ANTIOXIDANT AND ANTI-INFLAMMATORY EFFECT OF SUNTHI IN PRANVAHA SROTAS
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INTRODUCTION

Pranvaha srotas considered as Respiratory system. It’s main function is concerned with Ucchwas (Expiration) and Nishwas (Inspiration). Through the Pranvaha srotas is Hrdaya and Mahasrotas, Hridya, Phupphusa and Rasavahi Dhannis are also Mula of Rasavaha srotas. According to Ayurveda Dhatu kshaya, Vegadharana, Vyavaya, Ruksha Aahara-Vihara are causes of Pranvaha srotas Vyadhi, hence it is convenient to discuss heart and its related disorders under Respiratory system. The drug “Shunthi” Zingiber officinalis belongs to the family of Zingibraceae. The health promoting perspective of Ginger is attributed to its rich volatile and non-volatile substance. Volatile including sesquiterpene and monoterpenoid hydrocarbons providing the distinct aroma and taste of Ginger. Non-volatile pungent compound including Gingerol’s, Shogaol’s, Paradols and Zingerone. It also has anti-inflammatory and anti-oxidant properties for controlling the process of aging also anti-microbial potential. Shunthi prevent the formation of intermediate product like Lactic acid, uric acid, ketone bodies helps to treat the infectious disease. All the above properties are useful in Respiratory Disease as well as several number of disease like Heart disease, Neuro degenerative disease, Cancer. The bioactive of Ginger like Gingerol have show anti-oxidant activity in various modules.

AIM & OBJECTIVES

(1) To study the Anti-inflammatory and Anti-oxidant properties of Ginger.
(2) To study about the role of Ginger in Pranvaha Srotas.

RESPIRATORY SYSTEM

Respiration in the process by which oxygen is the taken in and carbon dioxide is given out. The first breath takes place only after birth. Fetal lungs are non-functional So, during intrauterine life the exchange of gases between fetal blood and mother’s blood occurs through placenta. After the first breath, the respiratory process continues throughout the life Permanent stoppage of respiratory occurs only at death.

RESPIRATORY RATE AT DIFFERENT AGE

New born :: 30 to 60/sec.
Early child :: 20 to 40/sec.
Late child: 15 to 25/sec.
Adult: 12 to 16/sec.

Types of Respiration²
Respiration is classified into two parts

(1) External respiration: That involves exchange of respiratory gases, i.e., Oxygen and Carbon dioxide between lungs and blood.

(2) Internal respiration: Which involves exchange of gases between blood and tissue.

Classification of Respiratory Tract

Pathology³: Pathology of the respiratory system is divided into following parts ±:

(A) Mucous Gland: Due to chronic irritation, mucous glands undergo hypertrophy which is main pathology finding in Pranvaha Srotas Vyadhi. The ration between the thickness of gland and thickness of the bronchial wall is known as Reid index. This is normally 0.26 and in disease it become 0.59. This is the diagnostic feature.

(B) Goblet cells: In the bronchioles Goblet cells proliferate and are over distended with mucous. Goblet cells are responsible for the airway obstruction. Thus there are wheeze, ronchi and breathlessness.

(C) Mucous: Mucous secretion is enormously increase due to hypertrophy of mucous and proliferation of Goblet cells. This is cause chronic cough & sputum.

(D) Infection: Increased mucous predisposes to infection by various organism- H.influenzae, S.pneumonia. This leads to severe inflammation of the bronchial tree resulting in muco purulent sputum

Drug Review: Shunthi [8, 9]

<table>
<thead>
<tr>
<th>No.</th>
<th>Drug</th>
<th>Botanical name</th>
<th>Rasa-Panchaka</th>
<th>Pharmacological activity</th>
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Chemical Composition [8]
The rhizome contains essential oils: alpha-Zingerene, beta-bisabolene, 1,8-cineole, camphene, alpha- phellandrene, sesquiphellandrene, alpha-curcumene, pungent constituent: 6,4,8,10,12-gingerols, 6-gingerol, 6-shagaol, 6-shagaol, 6-gingediol-3-aceta, 6-gingediol, 5-aceta, 6-gingediol-3-aceta, 6-gingediacetate.

Percentage of vitamin in Shunthi powder: Thiamine – 0.035%, Riboflavin-0.015%, Niacin- 0.045%, Pyridoxin-0.056%, Vitamin C-44%, Vitamin A- Traces, Vitamin E-Trace, Total – 44.15% 12.

Pharmaceutical Activity of Shunthi- Antimicrobial, Anti-inflammatory, Antioxidant and immune modulatory role.

