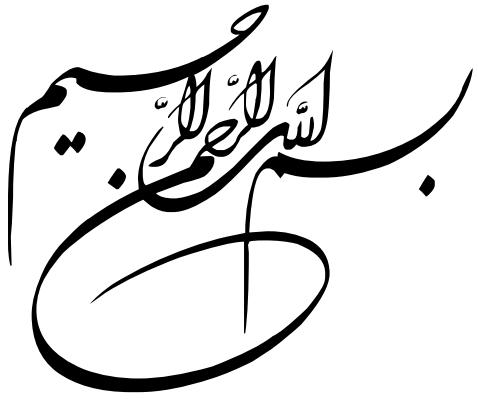
بسم الله الرحمن الرحيم

The abstract book of 5th national congress of pediatric respiratory diseases

خلاصه مقالات پنجمین همایش بیماری‌های ریوی کودکان

گردآورندگان:

دکتر نازنین فرح‌بخش، دکتر قمرتاج خان‌بابایی،

دکتر محمد رضایی، دکتر طاهره صبوری، دکتر سید احمد طباطبایی

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Pulmonary complication of sickle cell disease

Saba Ramazani, Mehri Abbasi Aghdam
Pediatric pulmonology fellow, Mofid children's Hospital, Shahid Beheshti University of Medical Sciences, Thran, Iran

Pulmonary complications are a major concern for individuals with sickle cell disease (SCD), significantly impacting their health and mortality. Acute chest syndrome (ACS) is the most common form of acute pulmonary disease in SCD, affecting nearly half of patients. Chronic dyspnea is a prevalent yet often underreported symptom in adults with SCD, necessitating careful evaluation. Pulmonary function tests (PFTs) frequently reveal abnormalities, with restrictive patterns being common in adults and obstructive patterns more prevalent in children. Additionally, asthma is a significant modifier of the disease, increasing the risk of ACS and exacerbating respiratory symptoms.

Pulmonary hypertension (PH) is a severe and relatively frequent complication of SCD, independently associated with higher mortality rates. Diagnosis of PH typically requires right heart catheterization to confirm resting mean pulmonary arterial pressure (mPAP) of 25 mmHg or higher. Furthermore, individuals with SCD face an increased risk of venous thromboembolism (VTE) and pulmonary artery thrombosis, necessitating careful consideration of diagnostic approaches and anticoagulation due to the risks associated with anemia.

Pulmonary fibrosis, characterized by chronic scarring of lung tissue, may develop in patients with recurrent ACS episodes and pulmonary infarction. Preventative measures are crucial in managing this condition, as there is no specific therapy available. Additionally, sleep-disordered breathing, including nocturnal hypoxemia and obstructive sleep apnea (OSA), is common in children and adolescents with SCD, requiring heightened clinical suspicion and potential interventions such as tonsillectomy and adenoidectomy.

In summary, individuals with SCD face a multitude of pulmonary complications, including ACS, chronic dyspnea, PFT abnormalities, asthma, PH, VTE, pulmonary fibrosis, and sleep-disordered breathing. These complications significantly impact their health and require careful evaluation and management to improve outcomes and quality of life.

Key words: Pulmonary complication, SCD, children

The role of nutrition in cystic fibrosis children

Nazanin farahbakhsh
Assistant professor, pediatric pulmonologist, Mofid Children's Hospital, Shahid Beheshti university of medical sciences, Tehran, Iran

Cystic fibrosis (CF) is a genetic disorder characterized by mutations in the CFTR gene, leading to dysfunctional chloride channels and impaired mucociliary clearance in the respiratory and gastrointestinal tracts. Malnutrition and malabsorption are common in CF patients due to pancreatic insufficiency, intestinal obstruction, and increased energy expenditure from chronic inflammation.

Nutritional management plays a crucial role in the care of CF patients, with high-calorie, high-fat, and high-protein diets recommended to meet their increased energy needs and promote growth. Adequate nutrition is essential for maintaining optimal lung function, supporting immune function, and improving overall quality of life in CF patients.

The nutritional status of CF patients has a significant impact on their respiratory health and disease progression. Poor nutritional status is associated with worsened lung function, increased risk of pulmonary exacerbations, and decreased survival rates. Therefore, optimizing the nutritional status of CF patients through personalized dietary interventions and nutritional supplementation is essential for improving outcomes and enhancing their quality of life.

Key words: cysticfibrosis, nutrition, children

Management of Gastrointestinal Diseases in Pediatric Cystic Fibrosis

Katayoun Khatami
Assistant Professor of Pediatric Gastroenterology and Hepatology
Pediatric Gastroenterology, Hepatology and Nutrition Research Center, Research Institute for Children's Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Gastrointestinal complications of Cystic Fibrosis (CF) have very important role in morbidity of these patients. As the pathophysiology of CF is abnormal transport of chloride and bicarbonate due to mutation in CF transmembrane conductance regulator gene (CFTR), thick mucus and secretions of pancreas, gastrointestinal tract, hepatobiliary and lung make their lumens obstructed. Thus hydration is essential for management of patients with CF. Pancreatic enzyme replacement therapy (PERT) is important for pancreatic insufficiency in individuals with CF. PERT increase fat absorption and decrease stool frequency in CF with pancreatic insufficiency. PERT is not indicated in CF population with pancreatic sufficiency. PERT should be given at the beginning of meals. The dosage of PERT varies according to patient's weight, age and dietary fat intake. The dosage should not be more than 10000 lipase units per kilograms of body weight, since it may cause fibrosing colonopathy.

Energy requirement in patients with CF depends on the patient's age, health status and CF genotype. So, calories intake may be needed as high as 150 percent of normal. Nutritional support in CF population prevents from exacerbation of lung disease and improves pulmonary symptoms. Fat soluble vitamins should be given to all patients with CF. The recommended dosage is different according to age and vitamin deficiency. Monitoring of these vitamins is recommended. As the risk of hyponatremic dehydration is higher in patients with CF, especially in hot climate or conditions such as diarrhea, routine supplementation with sodium chloride is recommended in individuals with CF from infancy. The recommended dosage is according to age and conditions such as diarrhea and hot weather.

Conclusion: Hydration, Nutritional support and PERT are essential factors in management of patients with CF.

Key words: Cystic Fibrosis, Nutrition, Pancreatic enzyme therapy, Pediatric

Clinical Applications of Inhaled Corticosteroids in Children

Seyedeh Zalfa Modarresi[1*]
1. Assistant professor of Pediatric Pulmonology, Children Growth Disorder Research Center, Shahid Sadoughi Hospital, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
*Correspondant author: email: z.modaresi@ssu.ac.ir

Abstract: Inhaled glucocorticosteroids (ICS), that are the most effective anti-inflammatory agents, are widely used in pediatrics. Their mechanism of action involves inhibiting various stages in the inflammatory response cascade. ICSs play a vital role in managing respiratory conditions such as bronchial asthma, croup and etc. ICSs decrease bronchial hyperresponsiveness, prevent the late asthmatic responses, and improve lung function.

Due to minimal systemic side effects, ICSs are preferred over oral corticosteroids. Inhaled medications exhibit higher bioavailability in the lungs, and a significant portion of the absorbed drug at lower doses undergoes deactivation after passing through the liver, thereby enhancing efficacy and reducing side effects.

The bioavailability of inhaled corticosteroids in the lungs is influenced by various factors, including the type of inhalation device used, the propellant type (HFA or chlorofluorocarbon), the particle size of the respirable fraction, and the characteristics of the drug. Drug properties that play a role in bioavailability include lipophilicity, glucocorticosteroid receptor affinity, and duration of action. For instance, fluticasone furoate is the most lipophilic and potent, whereas beclomethasone dipropionate is the least.

The primary applications of ICS in children include the treatment of asthma and virus-induced wheezing. In the 2023 update of the GINA guideline, ICS is acknowledged for its dual role as a controller and reliever in asthma management, leading to a reduction in impairment and risk markers.

The starting dose of ICS is tailored to the severity of asthma symptoms at initiation of treatment. The dose-response curve of ICS demonstrates optimal efficacy at lower doses, with minimal additional benefits at higher doses.

Prolonged daily use of ICS enhances asthma control and lung function but does not sustain benefits post-discontinuation.

Intermittent use of inhaled glucocorticoids for virus-induced wheezing in young children may reduce asthma-like symptoms and the need for rescue oral glucocorticoids in preschoolers with virus-associated wheezing who are not on daily inhaled glucocorticoid therapy. However, conflicting results have been reported in this area. In contrast, routine use of ICS during acute asthma exacerbations in children is not advised.

