

## Research Article

### Childhood Asthma: Diagnostic Difficulties in Resource Limited Health Centres

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**Abstract:** Case report of three and a half years old boy with recurrent chest problems which have been mismanaged in several health centres due to limited facility to make a proper diagnosis. This report is meant to highlight the difficulties asthmatic children and their caregivers face in resource limited health centres.

**Keywords:** Asthma, childhood, diagnostic difficulties, KIUTH, mismanaged, resource limited, Uganda

#### INTRODUCTION

B.H, a three and half years old boy, who resides with his grandmother at Bunyaruguru, Munyankole by tribe was admitted through the Accident and Emergency unit at 2.00 am on the 11<sup>th</sup> of June, 2011. He presented with cough and fever for 3 days. Cough was dry, severe, worse at night and preceded by a runny nose. It was associated with difficulty in breathing and wheezing. The fever was intermittent, high grade but not associated with convulsion. There was no blue spells or feeding difficulty or diaphoresis. He has had four previous admissions for similar problems. The first was at 6 months of age in Butane clinic, where he was admitted for 1 week. The second was for 5 days, at 1 year of age in Comboni Health Centre, the third and fourth, at two and half years of age and 3 years, in Ishaka Adventist Hospital and KIUTH, respectively for 4 days and received Oxygen, IV fluids and antibiotics. He was treated as for bronchopneumonia. His pregnancy and birth history were unknown to the grandmother, he was first immunised at 2 months of age, but had completed the primary childhood immunisation for age. He was started on cow's milk at 1 month of age and currently is on family diet. He is the only child of the parents, but was abandoned to his paternal grandmother who smokes but does not take alcohol. She is a peasant farmer, who keeps cows and goats, digs and cares for 3 other children. They live in 4 roomed temporary house that is not cemented. She cooks outside the house with firewood and the child often accompanies her. There was a family history of recurrent itchy eyes and running nose in the father and grandmother but no family history of Asthma.

On examination at admission, he was of good nutritional status, very sick looking, tachypnaeic (RR = 40 c/min) and tachycardic (HR = 130 b/min), afebrile and with blood pressure of 100/60 mmHg. He was lethargic, in severe respiratory distress as evidenced by head nodding, grunting, nasal flaring, chest indrawing, intercostal recession and audible wheeze, however, he was acyanosed. His chest was almost barrel shaped with increased anterior-posterior diameter. Equal breath sounds, expiratory wheeze and crackles in all lung fields on auscultation. We made a working diagnosis of bronchiolitis with superimposed severe bronchopneumonia and differentials of acute severe asthma, acyanotic congenital heart disease. CXR revealed hyper-inflation with peri-hilar infiltrates in the lungs.

There was unremarkable improvement with continuous intranasal Oxygen at 3 L/min, 10% Dextrose 5 mL/kg bolus, NGT feeding, iv benzyl penicillin 0.5 mu 6 h, iv chloramphenicol 250 mg 6 h and nebulized salbutamol 25 mg/3 mL every 20 min on the first day of admission, however he responded slowly but progressively to sc epinephrine 0.01 mL/kg stat then repeated every 20 min (he received 2 doses), iv hydrocortisone 5 mg/kg/6 h, iv aminophylline 5 mg/kg stat (slowly) then 2 mg/kg/day in continuous infusion, with an increase in the pulse oxymetry to 97% from the second day of admission. He was discharged after 3 days, with a final diagnosis of severe acute asthma, on tabs prednisolone 10 mg 8 h for 5 days, then 10 mg daily for 2 days, salbutamol inhaler 2 puffs prn for wheeze, tabs montelukast 4 mg daily for 1 month and amoxicillin capsules 250 mg 8 h for 5 days. The grandmother was educated on the child's conditions,

treatment and preventive measures. He has not yet come for follow-up in the out-patient department.

## DISCUSSION

Asthma is common and becoming more so in children with increasing social and environmental development. However, there are difficulties in diagnosing asthma in very young children below the age of 3 years due to their age-related narrow airway which is disproportionate to their lung volumes, the predominance of wheeze-producing viral respiratory tract infections in this age group, the inability of their immune system to mount up IgE-specific antibodies against aero-allergens at this age (Ross *et al.*, 2003) and limited resources. So therefore often times, we misdiagnose asthma, for bronchopneumonia, upper respiratory tract infections, bronchiolitis, acute bronchitis, congenital heart disease to mention a few. As a result, over treatment with antibiotics with frequent hospitalisation occurs (Marra *et al.*, 2011).

In a study in Poland, where asthma was diagnosed using skin prick tests, screening spirometry and additional tests in doubtful cases in individuals from 3-80 years of age. They reported that accurate diagnosis of asthma had not been made in 71% of symptomatic children and 49% of the adults (Kupryś-Lipińska *et al.*, 2010). This problem is compounded by the inability of these young children to cooperate and participate in the pulmonary function tests (especially the exercise bronchoprovocation test), that could assist in diagnosis (Kupryś-Lipińska *et al.*, 2010). Moreover, many health facilities in the third world do not have the capacity to carry out these tests. Despite this uncertainty in diagnosis, asthma medication is often overprescribed to wheezing infants. Moreover, the response to asthma medication itself is widely used as a diagnostic tool to strengthen or reject the possible diagnosis of asthma and the general consensus is that from the age of 5 to 6 years a diagnosis of asthma can be made with reasonable certainty. In a Dutch National survey in 2001, only 49% of all children receiving asthma medication was diagnosed as an asthmatic. The prescribing of asthma medication was highest in children age 0-2 years (11.7%) and steadily declined with rising age, to 5.1% in the group of 15-17 year old children (Zuidegeest *et al.*, 2008).

