



The Clinical Effect of *Albizia lebbeck* Stem Bark Decoction on Bronchial Asthma

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ABSTRACT

Bronchial asthma is a disorder characterized by increased response of trachea and bronchioles to various stimuli resulting in wide spread narrowing of airways. It is an inflammatory disease of respiratory organs combined with inflammatory cell infiltration, epithelial damage and sub-epithelial fibrosis as its internal pathological picture. Its symptoms closely resemble with symptoms of *Tamak Shwasa* in Ayurveda. The present study was conducted on 81 patients at I.P.D. and O.P.D. level. Patients were given *Albizia lebbeck* stem bark decoction (*Shireesh Twak Kwatha*) in a dose of 50 ml thrice daily for 6 weeks, supported by light diet. The results were assessed in terms of clinical recovery, symptomatic relief and pulmonary function improvement. The effect of the treatment was assessed based on subjective and objective parameters. A significant increase in PEFr and considerable decrease in total leukocyte count, eosinophil count and E.S.R. were observed. From the study conducted, it was found that 56 % (28) cases has shown good response, 38 % (19) cases shown fair response, 6 % (03) cases shown poor response and 31 cases were dropouts. The results demonstrate that the formulation can be used as an effective drug in Bronchial asthma however detailed observational studies are required to demonstrate the effect of drug at molecular level.

Keywords: Bronchial asthma, *Shireesh Twak Kwatha*, PEFr, Pulmonary function, *Albizia lebbeck*.

INTRODUCTION

Asthma is a common disease worldwide with significant ethnic and regional variations. An increasing morbidity and mortality, as well as health care burden from asthma have been recognized lately. The prevalence of asthma worldwide is around 200 million with a mortality of around 0.2 million per year. The estimated burden of asthma in India is more than 15 million. The population prevalence of asthma reported in different field studies and specific population group is reported to be variable.^[1-2] Although asthma cannot be cured but clinical episode can be prevented and controlled by proper management. The exact cause of asthma is not known. There are a variety of host and the environmental risk factors. The host factors are genetic predisposition, atrophy^[2], airway hyper responsiveness, gender and race/ethnicity. The environmental risk factors are indoor and outdoor allergens, occupational sensitizers, tobacco smoke and air pollution^[2-4], respiratory infections, parasitic infections, socio economic factors, family size, diet, drugs and obesity. Bronchial asthma is a chronic inflammatory disorder of the

airways associated with airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning combined with inflammatory cell infiltration, epithelial damage, and sub epithelial fibrosis as its internal pathological picture. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. Its symptoms closely resemble with symptoms of *Tamak Shwasa* in Ayurveda which is due to disturbance in equilibrium of the body humors the *Kapha* and *Vata* with *Pitta Dosha*, apart from *Ama*. This *Ama* induces the inflammation of airways, breathlessness, bronchoconstriction, wheezing sounds, difficulty in expectoration, giddiness and feeling little comfort in erect posture. The review of the literature of both Ayurvedic and modern medicine dealing with *Tamak Shwasa* (Bronchial Asthma) reveals that this disease is known from the ancient times. It is a very common and distressing disease, the incidence of which is increasing day by day with increased pollution, stress and strain of life. It is a disease marked by mild to extremely severe attacks of breathlessness which usually proceed to the exposure to known or unknown allergens, stress, strain, emotional changes or changes in the environment.^[5-6] In spite of the extensive research, scientists

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have not been able to do much to prevent either the progression or the incidence of the disease.

In Ayurveda it has been mentioned that this disease is curable if it is of the recent origin. Otherwise it continues to be a life long illness and can be controlled or relieved temporarily by medical treatment. Keeping in view the lacking of some effective medical treatment in modern science and their side effects over long usage, this study was conducted to evaluate the efficacy of use of *Albizia lebbek* stem bark decoction (*Shireesh Twak Kwatha*) in the cases of Bronchial Asthma.

