



Review Study

BRONCHIAL ASTHMA IN CHILDREN- AN AYURVEDIC PERSPECTIVE

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ABSTRACT

Childhood Asthma is the most common serious chronic disease in infants and children. Bronchial asthma (*Swasa roga*) referred to as a chronic lung disease, showcase an obstructed air pathway, which hinders the free flow of inhaled oxygenated air through the air channels in the lungs, as being inflamed, constricted and filled with mucous. Certain dietary practices and deeds/habits which both the parents and children tends to perform on a regular basis causes *Kaphapitha Dushti* which coupled with *Aniyata Vahni* (unstable digestive fire) of children, leads to *Jataragni Mandya* (indigestion) in children and results in the formation of *Krimi* (worms) in the stomach. These *Krimi* in turn worsens the *Agnimandhya*, thereby completely destabilizing the digestive and assimilative capacity of the gastrointestinal system. The *Srotorodha* produced by the vitiated *Kapha Pitha Dosha* along with *Ama* in the *Amasaya*, leads to *Vataprakopa* and thus a *Doshic* derangement happens in the *Amasaya*. As stated by Vagbhatacharya in *Swasa Nidana*, this *Doshic* derangement in the *Amasaya*, triggers a disease process in the previously indisposed, trigger awaiting *Pranavaha Srotas*, leading to *Swasa Roga*. Here in *Swasa Roga*, *Ajeerna* (indigestion) and *Krimi* (worms) acts as *Sannikrishta Nidanans*, whereas *Pranavaha srotodushti* act as *Viprakrishta Nidana*. The mainstay of treatment should be avoidance and clearance of *Sannikrishta Nidanans* and addressing the *Viprakrishta Nidana*. But most importantly, the drugs should have action over the respiratory system to strengthen and revitalize the system and make it immune and less susceptible to future attacks.

KEYWORDS: Bronchial asthma, *Krimi*, Worm, Microbes.

INTRODUCTION

The latest operational definition of asthma put forth by the GINA (Global Initiative in Asthma) 2015 workshop is "Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation.^[1] The classical features include wheeze, shortness of breath, chest tightness and cough that may vary over time and intensity together with variable expiratory airway inflammation".^[2]

The current view is that development of asthma in childhood is multifactorial, reflecting both genetic predisposition and multiple environmental exposures occurring at critical time-points as the child develops. These include viral respiratory infections^[3,4], delayed immune system maturation^[5] and allergic sensitisation.^[6]

Epidemiology

Globally, asthma is ranked 28th among the leading causes of burden of disease and 16th among the leading causes of years lived with disability.^[7] In India, the prevalence of bronchial asthma in 5-11 years old is between 10% and 15%.^[8]

Etiology and Risk Factors of Bronchial Asthma in Children

Bronchial asthma is characterized by heterogeneous group of phenotypes that differ in presentation, etiology and pathophysiology. The risk factors for each recognized phenotype of asthma include host factors and environmental factors.

Host factors

Host factor predisposes individuals from developing asthma. It includes atopy (allergic sensitization) or genetic predisposition, delayed immune system maturation or immunodeficiency, airway hyper responsiveness, gender and race.

Environmental factors

Environmental factors are responsible for the susceptibility of developing asthma in predisposed individuals, precipitating asthma exacerbations, and causing symptoms to persist. These factors include,

- Sensitization to aeroallergens- house dust mite, cat, cockroach allergens, fungi.
- Occupational sensitizers

- Smoke
- Air pollution
- Respiratory (viral) infections- The timing and frequency of viral infections are important because in infancy both the immune system and lung development is not complete. Infants experiencing viral infections (RSV) during the first 6 months of life have a higher prevalence of asthma.
- Parasitic infections- eosinophilia is one of the principal features of parasitic helminthic infection and is also associated with asthmatic disease. Helminthic parasites produce the most potent IgE responses in nature.^[9]
- Diet- Some food and other ingested substances such as salicylates, food preservatives, monosodium glutamate, and some food-colouring agents have an effect of causing asthma exacerbations.
- Socioeconomic status
- Weather changes- Adverse weather conditions, such as freezing temperatures, high humidity, and episodes of acute pollution etc.
- Stress factors.