ICS are also effective for croup treatment, with inhaled budesonide showing comparable efficacy to oral dexamethasone and exhibiting no adverse effects. The anti-inflammatory mechanisms of glucocorticoids are hypothesized to reduce edema in the laryngeal mucosa of pediatric patients with croup.

Furthermore, studies suggest a potential role for ICS in reducing bronchopulmonary dysplasia (BPD) incidence, but their impact on mortality remains unclear. Thus, the routine use of inhaled corticosteroids for BPD prevention in the early phase is not currently recommended. The use of ICS for the management of bronchiolitis, acute respiratory distress syndrome (ARDS), pneumonia, and Covid-19 has not been documented yet.

In pediatric respiratory medicine, ICS represent a cornerstone in the management of respiratory diseases, providing targeted therapy with improved safety profiles. Future research should explore additional potential use of ICS beyond asthma management.

Key words: Inhaled corticosteroids, Asthma, Croup, Bronchopulmonary dysplasia, Children.

Chronic cough

Seyed Hossein Mirlohi, Pediatric Respiratory and Sleep Medicine Research Center, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Background: Chronic cough in children 14 years and younger usually is defined as a daily cough lasting four or more weeks. This definition is based upon expert consensus, as expressed in guidelines from the American College of Chest Physicians (ACCP) and Thoracic Society of Australia and New Zealand (TSANZ). The British Thoracic Society (BTS) utilizes a threshold of eight weeks duration, which is the threshold used to define chronic cough in adults. relentlessly progressive prolonged acute cough [>three weeks] … may warrant investigation before eight weeks.

Methods: Specific cough refers to a chronic cough that is ultimately attributable to an underlying physiologic cause (which is usually but not always of pulmonary origin)

- Wet/productive chronic cough
- Wheezing or dyspnea
- Onset after an episode of choking (even if days or weeks prior)
- Neonatal onset of symptoms
- Any other associated medical conditions (cardiac, neurologic, autoimmune or immunodeficiency, or suspicion thereof)

Nonspecific cough is defined as a chronic cough that does not have an identifiable cause after a reasonable evaluation. A chronic cough is more likely to be nonspecific if it is dry and there are no abnormalities identified on initial evaluation

Results: In investigating the causes of chronic cough, the following diagnostic procedures are required:

Chest radiograph - should be obtained as part of an evaluation in children with chronic cough.

An abnormal chest radiograph (other than perihilar bronchial thickening) is an important pointer for specific cough.

Spirometry - Normal spirometry does not exclude disease.

GERD is probably an unusual cause of chronic cough in otherwise healthy children.

Nonetheless, in selected children with nonspecific cough and other symptoms suggestive of GERD (such as heartburn or regurgitation), it is reasonable to do an empiric trial of treatment for GERD for four weeks, using acid-suppressing medications such as a proton pump inhibitor (PPI).

Sinusitis: most authorities suggest that sinusitis is not acommon cause of chronic cough in children, except in association with an immune defect predisposing to chronic airway infection. For patients with clinical features strongly suggestive of sinusitis (eg, mucopurulent drainage, chronic nasal obstruction, or facial pain or pressure), imaging of the sinuses and/or an empiric trial of treatment for sinusitis may be undertaken.

Conclusion: in examining and treating chronic cough in cases where we do not find a specific cause empirical treatment can be used. if the cough is troublesome, it is reasonable to perform an empiric trial of bronchodilators (short-acting beta -agonists) or low-dose inhaled corticosteroids (<400 micrograms budesonide equivalent daily). If empiric treatment is undertaken, the trial should be time-limited (two to four weeks).

corticosteroid action in asthma

Rohola Shirzadi
associate professor in tehran university

glucocorticoids - Glucocorticoids are the most effective antiinflammatory agents available for the treatment of asthma. They act by inhibiting most steps in the cascade of the inflammatory response. The benefits of glucocorticoids include reduced bronchial hyperresponsiveness, prevention of the late asthmatic response, and enhanced lung function. Inhaled glucocorticoids delivered directly to the airways at a dose much lower than needed when given systemically have minimal side effects. In addition, much of the small amount of drug that is absorbed at low doses is deactivated after one pass through the liver.

Specific preparations - The inhaled glucocorticoid preparations available in the United States and approved by the US Food and Drug Administration (FDA) for use in children <12 years are listed in the table (table 1). Off-label use of inhaled beclomethasone or inhaled fluticasone administered by metered dose inhaler (MDI) with spacers or valved holding chamber devices (some will need a facemask) are reasonable alternatives for young children [7]. This table also includes information on potency and dosing. Potency refers to the dose required to achieve the same clinical effect. (See "The use of inhaler devices in children".)

Asthma diagnosis and evaluation:

Efficacy - Inhaled glucocorticoid treatment is associated with reduction in measures associated with impairment (symptom frequency and severity, functional limitations) and risk. Improvements in these parameters are generally greater and occur more frequently than changes seen with LTRAs (montelukast). Efficacy for each indication is discussed below.

Time to improvement - A reduction in asthma symptoms may occur rapidly, and reduced inflammation is seen within hours. Lung function continues to improve over four weeks and then plateaus. It may take as long as three months to reach a plateau in response, and any changes in dose should be made at intervals of three months or more.

Time to loss of effect after discontinuation - When inhaled glucocorticoids are discontinued, there may be a gradual increase in symptoms and airway responsiveness back to pretreatment values. In a study of preschool children, the benefits were only seen while taking inhaled glucocorticoids, with symptoms worsening soon after the inhaled glucocorticoids were stopped.

Stridor as a Common Noisy Breathing in Children

Eshghi. Alireza: Aliasghar Clinical Research Development Center, Department of Pediatrics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.

Background: noisy breathing is a general term that is mostly pathologic. stridor is a kind of noisy breathing can heard in both inspiration and expiration. In each age stridor is aclue to find diagnosis.

At birth stridor is a sign of vocal cord dysfunction. after one week the beginning of stridor is accompolish with laryngomalacia. if stridor begin after one or two months of life subglottic hemangioma (SGH) is consider as aimportant diagnosis.

After 6 monts foreign body aspiration (FBA) and laryngo trachea bronchitis (croup) are 2 possible diseases. ofcourse the first one need to choking history.

Conclusion: stridor is a guide to find the diagnosis and management and age of start is important.

Key words: stridor, children, noisy breathing

Wheezing evaluation in children

Majid Keivanfar, MD
Assistant Professor of Pediatric Pulmonology, Division of Pediatric Pulmonary and Sleep Medicine, Emam Hossein children's Hospital,
Research Institute for Primordial Prevention of Non-Communicable Disease, Child Growth and Development Research Center, Isfahan University of Medical Sciences, Isfahan, Iran
Tel: +98 913 311 6127
Email: keivanfar@med.mui.ac.ir

Abstract

Background: Wheezing in early childhood is a common issue, with around half of children experiencing it within their first year. Recurrent wheezing affects about one-third of preschoolers, leading to significant health problems, reduced quality of life, increased healthcare usage, and higher costs. Research shows that wheezing in early life varies in terms of timing and risk factors like allergies and genetics, resulting in different outcomes.

Objectives: Although wheezing is very common in children, its pathophysiology is complex and not well understood. Multiple factors play a role in wheezy conditions and include anatomical, genetic, environmental, and immunological factors that can interact with each other and affect airway patency. Airflow obstruction is affected by the caliber of the airway and compliance of the child's lung. Resistance to airflow through the airway is inversely related to the radius of the tube to the power of 4. A small amount of additional narrowing of the airway can cause further flow limitation and a subsequent wheeze, especially in infancy.

Methods: Wheeze is often clinically diagnosed as requiring no further tests, but patients who continue to have recurrent or persistent wheeze should be investigated by, for example, chest X-rays, which are mainly used to identify structural anomalies or other underlying conditions, such as foreign body aspirations. A chest CT scan can be used to determine whether persistent abnormal chest X-ray results or symptoms persist despite therapies. In atopic patients, a full blood count could help diagnose eosinophilia, and in some cases, the physician may perform a radioallergosorbent test, skin test, or immunoglobulin assay, especially to check IgE levels.

Results: If a facility is available to perform a PFT, infant PFTs can reveal reduced lung volume in recurrent wheezing in infancy. Standard spirometry could be beneficial for assessing the response to a bronchodilator. If spirometry is not available; it is worth performing a challenge with a bronchodilator or inhaled corticosteroid. There is often no benefit to performing a viral culture, nasopharyngeal aspirate culture, or PCR for common viral illness as the results will not affect the management plan. Recently, exhaled nitric oxide was found to be a simple but helpful tool in children of preschool age with wheezing, in whom it had high diagnostic accuracy (92%).

