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Evaluation of asthma with special reference to asthma evaluation score

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Abstract
Objective: Assess severity with different asthma scores, correlate PEFR & Spo2 with clinical scores.
Methods: Prospective study done at tertiary hospital including 100 asthma children. Clinical asthma evaluation score (D.W.), Pulmonary index (Becker) & Pulmonary score (Sharon smith) with Spo2 &PEFR measured initially & 1 hour after treatment. Acute severe asthma on presentation & no significant improvement after 1 hour of Rx were admitted.
Results: In W.D, 1(100%), 8(100%) & 54/91(59.3%) with score>7, 6-7& 0-5 respectively admitted. In P.I.16 (100%), 45/63(71.42%) & 2/21(9.5%) with score >6, 4-6& 0-3respectively admitted. In P.S. 11(100%), 49/65(75.38%) & 3/24(12.5%) with score>6, 4-6&0-3 respectively admitted. No patients with PEFR>= 80% admitted. All patients with SPO2<=90% admitted. Coefficient of correlation between PEFR &score W.D., P.I. & P.S. IS -0.65, -0.64 & -0.66 respectively. Coeff. of correlation between SPO2 & score W.D., P.I. & P.S. is 0.68, 0.67 & 0.62 respectively.
Conclusion: PEFR have significant negative correlation with scores. But pulmonary score is easy to perform & doesn't require laboratory assistance. SPO2 show significant negative correlation with scores.

Keywords: Asthma score, PEFR, SPO2

Introduction
Asthma is a Greek word meaning hard breathing. It was called "Tamaka Swara" in Charak Samhita in ancient India. Asthma is a heterogeneous disease, usually characterised 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 expiratoryairflow limitation [1]. Approx. 80% of all asthmatics report disease onset prior to 6 years of age [2]. Assessing acute asthma severity is subjective and imprecise, in part because physicians have limited objective means with which to make this determination [3]. % FEV1 by spirometry is the accepted reference std. for severity of airflow obstruction but requires personal training & can't be performed frequently by younger children & patients in respiratory distress. When available, spirometry was used in less than 2% of visits for acute asthma in a pediatric emergency department [4]. Bedside acute asthma scoring might facilitate communication between health care providers and implementation of timely and appropriate therapy. This study was done to assess severity of acute asthma according to different clinical score & correlation with pulse oximetry & PEFR. To obtain better asthma evaluation score from most commonly used scores.

Methods
Cross sectional study carried out on 100 patients of known case of bronchial asthma in paediatric depart. of tertiary care hospital. Patients with acute bronchiolitis, heart disease, BPD & other chronic disease were excluded. All demographics data, history, clinical parameters, asthma scores were recorded in case record sheet after informed written consent of parents. Clinical asthma scores included in this study are (1) clinical asthma evaluation score (wood D.W.) (W.D.) [5] (2) Pulmonary index (Becker AB) (P.I.) [6] (3) Pulmonary score (Sharon Smith) (P.S.) [7]. All 3 scores along with pulse oximetry & PEFR (>5 years) value was recorded in all patients.

Table 1: Clinical asthma evaluation score (W.D.)

	0	1	2
PaO2/ Cynosis	70-100 in air/none	<70 in air	<70 in 40% O2
Inspi. breadth sound	Normal	Unequal	Decreased to absent
Accessary muscle use	None	Moderate	Maximal
Expiratory wheezing	None	Moderate	Marked
Cerebral function	Normal	Decreased/agitated	Coma

It was devised by wood D.W. *et al*. & published in Am J Dis child, 1972 as a clinical scoring system for diagnosis of respiratory failure. Score>5: impending respiratory failure, >7 + pCO2 65 mmhg: existing respiratory failure.

