: The maximum diameter of the insertion tube of paediatric sized flexible bronchoscopes is significantly greater than the manufacturers specifications. This may impact on the choice of bronchoscope selected for procedures in children.

P2858**Paediatric bronchoscopy: 4-year review**

Ana Rego, Ana Oliveira, Miguel Guimaraes, Sofia Neves, Jose Almeida, Joao Moura e Sa. *Bronchology Unit, Centro Hospitalar de Vila Nova de Gaia, Vila Nova de Gaia, Portugal*

Paediatric bronchoscopy needs close cooperation between the paediatrician, anaesthetist and bronchologist. Hospitals working in this particular area must have the necessary equipment together with experienced medical personnel.

The aim of the study is a revision from paediatric patients that underwent bronchoscopic exams in the Bronchology Unit of CHGaia between Set 01/Aug 05.

The authors made a review of the clinical records of all paediatric patients. Analyzed parameters: demographic data, past pathological history, indication for the exam, endoscopic presentation, bacteriological findings and complications.

In that period 416 exams were performed in a total of 354 patients, 198 males, 154 females. Rigid bronchoscopy was performed in all patients, 132 also underwent flexible bronchoscopy through the rigid bronchoscope. Mean age was 2,6 years, median age 1 year (min 1d, max 14y); 77 patients had past pathological history, the most frequent being asthma and esophageal atresia with tracheoesophageal fistula; the main indications for the exams were stridor(30%), suspicion of foreign body aspiration(9%) and atelectasis(8%); 59 exams were normal, the most common endoscopic presentations were purulent secretions in 116(28%), laryngomalacia in 103(25%) and foreign bodies in 24(6%); 93 bronchial lavages revealed positive microbiological cultures (45 H. influenzae, 16 M. catarrhalis, 6 M. tuberculosis); complications were rare: 1 case of pneumothorax and mediastinic emphysema and occasional cases of desaturation, cough and laryngeal oedema.

Rigid bronchoscopy proved to be an important procedure in paediatric population. It can be safely performed in experienced centers.

254. Role of fiberoptic bronchoscopy (FOB) in chronic or recurrent pulmonary disorders in children

P2856**Unilateral eventration of the diaphragm as a cause of congenital stridor**

Andrea Schweiger-Kabesch, Karl Reiter, Martina Heinrich, Birgit Kammer, Thomas Nicolai. *University Children's Clinic, LMU, Munich, Germany*

Newborns with congenital stridor are often seen in paediatric pulmonology. In some cases serious conditions may be the reason of this normally benign symptom.

P2859**Flexible bronchoscopic management of airway foreign bodies in infants and children**

Salomón S. Flores-Hernández, Carlos Núñez P.-R.. *Broncoscopia, Instituto Nacional de Enfermedades Respiratorias, México, Mexico*

Objective: Report our experience in the removal of tracheobronchial foreign bodies in infants and children by flexible bronchoscopy.

Patients and methods: All infants and children referred to the Department of Bronchoscopy from March 2004 to December 2005.

Results: Twenty patients from 11 months to 12 years, average 3 years and 8 months; 13 male, 7 female. (Table 1) Location: 11 in the trachea, 3 in the right mainstem bronchus, 2 in the left mainstem bronchus, 2 in the intermediary bronchus and 2 in the left lower lobe bronchus. (Table 2) Most foreign bodies were seeds. (65%) The foreign body was removed at the first attempt in 16 cases with a flexible bronchoscope. (Figure 1) Rigid bronchoscopy was successfully used in the other 4 after failure with the flexible instrument because the foreign bodies were heavily impacted; they had been aspirated from 3 to 12 months before. These were no major complications.

Table 1. Clinical findings of patients

Findings	Data
Gender M/F	13/7
Age	11m - 12y
Evolution	1d - 1 y

Table 2. Anatomic location

Location	Data
Trachea	11
Right mainstem bronchus	3
Lef mainstem bronchus	2
Intermediary bronchus	2
Left lower lobe bronchus	2



Conclusion: This study provides support for the removal of tracheobronchial foreign bodies in infants and children by flexible bronchoscopy.

