

## RESEARCH ARTICLE

# Pulmonary Tuberculosis Wheezing in Early Childhood

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**Background:** Primary pulmonary tuberculosis in children and infants can be suggested by the presence of a wheezing, often interpreted as acute bronchiolitis or asthma. The objective of this study is to assess the frequency and mechanism of wheezing in infants and toddlers with tuberculosis and to assess its value as an alarm symptom in children from areas where tuberculosis incidence is high.

**Material and method:** We carried out a retrospective study in the Pediatric Clinic of the "Filantropia" Municipal Hospital of Craiova between 2007–2011. We studied 25 children and infants, who at hospitalization presented signs like: wheezing, cough and dyspnoea.

**Results:** There were 25 children and infants diagnosed with primary tuberculosis. Twenty-one cases (84%) came from rural areas and 56% (14 cases) occurred in infants. Out of the 25 cases, 22 (88%) presented wheezing, 18 (72%) were accompanied by dyspnoea and 16 patients (64%) presented cough. The majority of cases (16 out of 25, representing 64%) came from families in which a tuberculosis focus was identified during the epidemiological investigation.

**Conclusions:** The positive epidemiological research, together with other data provided by the clinical, laboratory analyses and the collaboration with other specialties determine the classification of wheezing as a symptom within tuberculosis.

**Keywords:** wheezing, tuberculosis, child

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## Introduction

Wheezing can be one of the clinical manifestations of primary pulmonary tuberculosis onset in infants and toddlers, especially when it is associated with other signs and symptoms like low grade fever, loss of appetite, weight loss, etc. About 20–30% of infants develop a wheezing episode [1]. This symptom is frequently assigned to an acute respiratory viral infection or to the recurrent post-bronchiolitis wheezing, when such episodes are present in the personal antecedents [2,3]. The diagnosis of asthma may also be suggested by the presence of wheezing, but this can cover the evolution of a primary complex or some compressive mediastinal masses on the tracheobronchial tree. It is important for a clinician to evaluate correctly the patient and the diagnosis, in order to establish an appropriate therapeutic scheme. For the correct interpretation of such a clinical case a close collaboration between the general practitioner (GP), pediatrician and pneumologist, together with the laboratory physician and the radiologist is necessary. If the differentiation between the non-specific infectious, usually viral cause of wheezing, and the atopic field is relatively easily established, the specific tubercular etiology may be suggested if we insist on the epidemiological research, but also by the clinical, laboratory and X-ray examination, given the fact that child tuberculosis is especially present in areas with high epidemiological risk [4,5].

If wheezing occurs in the first year of life in the context of respiratory infections, the risk of asthma is higher [6].

Therefore a faster orientation of the clinician regarding the tubercular etiology of a child who presents wheezing and an early start of specific treatment positively influences the prognosis, being known that up to the age of 5, primary tuberculosis in a child may lead to severe types of miliary or tubercular meningitis [7]. At the same time, it is necessary to make the differentiation between tuberculosis infection and the tuberculosis disease, the therapeutic attitude being different [4,5].

The objective of this study is to assess the frequency and mechanism of wheezing in infants and toddlers with tuberculosis and its value as an alarm symptom in children from areas where tuberculosis incidence is high.

## Material and method

We carried out a retrospective research in which we included hospitalized children from the Pediatric Clinic of „Filantropia” Municipal Hospital in Craiova between 2007–2011. There were 14,646 admissions in the above mentioned period, out of which 6503 patients had a respiratory disease. Out of these, 572 children presented wheezing and 25 were confirmed with primary tuberculosis, requiring transfer to the Clinic of Pediatric Pneumology.

We studied the patients' medical files. Inclusion criteria were: children aged 0–3 years, diagnosis of tuberculosis in the hospital and the presence of wheezing in the clinical picture. We assessed the following parameters: age, socio-economic status, epidemiological data — contact with a source case in the family and symptoms — wheezing, cough and dyspnea. Data was collected and processed with Microsoft Excel.

