

CRITICAL ANALYSIS OF COUGH AS PER AYURVEDA

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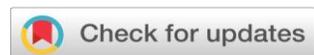
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ABSTRACT

Cough is a protective phenomenon for the respiratory tract of a human. It is a reflex phenomenon that works effectively by expelling out the retained airway secretions and aspirated materials predisposing the respiratory tract to opportunistic infections. Cough also plays a major role in determining the underlying respiratory tract infection. In the *Ayurvedic* treatises, the cough has been mentioned as *Kasa*. *Kasa* is discussed both as a clinical manifestation of other diseases and a separate disease entity in *ayurvedic* classics. *Kasa* is considered a disease separately in the conditions, it leads to the manifestation of other clinical features which are discussed about *Nidanarthakara rogas*. Risk factors for the production of cough include smoke, dust, cold exposure, occupational dust and chemicals, exercise, etc, which are also mentioned in *ayurvedic* classics. In *Ayurveda*, several characteristic patterns of *Kasa* have been discussed about different diseases. The study aims at a critical analysis of evaluation of cough in light of *Ayurveda* to help in determining an appropriate *ayurvedic* diagnosis and also to adopt effective *Ayurvedic* management accordingly

Keywords: *Kasa*, Cough, *Nidanarthakara rogas*.

INTRODUCTION

A cough is one of the most common medical complaints accounting for as many as 30 million clinical

visits per year. A cough is an innate primitive reflex and acts as part of the body's immune system to pro-

fect against foreign materials. Evaluation of a cough is initially a subjective and highly variable assessment.¹ Weak or ineffective cough comprises the ability to dispose of more serious and their sequelae. Weakness, paralysis, or pain of the expiratory (abdominal and intercostal) muscles is foremost on the list of causes of impaired cough. Cough strength is generally assessed qualitatively, peak expiratory flow or maximal expiratory pressure at the mouth can be used as a surrogate marker of cough strength.² In *Ayurveda Kasa* has been mentioned as a clinical manifestation of several diseases. However, it has been clearly stated in *Ayurveda* that when *Kasa* is manifested as the cardinal clinical feature among a group of less virulent clinical symptoms, it is considered an independent disease entity³. It has been explained that vitiated *udan vayu* in association with *prana vayu* forcefully comes out of the mouth expelling *dosas* (*kapha* and *pitta*) producing *kasa*⁴. *Kshaya* can be manifested as a *nidanarthakara vyadhi* of *kasa* if early interventions are not taken.

OVERVIEW OF COUGH:

Cough mechanism⁵

Spontaneous cough is triggered by stimulation of sensory nerve endings that are thought to be primarily rapidly adapting receptors and C fibers. Both chemical (e.g., capsaicin) and mechanical (e.g., particulates in air pollution) stimuli may initiate the cough reflex. A cationic ion channel—the type 1 vanilloid receptor—is found on rapidly adapting receptors and C fibers are the receptor for capsaicin, and its expression is increased in patients with chronic cough. Afferent nerve endings richly innervate the pharynx, larynx, and airways to the level of the terminal bronchioles and extend into the lung parenchyma. They may also be located in the external auditory meatus (the auricular branch of the vagus nerve, or Arnold's nerve) and the esophagus. Sensory signals travel via the vagus and superior laryngeal nerves to a region of the brainstem in the nucleus tractus solitarius vaguely identified as the “cough center.” The cough reflex involves a highly orchestrated series of involuntary muscular actions, with the potential for input from cortical pathways as well. The vocal cords adduct,

leading to transient upper-airway occlusion. Expiratory muscles contract, generating positive intrathoracic pressures as high as 300 mmHg. With the sudden release of the laryngeal contraction, rapid expiratory flows are generated exceeding the normal “envelope” of maximal expiratory flow seen on the flow-volume curve. Bronchial smooth-muscle contraction together with dynamic compression of airways narrows airway lumens and maximizes the velocity of exhalation. The kinetic energy available to dislodge mucus from the inside of airway walls is directly proportional to the square of the velocity of expiratory airflow.

Types of cough⁶:

1. Dry or unproductive: Upper respiratory tract infection, bronchogenic carcinoma, interstitial fibrosis, tropical eosinophilia.
2. Wet productive: Bronchiectasis, lung abscess.
3. Paroxysmal: Bronchial asthma, cardiac failure.
4. Nocturnal cough: LV failure, bronchial asthma, GERD, ACE inhibitors.