P2860**The role of flexible fiberoptic bronchoscopy in children with recurrent and persistent pneumonia and the results of the patients in the follow-up**

Erkan Cakir, Zeynep S. Uyan, Okan Yapar, Refika Ersu, Bulent Karadag, Fazilet Karakoc, Elif Dagli. *Pediatric Pulmonology, Marmara University, Istanbul, Turkey*

Introduction: Recurrent and persistent pneumonia are important respiratory problems in children and result and etiologic evaluation and early diagnosis are important in the prevention of future sequela.

Aim: To detect the role of flexible fiberoptic bronchoscopy (FFB) in patients with recurrent and persistent pneumonia and to investigate long term outcome.

Method: Patients with persistent pneumonia that lasted at least 6 weeks or recurrent pneumonia with two or more episodes per year or three or more episodes in a life time were included to the study retrospectively in whom FFB was performed.

Results: Between 1997 and 2005 FFB was performed in 654 patients and 107 patients met to inclusion criteria were enrolled in this study. Thirty-eight % of the children were female and mean age was 78±52 months. Most common symptoms were cough, wheezing and sputum production, and the mean duration of symptoms was 23±31.3 months. FFB was performed after 4.9±8.5 weeks at presentation. Pathological findings were present in 73% of the bronchoscopies. Patients were followed up for 19±28 months. Clinical and bronchoscopic findings revealed that 11% of the patients had foreign body aspiration, 7% had gastroesophageal reflux, 27% had bronchiectasis, 13% had asthma, 4% had immunodeficiency, 5% had pulmonary hemosiderosis, 14% had tuberculosis, 2% had vascular ring, 2% had primary ciliary dyskinesia. FFB was helpful for definitive in diagnosis in 21% of the patients, and confirmative in 34%.

Conclusion: FFB is important in the differential diagnosis and treatment for recurrent and persistent pneumonia.

P2861**Should flexible bronchoscopy routinely performed for children with persistent wheezing unresponsive to antiinflammatory therapy?**

Erkan Cakir, Zeynep S. Uyan, Okan Yapar, Bulent Karadag, Refika Ersu, Fazilet Karakoc, Elif Dagli. *Pediatric Pulmonology, Marmara University, Istanbul, Turkey*

Introduction: Persistent wheezing is one of the most common problems in the first three years of life and differential diagnosis can be difficult.

Aim: To detect the role of fiberoptic flexible bronchoscopy (FFB) in the differential diagnosis of the patients with persistent wheezing and to investigate long term clinical results of them. Method: Patients with chronic wheezing that lasted at least 6 weeks and didn't respond to antiinflammatory therapy were included to the study retrospectively.

Results: Between 1997 and 2005 FFB was performed in 654 patients. Eighty-six patients who had persistent wheezing were enrolled to the study. Thirty percent of the children were female. Mean age was 36.7±41.8 months at presentation and mean duration of symptoms was 14.5±23.1 months. FFB was performed after 6.01±11.5 weeks of presentation. Pathological findings were present in 73% of the bronchoscopies. Patients were followed for 16.4 ± 22.3 months. Clinical and bronchoscopic findings revealed that 36% of the patients had asthma, 22% had gastroesophageal reflux, 16% had foreign body aspiration, 30% had laryngotracheomalacia, 9% had bronchiectasis, and 2% had vascular ring. FFB was helpful for definitive in diagnosis in 46% of the patients, and confirmative in 17%.

Conclusion: FFB has an important role in the diagnosis of underlying cause of children.

P2862**Pulmonary lymphangiectasia in infancy**

Theodor Zimmermann¹, Achim Freihorst², Michael A. Kandler¹, Henrik Köhler¹, Thomas Aigner³, Frank Brasch⁴, Nicole Spychalski¹. ¹*Kinder- und Jugendklinik, Universität Erlangen-Nürnberg, Erlangen, Germany;* ²*Klinik für Kinder- und Jugendmedizin, Ostalb-Kliniken, Aalen, Germany;* ³*Institut für Pathologie, Universität Erlangen-Nürnberg, Erlangen, Germany;* ⁴*Institut für Pathologie, Ruhr-Universität, Bochum, Germany*