Pathophysiology of Bronchial Asthma

Asthma is of three types mainly- intrinsic, extrinsic and mixed. Intrinsic asthma is non-atopic, not associated with allergy and usually begins in adult life. Extrinsic Asthma is atopic, mediated by type I hyper sensitivity involving IgE bound to mast cells and begins in childhood, usually in patients with a family history of allergy. Exposure to defined allergens or to various non-specific stimuli result in both acute and chronic inflammatory process mediated by a complex and integrated assortment of locally released cytokines and other mediators. Release of these mediators can alter airway smooth muscle tone and responsiveness, produces mucous hyper secretion and damage airway epithelium. Characteristic features of the airway inflammation are increased numbers of activated eosinophils, mast

cells, macrophages, and T lymphocytes in the airway mucosa and lumen.

Gut-Lung Axis Theory

The recent 'Gut Lung Axis Theory' in respiratory diseases, gaining grounds, highlights a crucial cross-talk between the intestinal microbiota and the lungs. The metabolic functions as well as immune responses in our body are mainly under the control of gut microbiota and of which diet plays a determining role in the composition of the gut microbiota. The dietary nutrients are assimilated with the help of gut microbes and the metabolites produced by them regulate gastro-intestinal immunity and impact distal organs like lung and brain. Any change in the constituents of the gut microbiome, through diet, diseases or medical intervention is linked with altered immune responses and homeostasis in the airways. This gut dysbiosis in humans has been linked to inflammatory conditions not only in the gastrointestinal tract, but also in the airways, such as in asthma and chronic obstructive pulmonary disease (COPD).^[10,11]

Ayurvedic Perspective

Ayurveda has given prime importance to *Swasa Roga* as an independent disease as well as a symptom of many other diseases. *Swasa Roga* is predominantly *Vata Kaphaja*, originating from *Amasaya* and manifesting through the *Pranavaha Srotas* (Respiratory channels). *Tamaka Swasa* is a disease in which free flow of *Vayu* is deranged, when obstructed by the vitiated *Kapha* in the respiratory pathways.

Nidanas of Swasa Roga (Etiological Factors)

Ayurvedic management is nothing other than *Nidana parivarjanam* (avoidance of causative factors). The knowledge of etiological factors (*Nidana*) is very essential for its management. *Tamaka Swasa* is mentioned as *Kashtasadya* (difficult to cure) and a thorough understanding of the causative factors is essential in the management. The etiological factors can be summarized as below.^[12]

| Apathya Ahara (Unhealthy food) | Apathya Vihara (Unhealthy regimen) | Rogas (diseases) |
|--|--|---|
| <i>Rukshanna</i> (excessive intake of dried food) <i>Vishamasana</i> (untimely food intake of food which is excess or low in quantity) <i>Samasana</i> (intake of desirable and undesirable food) <i>Adhyashana</i> (intake of meal before digestion of previous meals) <i>Seetashana</i> (cold food) <i>Seetapana</i> (cold water consumption) <i>Tila Taila</i> (sesame oil) | <i>Rajas</i> (dust) <i>Dhuma</i> (smoke) <i>Anila</i> (breeze) <i>Seeta vayu</i> (cold wind) <i>Vyayama</i> (over exercise) <i>Adhva</i> (excessive walking) <i>Vega Rodha</i> (suppression of natural urges) <i>Divaswapna</i> (day sleep) | <i>Amatisara</i> (Diarrhea due to indigestion) <i>Jwara</i> (fever) <i>Kasa</i> (cough) <i>Pratishyaya</i> (allergic rhinitis), <i>Vamadhu</i> (vomiting) <i>Visha</i> (poisons) <i>Pandu</i> (anaemia), <i>Kshathakshaya</i> |

| | | |
|--|--|---|
| <p>Guru bhojana (heavy food) Katu (pungent) Amla (sour) Lavana (salty) Saka (leafy) Maasha (black gram) Pistanna (rice flour preparations) Nispaava (beans) Anupa Mamsa (meat) Dadhi (curd) Aamakshira (milk) Shleshmala (Kapha producing food) Abhishyandi (food causing obstruction in channels)</p> | | <p>(generalized weakness) Raktapitta (intrinsic hemorrhage)</p> |
|--|--|---|

Samprapti of Bronchial Asthma in Children

Swasa Roga presents with various accompaniments and quite a lot of factors predispose the condition.