Types of expectoration⁷:

1. Watery: pulmonary congestion, acute pulmonary oedema.
2. Mucoid: sticky sputum containing increased mucin in acute or chronic bronchitis, asthma, weakened bronchial musculature.
3. Mucopurulent: the sputum is generally mucopurulent and almost all infections of the bronchi and lungs give rise to this type of sputum.
4. Purulent: Indicates infection somewhere in the respiratory tract. Large quantities of purulent sputum in bronchiectasis, lung abscess, etc.

Colour of sputum⁸:

- Blackish: due to inhalation of carbon in coal miners, copious black sputum may occur when there is a breaking down of lung tissue.
- Rusty: Due to altered blood mixed with tenacious sputum in lobar pneumonia.
- Reddish color: The indicated presence of blood, fresh or altered.
- Frothy pink sputum: Pulmonary oedema.
- Dark brown: Purulent material like anchovy sauce in amoebic lung abscess.
- Green: Pseudomonas infection.

- Chalky white: Pulmonary alveolar proteinosis.
- Odour⁹:** A foul odor indicates infection with anaerobes.

Microscopic Examination¹⁰

1. Organised constituents:

- Fibrinous casts – Casts of a small bronchus in fibrinous bronchitis, pneumonia during the stage of resolution, and diphtheritic affection of finer bronchi.
 - Bronchial spirals – Resemble bronchial casts. Faint, translucent, elongated masses.
 - Elastic tissue – Single threads or small bundles indicate destructive processes in the lung, e.g abscess of the lung.
2. **Eosinophils** – The presence of eosinophils suggests an allergic process, they are commonly found in asthma and pulmonary eosinophilia.
 3. **Animal parasites**– Paragonimus westermani, Entamoeba histolytica, filaria, tinea, echinococcus ascariis.
 4. **Fungi** – Actinomycosis, aspergillosis.
 5. **Malignant cells** – May be found in bronchogenic carcinoma.

Ayurvedic Review of Kasa:

The disease *Kasa* is categorized under *Pranavahasrota vyadhi* having origin in *amasaya*. Acharya Charak has defined *Kasa* as the expulsion of obstructed Vata resulting in the production of abnormal sound which can be either productive or dry.¹¹ *Vikriti* of the *udan vayu* that resides in *kantha* leads to the production of *Kasa*.¹¹ Excessive exposure to dust, excessive exercise, intake of dry diet, etc. are considered as the etiological factors of *Kasa*.¹² When *kasa* is presented as an individual disease entity, if early measures are not taken to limit the condition, it develops further to give rise to *Kshaya* as *nidanarthakara vyadhi*¹³.

Pathogenesis of Kasa:

Samprapti of *Kasa* as per mentioned in *Charak Samhita* describes obstruction to the downward movement of *apan vayu*. Charak has mentioned *apan vayu* as *adhahpratihata vayu*. The direction of movement of *apan vayu* thus becomes upward and it enters into the minute channels of circulation of the upper part of the body, especially in *Urah* and *kantha*. Along with that it also obstructs the *srotas* of *shiras*. While men-

tioning the *samprapti* of *kasa*, Charak has particularly mentioned the term *udanabhavamapanna*, which denotes vitiation of *prana vayu* at first which in turn leads to the aggravation of *udana vayu*¹⁴.

There are five types of *Kasa* i.e, *Vataja*, *Pittaja*, *Kaphaja*, *Kshataja*, *Kshayaja* as per mentioned in the classics.¹⁵

Types of sputum production related to different varieties of *Kasa* as per mentioned in the classics in context to various diseases:

1. *Vataja Kasa*:¹⁶ Very little or no sputum is seen. A small amount of *kapha* is expelled out after repeated episodes of *kasa vegas*.
2. *Pittaja kasa*:¹⁷ Patient expels out typically yellowish sputum.
3. *Kaphaja Kasa*:¹⁸ Thick, slimy sputum is produced.
4. *Kshayaja kasa*:¹⁹ Patient expels putrid, greenish or reddish, foul-smelling sputum.
5. *Kshataja kasa*:²⁰ Cough is unproductive initially which becomes blood mixed mucoid later.
6. *Rajyakshma*:²¹ Large quantity of purulent, sticky sputum, mucoid in nature, greenish, whitish, or yellowish.
7. *Kshatakshina*:²² Blackish, a foul-smelling, yellowish, thick, large quantity of blood mixed with mucoid sputum.
8. *Ativyayama*:²³ Cough related to exertion.
9. *Tamaka swasa*:²⁴ persistent cough followed by syncope.