Table 2: Pulmonary Index

Score	RR per min	Wheeze	I:E ratio	Acc. muscle use
0	<30	None	5/2	0
1	31-45	Terminal exp. with stetho	5/3-5/4	+
2	46-60	Entire exp. with stetho	1/1	++
3	>60	Insp.& Exp. without stetho	<1/1	+++

0-3 mild, 4-6 moderate, >6 severe. If no wheezing due to minimal air exchange, score-3

Table 3: Pulmonary score

Score	RR per minute		Wheeze	Ace. muscle use
	<6years	>6 years		
0	<30	<20	None	0
1	31-45	21-35	Terminal exp with stetho	+
2	46-60	36-50	Entire exp with stetho	++
3	>60	>50	Insp. & Exp without stetho	+++

Scores: 0-3 mild, 4-6 moderate, >6 severe

A pulse oximeter was used to measure SPO2 in room air. SPO2 value was registered after first minute of stabilisation as the value that remained most constant during second minute. PEFR was performed by children>5 years &done by wright peak flow meter children were asked to remain in Ortho static position & after max. Forced inspiration, make a strong & forceful expiration. It was performed 3 times & highest obtained value was taken. This value was expressed as percentage of predictive value, according to height/sex of the patient.

After initial evaluation, treatment was given with nebuliser/ inhaled salbutamol as per standard asthma management protocol [1]. After 1 hour of treatment, patient was assessed with clinical score, SPO2 & PEFR and compared with initial values. All patients with severe asthma as per P.S. and P.I. and Existing respiratory failure as per Wood score were admitted along with those who do not show significant improvement after 1 hour of treatment were also admitted. Supplemental oxygen was given in patients with SPO2 <93%.

Data were Analyze using SPSS software. t-test & Chi square tests or fisher exact tests were used to test significance of difference between two means & proportions respectively.

Results: Total 100 patients of asthma were enrolled in this study.

Table 4: Provides baseline characteristics of all patients.

Parameters		Present study	Other study
Age	<1 year	0%	
	1-5 years	68%	
	>5 years	32%	
Sex	Male	54%	64% (H. Paramesh) [8]
	Female	46%	30% (H. Paramesh)
Age of onset	<1	7%	26.3% (Paramesh *et al*.)
	1-5	78%	51.4% (Paramesh *et al*.)
	>5	15%	22.3% (Paramesh)
Aggrav. F	Respi. Inf.	51%	40% (Paramesh)
	Seasonal	35%	35% (Paramesh)
	Others	14%	25% (Paramesh)
Presenting comp.	Fever	50%	-
	Cough	100%	90% (Paramesh)
	Diff. breath.	97%	-
	Vomiting	6%	5% (Paramesh)
	Abdo. pain	3%	3% (Paramesh)
	Other	2%	1% (Paramesh)
Family H	Present	18%	18
Drug H	Irregular	43.9%(18/41)	
	Regular	56%(23/41)	
Classification aco to	Mild intermittent	63%	61% (Mizparo *et al*.) [9]

NAEPP	Mild persistent	25%	21.5% (Mizparo *et al.*)
	Mod persistant	12%	9.3% (Mizparo)
	Severe persistent	Nil	7.7% (Mizparo)
Inhalation drug delivery device use at home	MDI only	36%	
	MDI +Spacer	21.9%	
	MDI+Spacer+Mask	14.6%	
	Nebuliser	-	
	Rotahaler	-	

Table 5: Clinical asthma evaluation score & hospitalisation

Initial score	Total	Admitted
0-5	91	54
6-7	08	08
>7	01	01

Out of 91 patients from 0-5 score group, 59.3% were admitted. All patients from 6-7 &>7 score groups were admitted. Improvement in Wood (D.W.) score after 1 hour of treatment shown in figure 1.