Conclusions: Wheezes are very common in children, in whom they appear as heterogeneous groups; hence, physicians should be aware of wheezing phenotypes, most of which abate with age. Few groups continue to wheeze during childhood, although exposure to environmental triggers is a poor prognostic factor. Determining the appropriate level of investigation and treatment remains a challenge to physicians at the level of investigations and treatments. The modified Asthma Predictive Index could be beneficial for predicting which groups should be treated as asthmatic patients, in whom interventions are conditional but regular follow-up and monitoring are strongly recommended. Wheezes are known to be a burden to any patient's health care, and interventions should therefore be based on evidence.

Aerosolized Antibiotics and their use in pediatric pulmonology

Matin Pourghasem, Pediatric Pulmonology Department, Mofid Children's Hospital, Shahid Beheshti University of Medical Sciences

Background: Due to the emergence of multi drug-resistant (MDR) and extensively drug resistant (XDR) microorganisms especially in the setting of critical care, we need to use novel approaches to eradicate these agents such as aerosolized antibiotics.

Objectives: In addition to be a potential tool to combat these microbial agents, they also help to limit the emergence of newer resistant organisms.

Methods: The logical reason for using inhaled antibiotics is to maximize drug delivery to the site of infection and reduce drug side effects. The most indications for aerosolized antibiotics use are ventilator associated pneumonia due to XDR pathogens and ventilator associated tracheobronchitis. There are some limitations for inhaled antibiotics that include bacteremia, increased mechanical ventilation duration and poorer aerated consolidations.

Results: There are several pulmonary diseases in which inhaled antibiotics are used; these are cystic fibrosis, non cystic fibrosis bronchiectasis, ventilator associated pneumonia, post lung transplant infections, mycobacterial disease and chronic obstructive pulmonary disease.

Conclusion: Some available and tested drugs reported in the literature for treatment of infections associated with specific clinical conditions are listed below; they include: aminoglycosides, polymyxins, glycopeptides, monobactams, beta-lactams and fluoroquinolones.

Key words: inhaled antibiotics, pulmonary disease, drug resistant microorganisms

Pulmonary manifestation of cystic fibrosis in children

Ghamartaj khanbabaee
Associate professor, pediatric pulmonologist, Mofid Children's Hospital, Shahid Beheshti university of medical sciences, Tehran, Iran

Cystic fibrosis (CF) is a genetic disorder that primarily affects the lungs and digestive system. It is caused by mutations in the CFTR gene, leading to the production of thick, sticky mucus that clogs the airways and obstructs the pancreas. The main etiology of CF is a defect in the CFTR protein, which regulates the flow of salt and fluids in and out of cells, resulting in the buildup of thick mucus in various organs.

Pulmonary complications are a major concern in CF patients, as they are the leading cause of morbidity and mortality in this population. The burden of pulmonary manifestations in CF is substantial, with chronic lung infections, inflammation, and bronchiectasis contributing to progressive lung damage over time. Colonization with invasive bacteria such as Staphylococcus aureus and Pseudomonas aeruginosa can lead to bronchiectasis, a condition characterized by irreversible dilation of the bronchi and bronchioles.

Pulmonary exacerbations, characterized by acute worsening of respiratory symptoms and increased sputum production, have a significant impact on lung function in CF patients. These exacerbations can further exacerbate inflammation, airway obstruction, and lung damage, leading to a decline in respiratory function and overall health status.

In conclusion, pulmonary manifestations play a crucial role in the clinical course of cystic fibrosis, significantly impacting the quality of life and prognosis of affected individuals. Understanding the importance and burden of pulmonary complications in CF underscores the need for comprehensive management strategies aimed at preventing and treating respiratory issues to improve outcomes and enhance the well-being of patients with this complex genetic disorder.

Key words: cystic fibrosis, pulmonary, children

Wheezing due to cardiovascular problems in children

Fariba Alaei
Associate Professor, Pediatric Cardiologist, Mofid Children's Hospital, Shahid Beheshti university of medical sciences, Tehran, Iran

Wheezing is a common respiratory symptom in children that can be indicative of various underlying conditions. Understanding the pathophysiology of wheezing is essential for accurate diagnosis and management. In children, wheezing typically results from narrowing of the airways, leading to turbulent airflow and characteristic high-pitched sounds during expiration. This obstruction can be caused by inflammation, bronchoconstriction, or mucus accumulation in the airways, resulting in the classic wheezing sound heard on auscultation.

The etiology of wheezing in children is diverse and includes asthma, viral respiratory infections, allergic reactions, and structural abnormalities of the airways. Asthma is one of the most common causes of wheezing in children, characterized by chronic inflammation and hyperreactivity of the airways. Viral respiratory infections, such as bronchiolitis and croup, can also trigger wheezing episodes in young children due to airway inflammation and obstruction.

History taking and physical examination play a crucial role in diagnosing the etiology of wheezing in children. A detailed history of symptoms, including the timing of wheezing episodes, associated triggers, and response to medications, can provide valuable clues to the underlying cause. Physical examination findings, such as wheezing on auscultation, signs of respiratory distress, and presence of other associated symptoms, can further aid in narrowing down the differential diagnosis.

In conclusion, understanding the pathophysiology and etiology of wheezing in children is essential for accurate diagnosis and appropriate management. History taking and physical examination are key components of the diagnostic process, helping healthcare providers identify the underlying cause of wheezing and tailor treatment strategies to improve outcomes in pediatric patients.

Key words: wheezing, vascular ring, cardiovascular

Management of Asthma in Children

Dr.Shahkar, Lobat, MD, Assistant professor of pediatric pulmonology, Taleghani children hospital, Golestan university of medical sciences, Gorgan, Iran.

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness and cough, that vary over time and in intensity, together with variable expiratory airflow limitation. Airflow limitation may later become persistent.

The diagnosis of asthma is based on the history of characteristic symptom patterns and evidence of variable expiratory airflow limitation. Asthma is a common, chronic respiratory disease affecting 1–18% of the population in different countries. Respiratory symptoms of wheeze, shortness of breath, cough and/or chest tightness: Patients experience more than one of these types of symptoms. Symptoms are often worse at night or in the early morning. Symptoms vary over time and in intensity. Symptoms are triggered by viral infections (colds), exercise, allergen exposure, changes in weather, laughter, or irritants such as car exhaust fumes, smoke or strong smells.

Material and Method: The recently published updaterd GINA sterategy for asthma management and prevention was used in this regard.

Findings: Level of asthma control is the extent to which the features of asthma can be observed in the patient, or have been reduced or removed by treatment. Asthma control is assessed in two domains: symptom control and risk of adverse outcomes. Poor symptom control is burdensome to patients and increases the risk of exacerbations, but patients with good symptom control can still have severe exacerbations. The current definition of asthma severity is based on retrospective assessment, after at least 2–3 months of controller treatment, from the treatment required to control symptoms and exacerbations.

Result: The long-term goals of asthma management are to achieve good symptom control, and to minimize future risk of asthma-related mortality, exacerbations, persistent airflow limitation and side-effects of treatment. The

patient's own goals regarding their asthma and its treatment should also be identified.

Children with asthma should receive ICS-containing controller treatment to reduce their risk of serious exacerbations and to control symptoms. ICS-containing controller can be delivered either with regular daily treatment .For the best outcomes, ICS-containing controller treatment should be initiated as soon as possible after the diagnosis of asthma is made.

Conclusion: Gols of asthma management is best achiveved when the approach is based on the control of symptoms and minimizing the risks.

Key words: asthma, children, treatment

Pediatric spirometry

Shilan Mohammadi,
Pediatric Respirologist, Lung Diseases and Allergy Research Center, Research Institute for Health Department, Kurdistan University of Medical Sciences, Sanandaj, Iran

Pediatric spirometry is a diagnostic test used to assess lung function in children. It involves measuring the amount (volume) and speed (flow) of air that can be inhaled or exhaled by the lungs. Here are some key points about pediatric spirometry:

Purpose: Pediatric spirometry helps diagnose and monitor respiratory conditions such as asthma, cystic fibrosis, chronic lung diseases, and other breathing disorders in children.

Procedure: During spirometry, a child will be asked to breathe into a mouthpiece connected to a spirometer, which measures airflow. The child will be instructed to take a deep breath and then blow out as hard and fast as possible until the lungs are empty.

Interpretation: Results are compared to predicted values based on the child's age, height, sex, and ethnicity. Abnormal results can indicate airway obstruction, restrictive lung disease, or other respiratory issues.

Challenges in Children: Conducting spirometry in children requires cooperation and effort. Younger children may find it difficult to perform the test correctly due to lack of understanding or attention span.

Age Considerations: The feasibility and interpretation of spirometry can vary with age. Young children may require special techniques or modified tests.

Pediatric spirometry is generally safe.