MATERIAL AND METHODS

This single blind study was conducted on 81 voluntarily accepted patients of both the sex, at I.P.D. and O.P.D. level at National Institute of Ayurvedic Pharmaceutical Research, Patiala. 50 patients completed the treatment and 31 patients were excluded from the study due to one reason or the other. *Albizia lebbek* stem bark decoction (*Shireesh Twak Kwatha*) was prepared in pharmacy of the institute following Standard Operative Procedure (SOP) as laid in Ayurvedic Formulary of India (AFI).

The project was carried out keeping in view all the ethical considerations of the ethical committee. The patients were selected as per the inclusion and exclusion criteria given below. The patients were informed about the study and consent was obtained. The patients were given *Albizia lebbek* stem bark decoction (*Shireesh Twak Kwatha*) 50 ml thrice daily for six weeks, irrespective of their age supported by light diet. The patients were advised not to take spicy foods. The patients who used inhalers or some other steroids at times of asthmatic attacks were considered as dropouts. The patients who could not continue the regimen for the prescribed duration were also considered as dropouts. Exacerbation of asthma is characterized by the worsening of symptoms with increase in dyspnoea, cough and wheeze. There is a decline in lung function, which can be quantified with measurements of PEFr or FEV₁. The exacerbations are categorized as severe or non severe. Severe exacerbation of asthma are characterized by increase in dyspnoea, with patient unable to complete one sentence in one breath (in children : interrupted feeding and agitation), respiratory rate > 30/minute, heart rate > 120/minute, use of accessory muscles of respiration, pulsus paradoxus > 25 mmHg, PEFr < 60 % personal best or < 100 litres/ minute in adults. All the investigations like TLC, DLC, ESR and Peak Expiratory Flow Rate (PEFR) were done before treatment and repeated after every 15 days interval for 45 days.

The investigations performed for the study were Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC), Erythrocyte Sedimentation Rate (ESR) and sputum for Acid Fast Bacilli (AFB), stool examination for ova and cyst to rule out any parasitic infestation. The chest was screened to exclude pulmonary tuberculosis and to evaluate the precise pulmonary disease. Pulmonary Function Tests (PFT), were performed with the Spiro meter. The cases were regularly observed and the clinical response shown by the cases, subjective and objective parameters were recorded in the light of improvement in pulmonary functions and other relevant investigations, which were repeated at the end of the trial. The assessment of results was made on the basis of values of assessment criteria as well as symptomatic relief.

A criterion for the selection and exclusion of the patients is as follows:

Criteria for Inclusion

- Age between 12-70 yrs
- Difficulty in breathing
- Paroxysmal attack of Dyspnoea
- No/difficult expectoration
- Relief after expectoration
- Wheezing sounds
- Relief in erect position
- Impaired pulmonary capacity
- Duration of illness within 10 yrs

Criteria for Exclusion

- ✓ Age below 12 and above 70 yrs
- ✓ Duration of the disease more than 10 yrs
- ✓ Acute asthma requiring emergency measures
- ✓ Cardiac asthma
- ✓ Bronchiectasis
- ✓ Tuberculosis
- ✓ Pyothorax
- ✓ Malignancy
- ✓ Diabetes Mellitus
- ✓ Severe systemic disease
- ✓ History of liver or Renal disease in recent past

The patients were assessed for the symptomatic relief as per criterion given below:

Good if symptoms reduce >75%

Fair if the symptoms reduce from 50 %-75 %

Poor if the symptoms are reduced less than 50 %

RESULTS

Table 1 shows that 28 (56 %) patients got good relief, 19 (38 %) got fair relief, 03 (6 %) patients got poor relief. It was also observed that the locality in which the patients live, seasons, chronicity and diet affected the results. The patients living in unhealthy atmosphere like near factories, taking non vegetarian diet and with the chronicity of more than 4 yrs have shown fair to poor response (data not shown). There was a significant decrease in the WBC from 11749±211 8536±236 ($p = <0.01$) on 45th day, Eosinophil count 13.71±1.21 at 0 day to 6.32±0.41 and ESR value which ranged from 32.62±2.62 at 0 day to 12.23±2.16 ($p = <0.01$) on 45th day, however there was significant increase in PEFr values. As shown in Table 2 there was a highly significant increase in PEFr value which ranged from 126.42±14.64 on 0 day to 249.66±22.22 ($p = <0.01$) on 45th day.