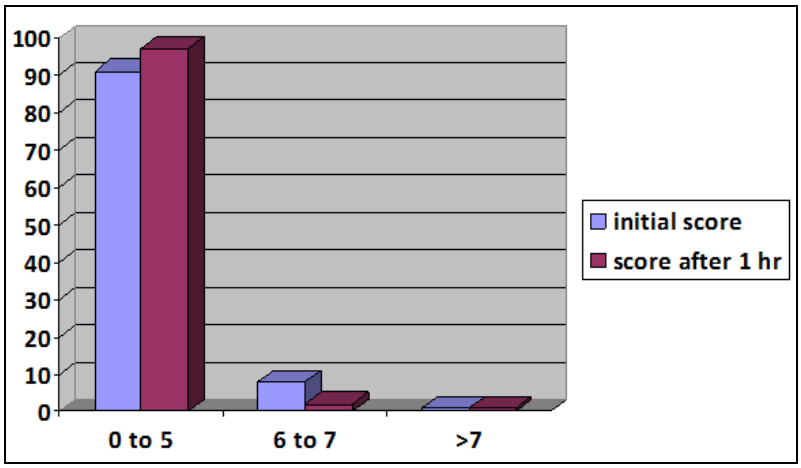

Fig 1: Improvement in wood (D.W.) score after 1 hour of treatment

Table 6: Pulmonary Index & hospitalisation

Initial Score	Total	Admitted
0-3 (mild)	21	02
4-6 (moderatr)	63	45
>6 (severe)	16	16

All patients with severe attack, 71.4% (45/63) of moderate & 9.5% (2/21) of mild attack were admitted. Improvement in P.I. after 1 hr of treatment shown in figure 2.

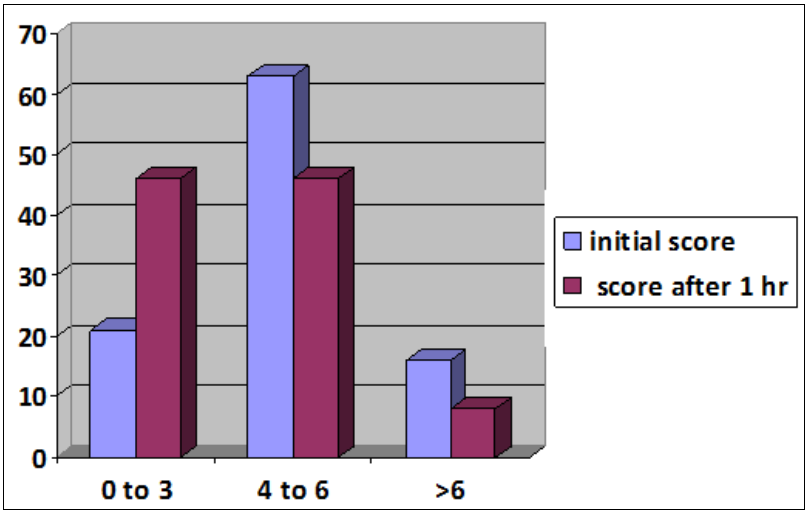

Fig 2: Improvement in P.I. after 1 hour of treatment

Table 6: Pulmonary score & hospitalisation rate

Initial Sore	Total	Admitted
0-3 (mild)	24	03
4-6 (moderate)	65	49
>6 (severe)	11	11

All patients with severe attack, 75.4% (49/65) patients with moderate & 12.5% (3/24) patients with mild attack were admitted. Improvement in P.S. after 1 hr of treatment shown in figure 3.

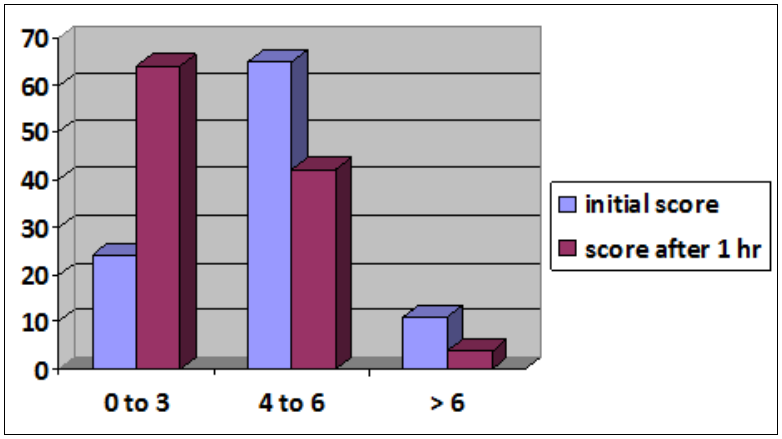

Fig 3: Improvement in P.S. after 1 hour of treatment

In this study, 32 children are >5 years. Out of 32, 23 patients were able to perform.