Key words: spirometery, children, lung function tests

Bronchiolitis in children

Safa Askari, Ahmad Safapoor
Pediatric pulmonology fellow, Mofid children's Hospital, Shahid Beheshti University of Medical Sciences

Viral bronchiolitis, a common medical emergency in infancy, presents with acute wheezing in infants and children, typically associated with respiratory infection symptoms. Respiratory syncytial virus (RSV) is the primary etiologic agent, with infants <6 weeks old, premature infants, and those with cardiopulmonary disorders or immunodeficiencies at increased risk of severe bronchiolitis.

Supportive care focusing on maintaining oxygenation and hydration remains the cornerstone of bronchiolitis treatment. Pharmacological therapies, including nebulized hypertonic saline, bronchodilators, epinephrine, and corticosteroids, are commonly used, although their efficacy is debated. Recent studies suggest a potential benefit of nebulized hypertonic saline in reducing clinical severity and hospitalization duration, as well as a promising role for nebulized epinephrine in decreasing hospitalization rates.

Despite efforts, no specific antiviral treatment has demonstrated effectiveness against bronchiolitis. Preventative measures using monoclonal antibodies have shown efficacy in reducing illness severity in high-risk individuals, but cost considerations limit their widespread use, especially in developing countries.

Advancements in vaccine development offer hope for controlling bronchiolitis. Maternal immunization is crucial due to the predominance of disease in young infants. However, challenges persist in translating adult-effective vaccines to infant protection due to transient RSV immunity and multiple circulating subtypes. Further research is needed to bridge this gap and develop effective vaccination strategies for bronchiolitis prevention.

Key words: bronchiolitis, wheezing, infants

Viral pneumonia and it’s treatments in pediatric pulmonology

Maedeh Soflayi, Pediatric Pulmonology Department, Shahid Rajaee Hospital, Iran University Of Medical Sciences, Tehran, Iran

Background: Pneumonia is caused by the involvement of the lung parenchyma in most cases following an infectious process in which the pulmonary alveoli are filled with pus and fluid. Lung infection is often caused by viral, bacterial or fungal agents. Viral pneumonia is the most common type of pneumonia worldwide.

Objectives: Our goal in this study is to know the causes of viral pneumonia, it’s pathophysiology, determining the signs, symptoms and diagnostic methods and finally the use of appropriate treatment.

Methods: The common causes of viral pneumonia include RSV (the most common), Para-influenza viruses (1,2,3), influenza viruses (A,B), adenovirus, rhinovirus, coronavirus, CMV, Rubella and HSV. Children with viral pneumonia often present with symptoms of fever, chills, coryza, cough, diarrhea, and vomiting and we notice signs of respiratory distress, abnormal pulmonary sounds and hypoxia during the examination.

Results: Diagnosis of viral pneumonia can be made by history and physical examination. In cases of doubt, paraclinical tests can be used. Imaging is also applicable when complicated pneumonia or other diagnoses are suspected.

Conclusion: It should be noted that the treatment of viral pneumonia is symptomatic and supportive in most cases, so it is very important to distinguish viral pneumonia from bacterial pneumonia. Knowing this issue prevents the unnecessary use of antibiotics.

Key words: Viral pneumonia, Respiratory Viruses, Pneumonia

Chylothorax in children: diagnosis and management

Saeid Hashemi, Department of Pediatrics, Clinical Research Development Center of Children Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

Background: Chylothorax, which refers to the buildup of chyle in the pleural space, is a relatively uncommon reason for pleural effusion in children. The condition can result in serious respiratory complications, as well as contribute to nutritional deficiencies and weakened immune system. Therefore, it is crucial to promptly diagnose and treat a chylothorax in the pediatric population.

Objectives: To review the causes, diagnosis, and treatment of chylothorax in infants and children.

Methods: A comprehensive revies was conducted on the causes, diagnosis, and treatment of chylothorax in the pediatric population.

Results: Causes of chylothorax in children include congenital, traumatic, high central venous pressure, tumor-associated, and others, such as granulomatous infections. Chylothorax can have a spectrum of presentations ranging from asymptomatic to hemodynamic instability, mainly depending on the cause and the rate of chyle accumulation. Chylothorax is primarily diagnosed when pleural fluid is observed in a chest radiograph and later definitively determined through the analysis of the fluid obtained on thoracentesis. Then the site of the thoracic duct rupture needs to be determined, using lymphangiography, lymphoscintigraphy, thoracoscopy, computed tomography, or magnetic resonance lymphography. Its management aims at relieving the respiratory symptoms, prevent recurrence, and prevent or treat malnutrition and immunodeficiency. Management can be either medical or surgical; however, the first step is chest tube insertion. Depending on the chyle volume, patients can be managed either surgically (>100 ml/year of age) or medically (<100 ml/year of age). Surgical management is thoracic duct ligation, but if it cannot be performed or is unsuccessful, pleurodesis or pleuroperitoneal shunt placement should be considered. As for medical management, dietary management with enteral diet containing medium-chain triglycerides, parenteral nutrition containing intravenous lipid emulsion, when there is high-output chyle, enteral diet is

not working, or the patient cannot take enteral diet, and a trial of octreotide or somatostatin can be considered. It is important to note that when the patient is receiving medical management, if chylothorax persists after two to four weeks, surgical management is warranted.

Conclusions: Chylothorax is an uncommon source of pleural effusion in children, except during the neonatal period where it becomes the predominant cause. The diagnosis is established through the measurement of triglyceride levels, determination of the pleural fluid to serum cholesterol ratio, and identification of chylomicrons in the pleural fluid. There are various causes of chylothorax in pediatric patients. Understanding the structure and function of the lymphatic system, specifically the thoracic duct, is crucial for evaluating and treating patients. The first step in treatment includes draining the effusion, making dietary adjustments, and using other medical therapies to reduce chyle flow and promote healing of the thoracic duct. Somatostatin and octreotide have varying levels of usefulness. If medical management is unsuccessful, especially if the child experiences complications from the chylothorax, early surgical intervention is recommended. The outcome for children with chylothorax is influenced by various factors, including the cause of the effusion, how well it responds to medical or surgical treatments, and any complications that may arise as a result of the condition.

Bronchoscopy and Bronchoalveolar Lavage in Pediatric Pationt

Fateme Tarighatmonfared, pediatric pulmonologist, assistant professor of Qom university medical science, Email: fateme.tarighat@gmail.com

Background: Visualization of the interior of the body is often the most effective and efficient way to evaluate a patient's problem. Bronchoscopy is an important aspect of the diagnostic and therapeutic abilities of pulmonary specialists.

Abstract

Objectives: The rigid ("open tube") bronchoscope consists of a metal tube of appropriate diameter and length that is passed into the trachea and through which the operator may look and the patient may breathe. It is equipped to deliver anesthetic gasses and light to the distal tip. with the proximal end of the bronchoscope closed with a lens cap or with a telescope in place. Flexible bronchoscopy: The flexible bronchoscope is essentially a solid instrument composed of thousands of glass fibers that carry the light for illumination and the image. It have a small suction channel through which secretions may be aspirated, fluids may be delivered to the airways, or small flexible instruments may be passed.

Methods: The rigid bronchoscope must be an appropriate size for the patient. Therefore, a variety of instruments must be available to the pediatric bronchoscopist ranging in diameters from 3 to 7 mm or larger and in length from 20 to 50 cm. There must be a full range of telescope lengths and diameters for the different bronchoscopes. In addition, glass rod telescopes may be made with a prism on the distal end to facilitate observation of the upper lobes. It is the preferred instrument for biopsy and for foreign body extraction.The flexible bronchoscopy: most diagnostic procedures in pediatric patients can be performed with the standard 2.8 mm or 3.5-mm pediatric flexible instruments. Depending on the instrument used and the size of the patient, airways as small as 2 mm and as far as 14 to 16 generations from the carina may be inspected.

Results: The diagnostic result include anatomic findings, definition of airway dynamics, and the results of microbiologic and/or microscopic evaluation of

specimens. There is often great value in a normal bronchoscopic examination; the definitive exclusion of suspected problems.

Bronchoscopy is often performed in patients with airway obstruction. Bronchoalveolar lavage (distinguish infectious from noninfectious processes, alveolar hemorrhage, PAP, histiocytosis, or interstitial lung diseases, for patients with suspected aspiration, dyspnea, hypoxia, tachypnea, recurrent or interstotial pulmonary infiltration.

BAL include the removal of mucus plugs or blood clots, foreign lipoid material, the removal of bronchial casts in Plastic bronchitis, or whole lung lavage as a therapy in PAP), visual analysis, bronchial (mucociliary transport), brush biopsy mucosa (evaluation of ciliary motility and ultrastructure), endobronchial biopsy (granulation tissue), TBB (parenchyma), TBNA (evaluation of diffuse lung diseases or suspected malignancy) are other diagnostic techniqes.