Bronchial asthma (*Swasa Roga*) referred to as, a chronic lung disease, showcase an obstructed air pathway, which hinders the free flow of inhaled oxygenated air through the air channels in the lungs, as being inflamed, constricted and filled with mucous. These vital air channels rightfully described as *Pranavaha Srotas*, one among the 13 transporting channels (*Srotas*) in the body as per the holistic science, has its roots established in *Hridaya* (Cardiovascular system concerned with circulation) and *Mahasrotas*^[13] (Gastrointestinal Tract concerned with digestion and assimilation). Thus one gets the impression that any derangement in the *Hridaya* or the *Mahasrotas*, disrupts the respiratory equilibrium posing a serious threat to the smooth functioning of the system.

The genetic predispositions (*Sahaja nidanas*- asthma and atopy in parents), in conducive prenatal exposure (*Garbhaja nidanas*- passive tobacco exposures, dietary deficiency of Vitamin C, D, E; prenatal lack of sunlight, maternal stress), perinatal risk factors (*Janmothana nidanas*- respiratory distress of prematurity, HIE-hypoxic ischemic encephalopathy, MAS- meconium aspiration syndrome, TTN- transient tachypnea of the newborn, CHD- congenital heart defect, Congenital malformations, upper airway obstructions), all mould a progeny with a weakened and indisposed *Pranavaha Srotas*, which is the main *Viprakishta Nidana* to the *Swasa Roga*.

The child may present with manifestations of vitiated *Pranavaha Srotas* (*Pranavaha Sroto Dushti Lakshanas*)^[14] which include abnormal respirations that are too long (*Atisrushtam*), too restricted (*Athi badham*), aggravated (*Kupitham*), shallow (*Alpalpam*), frequent (*Abheeshnam*) or associated

with pain and sound (*Sasabda Soola Uchwasantham*); right after birth or during the perinatal period that follows. However, the child gets symptomatically managed and the problem gets fixed for the time being, only to become susceptible to future attacks of bronchial asthma, which would precipitate with conducive triggering factors (*Sannikrishta nidanas*). Here lies the basic underlying pathology of *Swasa Roga*, which awaits its turn to manifest into a fully-fledged disease state, upon suitable triggering factors that lead to derangements in the *Mahasrotas* or the *Hridaya* and its *Dasa Dhamanis* (*Pranavaha Srotomoolam*).

Triggering factors

The recent 'Gut Lung Axis Theory'^[15] in respiratory diseases, gaining grounds, throws insight into the concept of origin of *Pranavaha sroto rogas* from the *Mahasrotas*, as rightfully mentioned by Vagbhatacharya in *Swasa Samprapti*, "*Urastha: Kurute Swasam Amasaya Samuthbhavam*".^[16]

A healthy congenial diet thus becomes part of respiratory cure, which unfortunately could not be observed always or essentially be maintained in children during their growth phases. In a way or other, the optimal nourishment is compromised, that too mostly on grounds of palatability. Timely intake of food, cleanliness, wholesomeness, all seem next to impossible with children. Moreover their digestive fire is so unstable (*Aniyatha vahni*) owing to the peculiarity of their age, which further seem to worsen the scenario, particularly in Indian society which demands the child to be fed full stomach.

There are certain dietary practices and deeds/habits which both the parents and children settle for, which they tend to observe on a regular basis like intake of *Kshira* (milk), *Dadhi* (curd), *Guda* (jaggery), *Tila* (sesame), *Mamsa* (meat), *Masha* (black gram), *Pishtanna* (rice flour preparations), *Matsya* (fish) etc and deeds like *Diva Swapna* (day sleep), *Ajeernasana* (indigestion), *Asatmya Virudha Bhojana*

(incompatible food) leading to *Kapha pitha dushti* are commonly observed in children. These *Kaphapitha pradushta nidanas* coupled with *Aniyata vahni* (unstable digestive fire) of children, result in *Jataragni mandya/Ajeerna* (indigestion) in them.