Hence, diagnosing Asthma in the very young is clinically based without a single confirmatory diagnostic test, only corroboration of the diagnosis with changes in lung function or response to treatment. In the past, lung function testing was not possible before the age of about 5 years, but several newer tests may

enable testing somewhat earlier (e.g., specific airways resistance, impulse oscillometry and measurements of residual volume) although none as yet has been fully evaluated and certainly not available in resource limited health centres (Zuidegeest *et al.*, 2008).

Many people consider 'wheeze' synonymous with asthma, yet there are many different causes of wheeze in childhood and increasingly we recognise different 'phenotypes' of wheezing. These are usually determined retrospectively as they depend on the pattern of symptoms over time. Different wheezing phenotypes have been described in children below the age of 6 of which transient early wheezing is the most common one, accounting for over 50% of wheezing children. This wheezing phenotype is often outgrown in the first 3 years of life and only a minority of wheezing children will develop persistent atopic asthma over time. The outflow obstruction reverses either spontaneously or with medication. Atopic asthma is more common in school-aged children. Boys are affected more before puberty (3 times greater prevalence). The female gender and more severe, frequent wheezing episodes are risk factors for persistence of asthma into adulthood<sup>4</sup>.

In making a diagnosis, we need a good history, looking for specific symptoms like recurrent wheezing, shortness of breath, chronic day and night cough as we saw in B.H and also, chest tightness, exercise limitations and mucoid vomiting. History of associated problems like rhinitis, dermatitis, atopy were present in B.H. History of precipitating triggers like early introduction of cowmilk, viral infections, tobacco smoke, vigorous exercise, irritant exposure, to mention a few, which B.H was likely to have been exposed to often (Ross *et al.*, 2003).

Past treatment history of improvement with inhaled bronchodilator or anti-inflammatory medications, but no improvement with antibiotics or antihistamine treatment is also suggestive (Ross *et al.*, 2003). However, B.H had no past history of being treated with inhaled bronchodilator or anti-inflammatory medications, but he did not improve with antibiotics in this index admission.

B.H is an early wheezer. He began to wheeze within the first year of life, with poor socioeconomic status, the history of atopy and early introduction of cowmilk, moreover, his grandmother smokes, cooks with firewood, keeps animals in the house, the floor of their apartment is uncemented (cold raw earth), he is likely to become a persistent wheezer, with frequent severe exacerbations, even into adult life.

The signs on presentation depends on whether the patient was seen in between attacks or during an acute episode or during a very severe attack. In the symptom-free interval, the signs are minimal and may include

only a prolonged expiratory time and wet cough. In the acute phase, there may be wheezing sounds, evidence of respiratory distress: tachypnea and use of accessory muscles of respiration, reduced airflow throughout the lung fields and chest hyperinflation. The very severe cases are characterized by absent wheeze, severe respiratory distress, flushed moist skin, dry mucus membrane, cyanosis, pulsus paradoxus, agitation or lethargy, silent chest, inability to complete a sentence or talk and altered sensorium. Our patient presented in the acute phase (Ross *et al.*, 2003).

The chest Xray findings in a case of longstanding or severe asthma include evidence of lung hyperinflation (flattened diaphragm, hyperlucency of the lungs, horizontal ribs, increased space between the ribs, box-shaped chest cavity, increased number of ribs above the diaphragm and diminished cardiac shadow), heavy lung markings and peribronchial thickening.

There is an urgent need in our healthcare system, which requires appropriate actions to develop simple, cost-effective, reliable measures aimed at early diagnosis and intervention before the patient's health deteriorates irreversibly. This will also go a long way to

reduce the burden of frequent admissions, school absenteeism and health care cost.

## REFERENCES

- Kupryś-Lipińska, I., A. Elgalal and P. Kuna, 2010. The underdiagnosis and undertreatment of asthma in general population of the Lodz Province (Poland). *Pneumonol. Alergol. Pol.*, 78(1): 21-7.
- Marra, F., C.A. Marra, K. Richardson, L.D. Lynd and M.J. Fitzgerald, 2011. Antibiotic consumption in children prior to diagnosis of asthma. *BMC Pulm. Med.*, 11(32).
- Ross, M.H., C.M. Mjaanes and R. Lemanske, 2003. Asthma. In: Rudolph, C.D. and A.M. Rudolph (Eds.), *Rudolph's Pediatrics*. 21st Edn., McGraw-Hill, New York, pp: 1950-1963.
- Zuidgeest, M.G., L. Van Dijk, H.A. Smit, J.C. Van Der Wouden, B. Brunekreef, H.G. Leufkens and M. Bracke, 2008. Prescription of respiratory medication without an asthma diagnosis in children: A population based study. *BMC Health Serv. Res.*, 8(16).