A male infant with a funnel chest was born by vacuum extraction at 38 weeks of gestation, weighing 3500g and 52 cm bodylength. The Apgar scores were 10/10 at 5 and 10 minutes, respectively. Cord blood pH 7.14. Screening for newborns normal. Within the first 6 weeks respiratory distress with retractions developed while the infant was breathing room air. An initial chest radiograph showed dystelectasis and suspected interstitial pneumonia and oxygen was given continuously. On a subsequent CT-scan infiltrates in the upper- and lower lobes of both lungs were seen in the posterior area. Surfactant analysis was normal, a congenital heart disease was ruled out and cultures of blood and tracheal aspirates were unrevealing. An open lung-biopsy was performed at the age of 3.5 months. On gross examination, tissue of the lungs was emphysematous. On microscopical examination, there was an enlargement of the septae interlobares with ectasia of the lymphatic vessels. Myxoid material was located in the vessels. Drainage of the lymph from the lungs towards caudal was delayed as demonstrated by scintigraphy. These findings are consistent with a diagnosis of congenital pulmonary lymphangiectasia (PL). We started a sequential massive-dose treatment with prednisolone and hydroxychloroquin sulfate. Oral feeding was sustained with a g-tube. The body weight and length at the age of 9 months was 7890 g and 74 cm, respiration rate 40-60/min., pCO₂ 50 mmHg, oxygen-saturation 95% when 1 - 1.5 l oxygen was given continuously. As demonstrated with this case, recent case reports and case studies indicate that survival is possible in PL.

PL does not have as dismal a prognosis as previously described and symptoms and clinical findings may improve after the neonatal period.

P2863**Systemic aorto-pulmonary left to left fistula - rare cause of vascular compression of the airways**

Predrag B. Minic¹, Jovan Lj. Kosutic², Aleksandar D. Sovtic¹. ¹*Department of Pulmonology, Mother and Child Health Institute, N. Beograd, Serbia, Serbia;* ²*Department of Cardiology, Mother and Child Health Institute, N. Beograd, Serbia, Serbia*

We present the 3 months old male infant referred for further evaluation of persistent wheezing. On flexible bronchoscopy pulsating structure compressing lower trachea and both main stem bronchi from behind was found. Angiography revealed huge systemic anomalous aorto-pulmonary left-left fistula connecting descending thoracic aorta with anomalous right upper lobe pulmonary vein. The anomalous arterial collateral vessel produced compression of trachea and main stem bronchi giving the signs and symptoms of vascular ring. The coil embolization of anomalous vessel close to its origin was performed. This led to partial desobstruction of the airways and significant clinical improvement. As opposed to acquired, congenital arteriovenous fistulas are very rare. Here we report a case of congenital aorto-pulmonary left-left fistula as a rare cause of the compression of large airways.

MONDAY, SEPTEMBER 4TH 2006

To our knowledge, there is no similar case in which the vascular compression of the trachea in an infant has been successfully treated by coil embolization.

Itraconazole was added to treatment.

Systemic corticosteroids were considered but there was no patient's agreement for this treatment. Inhaled corticosteroids were given in high doses. The patient improved rapidly and atelectasis in chest radiogram resolved.

P2866**Neurogenic tumours with respiratory symptoms in children**

Andrea Banfi¹, Erzsebet Peterffy¹, Gyorgy Balazs², Tihamer Toth³, Gyorgy Baktai¹. ¹Bronchological, Paediatric Institute "Svábhegy", Budapest, Hungary; ²Radiology, Heim Pal Children Hospital, Budapest, Hungary; ³3rd Surgical, Medical Faculty of Semmelweis University, Budapest, Hungary

Neurogenic tumours represent 20% of chest tumours in adulthood. In addition, in children 9% of malignant tumour cases are neuroblastoma. The chest neurogenic tumours arise mostly in the posterior mediastinum, rarely in the airways. We show neurogenic tumour cases, which were diagnosed in our paediatric bronchological practice. 7 neurogenic tumours were established in 20 years (1985-2005) among children who were suffering from chronic pulmonary disease. 2 children were asymptomatic, thus the tumours were detected through the routine chest x-rays. In 5 cases tumours caused therapy resistant chest symptoms - cough, bronchitis, stridor in 3, 1, and 1 case respectively. Other varied concomitant signs (gastrointestinal, vascular, neurological, pericardial, etc.) did not occur in our cases. Tumours localised in the posterior mediastinum in 6 cases and in the larynx in 1 patient. The differential diagnostic procedure included bronchological examinations in all cases. Imaging techniques (CT, MRI, ultrasound-scans and bone scinti-scans) and determination of serum tumour markers as well as urine catecholamins were applied, as required. The definitive solution was surgery in all cases. The exact diagnosis was proved by histology. There were neuroblastoma, neurofibroma, schwannoma, and ganglioneurinoma in 3, 2, 1 and 1 case respectively.