Bronchoscopy also have therapeutic benefit, such as the removal of a mucus plug causing atelectasis, forein body removal, whole lung lavage, bronchoscopic intubation, dilation of the stenotic airway, laser to ablate tissue, cautery, microdebrider, placing stents, bronchial thermoplasty and bronchoscopic surgery.

Conclusion: Bronchoscopy is a powerful (and often underutilized) tool for the diagnosis and management of airway and pulmonary problems in infants and children. Both rigid and flexible instruments are available for diagnostic and/or therapeutic bronchoscopic procedures; each has special advantages and limitations, and in many patients, the use of both modalities may enable more effective and accurate assessment/treatment.

An 8-month-old boy with biphasic wheezing-stridor episodes known as a rare congenital condition named ring-sling complex

Seyedeh Zalfa Modarresi[1*], Mohammad Reza Alipour[2], Abdolhamid Jafari Nodoushan[3], Hosein Loje[4]

1. Hematology and oncology research center, Shahid Sadoughi Hospital, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
3. Children Growth Disorder Research Center, Shahid Sadoughi Hospital, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
4. Student research committee, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

*. correspondent author, email: z.modaresi@ssu.ac.ir

Pulmonary artery sling (PAS) in which the left pulmonary artery arises from the right pulmonary artery is a rare congenital vascular malformation that may be associated with congenital tracheal stenosis (CTS), also known as Ring-Sling Complex. Approximately 50-65% of PAS patients having concurrent CTS. The patients may have non-specific symptoms such as stridor, wheezing, and feeding problems dysphasia. The condition is recognized with high mortality rate. Case presentation: The case is an eight-month-old boy with a history of recurrent hospitalization due to biphasic wheezing-stridor episodes, who was referred to Shahid Sadoughi hospital. He was the first child of consanguineous parents and was born prematurely at 31 weeks gestational age, requiring 30 days of administration in the neonatal intensive care unit (NICU). The patient suffered from respiratory symptoms, including wheezing, stridor, tachypnea, respiratory distress, feeding problems, and failure to thrive since birth. After treatment with nebulized epinephrine and bronchodilator, the patient was stabilized and undergone cardiac computed tomography angiography. The results revealed pulmonary artery sling and a long-segment tracheal stenosis, 3 cm above the vascular ring. A fiberoptic bronchoscopy was performed, revealing tracheal rings begin 1 cm below true vocal cords. Fiberoptic bronchoscope size 3.5 could not be passed. Conservative management was successful for the patient. He

cached up and his symptoms improved with age without surgical intervention.

Conclusion: Wheezing-stridor episodes should be considered an alarm sign for cardiopulmonary abnormalities in children. Although surgical management has traditionally been the mainstay of treatment for PAS-CTS, it carries a high mortality and morbidity rate. Therefore, conservative management until the child grows up may be an option for these children, followed by a decision regarding surgical intervention.

Key words: pulmonary artery sling- tracheal ring- ring-sling complex- CT angiography

Ventilator Management of Acute Severe Asthma in Children

Amir Rezaei, MD; Pediatric Pulmonologist and Intensivist, Assistant Professor, Masih Daneshvari Hospital

Background: While the goal of treatment of severe status asthmaticus is often to prevent intubation, occasionally, the only option is to use mechanical ventilation.

Objective: To present a practical summary for assessment, management and ventilator strategies for those patients who need intubation and mechanical ventilation.

Methods: This review was performed through searching the title in the literature and a practical summary was made based on the assessment, intensive care and mechanical ventilation in children with acute severe asthma and refractory bronchospasm.

Results: Acute severe asthma (status asthmaticus) refers to patients who are unresponsive to traditional asthma therapies on presentation, including repeated doses of beta-agonists. These patients are at risk for acute respiratory failure from severe bronchospasm. Incidence of intubation for status asthmaticus is about 0.5% and mechanical ventilation is associated with higher mortality. Treatment of acute asthma includes: treatment of hypoxemia; administration of bronchodilators including inhaled short-acting beta2-agonists ± ipratropium bromide; administration of corticosteroids; assessment of response; and considering other treatments including noninvasive or invasive mechanical ventilation and transfer to a tertiary facility. Treatment should be instituted as soon as a rapid assessment is completed. Patients should be monitored closely to assess their response to initial management. Intubation and mechanical ventilation should be initiated only when there is failure to respond to optimized initial care, only by the most experienced person available, and preferably in conjunction with a pediatric intensivist.

Conclusion: Effective treatment of severe status asthmaticus depends on the accurate and rapid assessment of disease severity at presentation and prompt management and disposition of these patients.

Key words: Acute severe asthma, Status asthmaticus; Intubation; Mechanical ventilation, Children

Anti-leukotriene compared to inhaled corticosteroid for recurrent wheezing in children under five years of age: a randomized clinical trial

Dr Azar Dastranji -Pediatric pulmonologist -Assistant Professor - Pediatric Health Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
dastranji61@gmail.com

Abstract

Background: Asthma is a common chronic disease in childhood, affecting 10-15% of children. Approximately 40% of preschool-age children have wheezing, but only 10% of them may have persistent asthma. Diagnosis of asthma in under five years is based on symptoms such as recurrent wheezing, cough, dyspnea, and airway hyper-responsiveness with the positive response to bronchodilators. Asthma diagnosis with pulmonary function test (PFT) or evaluation of airway inflammation is not common in preschool children.

Inhaled corticosteroid (ICS) is the most effective anti-inflammatory drug for controller therapy of persistent pediatric asthma that decreases mortality and morbidity of asthma, improves lung function, and reduces exacerbation of airway hyper-responsiveness.

Leukotriene is an important inflammatory mediator in asthma. Recently, anti-leukotrienes such as Montelukast, Zafirlukast, Zileuton, etc., are being studied as an anti-inflammatory drug in the treatment of asthma. Montelukast is a specific leukotriene receptor antagonist (LTRA), and it is the only leukotriene receptor antagonist approved for young children. Montelukast is administered orally in a single daily dose and has no negative effect on growth, bones, or the adrenal system.

Objectives: According to the international guidelines, inhaled corticosteroid (ICS) is prescribed for treating recurrent wheezing in children under five years. However, considering poor adherence, high cost, and possible side effects of ICS in young children, anti-leukotrienes are recommended as a safe initial treatment for recurrent wheezing. Therefore, we performed this study to compare anti-leukotriene versus ICS in treating recurrent wheezing (wheezing more than three times over the past year) or mild persistent asthma based on NIH guideline (daily symptoms occur several times per week but

not daily and 2 or less nocturnal symptoms per month) in children under five years**.**

Methods: We enrolled 68 patients under five years old with recurrent wheezing (more than three times over the past year) and mild persistent asthma in this randomized controlled clinical trial. The patients were randomly divided in a 1:1 ratio into two groups. Group 1 was treated by ICS 50 mcg twice daily, and group 2 was treated by daily montelukast (4 mg granules). The patients followed up for six months, and the results of the two groups were compared.

Results: Thirty-four out of 68 patients received montelukast and 34 were consumed ICS. In montelukast and ICS group, 23 (68%) and 20 patients (59%) were boys, respectively. The frequency of wheezing decreased significantly in patients receiving montelukast ($p < 0.001$) as well as ICS ($p < 0.001$). However, there were no differences between two groups in efficacy of treatment ($p=0.38$).

Conclusions: In children under five years with mild persistent asthma, both montelukast and ICS were effective with no differences between groups in efficacy of treatment.

The role of Bronchodilators in wheezing children

Nazanin farahbakhsh
Assistant professor, pediatric pulmonologist, Mofid Children's Hospital, Shahid Beheshti university of medical sciences, Tehran, Iran

Bronchodilators, such as salbutamol, play a crucial role in managing wheezing in children by targeting the underlying bronchoconstriction. These medications work by activating beta-2 adrenergic receptors in the smooth muscle of the airways, leading to relaxation and dilation of the bronchioles. This mechanism of action helps to alleviate wheezing and improve airflow in children experiencing respiratory distress.

Wheezing is a common symptom observed in various respiratory conditions in children, including bronchiolitis, asthma, viral infections, and foreign body aspirations. In these situations, bronchodilators can be effective in relieving bronchoconstriction and reducing the severity of wheezing episodes. Understanding the role of bronchodilators in managing wheezing in children is essential for healthcare providers to provide timely and appropriate treatment for pediatric patients with respiratory issues.