## Results

In the research group the highest number of diagnosed tuberculosis in early childhood cases came from rural areas, namely 21 cases (84%), compared to 4 cases (16%) from urban areas. Fourteen cases (56%) were diagnosed in children. The most frequent identified symptom was wheezing. This was present in 22 children out of the 25 diagnosed with tuberculosis, representing 88%. Also, cough was present in 16 children (64%) and dyspnea in 18 cases (72%).

## Discussions

The population who receives medical assistance is mainly made up of children from Dolj County, but also of patients from the adjacent areas. Dolj County remains on the first places at national level regarding the incidence of tuberculosis. This varies in the researched period from 146%000 to 172%000, compared to the national values of between 90.5%000 and 117.8%000.

The fact that 21 cases come from rural areas, compared to only 4 from urban areas can be explained by the greater incidence of tuberculosis in rural areas, but especially by the socio-economic characteristics of these children [4,5,7].

The majority of cases (16 out of 25, representing 64%) came from families in which the contact with a source case was identified during the epidemiological research. These were represented by the family members, usually mothers, rarely other persons like father, uncle, grandparents, who, in the last 12 months were diagnosed and were given a strictly supervised treatment, with one of the schemes specified by the Tuberculosis Control National Programme. Figures correlate with data from the specialized literature which raise attention on the fact that tuberculosis in a child represents a true indicator on the control of this disease in the territory served [9].

The greater number of diagnosed children in rural areas can be explained by the fact that the greatest number of source patients is recruited from this territory, because they neglect their health and they interrupt the prescribed specific anti-tubercular treatment. Epidemiological research is regularly made in urban areas by a specialized staff, from the pneumatology dispensaries, benefiting from the contribution of every medical echelon (paediatrics, internal medicine, etc.). In rural areas, this is the GPs' task. Different levels of competence and implication in correctly and completely identifying the consumptive's contacts could be an explanation for the preponderance of cases in early childhood.

The data collected at the level of Dolj county by the Public Health Service refer to the 0–14 year age group. In this age group, there were 148 new registered cases in the researched period, out of which 68 (45.9%) came from rural areas.

The greater incidence in the first year of life (56%) can be justified by the immaturity of the immune system in early childhood compared to other stages, but also by the close contact which the child has with the source case which is

usually the non-diagnosed mother [10]. The infant spends much time with parents or other family members, thus creating the conditions for a persistent contact with the tuberculous sources. These data also correlate with the rural origin of diagnosed children, the home characteristics with smaller volume of air than in urban areas promoting the development of the disease [4].

The most frequent identified symptom in the researched group was wheezing. The fact that wheezing is not specific for tuberculosis is also confirmed by our research, only 3.84% of the hospitalized children with wheezing being diagnosed with tuberculosis. The rest of the cases were diagnosed with non-specific respiratory infections or atopic recurrent wheezing.

Symptom sensitivity can not be a singular criterion for suspecting wheezing children of tuberculosis, but its association with data from the anamnesis, especially the close contact with a symptomatic bacillary obliges the clinician to make the differential diagnosis with this disease. In the researched group, 3 children were initially treated of recurrent wheezing within asthma causing a transient remission of symptoms, explained by the fact that the administered cortisone medicines (sprays or aerosol sprays) have a positive effect also in tuberculosis cases [11]. This reinforces the observation that in case of children who present wheezing and are in close contact with a tuberculosis source, tuberculosis should be considered as a differential diagnosis.

## Conclusions

Wheezing plays an important part in the respiratory pathology of the child and infant. The primary complex in evolution and its sequels can occur with wheezing, often assigned to other diseases, such as asthma, post-viral bronchiolitis, etc). The positive epidemiological research, together with other data provided by the clinical, laboratory analyses and the collaboration with other specialties determine the classification of wheezing as a symptom within tuberculosis.

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