

Sensitivity to *Sorghum Vulgare* (Jowar) Pollens in Allergic Bronchial Asthma and Effect of Allergen Specific Immunotherapy

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Abstract

Sorghum vulgare pollens sensitivity has been recognized as potential health problem in farmers and field workers. September to December is pollination season of *Sorghum vulgare* cultivated extensively in India. Aim of present study was to find out role of *Sorghum vulgare* pollens in causation of bronchial asthma with reference to pulmonary function test and effect of allergen specific immunotherapy in comparison with pharmacological treatment. Altogether 659 patients undergone modified skin prick test with *Sorghum vulgare* pollen extract. Of these, 594 patients were having symptoms of sneezing, rhinitis and bronchial asthma. Sixty five normal persons were also tested as control group. Out of 659 patients, 51 patients were 3 + positive with *Sorghum vulgare* pollen extract. Thirty six patients were selected for allergen specific immunotherapy as per WHO guidelines. While 15 patients were given pharmacotherapy in the form of steroid, bronchodilators and antihistaminics. The present study indicates that 20-40 yrs. age group population is more affected. Females are more sensitive than males. Short term (4 months) improvement in clinical symptoms and Pulmonary function test (FEV₁, PEFR, FVC, FEF 25-75%) was recorded 11% (n=4) in immunotherapy group and 86% (n=13) with drug, pharmacological treatment. While long term (3 yrs) improvement 47% (n=17) was observed with immunotherapy and 20% (n=3) with pharmacological treatment. On the basis of above observations allergen specific immunotherapy is helpful, for long term treatment of allergic bronchial asthma and reduces the steroids' side effect but it should be used judiciously and requires long term studies.

Key words : *Sorghum vulgare*. Pollen allergy, Farmers, Asthma, Immunotherapy.

INTRODUCTION

There are many farmers suffering with bronchial asthma due to pollen allergens of *Sorghum vulgare* (jowar). Jowar crop is cultivated largely in Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh. In Maharashtra, jowar is used as a main food grain. We have observed many farmers from our area suffering with rhinitis, conjunctivitis, urticaria

and bronchial asthma after exposure to jowar, mainly during September to January. We observed patients round the year for six years. Clinical symptoms and pulmonary function tests were studied. Allergen specific immunotherapy was given to many of them.

MATERIAL AND METHODS

Data for this study have been collected at Shriratna intensive care and Hospital, where patients report from Satara, Sangli, Kolhapur districts of Maharashtra. Altogether 659 patients were considered for this study. Of these 594 patients with history of

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breathlessness and wheeze were included in study while 65 normal persons taken as control group.

Clinical features of patients

Personal history of Rhinitis, Conjunctivitis, Breathlessness, Cough and Wheeze were recorded (Fig. 1). History of bronchial asthma after exposure to jowar pollens were notified by 36 patients. (Table 1).

Investigations

Allergens extracts from pollen, house dust, dust mite and food allergens were used for modified prick tests (1). Histamine diphosphate was used as positive control while buffered saline was used as negative control. The tests were performed on forearm of the patients and reaction was recorded at 10 min, 15 min, 20 min. Any wheal and flare reaction produced by negative control were subtracted from reaction produced by allergens before comparing with positive control. Out of 659 patients, 52 patients showed >+

3 positive test for *Sorghum vulgare* pollen extract. Fifty one patients received treatment as one patient was asymptomatic and was not having any sign of bronchial asthma (false positive test). The patients in 20-40 age group were more affected with bronchial asthma (Fig 2). Females were more affected than males (Fig. 3).

Thirty three patients were having nasal secretion smear eosinophilia count > 10%. Xray PA view were done whenever indicated to rule out infection and other conditions. Blood investigation viz. CBC, Blood sugar, serum, creatinine, HIV were done as per requirement. Pulmonary function tests were done numerically and graphically by using Cosmed-Italy computerized PFT machine. FVC, FEV1, FEFR and FEF25-75% were measured (Table 2).