Wheezing is a common symptom observed in various respiratory conditions in children, including bronchiolitis, asthma, viral infections, and foreign body aspirations. Bronchodilators, such as salbutamol, play a crucial role in managing wheezing in children by targeting the underlying bronchoconstriction. In children with wheezing due to bronchiolitis, a trial of bronchodilator therapy can be initiated, and if there is a positive medical response, it can be continued as part of the treatment plan. This approach can help alleviate bronchoconstriction and improve respiratory distress in affected children. Furthermore, in the context of childhood asthma, bronchodilators are commonly used as rescue therapy to relieve acute symptoms of wheezing and dyspnea. It is essential for healthcare providers to emphasize the importance of prompt administration of bronchodilators in children experiencing asthma-related wheezing, as early intervention can significantly improve airflow and alleviate respiratory distress.

On the other hand, in cases of viral infections and viral pneumonia, bronchodilators are generally not indicated unless the child has a known history of hyperreactive airway disease or asthma. In these instances, the use

of bronchodilators can help manage wheezing and respiratory symptoms associated with hyperreactive airways, thereby improving the child's overall respiratory function.

Understanding the role of bronchodilators in managing wheezing in children is essential for healthcare providers to provide timely and appropriate treatment for pediatric patients with respiratory issues. By recognizing the specific indications for bronchodilator use in different respiratory conditions, healthcare professionals can optimize the management of wheezing in children and improve clinical outcomes.

Key words: bronchodilator, children, wheezing

Mechanism and Pathophysiology of Wheezing in Children

Seyed Ahmad Tabatabaii
Associate professor, pediatric pulmonologist, Mofid Children's Hospital, Shahid Beheshti university of medical sciences, Tehran, Iran

Wheezing is a common respiratory symptom in children that can be indicative of various underlying conditions. Understanding the pathophysiology of wheezing is essential for accurate diagnosis and management. In children, wheezing typically results from narrowing of the airways, leading to turbulent airflow and characteristic high-pitched sounds during expiration. This obstruction can be caused by inflammation, bronchoconstriction, or mucus accumulation in the airways, resulting in the classic wheezing sound heard on auscultation.

The etiology of wheezing in children is diverse and includes asthma, viral respiratory infections, allergic reactions, and structural abnormalities of the airways. Asthma is one of the most common causes of wheezing in children, characterized by chronic inflammation and hyperreactivity of the airways. Viral respiratory infections, such as bronchiolitis and croup, can also trigger wheezing episodes in young children due to airway inflammation and obstruction.

History taking and physical examination play a crucial role in diagnosing the etiology of wheezing in children. A detailed history of symptoms, including the timing of wheezing episodes, associated triggers, and response to medications, can provide valuable clues to the underlying cause. Physical examination findings, such as wheezing on auscultation, signs of respiratory distress, and presence of other associated symptoms, can further aid in narrowing down the differential diagnosis.

In conclusion, understanding the pathophysiology and etiology of wheezing in children is essential for accurate diagnosis and appropriate management. History taking and physical examination are key components of the diagnostic process, helping healthcare providers identify the underlying cause of wheezing and tailor treatment strategies to improve outcomes in pediatric patients.

Key words: wheezing, children, etiology

Etiology of Wheezing in Children

Sara Ghahremani
Assistant Professor of Pediatrics, Department of Pediatric Pulmonology, Faculty of Medicine, Mashhad University of Medical Science

For easier evaluation of the etiology of wheezing in children, it is better to categorize wheezing based on its onset and the mechanism of airway narrowing into acute and chronic types, as well as congenital and acquired types. The most common cause of wheezing with an acute onset, regardless of the patient's age and history of atopy is asthma, infections such as viral and bacterial infections and foreign body aspiration are the other ones. Apart from foreign bodies in the airway, pharyngeal foreign bodies, especially in patients with swallowing difficulties and dysphagia, should be considered in the differential diagnosis of wheezing.

Chronic wheezing can be attributed to structural and non-structural etiologies; a wide range of structural anomalies in the tracheobronchial tree and thoracic structures can lead to chronic wheezing. Among these, tracheobronchial tree anomalies and vascular rings, particularly in early life (first few months of life), can cause wheezing that does not respond to asthma treatment. Vascular rings, sometimes due to compression of the esophagus, can also lead to vomiting and feeding difficulties. Fistulas such as tracheoesophageal fistula are another cause, which may not be diagnosed immediately, especially in types like H-type, and later present with recurrent pneumonia, chronic cough, wheezing, and worsening symptoms with feeding.

Various mediastinal masses, including congenital cases like bronchogenic cysts and acquired types such as enlarged lymph nodes, lymphoma, and tumors, can cause localized wheezing due to airway compression. Foreign body aspiration, while highly likely in cases of sudden-onset wheezing, may manifest as chronic and recurrent respiratory issues like chronic cough and wheezing if left undiagnosed. Congenital heart defects such as left-to-right shunts and pulmonary vessel congestion, as well as less commonly cardiomegaly and airway compression, can also lead to wheezing. Additionally, hyperreactivity of the airways has been reported frequently in patients with congestive heart failure.

Functional (non-structural) causes of chronic and recurrent wheezing include asthma, aspiration syndromes, vocal cord dysfunction, bronchopulmonary dysplasia, and rare conditions like primary ciliary dyskinesia and cystic fibrosis. Aspiration syndromes are divided into two categories: structural causes such as tracheoesophageal fistula and functional causes like gastroesophageal reflux and swallowing disorders. Aspiration syndromes are often mistaken for difficult-to-control asthma in many cases.

A key point in diagnosing vocal cord dysfunction is symptom relief during sleep. Rare causes of recurrent wheezing include conditions leading to recurrent infections and bronchiectasis such as cystic fibrosis, primary ciliary dyskinesia, immune system deficiencies, and obliterated bronchiolitis.

Key words: wheezing, causes, children

Anticholinergic inhalers in pediatric asthma

Nasrin Hoseiny Nejad
Aliasghar Children Hospital. Pediatrics department. School of medicine. Iran university of medical Sciences, Tehran, Iran

Anticholinergic drugs play a significant role in control of asthma in different ways. Firstly, bronchospasm cauded by triggering muscarinic receptors is brohibited. The second effect of anticholinergics is declining mucus secretion. Acethyl choline released due to electrical stimulants of muscarinic receptors in goblet cells causes mucus secretion. Anticholinergics inhibit this mechanism. Furthermore, while muscarinic receptors promote proliferation of goblet cells, anticholinergics regulate this process resulting less mucus production. In addition, acethylcholine promote inflammation of airways by signaling Tcells proliferation by production of chemokines.

Although the mechanism is not well known, regulation of transcrion factor NF and protein Kinase C play a role. Anticholinergics mainly treat COPD, but play some roles in controlling asthma as well. Mostly anticholinergics are as inhalers, but in some emergency occasions, they may be nebulized. They cause releasing bronchoconstriction by blocking the cholinergic pathways. These pathways thighten the airways by releasing stimulant chemicals.

There are five anticholinergics currently licensed for use in COPD: Ipratropium, tiotropium, Umeclidinium, Glycopyronium, and Aclidinium. However, two of them, including Ipratropium and tiotropium, are approved for asthma treatment. The first is a short acting form used in acute and chronic asthma added to Beta 2 Agonists. While the second one is the only long acting form as add-on therapy to inhaler corticosteroid and bronchodilators. Some complication such as production of eosinophilia and urinary retension are reported following usage of these medications. However, this is not the case for inhaled forms.

Key words: anticholinergics, inhaler, asthma

Complicated pneumonia in pediatrics

Neda Entezari, mahsa ghadrdan
Pediatric pulmonology fellow, Mofid children's Hospital, Shahid Beheshti University of Medical Sciences

Pneumonia is a lower respiratory tract disease usually caused by an infectious agent resulting in inflammation of the tissues of one or both lungs. Complicated community-acquired pneumonia is a severe illness characterised by combinations of local complications (parapneumonic effusion, empyema, necrotising pneumonia, and lung abscess). Complicated pneumonia should be suspected in any child with pneumonia not responding to appropriate antibiotic treatment within 48–72 hr. Common causative organisms are s.pneumoniae and S.aureus.

