153. Flexible bronchoscopy in the diagnosis of paediatric lung diseases

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Airway-related complications in preterm infants who were intubated at birth

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Background: Airway (AW) complications associated with intubation (IT) and mechanical ventilation (MV) have been observed in preterm infants (PTI).
Methods: Fiberbronchoscopy (FB) was performed in symptomatic PTI who were intubated at birth. We describe their clinical manifestations (CM) and FB findings. Chi^2 test was used to assess the association between left vocal cord paralysis (LVCP) and patent ductus arteriosus ligation (PDAL). Two logistic regressions

were built using "condition likely to be associated with IT and MV (CAIT&MV*)" and "need for tracheostomy" as dependent variables. Gender, gestational age (GA), birth weight (BW), length of IT and PDAL were independent ones.
Results: 42 symptomatic PTI underwent a FB: 55% males; age 10±14 mo; GA 27±3 wk; BW 1070±467 gr; IT duration 31±28 d. The most common CM were stridor (76%), dysphonia (38%), failed extubation (12%) and suspicion of upper AW obstruction in lung function tests (12%). AW abnormalities were identified in all PTI: AW malacia (59%), laryngotracheal cyst or granuloma* (45%), LVCP (33%), subglottic stenosis* (30%), supraglottic oedema/hypertrophia* (21%) and tracheal stenosis* (7%). 27 PTI underwent PDAL, 9 tracheostomy and 6 AW surgery. All PTI with LVCP had undergone PDAL ($p<0.0001$).

Logistic regression

	CAIT & MV*			Tracheostomy		
	OR	CI 95%	p	OR	CI 95%	p
Male gender	0.48	0.08–2.96	0.43	0.69	0.08–5.62	0.73
GA	1	0.54–1.83	0.99	0.9	0.47–1.70	0.74
BW	1	0.99–1.01	0.16	0.99	0.99–1.01	0.74
IT duration	1.09	1.01–1.18	0.026	1.06	1.01–1.12	0.015
PDAL	0.22	0.02–2.05	0.18	0.37	0.02–5.52	0.47

Conclusions: All symptomatic PTI had abnormal FB findings. LVCP is strongly associated with PDAL. Each day of invasive MV increases by 9% the risk of acquired AW anomalies and by 6% the need for tracheostomy.

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The role of flexible bronchoscopy in evaluation of recurrent and persistant pneumonia in children

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Background: Recurrent pneumonia is defined as at least 2 pneumonia episodes in a 1-year period or at least 3 during a lifetime. Persistant pneumonia is defined as persistence of symptoms and radiographic abnormalities for more than one month. The aim of this study was to determine the role of flexible bronchoscopy (FB) in evaluation of recurrent/persistant pneumonia in children.
Material-methods: Retrospective review of patients who underwent FB with an indication of recurrent/persistant pneumonia from January 1997 through March 2010 at the Division of Pediatric Pulmonology, Marmara University, Istanbul. Demographic data, underlying illness and the role of FB in diagnosing the underlying illness were evaluated.
Results: There were 161 patients (58% male) and median age at presentation was 6.6 years (25-75.persentile, 2.3-9.5 years). 67% of the patients were diagnosed as persistent, 33% patients were diagnosed as recurrent pneumonia. An underlying etiology could be identified in 52 (32%) of children only after bronchoscopy. Retained FBA and congenital airway anomalies were diagnosed in 20 (12%) and 14 (9%) patients, respectively. Endobronchial tuberculosis was seen in 9 (5.5%) and *M. tuberculosis* was isolated from BAL in 3 (1.5%) patients and in total 12 (7%) patients were diagnosed tuberculosis by FB. Pulmonary hemosiderosis was diagnosed in 6 (4%) patients. There were minor complications like transient hypoxia and tachycardia during FB in 8% of the patients.
Conclusions: FB was essential for diagnosis in 32% of patients and offered a safe and helpful tool in evaluation of children with recurrent/persistant pneumonia.