Table 1: Effect of *Albizia lebbek* stem bark decoction in patients of bronchial asthma

S. No.	Drug	Response			Total
		Good	Fair	Poor	
1	<i>Shireesh Twak Kwatha</i> (<i>Albizia lebbek</i> stem bark decoction) 50 ml TDS	28 (56%)	19 (38%)	03 (6%)	50

DISCUSSION

According to Ayurveda, Asthma is a result of disturbance in the equilibrium of body humours known as *Vata* and *Kapha*, which cause obstruction in the normal course of humours (*SROTODHA*). So a drug, which can remove the blockage, is essential in this disorder. The trial medicine has pharmacokinetic properties as per Ayurveda (*Madhur Rasa*, *Laghu*, *Ruksha* and *Tikshana Guna*, *Ushana Veerya* and *Katu Vipaka*) help to clear the blockage. These properties specifically *Madhur Rasa* and *Ushna Veerya* may act as *Vata*

Hara i.e. the reaction of an organ towards any stimulus. [7-8] *Katu Vipaka* property of the drug helps to cure *Ama* the inflammatory condition of the bronchial tree. *Laghu*, *Ruksha* and *Tikshana* property helps to control *Kapha* responsible for the mucogenic secretion in the respiratory track.

Albizia lebbek has been recommended in Ayurvedic system of medicine for a variety of diseases including bronchial asthma. [9] Stem bark decoction of *Albizia lebbek* has been found to be active on blood vessels of various animals. Aqueous extract of this plant has been shown to decrease histamine-induced bronchospasm in guinea pigs that may prove protective in bronchial asthma. [10] The plant bark contains two saponins known as lebbekinin A & B. [11-13] Three saponins *albiziasaponins A, B, and C* were isolated from the barks of *Albizia lebbek* [14] has been shown to possess anti-asthmatic activities. [15] These saponins exert mast cell granulation inhibition and depression of cell mediated immunity phenomenon in rats. These also exert di-

sodium chromoglycate like action on mast cells, there by effectively combating against bronchospasm involved by histaminic acid phosphate. The bark yields tannins like lebbecacidin that possesses expectorant action. [16] According to another study, decoction of the bark protects the guinea pig against histamine as well as acetylcholine induced bronchospasm. [17] It is evident from Table 2 that the total leukocyte count, ESR and eosinophil count came down significantly with a significant increase in the PEFR values. These findings are in accordance to those found by Bhattathri et al. [15] The results reveal that the drug significantly acts upon the parameters that were assessed during the study. It could suppress total leukocyte count, eosinophil count and ESR and improve the PEFR along with symptomatic relief. So the drug can be recommended for its use in the Bronchial Asthma patients.

Table 2: Mean Effect of *Albizia lebbek* stem bark decoction on W.B.C., Eosinophil count, E.S.R. and P.E.F.R.

Parameter	n	Before Treatment	After 15 days	After 30 days	After 45 days	p value
W.B.C	50	11749±211	10346±117	9188±178	8536±236	22.69*
Eosinophil count	50	13.71±1.21	11.23±2.1	7.89±0.96	6.32±0.41	40.83*
E.S.R. Level	50	32.62±2.62	31.2±0.84	20.83±1.23	12.23±2.16	57.6*
P.E.F.R.	50	126.42±14.64	141.29±10.64	199.26±11.24	249.66±22.22	39.22*

n- Number of patients, p- Probability, * p = <0.01 statistically highly significant

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