Necrotizing pneumonia is characterized by necrosis and liquefaction of consolidated lung tissue, which may be complicated by solitary, multiple, or multiloculated radiolucent foci, bronchopleural fistula, and intrapulmonary abscesses. Pneumatoceles are commonly associated with, and develop after, localized bronchiolar and alveolar necrosis, which allows for one-way passage of air into the peripheral airways and alveoli. Necrotizing pneumonia is usually secondary to S. pneumoniae, S. aureus, K. pneumoniae, or, less commonly, P. aeruginosa infections. CA-MRSA is often associated with this clinical presentation since there is production of Panton-Valentine leukocidin, an exotoxin that causes tissue necrosis.

pulmonary abscess is a thick-walled cavity that contains purulent fluid. The pathogenesis of a lung abscess begins with inflammation of the parenchyma progressing to necrosis, cavitation, and abscess formation. An abscess may be secondary to predisposing conditions (pulmonary aspiration), especially in children with neurodevelopmental delays, congenital malformations, immunodeficiency, or endocarditis. The initial clinical presentation of a lung abscess is like that of uncomplicated CAP, with fever and cough as its key features. Other common signs are dyspnea, chest pain, anorexia, nausea, vomiting, malaise, or lethargy.

Empyema: The incidence of empyema complicating community-acquired pneumonia is increasing and causes significant childhood morbidity. Pneumococcal infection remains the most common isolated cause in

developed countries, with Staphylococcus aureus the predominant pathogen in the developing world.

Complicated pneumonia is treated with a prolonged course of intravenous antibiotics, and then oral antibiotics. The initial choice of antibiotic is guided by local microbiological knowledge and by subsequent positive cultures and molecular testing, including on pleural fluid if a drainage procedure is done. Information from pleural space imaging and drainage should guide the decision on whether to administer intrapleural fibrinolytics. Most patients are treated by drainage and more extensive surgery is rarely needed. The clinical course of complicated community-acquired pneumonia can be prolonged, especially when patients have necrotising pneumonia, but complete recovery is the usual outcome.

Evaluation and Management of Indoor Triggers and Stimulants of Children Asthma Exacerbation

Farnaz Amiri kar
Department of Pediatrics Pulmonology, Mardaniazar Hospital, Tabriz University of Medical Sciences, Tabriz, Iran

Abstract

Background: Significant progress has been made in the study of respiratory allergies in recent years, thanks to various epidemiological, clinical, and experimental research. The development of respiratory allergies is caused by multiple risk factors, and a comprehensive approach to secondary prevention is necessary to address these factors. Asthma triggers can be allergenic or nonallergenic. Allergenic triggers include indoor and outdoor allergens, while nonallergenic triggers include viral infections, smoking, and exposure to certain occupations. Avoiding these triggers can lead to clinical benefits and reduce asthma morbidity. Public smoking bans and clean air policies are effective in reducing air pollution, and proper safety measures can prevent work-related asthma.

Objectives: Preventing asthma attacks is crucial, and identifying the triggers that cause them is the basis of secondary prevention; so, we aimed to identify indoor triggers and stimulants of asthma for better management and future preventions.

Methods: A study was conducted on 100 children who were diagnosed with bronchial asthma and attended an asthma clinic between January 2023 and February 2024. The study was conducted with great care and precision at a highly-regarded tertiary care teaching hospital located in the East-Azerbaijan State of Iran. The diagnosis of asthma was based on a detailed history and clinical examination of each patient. Once the parents gave their consent for their child's participation in the study, they were interviewed in their mother tongue to gather information about their family history of asthma, allergies, comorbidities, number of hospital admissions, and duration of symptoms before treatment. Each child was followed up for one year, and their clinical response to treatment with long-acting beta-agonists and compliance was assessed and recorded at the 3rd month, 6th month, and one-year follow-up. Data regarding their demographic profile, familial history of asthma,

allergies, comorbidities, number of hospital admissions, exposure status and symptoms during treatment were also collected on a well-structured form.

Results: According to observations made at a paediatric asthma clinic, out of 100 registered bronchial asthma patients, 63 of them were between the ages of 5-8 years. Among these children, 41% suffered from moderate persistent bronchial asthma, 23% had intermittent asthma, and 36% had severe asthma. Additionally, 58% of the patients had a positive family history of bronchial asthma and 14% had a family history of allergic rhinitis. Out of the 100 children, 78% had a history of triggering factors that could cause acute exacerbation. The majority of the children (29%) were exposed to dust as a triggering factor, compared to only 3% exposed to cold. However, 31% were found to have both cold and dust exposure as triggering factors. 5% of children developed an acute exacerbation following exposure to cold and dust, along with exercise.

Conclusion: It can be concluded that the severity of bronchial asthma tends to increase primarily at the time of school entry. Majority of the cases have a positive family history of either bronchial asthma or allergic rhinitis. Furthermore, exacerbation of bronchial asthma is associated with certain triggering factors that can be better avoided for improved management of the condition.

Key words: Asthma, Trigger, Childhood, Exposure, Allergen

Use of decongestants in pediatric pulmonary diseases

Nafise Fadavi, Pediatric Pulmonology Department, Mofid Children`s Hospital, Shahid Beheshti University of Medical Scinces

Background: Congestion is caused by dilatation of blood vessels in nasal and airway membranes, which makes it hard to breathe and can trap mucus. Decongestants produce vasoconstriction within the nasal mucosa through α-adrenergic receptor activation and therefore are effective in relieving the symptoms of nasal obstruction.

Objectives: To determine the efficacy of decongestant therapy in children with nasal congestion on the outcome of underlying disease resolution and medication side effects.

Results: Most decongestants are not approved for use in children younger than 6 years. These drugs are available in intranasal or oral forms or in combination with antihistamines and are used to reduce symptoms in diseases that have nasal congestion (such as colds, flu, allergic rhinitis, sinusitis, …). Using these agents for more than 3 to 5 days can cause rebound congestion after withdrawal of the drug. In addition, except for allergic rhinitis, nasal decongestants do not have a significant effect in improving the symptoms of the other upper respiratory tract diseases.

Conclusions: Due to the low benefits and the increased risk of side effects, the use of decongestants is not recommended in the treatment of most pediatric pulmonary diseases.

Tracheo esophageal fistuls

Saba Ramezani[1], Soheila Hokm Abadi[2]
1. Pediatric pulmonary assistant at Shahid Beheshti University of Medical Sciences
2. Assistant professor, Pediatric pulmonary, Mazandaran university of medical sciences, Iran.

Background: The occurrence of esophageal atresia with tracheoesophageal fistula is 1 out of 3000–5000 live births Contrary to the relatively significant prevalence of TEF and Bronchoesophagus fistula, it is very rare. Congenital broncho-esophageal fistula (BEF) effects from an undue passageway caudal to the foregut lung anlage. BEF may be related to esophageal atresia and usually involves the right lung.

Case report: we present the case of a 2-year-old girl with Tracheoesophageal fistula (TEF) who presented with dysphagia of solids. She was treated surgically by the closure of the tracheoesophageal fistula and by end-to-end esophagus-esophageal anastomosis. Two years later, she suffered from excessive dysphagia to solids and coughed when feeding. Esophagography was repeated and revealed a second fistula between the right main-stem bronchus and the lower esophagus .and after performing fiberoptic bronchoscopy, we noticed a Bronchoesaphagous fistula in the apical segment of the right lower lobe.

Conclusion: In patients with tracheoesophageal fistulas, in addition to examining the trachea, we should also pay attention to the bronchi due to the possibility of a fistula.

Key words: Bronchoesaphagous fistula, tracheoesophageal fistula, Congenital

Chest X-in Pediatric Respiratory Illness

Dr. Abdolohamid jafari nodushan, MD
Assistant professor,pediatric pulmonologist
Department of pediatrics, Shahid Sadoughi University of medical science,Yazd, Iran

X-ray exams are used to help diagnose a wide variety of injuries and illnesses in children. It is often the first type of imaging used to identify sources of pain, evaluate traumatic injuries, and locate a foreign body.

Chest x-ray is the most commonly used imaging exam for evaluating the chest. It can help diagnose and assess:

- pneumonia
- tumors
- airway disease
- birth abnormalities
- trauma to blood vessels or lungs
- foreign bodies that have been swallowed or inhaled.

- Following a set system can be helpful as you’re learning to read CXRs

ABCDEFG

- Airways
- Bones
- Cardiac
- Diaphragm
- Equipment
- Fields
- Great Vessels

Airways

- Is trachea midline or deviated?
- Is anything collapsed or plugged?
- Angle of the carina?
- Normal: ~90o

Bones

- Trace outlines of clavicles & full ribs for fractures
- Follow the curves of ribs
- Posterior ribs: more horizontal
- Anterior ribs: more curved
- How many visible ribs?

Cardiac

- Size and positioning of the heart?
- Cardiomegaly: width of heart >1/2 of rib cage width
- Dextrocardia
- Abnormal silhouette?

Diaphragm

- Does it appear symmetric?
- Normal for right hemidiaphragm to be slightly superior compared to left
- Is the costophrenic angle sharp?
- Is there free air inferior to diaphragm?