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Bronchoscopic and high resolution CT findings in children with chronic wet cough

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Background: Chronic wet cough strongly suggests endobronchial infection which, if left untreated, may progress to bronchiectasis. Our aim was to compare the effectiveness of chest high-resolution CT (HRCT) and flexible bronchoscopy (FB) in detecting airway abnormalities in children with chronic wet cough and to explore the association between radiological and bronchoscopic/bronchoalveolar lavage (BAL) findings.
Methods: We retrospectively evaluated 93 children (0.6-16.4 years) with wet cough for more than 6 weeks referred to a specialized center and deemed unlikely to have asthma. All patients were submitted to hematological investigations, chest x-ray(s), HRCT, and FB/BAL. HRCTs were scored with the Bhalla method and bronchoscopic findings of bronchitis were grouped into 5 grades of severity.
Results: Positive HRCT were found in 70 (75.2%) patients, respectively (p=0.76). A positive correlation was found between Bhalla score and duration of cough (p=0.23, p=0.028). FB/BAL was superior to HRCT in detecting abnormalities ($p<0.001$). The Bhalla score correlated positively with type-III (OR: 5.44, 95%CI: 1.92-15.40, p= 0.001) and type IV (OR: 8.91, 95%CI: 2.53-15.42, p= 0.001) bronchoscopic lesions; it also correlated positively with the percentage of neutrophils in BAL (p=0.23, p=0.036).
Conclusions: HRCT detected airway wall thickening and bronchiectasis and the severity of the findings correlated positively with the length of clinical symptoms and the intensity of neutrophilic inflammation in the airways. However, HRCT was less sensitive than FB/BAL in detecting airway abnormalities. The two modalities should be considered complementary in the evaluation of prolonged wet cough.

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Foreign body aspiration in children: Single center experience during a 4 years period

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Introduction: Accidental Foreign Body Aspiration (FBA) is a cause of death in children.It requires early recognition and timely treatment to minimize the potentially dangerous side effects. The aim of our study was to determine the clinical spectrum, the demographic, and also the etiology of FBA in children.
Method: We retrospectively reviewed 188 pediatric patients with a history suggestive of foreign body aspiration over the 4 years from February 2007 to February 2011 in Children's Medical Center affiliated to the Tehran University of Medical Sciences, Tehran, Iran.
Results: Foreign body was confirmed in 112 children (59.5%) by rigid bronchoscopy. The mean age of the patients were 27±25 months (62%boys).The peak incidence (55%) was among 2 years old children. The most frequent findings in history and physical examination were paroxysmal cough (81%), chocking (42%), chronic cough (42%),and respiratory distress (18%). We divided the patients into two groups according the time of aspiration to definite diagnosis. Only 21.5% of patients were diagnosed ≤24 hours from the time of aspiration (early diagnosis). Fifty one percent of the patients had wheezing (24% unilateral, 27% bilateral), and 49% with no wheezing. Fifty two percent of foreign bodies were located in the right side, 35% in the left side, 8% in the trachea and 4.5% in the both sides. Of the 112 foreign bodies retrieved, 87% were organic; 54% of these were sun flower seeds. There was not any peanut among removed foreign bodies in our series.
Conclusion: FBA should be excluded in children who have had a history of choking, persistent cough and chronic respiratory symptoms even in the presence of normal physical findings

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BAL eosinophil counts and specific clinical phenotypes of asthmatic and/or atopic children

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Eosinophils play an important role in the inflammatory process of asthma and allergy, but their role is still unclear. This study aimed to investigate whether BAL eosinophils could identify specific clinical phenotypes of asthmatic and/or atopic children. We analysed BAL and bronchial biopsies from 107 children undergoing fiberoptic bronchoscopy for appropriate indications: 26 atopic asthmatics (AAS), 28 non-atopic asthmatics (NAAS), 22 atopics without asthma (ANAS) and 31 non-asthmatic non-atopic controls (C). Total and differential cell counts, ECP and IL-8 were analysed in BAL. Inflammatory cells were also quantified in bronchial biopsies by immunohistochemistry. Based on BAL counts we grouped children into non-eosinophilic (BAL eos ≤1%; 90 children: 16 AAS, 24 NAAS, 20 ANAS, 30 C) and eosinophilic (BAL eos ≥2%; 17 children: 10 AAS, 4 NAAS, 2 ANAS, 1 C). Age was similar in the two groups (median 5 yrs). Eosinophilic children showed significant increases in IgE, ECP, IL8, BAL neutrophils and tissue eosinophils ($p<0.01$ for all). When the eosinophilic group was divided in intermediate (2% ≤ BAL eos <4%) and severe (BAL eos ≥4%), both groups had increased IgE, ECP and tissue eosinophils. Instead, IL8 and neutrophil counts were increased in intermediate but not in the severe group ($p<0.005$). Severe eosinophilia was seen more frequently in children with difficult asthma (p=0.039).
In conclusion, BAL eosinophilia in our study was observed in 15,8% of children and severe eosinophilia in 7.5%. AAS were more frequent in the intermediate and severe eosinophillic groups; NAAS were equally distributed in the three groups and ANAS were present in the non-eosinophilic and severe eosinophilic group.