Mode of Action

(1) Anti-Oxidative Effect [14]

In Shunthi (Zingiber officinale) has a rich phytochemical compound that scavenge free radicals
{H\(^+\), OH\(^-\), Uric acid, Lactic acid} produced. In biological system for the purpose of energy production but some free radicals which generated during the process of oxidation are essential. In advanced production of free radicals result in oxidative stress that can lead to DNA damage. The Anti-oxidative properties of Ginger is undoubtedly protect human against many chronic disease. 6-Shagoal has exhibited the most potent anti-oxidant and anti-inflammatory properties in Ginger which can be attributed to the presence of alpha, beta unsaturated Ketone moiety. Extract of Zingiber officinalis. Ethanol & Acetaminophen. In Ethanol combination of vitamin-E this is protection is mediated by Renal anti-oxidant defence And Acetaminophen induced liver damage so it is also useful in preventing Acute liver injuries. Particularly fresh Ginger methanol extract of drug were found to have better antioxidant action then the n-hexane extract.

(2) Anti-Inflammatory \(^\text{[14]}\)

Zingiber officinalis is non-steroidal anti-inflammatory drug\(^\text{[12]}\) Respiratory tract is the anatomical structure through which air moves in and out. It includes nose, pharynx, Larynx, trachea, bronchus and lung's. Main pathology of Respiratory tract is that inflammation in inner epithelial layer of Nose, Larynx, Pharynx, trachea, bronchus, Lung's. Gingeral, Shogaol and other structurally related substance in Ginger inhibit prostaglandin and leukotrine biosynthesis through suppression of 5-lipoxygenase. They can also inhibit synthesis of pro inflammatory cytokines such as IL-1, TNF-alpha and IL-8. Shagoal can down regulate inflammatory iNOS and COX-2 gene expression. Rhizome hexane fraction extract of Zingiber officinalis inhibited the excessive production of NO, PGE, TNF-alpha and IL-beta because of patent compound in Ginger rhizome for inhibiting Allergic reaction. It may be useful for the treatment and prevention of Allergic disease.

Antimicrobial Action: Zingiber officinale rhizome afforded three lipophilic analogues 6-gingerol, 8-gingerol and 10-gingerol that exhibited antimicrobial activity. The lipophilic analogues(8-gengerol and 10-gingerol) were more active \(^\text{[12]}\).

### Acute Alveolar Injuries \(^\text{[9]}\)

- **Release of cytokines**
  - By activated macrophages
  - By activated neutrophils
- **Proteases, Paf Oxidants, Leukotrienes**
- **Local tissue damage,**
  - Intra-alveolar oedema,
  - Surfactant in activation
- **Hyaline membrane**
- **Stiff Lung**
  - Resolution
  - Organisation
  - Death

### Investigation of Respiratory System \(^\text{[10]}\)
- Digital Chest radiography
- CT scanning
- High resolution CT scanning
- Ultrasound
- MRI
- Pulmonary Function Test \(^\text{[7]}\)
- Blood test \(^\text{[7]}\)
- Bacteriological culture sputum \(^\text{[7]}\)

### Contra-Indication \(^\text{[8]}\)
- a) Kustha
- b) Pandu
- c) Mutrakricha
- d) Raktrapitta
- e) Vrana
- f) Jwara
DISCUSSION

Zingiber officinalis are well known as a Health-promoting perspective. It has Laghu, Snigdha Guna, Katu-Rasa, Madhur- Vipak and Ushana-Veerya. Due to its Veerya it is Kapha-vatashamak and anti-inflammatory property. It has a anti-bacterial so in condition of infection Shunthi is help to treat the disease. According to Acharya charak mentioned in Harit varga- and it’s used in appetizer & Vata-kapha vyadhi.[12] also Astrang Hridaya mentioned in Aushadha Varga which has a property like Jatharagni Vardhaka, Veerya Vardhaka, Hridhaya, Shrotoshodhaka & Kapha Vata Shamak.[14] As well as useful in Kidney disease, liver disorder, Muscular pain, Cardio-vascular diseases, Diabetes-mellitus, Gastrointestinal tract system. ingredients which can prevent various cancer’s angiogenesis and metastasis induction of apoptosis and inhibit of cell-cycle progression. It is very much useful to metabolized the free radicals which are responsible for all kind of respiratory system disease, DNA damage and play important role to inhibit the formation of intermediated product like Fee radical (H*, OH), lactic acid, uric acid and ketone bodies in blood stream.

CONCLUSION

Shunthi is a specially use in Vata-Kapha vyadhi, it’s a very good Aama pachaka, Kaphaghana, Vatahara drug. Due to its Ushana veerya useful for all kind of pain. Due to its Kaphaghana properties frequently used in Swasha, Kasa, Pratishayay and others respiratory disease. According to modern text pathology in respiratory is over production of mucus, proliferation of goblet cells, infections these are the common pathology in every Pranvaha Srotasa Vyadhi and all the properties which is mentioned above about Shunthi they are very much helpful to treat the disease especially n-hexane this is the substance which is highly anti-oxidant property and lipophilic analogues 6-gingerol, 8-gingerol and 10-gingerol that exhibited antimicrobial activity. as well as act as a bronchodilator. So according to all above properties Shunthi is play a effective roll in Pranvaha Srotas Vyadhi.

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