Immunotherapy

As per WHO guidelines, immunotherapy was given to patients suffering with bronchial asthma (2). Thirty

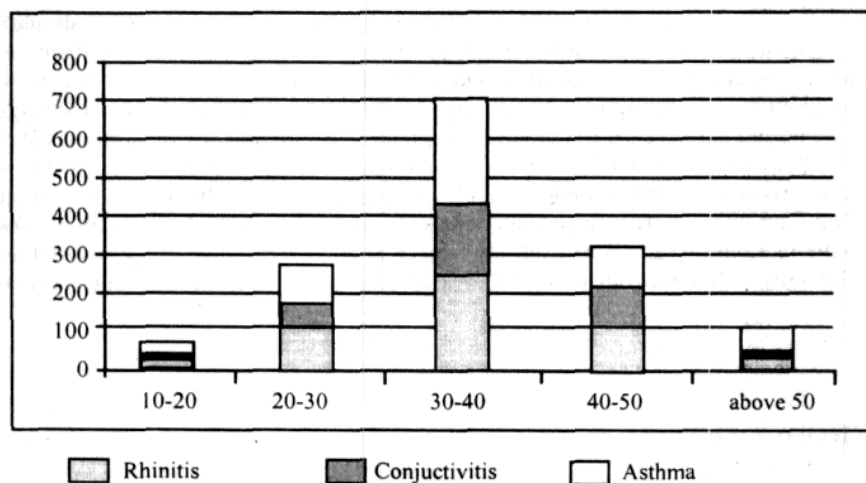


Fig 1. Clinical manifestations in different age group of patients

Table I. Clinical manifestations of patients selected for the study

Sign and symptoms	No. of patients	Age in Years				
		10-20	20-30	30-40	40-50	Above 50
Rhinitis	491	23	98	250	93	27
Conjunctivitis	386	12	67	179	115	13
Br. Asthma	594	23	104	286	120	61

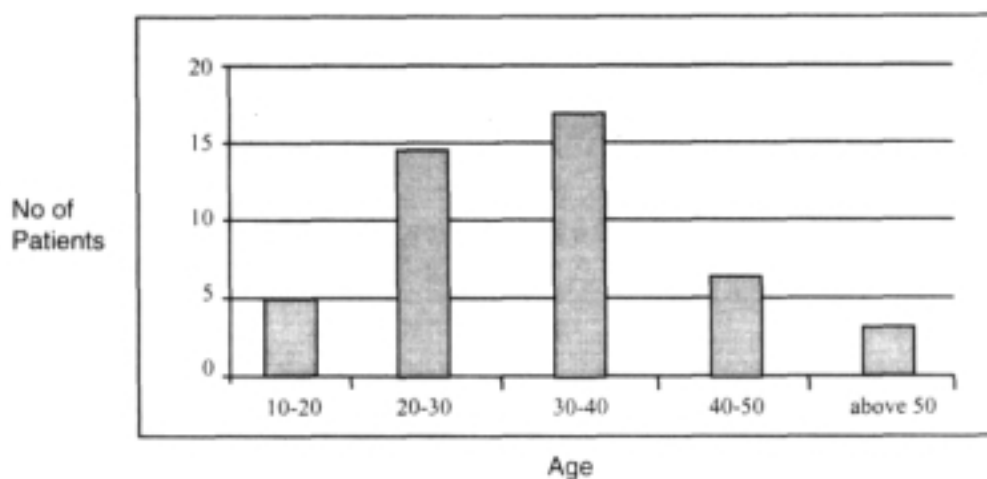
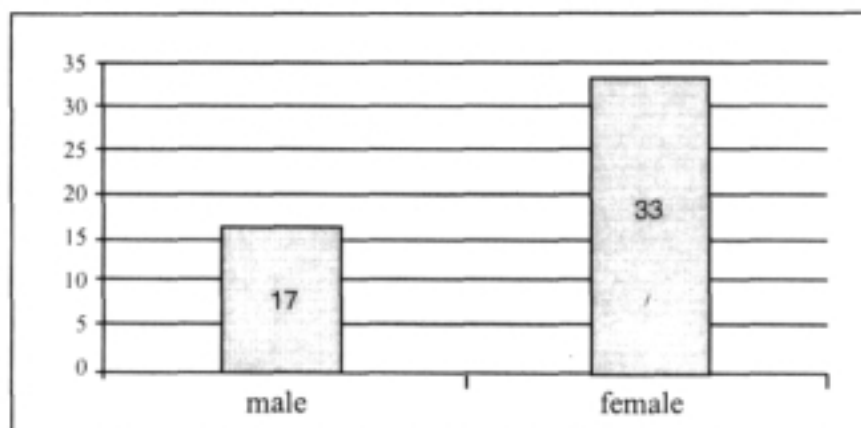
Fig 2. *Sorghum vulgare* sensitivity in patients of Bronchial AsthmaFig 3. Male to female ratio in patients showing positive skin tests to *S. vulgare* extract

Table II. Pulmonary Functions Tests
(Average of predicted values in %)