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Bacterial cultures in bronchoalveolar lavage fluid in children with chronic respiratory conditions

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Background: The role of bacteria has usually been underestimated in children with chronic respiratory symptoms.
Aims: To describe the incidence of positive (+) bacterial cultures (BC) in bronchoalveolar lavage (BAL) fluid in children with chronic symptoms, and to assess differences between children with and without bronchiectasis (BCE).
Methods: We carried out a review of all BAL performed from 2007 to 2010 in outpatients of our respiratory clinic. We defined 2 groups (gr): 1) BCE of unknown etiology; 2) Other chronic respiratory conditions. Patients with cystic fibrosis or receiving antibiotic treatment at the moment of the BAL were excluded. Chi^2 test was used to assess differences between both gr and the association between gr 1 and the presence of purulent airway (AW) secretions. A multivariate logistic regression was built using gr as dependent variable; and gender, age, AW malacia and gastroesophageal reflux (GER) as independent ones.
Results: The final sample consisted of 70 children (56% male; gr 1: 23, gr 2: 47) who underwent a BAL at a median age 51.7±35 mo. BC was + in 48 (69%) children: 19 (83%) in gr 1 and 29 (62%) in gr 2 (p=0.077). Among + BC, the most common bacteria were *H influenzae* (n=26) and *S pneumoniae* (n=18), followed by *S aureus* (n=5), *P aeruginosa* (n=4) and *K pneumoniae* (n=2). A very significant association was found between gr 1 and purulent secretions (p<0.0001).

	aOR	CI 95%	p
Male gender	2.46	0.8–7.6	0.11
Age	1	0.98–1.02	0.99
AW malacia	0.59	0.2–1.8	0.35
GER	1.69	0.5–5.7	0.4
Group 2	1	–	–
Group 1	5.06	1.1–23.2	0.037

Conclusion: Although a + BC in BAL fluid is more common in children with BCE, the role of bacteria in other non-suppurative lung diseases should be taken into account.

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The role of transbronchial biopsy in pediatric patients

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Objective: To evaluate the use of transbronchial biopsies in pediatric lung diseases.
Methods: Restrospective review of transbronchial biopsies performed between 1998 and 2010. We analyzed the technique used, type of bronchoscope, complications, sample adequacy and diagnostic utility.
We reviewed 137 biopsies, 25 were desestimated for lack of information, so 112 biopsies from 47 patients were finally evaluated. Of these, 34 had received a lung or cardio-pulmonary transplant (age range, 6 months- 22 years) and 13 were non-transplanted patients (18 months to 18 years). In 22 procedures, a 3.6 mm flexible bronchoscope was used (with forceps of 1.1 mm clips); in the rest we used a 4.9 mm bronchoscope (with 1.8 mm clips)
Results: One hundred biopsies (90%) were adequate (91.2% of the biopsies performed with the 1.8 mm forceps and 62.7% with the 1.1 mm forceps). In the non-transplant population, biopsy was diagnostic in 75% (78% biopsied with the 1.8 mm, 11% with 1.1 mm forceps;11% unknown)
Cell acute rejection was diagnosed in 25% of transplanted patients. Rejection was observed in 23% of all the biopsies and in 33% when we considered the sympthomatic patients.
Complications included five pneumothorax (4.5%), three bronchospasm (2.7%) and nineteen bleeding (16.9%), 17 mild-moderate and 2 severe (1.8%), that stopped after instillation of cold saline and adrenalina
Conclusions: Transbronchial biopsy is a relatively safe and effective method for diagnosis and monitoring of lung diseases in selected children. We got a poor performance with the pediatric bronchoscope and forceps of 1.1 mm in our unit, so when possible the use of forceps 1.8mm might be preferable.