The weakened *Agni*, becomes incapable of biodegrading and transforming the ingested food materials into an acceptable form (*Ahara rasa*) suitable for bodily tissues. This rejected improperly digested food material accumulates, proliferates and fermented by *Kaphapitha dosha* to give rise to *Krimi* (worms) in the stomach (*Ajeernadi krimi sambhava as told by Vijayarakshita and Sreekantadatta*). These *Krimi* in turn worsens the *Agnimandhya*, thereby completely destabilizing the digestive and assimilative capacity of the gastrointestinal system.

Moreover the worm antigens (*Krimi visha*) formed by the excretions and secretions of worms; along with the undigested food (*Ama*), produces *Amavisha* (toxins) in the stomach.

The *Srotorodha* produced by the vitiated *Kaphapitha dosha* along with *Ama* in the *Amasaya*, leads to *Vataprakopa* as well. Thus a *Doshic* derangement in the form of "*Kaphapitha vishama sannipatha dushti with ama-vishamaya anna*" happens in the *Amasaya*. As stated by Vagbhatacharya in *Swasa nidana*, this *Doshic* derangement in the *Amasaya*, triggers a disease process in the previously indisposed, trigger awaiting *Pranavaha srotas*, vitiating the air channels leading to *Swasa roga*. It is upon the weakened *Pranavaha srotas* that the *Kaphapitha sannipatha-ama-krimivisha- sannikrishta nidana* acts. As the chest (*Uras*) being the site of *Kapha (staneeya dosha)* and the age being young (*Balyavastha*), where the predominant *Dosha* is *Kapha*, the vitiated *Kapha dosha (Pitha utklishta Kapha)* enters and gets lodged in the airways of the already weakened *Pranavaha srotas*. Moreover, the *Kaphapitha* together produces inflammation (*Sotha*) in the *Srotas*, making them swollen and narrowed, thereby hindering free flow of *Vata*, through the *Pranavaha srotas*. The free movement of *Vata* is necessary for the normal functioning of each and every system in the body. The swollen, narrow and secretory air pathway hinders this free flow of *Vata*, through the *Pranavaha srotas*, which result in vitiation of *Vata* in the *Srotas*.

The vitiated *Vata* causes impaired *Sthambha* (stagnant) and *Sankocha* (constriction), which are the normal functions of *Vata*, in the airways. Loss of elasticity and broncho constrictions further restricts the movement of *Vata* in the *Srotases (athibadham)* leading to shallow (*Alpalpam*), increased rate of respiration (*Abheeshnam, Atisrushtam*); owing to its *Pratilomagati*. Obstructed *Kapha* in the *Srotas*

(mucous plug) lead to production of wheeze (*Sasabda*) when *Vata* tries to surpass it; and excessive and laborious respiratory muscle work leads to pain (*Soolena uchvasantham*), hence the manifestation of *Swasa roga*. This *Amavisha* can be thought as histamines/prostaglandins responsible for the inflammatory processes in the respiratory pathway.

Here *Ajeerna* (indigestion) and *Krimi* (worms) act as *Sannikrishta Nidana*, whereas *Pranavaha Srotodushti* acts as *Viprakrishta Nidana* for *Swasa Roga*. The mainstay of treatment should be avoidance and clearance of *Sannikrishta Nidana* and addressing the *Viprakrishta Nidana*.

CONCLUSION

Swasa Roga is mostly *Amasaya Samudbhava* in children. The resultant *Ama* and *Krimi Visha* acts as *Sannikrishta Nidanas* which acts upon already weakened and indisposed *Pranavaha Srotas*. The mainstay of treatment should be avoidance and clearance of *Sannikrishta Nidanas* and also by addressing the *Viprakrishta Nidana*. So the medicinal drugs chosen should be digestive to stabilize the *Agni* (digestive fire), Anti-helminthic drugs to flush out *Krimis* (worms), Anti-phlegmatics to remove the *Utklishta Kapha* from air pathways and most importantly, it should have action over the respiratory system to strengthen and revitalize the system and make it immune and less susceptible to future attacks.

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