Table 7: PEFR value & hospitalisation rate

PEFR initial	total	Admitted
>=80%	03	00
61-79%	12	03
<=60%	08	05

No patients with PEFR >= 80% require hospitalisation. Only 25% (3/12) with PEFR 61-79% & 37.5% (3/8) with PEFR <= 60% were admitted.

Table 8: Spo2 value & hospitalisation rate

Initial SPO2	Total	Admitted
<= 90%	06	06
91- 95%	55	45
>=96%	39	12

All patients with Spo2 <= 90%, 81.8% with Spo2 91-95% & 30.7% with Spo2 >96% requires admission.

Discussion

In this study, 68% patients is 1-5 years, M: F ratio is 1.17. 78% patients had onset of symptoms between 1-5 years which is more compared to H. Paramesh study. Respi. Infe. is most common aggravating factor. All patients have complain of cough in our study.

Incidence of positive family history of asthma shows wide variation in literature. In this study 18% (18/100) patients have positive family history. Out of 18 patients, 8 (44.4%) have moderate persistent asthma, 5(27.77%) have mild persistent & another 5(27.77%) have mild intermittent asthma. So patients with family history are having more chances of persistent asthma.41 patients was put on controller medication but 56% (23/41) patients are not taking medication regularly. It is difficult to get good compliance especially in children. In this study only MDI is commonly used at home by patients. For better drug delivery spacer&/or mask are advised but its use is limited.

All 3 scores used in the study are helpful to decide severity & hospitalisation. Wood score requires ABGA which may not be available in resource limited setting. In P. I., it is difficult to measure I: E ratio particularly in small children. Pulmonary score is easy to perform compared to other two. PEFR value has significant negative correlation (p value<o.oo1) with asthma score. As PEFR decreases severity & hospitalisation rate increases. But it is difficult to perform in uncooperative child.SPO2 also show significant negative correlation with asthma scores (p value<0.001). As SPO2 decreases, severity of asthma increases.

Although all 3 scores are showing significant correlation with PEFR & helpful to decide severity but Pulmonary Score doesn't require laboratory support like ABGA in Wood score & also no need of difficult clinical variable like I:E ratio in P.I. So it is better option amongst all 3 scores.

Conclusion

All 3 scores used in study are indicated & shows significant correlation with PEFR. But Pulmonary score is easy to

perform & not require laboratory assistance. So it is better option. As Spo2 decreases severity of asthma increases.

References

1. Global initiative for asthma. Global strategy for asthma management & prevention, 2019. Available from www.ginasthma.org
2. Robbins & cotran pathologic basis of disease, 7th edition, 723-727.
3. McFadden ER Jr. Acute severe asthma. Am J Respi. Criti. Care Med. 2003; 168:740-759. [Pubmed]
4. Standards for the diagnosis & care of patients with chronic obstructive pulmonary disease (COPD) & asthma. This official statement of the American Thoracic Society was adopted by the ATS board of directors, Nov 1986. Am Rev Resp Dis 1987; 136:225-244. [Pubmed] [google scholar]
5. The Pulmonary Index, Assesment of a clinical score for asthma. Allan B. Becker, Norma A. Nelson, Estelle R.Simons. American J Dis Child. 1984; 138(6):574-576. [JAMA paediatrics]
6. Validation of the Pulmonary Score: an asthma severity score for children. Smith SR *et al*. Acad Emerg Med. 2002; 9(8):868-9.
7. Acute asthma in the pediatric emergency department. Sharon R.S mith. PCNA. 1999; 46(6):1145-1165.
8. Epidemiology of asthma in India. H. Parmesh. The Indian Journal of paediatrics. 2002; 69(4):309-312.
9. Factors predictive of the development of acute asthma attacks in children. Maria Luisa Zocal paro, Jocquim Carlosa Rodrigues. J Bras. Pneumol. Sao Paulo. 2005; 31:5.