We survey through two cases (schwannoma and ganglioneurinoma), the differential diagnostic problems, and the role of bronchological examinations from the viewpoint of the diagnosis, the surgical solution, and the follow-up of the patients.

P2868**Extraction of small peripheral foreign bodies in young infants**

György Baktai, Erzsebet Péterffy, Andrea Bánfi. *Bronchological Dept, Paediatric Institute "Svábhegy", Budapest, Hungary*

Introduction: Aspiration is an evergreen challenge for bronchoscopists. We removed 98 inhaled foreign bodies between 1995 and 2005. It is especially difficult to extract small pieces from the segment or subsegment (sub-subsegment) bronchi.

Patients: We present two patients: (a) A 15-month-old infant with a piece of chicken bone in the right basal sub-subsegment bronchus (segment 10), and (b) A 14-month-old boy, who aspirated a piece of nut into the right basal sub-subsegment bronchus (segment 8).

Equipment: We had unsuccessful attempts to remove the small foreign bodies with: (1) the straight forceps and the smallest metal suction tube (OD: 2 mm) attached to the 5 mm OD rigid bronchoscope (Karl Storz, Germany, Serial No.: 10338EE) because of the inappropriate top-down approach, and (2) the 3,5 mm OD (suction channel: 1,2 mm) fiberoptic bronchoscope, (Karl Storz, Germany, Serial No.: 11002BC) since the limited motion facilities of the device at the subsegmental level.

To overcome the difficulties, we worked out a novel method: we led together into the rigid tube: the thin telescope (Karl Storz, Germany, Serial No.: 1032A, OD: 2,5 mm, O^o) and the flexible forceps (Karl Storz, Germany, Serial No.: 11003MA or 11003MB) which originally suited into the 1,2 mm working channel of the fiberoptic bronchoscope. This set-up requires two skilled bronchoscopists, one of them to drive the rigid bronchoscope and the thin telescope, and the another to handle the forceps, both following the procedure on the same monitor.

Summary: Nowadays, we are able to remove small peripheral foreign bodies with less bronchoscopies and shorter hospitalisation. We follow the development of this novel technique step by step through a detailed video demonstration.

P2869**Fungal plug caused segmental atelectasis in a patient with cystic fibrosis**

Wojciech Skorupa¹, Piotr Radwan-Rohrenscheff¹, Iwona Bestry², Jan Kus¹.

¹Department of Lung Diseases, National Tuberculosis and Lung Diseases Research Institute, Warsaw, Poland; ²Department of Radiology, National Tuberculosis and Lung Diseases Research Institute, Warsaw, Poland

A 20-year-old woman with cystic fibrosis diagnosed at age 18, chronically infected with *S.aureus*, presented with pain at the right hemithorax, fever, purulent sputum production. Physical examination revealed rales on the right hemithorax. Laboratory examination showed a WBC count of $16,4 \times 10^9/L$ (80,8% neutrophils, 1,3% eosinophils) and CRP 92 mg/L. Blood gases were normal. On the chest radiogram middle lobe atelectasis was observed. Computed tomography showed segmental atelectasis in middle lobe, bronchiectasis and bronchial wall thickening. The patient was given clindamycin and ciprofloxacin.

Fiberoptic bronchoscopy revealed pus in bronchial tree and purulent plug occluding narrowed, edematous orifice of bronchus to the lateral segment of the middle lobe. Microscopic examination of removed plug showed fungal hyphae and *Aspergillus fumigatus* was cultured. Precipitating serum antibodies to *A. fumigatus* were negative. Total IgE was 264IU/ml and transient blood eosinophilia was observed. There were no eosinophils in sputum.