Parameters	1st Visit	4 Months		1 Year		2 Year		3 Year	
		I	D	I	D	I	D	I	D
FVC	54.5 ± 12	55.5 ± 12.0	84.0 ± 18	86.0 ± 12	68.0 ± 14	90.0 ± 12.0	86.0 ± 12	92.0 ± 16	84.0 ± 12
FEV	55.5 ± 14	53.0 ± 16.0	94.2 ± 16.2	94.2 ± 16.0	78.0 ± 16.0	90.0 ± 14.0	88.0 ± 12	94.0 ± 13	76.0 ± 14
FEF	33.55 ± 16.6	34.5 ± 12.0	88.5 ± 12.0	86.3 ± 28	78.0 ± 12.0	92.0 ± 12	96.0 ± 16	98.0 ± 16	74.0 ± 14
PEFR	35.5 ± 13.6	34.5 ± 12.0	84.3 ± 24	86.3 ± 25.3	76.0 ± 14.0	80.0 ± 12.0	86.2 ± 14	94.2 ± 14	78.0 ± 13.0
MVV	124.0 ± 20.1	125.0 ± 19.0	125.0 ± 19.0	128.0 ± 22.0	122.8 ± 16.0	124.0 ± 16.0	126.0 ± 16	124 ± 22	125.0 ± 26

I = Allergen specific Immunotherapy.

D = Drug Treatment

six patients were selected for immunotherapy. Standardized allergen extracts were used which are commercially available in the country. Extracts prepared in phosphate buffer saline containing 0.4% phenol as preservative were standardized according to weight volume ratio. Multidose vials were used in graded concentration viz. 1:250000, 1:2500, 1:250, 1:50. This has been given in increasing doses and days with tuberculin syringe for first 4 months. Maintenance immunotherapy was given as fix dose every month. Pre-seasonal and co-seasonal immunotherapy was given and maintained for three years. All patients were assessed after 3 month, 1 year, 2 year and 3 year period during September to January considering this as a peak flowering and pollination period of *S. vulgare*. All patients selected were above 10 yrs of age and less than 70 yrs. During immunotherapy only one patient suffered systemic reaction to first dose. Patient showed perspiration, tachycardia, hypotension, cold extremities and difficulty in breathing. He was well controlled with subcutaneous adrenalin 0.2 ml (1:1000) and 100 mg hydrocortisone. Two patients demonstrated generalized urticaria which was controlled with antihistaminics. Many patients presented localized reactions viz. swelling, itching at site of injection which subsided within 24 hrs.

Pharmacotherapy

Those patients selected for pharmacotherapy were

treated with theophylline, Beta2 agonists, steroids by oral, inhalation and or injectable route.

RESULTS AND DISCUSSION

Sorghum vulgare pollen allergens are one of the inducing factors for bronchial asthma. Short term (4 month) improvement was very good with pharmacotherapy where 86% patients became asymptomatic. It improves FEV1, PEFR, FVC and FEF 25-75% while immunotherapy shows improvement in 11% only. Results were taken after 1 year, 2 year and 3 years of immunotherapy which helped patients significantly (3). Many patients became asymptomatic and frequency of bronchospasm reduced considerably. At the end of 3 yrs of immunotherapy, 47% patients became asymptomatic while only 20% patients showed improvement with pharmacological treatment (Table 3).

Hyposensitization treatment of antigen injection is way back to 1911 (Noon and Freeman) before its allergic basis was described (4,5). Type I allergic diseases are triggered due to inhalations of pollen spores, dust and dust mites. To combat allergic disorders, allergen specific immunotherapy reduces tissues or target organ response. Immunotherapy induce IgE antibody response in beginning but later blocking antibody i.e. IgG are produced. Also it reduces plasma level of eosinophil cationic proteins

Table III. Clinical observations of patients undertaken immunotherapy and pharamacotherapy

	Total patients	4 Month				I Year				2 Year				3 Year			
		T	A	S	D	T	A	S	D	T	A	S	D	T	A	S	D
Immunotherapy	36	36	4	32	0	36	20	8	8	28	18	7	3	25	17	5	3
			11%											47%			
Drug therapy	15	15	13	2	0	15	8	5	2	13	4	6	1	12	3	6	3
			86%											20%			
T = Total		A = Asymptomatic				S = Symptomatic				D = Dropped out							

(ECP). There is no treatment for bronchial asthma which can maintain normal level airway reactivity for prolonged period of time even after discontinuation of therapy except immunotherapy.

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