Equipment

- What equipment is actually visible?
- Leads, tubes, wires

- Is everything in the correct place?
- Nasogastric tube
- Tip should end in stomach (not esophagus or bronchi)
- Endotracheal tube
- Should end >2cm superior to carina (not right or left main bronchus)

Fields

- Which lung and lobe? Multiple?
- Unilateral? Bilateral?
- Dependent?

Great vessels

Terminology Review

- Pneumothorax: air between lungs and chest wall
- Air where it shouldn’t be (darkness where it shouldn’t be)
- Consolidation: filled with tissue/fluid debris
- Junk where it shouldn’t be (radiopacity where it shouldn’t be)
- Atelectasis: partial or complete lung collapse
- Effusion: accumulation of fluid in confined space
- Pleural, pericardial

Pneumothorax

- Air between the pleura and chest wall
- Usually a fine edge demarcates it
- Uniformly distributed
- Watch for pathologic site of damage (burst apical blebs)
- Almost always unilateral

• In pediatrics, can be associated with connective tissue conditions, but can also appear spontaneously in tall, thinner patients

Consolidation

• Think about WHAT the consolidation is with respect to your patient's pathophysiology

• Is it blood, chyle, pus/infection?

• Is it bilateral, unilateral?

• Can be very heterogenous, difficult to assess anatomy/distribution

• In pediatrics, the overall assessment of the patient is crucial.

Atelectasis

• Loss of lung volume secondary to collapse

• Volume loss = most important radiographic sign of collapse

• Less air inflating lung → less black

• Linear increased density on chest x-ray

• Most common cause: Bronchial obstruction → distal gas resorption → reduced volume of gas → alveolar walls collapse → size of area reduced

• Can sometimes see the obstructing lesion on XR

Pleural Effusion

• More liquid now adding another layer x-rays must pass through → less black

• Transudative

• Caused by fluid shifts

• ↑ hydrostatic pressure or ↓ oncotic pressure

• Exudative

• Caused by

Key words: chest x-Rey- respiratory disease-children

Determinants of Complicated Pneumonia in Hospitalized Pediatric Patients: PlumX Metrics

Mohammadreza Mirkarimi, Mohsen Alisamir, Parastoo Nasiri, Shahriar Barouti, Shooka Mohammadi

Abstract

Pediatric complicated pneumonia (PCOMP) is the leading cause of mortality in children under the age of five. The study was conducted to determine the epidemiological and clinical characteristics of children with PCOMP. A retrospective study was carried out among all pediatric patients who were hospitalized due to complicated pneumonia in Abuzar Hospital (Ahvaz, Iran) during two years. The patients were evaluated in terms of epidemiological and clinical characteristics. A total of 65 hospitalized children and infants were identified. More than half of the patients were females (n=36; 55.3%). Their mean age was 4.21±3.80 years (range six months-15 years), and 64.1% of them (n=42) were under the age of five. There were 12 (19.4%) patients with failure to thrive (FTT). In addition, 58.5% of patients (n=38) had no history of hospitalization, and 66.2% of them (n=43) did not have any underlying disease. The mean length of hospital stay (LOS) was 12.46±6.85 (range 4-45) days. Admission was more common in winter (40%) and autumn (33.8%). Moreover, there were no significant associations between the types of complications and patients' gender, age, FTT, and LOS. Further studies are warranted to identify factors contributing to disease severity and develop appropriate strategies for the prevention and treatment of PCOMP among Iranian children.

Hemothorax

Akbar zamani
Amirkabir hospital, Department of pediatric, Arak University of medical sciences, Arak, Iran

Background: Hemothorax is the presence of blood in the pleural space, specifically when the hematocrit of the pleural fluid is greater than or equal to 50% of that of the peripheral blood.

Hemothorax in children is a rare occurrence but is a relatively common complication of serious thoracic trauma and is associated with a high mortality rate. One of the types of hemothorax classification includes traumatic, iatrogenic and non-traumatic. Children have more compliant thoracic cages than adults because of ligamentous laxity and more flexible developing bones; as a result, significant intrathoracic trauma can occur with minimal external signs of injury. Therefore, hemothorax should be considered in all cases of blunt and penetrating chest trauma in children. Hemothoraces can also be iatrogenic, occurring after chest drain insertion, intrathoracic surgery, or with the inappropriate placement of central lines.

Objectives: Hemothoraces can cause significant cardiorespiratory effects, including cardiac arrest, and can be complicated by secondary infection and fibrosis, causing “trapped lung,” although these complications appear to be less frequent in children than in adults. The hemothorax may develop from blood draining into the pleural space from the lung, airway, esophagus, heart, or chest wall and may occur in conjunction with a pneumothorax termed “hemopneumothorax.” The four main potential pleural complications of traumatic hemothorax are the retention of clotted blood in the pleural space, pleural infection, pleural effusion, and perhaps fibrothorax.

Methods: Hemothorax can be diagnosed on CXR, or in the setting of trauma, a focused assessment with sonography for trauma (FAST) ultrasound scan may be considered and may be more sensitive than CXR. On CT scans, hyperdensity, due to the high hemoglobin content of retracted clot or sedimented blood, may point toward a hematoma.

Results: Treatment will depend on the nature of the injury (either penetrating or blunt force), size of the hemothorax, and clinical status of the patient.

Some pediatric patients with hemothorax can be managed conservatively with close observation. Others, particularly those with penetrating chest injuries or large hemothoraces, will require tube thoracostomies or open thoracic surgery to stop the bleeding.

Key words: hemothorax, trauma, hematocrit, FAST, thoracostomy

Nutrition, Obesity and Asthma in Children

Somaye Fatahi
Department of Clinical Nutrition and Dietetics, Faculty of Nutrition and Food Technology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Obesity is an important public health problem. WHO estimates that about 39 million children younger than 5 years of age are overweighted or obese. On the other hand, asthma is the most prevalent chronic disease in childhood, and thus, many children share those two conditions. Some respiratory changes have been described in obese children and, specially, the development of the so called “dysanapsis” (the disproportionate scaling of airway dimensions to lung volume) which seems to be common during the first stages of life, probably related to the early development of this condition.

It has been hypothesized that these increases are a consequence of changing environmental and/or behavioral factors. The modification of dietary habits (ie, decreased intake of fruits/vegetables and increased intake of “Westernized” processed foods) and a decrease in sun exposure have led to decreased intake of antioxidant vitamins and fatty acids and to decreased circulating levels of vitamin D, and have been proposed to explain the rise in asthma prevalence.

استفاده از نبولایزر برای استعمال داروهایی که تاکنون به روش استنشاقی مورد استفاده نبوده‌اند

Dr Sedigheh Yousefzadegan
Pediatric Pulmonologist, Department of Pediatrics, Rasoul Akram Central Hospital, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

تجویز داروها از طریق نبولایز کردن آن‌ها، همواره یکی از موثرترین و کم‌عارضه‌ترین راه‌های تجویز دارو در مشکلات ریوی به خصوص در گروه کودکان بوده است. گروه‌های دارویی که تاکنون بیشتر به منظور درمان بیماری‌های ریوی (از جمله سیستیک فیبروزیس) استفاده می‌شده‌اند شامل برونکودیلاتورها، کوتیکواستروییدها، آنتی‌بیوتیک‌ها و موکولیتیک‌ها بوده‌اند و علت اصلی استفاده از این روش از دیرباز، اثربخشی موضعی بهتر دارو در دستگاه تنفس بوده است ولی با توجه به سطح جذبی بالا در ریه، و سرعت بالای ورود دارو به گردش خون از این طریق، در سال‌های اخیر پژوهشگران درصدد برآمدند تا از اثرات سیستمیک تجویز دارو در ریه نیز استفاده نمایند. برای مثال تجویز موفقیت‌آمیز و بی‌خطر انسولین با این روش، دریچه‌ای در ابداع درمان‌های جدید برای بیماری‌های مزمنی چون دیابت باز نموده و اخیراً توصیه به استفاده از آن‌ها به عنوان یک گزینه درمانی شده است. نبولایز سورفکتانت نیز در ARDS و COVID19 بررسی شده است. انواعی از آنتی‌بیوتیک‌ها هم اخیراً به شیوه نبولایز امتحان شده‌اند مانند سیپروفلوکساسین و لووفلوکسین، آزترئونام، آمفوتریسین B و ... از سایر داروهای که به شیوه نبولایز استفاده شده‌اند می‌توان به Denofosol و Lancovutide و آنتی‌پروتئازها اشاره نمود.

در اینجا مزایا و معایب استفاده از این روش استفاده را در مورد داروهای جدید ذکر شده بررسی و ارزیابی خواهیم کرد و به نوع دستگاه نبولایزر مناسب، از جهت سایز پارتیکل‌های دارویی مناسب و مدت اثر اشاره خواهد شد.

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