Other clinical features mentioned in the context of different varieties of *Kasa* are summarized in the following table:

Clinical features	Vataja	Pittaja	Kaphaja	Kshataja	Kshayaja
Pain	Pain in <i>hrid-sankha-murddha-udar-parswa</i> ²⁵	Burning sensation of chest ²⁶	Exacerbations of cough are not associated with pain ²⁷ , Headache ²⁸	Pain in the throat with excessive tenderness and pricking sensation over the chest, toothache ²⁹	Pain in flanks ³⁰
Voice	With the increased frequency of cough, the intensity of voice diminishes. ³¹	Hoarseness of voice. ³²	–	Rhonchi ³³	Hoarseness of voice. ³⁴
Associated features	Dryness of chest, throat, mouth ³⁵	The bitterness of mouth ³⁶ , seeing glares and halos in front of eyes ³⁷	Sweetness and stickiness in mouth, heaviness of chest. ³⁸	–	Hollowness of chest ³⁹
Systemic features	Generalized weakness, Delirium ⁴⁰	The tastelessness of mouth, thirst, yellowish sclera, delirium. ⁴¹	Nausea, rhinorrhoea, anorexia ⁴²	Fever, Dyspnoea, hyperalgesia of chest. ⁴³	Malnourished, Fever(dwandaja), irregular bowel habit. ⁴⁴

DISCUSSION

Cough is a cardinal manifestation of many respiratory diseases and is encountered as the most common clinical symptom in clinical medicine. In the classics, five different varieties of *kasa* have been discussed. Also, *Kasa* has been mentioned several diseases as a symptom. The various characteristic features of the sputum produced have been discussed vividly in the classics about several diseases. The clinical significance of coughing in the diagnosis of minor to severe intrathoracic disease is of utmost importance. The type of sputum produced by many varieties of *Kasa* discussed in *Ayurveda* and their modern-day utility cannot be denied. In *Vataja Kasa*, the amount of sputum produced is very little which is expelled out with difficulty. There is associated pricking pain in the chest, temporals, head, and abdomen, and the patient looks sick. Most of the features of which are found in viral upper respiratory throat infections. Along with that, similar clinical features are noted in cases of interstitial lung diseases. *Pittaja kasa* is associated with the expulsion of yellowish sputum. Purulent

sputum is usually yellowish and often a characteristic feature of pneumococcal pneumonia. It is also seen in cases of bronchiectasis. The other clinical features of *Pittaja Kasa* can be seen in cases of Hyperacidity or Gastroesophageal reflex disorders. Along with most chronic fever cases, *pittaja kasa*-like features are seen. In *kaphaja kasa*, there is the production of thick, slimy sputum which is a mucoid variety of sputum. In acute or chronic bronchitis, there is the production of sticky sputum containing increased mucin. Chronic eosinophilia results in similar episodes of exacerbations. In *Kshayaja Kasa*, the expectorant is foul-smelling, mixed with pus, and predominantly reddish or greenish. Greenish sputum production is a characteristic feature of pseudomonas infection whereas reddish-brown sputum production is seen in Klebsiella infection. Foul-smelling putrid sputum production is primarily seen in lung abscess, bronchiectasis, bronchial carcinoma, and gangrene lung. *Kshataja Kasa* is produced as a result of *kshatakshina* (traumatic chest injury). It is characterized by an initial dry cough which becomes productive later, pre-

dominantly blood in the sputum. About *kshatakshina*, it has been mentioned that there is the expulsion of blackish sputum mixed with a large quantity of blood associated with chest pain. Though *kshataja kasa* is produced as a result of *kshatakshina*, it is discussed independently in the classics because to treat *Kshatakshina*, limiting the symptoms of *Kshataja kasa* at first as a *swatantra*(individual) *vyadhi* is necessary to avoid poor prognosis. Traumatic pleurisy, Blunt chest trauma (Haemothorax) presents with similar clinical manifestations as that of *kshataja kasa*. In *Rajayakshma*, the nature of sputum produced is of purulent variety, mucoid and yellowish to greenish which can be seen in cases of infections of bronchi and lungs such as pulmonary tuberculosis, chronic eosinophilic pneumonia, staphylococcus infection, etc. *Tamaka swasa* is characterized by the production of a very scanty amount of sputum which is expelled out with difficulty and associated with severe breathing difficulty. The patient gets mild relief after the expulsion of the sputum. This is typically seen in cases of acute presentation of bronchial asthma (status asthmaticus).

CONCLUSION

Based on the symptoms discussed in different varieties of *Kasa*, it is evident that there is significant similarity present with the various presentation of cough discussed as per contemporary medicine about several respiratory disorders. In Ayurveda, we have found references to a wide variety of cough presentations i.e. from allergic to infective to a few life-threatening manifestations. Many of the infective presentations of cough have been discussed vividly in Ayurveda. Further clinical correlations and interventions hold the breakthrough outcome in the field of research and medicine about cough with the help of the Ayurvedic treatment principle.

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