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Acute Severe & Life Threatening Asthma in Children – Experience at Tertiary Care Centre

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ABSTRACT *An acute severe asthma or life threatening asthma (status asthmaticus) is an acute attack of asthma where patient fails to respond to bronchodilator therapy. Delay in diagnosis and treatment can lead to serious consequences like respiratory failure & death. This hospital based study was carried out to know the admission rate of acute severe and life threatening asthma in children, their clinical profile and outcome.*

KEYWORDS : Acute severe asthma, admission rate, children.

Introduction: Poorly controlled asthma has significant effect on growth of child and possibility of risk of life threatening asthma.

Acute severe asthma remains a major economic problem and health burden .The natural history is recovery, in most of the patients and mortality in very few about 0.4 %(1). In one of the study done by Aguilar Rios JM in Mexican children and teenagers the prevalence of acute severe asthma was 10.3 %(2). The rate of intensive care admissions due to acute severe asthma in children varied between 2-20% and rate of intubation and rate of respiratory support fluctuated between 2-70%(1).Pal et al reported a mean prevalence of asthma in Indian children as7.24 ± SD 5.42%. (3) Similar prevalence was reported by Amir et al (4).

We decided to perform this study in view to find the admission rate, clinical profile, arterial blood gas parameters, treatment regimens, need of intensive care, need of artificial ventilation and outcome of acute severe and life threatening asthma in children at our institute.

Material & Methods: This was a prospective observational study. After obtaining ethical clearance from institutional ethics committee, all children (between 02 to 12 years of age) who were admitted to pediatric ward or intensive care unit with severe /life threatening asthma Physician's diagnosis using BTS guidelines 5 during Jan09 to Dec09 were enrolled in the study. A detailed history along with demographic data was noted. All patients were examined clinically and underwent necessary investigations like-complete hemogram, arterial blood gas analysis, x-ray chest etc. Patients were monitored and treated (as per GINA guidelines). The outcome of patients was studied in terms of mortality and immediate morbidity if any.

Results: Among the total annual admission of5306 children, 44 were diagnosed to have acute severe asthma. Thirty six out of 44 children were enrolled in the study (Table: 1 here).

Thirty four had acute severe asthma & 02 had life threatening asthma. The annual admission rate of acute severe asthma and life threatening asthma were 0.8% & 0.03% respectively. Seventeen (47.2%) out of 36 children were between age group of 2-4 years with mean age of 3.57± 2.52 years and M: F ratio 1:1.5. History revealed sixteen (44.4%) children had family history of asthma. Thirty two (88.8%) children had similar episodes in the past with 19 (52.7%) requiring recurrent admissions. Parental unawareness towards disease and available treatment was observed in 21(58.3%) children and only 07 (19.4%) children were on controller medications (Table: 2 here)

Cough, breathlessness, inability to speak & feed were the chief complaints present in all children. On examination, all patients had respiratory distress, 21 children (58.3%) had lethargy 14 (38.8%) had excessive perspiration & only two patients had altered sensorium and shock. Seventy five percent of children had haemoglobin less than 10gm%. Chest radiology revealed hyperinflation in 15(41.6%) of children. Twenty one patients had oxygen saturation between 90 - 92% and 10 had less than 90%.Arterial blood gas analyses showed compensated metabolic acidosis in twenty two (61.1%) and hypoxemia in 10 (27.7%). Maximum number of patients (29/36) responded to oxygen, repeated nebulization with salbutamol plus ipratropium bromide & systemic steroids. Three children required intravenous aminophylline and 04 children required intravenous magnesium sulphate in addition. None of them required ventilation. Only two out 36 required ICU care and average duration of stay was 3 days. All survived without any complication.

Discussion: The prevalence of acute severe asthma in our study was 0.8% among total indoor annual admissions of 5038 during study period. In a study done by Aguilar et al the reported incidence of acute severe asthma was 10.3 %.(2) while Hartman et al found 22.8% of total asthma admissions are due to status asthmaticus. (6). While Simatovic et al found increase in intensive care admission due to acute asthma in children as compare to adults. (7) In our study only two patients of life threatening asthma required intensive care.

The mean age of children in our study was 3.5years which was similar in a study done by Kam Lun Han and Gonzalez (8, 9).Our study showed very low rate of intensive care admissions (0.03%) which may be due to direct referral and immediate treatment while few also received prior treatment. In a study done by Deho et al, 85% children required intensive care (10) while Kam Lun Han reported 3% of total PICU admission as life threatening asthma(8).

As an established fact, we also found family history of asthma as a risk factor for acute severe and life threatening asthma. Other risk factors were young age, recurrent emergency admissions, parental unawareness and no controller medications in spite of recurrent attacks. Similar risk factors were noted in a study done by Kam Lun Han (8).Van den Bosch et al reported smoking, allergies, previous hospitalization and non-sanitized homes as risk factors for acute asthma in children (11).

A significant association was observed between episodes of acute upper respiratory tract infection and asthma in our study (47.2%), which was also reported by Aguilar Rios (2)

Compensated metabolic acidosis was found in 61% of patients. Because of non-availability of lactate and pyruvate levels we cannot comment whether it was type A or type B lactic acidosis. Type A metabolic acidosis results from hypoxemia while type B is because of adrenergic stimulation. Meert KL et al reported type B metabolic acidosis in 45% of children with acute severe asthma (12).

In a study done by Kam Lun Han 06 out 30 children required MgSO4 and ventilator care. In our study only 04 children required magnesium sulphate but none required ventilation support. Mean duration of stay in a study done by Kam Lun Han, was 2 v/s 2.5days in non-ventilated and ventilated patients respectively and he reported complication of pneumothorax in one patient but no mortality (8). In our study mean duration of stay was 3 ±1.5 days and there was no complication or mortality. Mc Fadden reported 8% mortality in intubated and ventilated adult asthma patients (1).

Conclusion: In this single institutional study, we found that younger age, positive family history, recurrent emergency department visits, no controller medications and parental unawareness as risk factors for acute severe asthma in children. Majority of patients had metabolic acidosis and response to nebulization and steroids was satisfactory. None of the children required ventilator support and all survived.

There is paucity of data about incidence of acute severe asthma in Indian children. In this view a well-planned, nationwide, multicentric trials should be carried out to generate the correct data.

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	Number of patients
Total number of annual admission in ward	5306
Total number of acute asthma admitted in ward	44
Total number patient enrolled	36
Acute severe asthma	34 **(0.8%)**
Life threatening asthma	02 **(0.03%)**

Table -1 Admission rate of acute severe & Life threatening asthma

Table : 2 History of previous admission, drugs, family history, treatment history

History	Number of Patients (n = 36)	Percentage
Frequent previous admission	19	52.7%
On controller drugs	7	19.4%
Family history of asthma	16	44.4%
Parental unawareness	21	58.3%
History of similar episode in past	32	88.8%
History of upper respiratory tract infection	17	47.2%

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