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### RESEARCH ARTICLE

#### CRITICAL ANALYSIS OF KASA AND KSHATAJA KASA SAMPRAPTI.

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#### Abstract

Kasa is a pranavaha srotos vyadhi having origin in amashaya. As we look into the samprapthi of kasa there is obstruction to movement of pranavata by nidanas like dhooma rajaadi which in-turn becomes the mechanical or chemical irritant to pranavaha srotas. The samprapthi explained in the samhita are indicating the cough reflex, which has both sensory and motor pathway, involving both prana and udana vata. This can be explained by the Valsalva maneuver. Kshataja kasa is one of the non-doshik varieties of kasa. In classics we can see the explanation of kshataja kasa in the context of rajayakshma and kshataksheena, the only difference is amount of nidana sevana and the severity. Here is an attempt made to explain that kasa samprapthi explained in samhitas is about "act of coughing. In modern parlance Kshataja kasa can be understood as haemothorax and haemo-peritonium upto some extent, after assessing its aetiology and symptoms."

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#### Introduction:-

The respiratory system is involuntarily, the most vulnerable system in the body. It is always at the risk of being exposed to all kind of air born infections and irritants like pollution, dust, chemical fumes etc with the process of respiration. Acute respiratory infections in India have increased from 32.76 mn in 2013 to 40.3 in 2016, rising consistently over the past five years.

Kasa derived from the word kas, ie gathi shatana<sup>1</sup> which means falling movement. According to Gangadhara it is kasri which means shabda kutsanya.

Kasa is a pranavaha srotos vyadhi having origin in amashaya. There are five types of kasa namely, vataja, pittaja, kaphaja, kshayaja and kshataja.

The samprapthi of kasa says there will be obstruction to downward movement of vata (in ura pradesha ie pranavayu which moves in ura and kanta), occupies urdwa srotas by acquainting udanabhava that is urdwa gati swabhava. Get lodges in kanta and uras and blocks all the srotas in shiras. There will be bending and involuntary movement of body mainly hanu(jaw) manya (nape of the neck) and eyes, followed by closure of eyes and stiffness of prishta(back) and ura (chest).as the result as this act there will be production of kasa with or without expectoration of kapha<sup>2</sup>.

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According to Acharya Sushruta kasa is due to involvement of prana and udana vayu. Dushta pranavata combines with udana vata and expels forcefully out with doshas through the mouth with a sound similar to broken metal<sup>3</sup>.

### **Involvement Of Vata In Kasa**

**PRANAVATA:** This is located primarily in head, brain and upper part of the body. It is associated with sensory perception, intellectual, sensory functions, thoughts and respiration particularly inhalation as well as other downward movements that flows into the body like swallowing, respiration, sneezing<sup>4</sup>.

### **Udana vata:**

It governs the upward movement of the body. This vayu is crucial in maintaining memory and proper speech patterns<sup>5</sup>. Located in the area of diaphragm and thoracic cavity, it also interacts with the downward flowing prana to regulate breath, particularly exhalation. The other activity also highlights the role of Valsalva maneuver, straining against forced expiration<sup>6</sup>, is performed moderately forceful attempted exhalation against a closed airway, usually done by closing one's mouth, pinching one's nose shut while pressing out as if blowing up a balloon<sup>7</sup>.

### **Apana vata:**

It is based in the colon and pelvic cavity. Its primary movement is downward and outward of the body, governing the movement and absorption of material through the colon and the excretion/expulsion of faeces, urination, semen and menstruation<sup>8</sup>. It is concerned with the involuntary movement and Valsalva maneuver as said in udanavata.

### **Cough reflex:**

Cough reflex has got both sensory (vagus) and motor path way<sup>9</sup>.

Cough receptors in epithelium of respiratory tract sensitive to both mechanical and chemical irritants. Trachea and bronchi especially larynx and carina are more sensitive to irritants.

When cough receptor triggered impulse travel via internal laryngeal nerve, branch of superior laryngeal nerve to the vagus and to the medulla.

Efferent pathway comes with relevant signals from cortex-medulla to glottis, intercostal muscles and expiratory muscles via vagus, superior laryngeal nerve.

### **MECHANISM:**

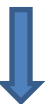
Contraction of diaphragm, creating negative pressure around the lungs.



Air rushes inside the lungs in order to equate the pressure.



Abdominal muscle contraction and relaxation of diaphragm.



Increased pressure inside the lungs.



Bronchi and non-cartilaginous part of trachea collapse to form slit through which air is forced.

As we look into the samprapthi of kasa there is obstruction to movement of pranavata by nidanas like dhooma, raja, vimarga gamana of ahara etc which in-turn becomes the mechanical or chemical irritant to pranavaha srotas. As pranavata is located in murdha (brain) and concerned with sensory function and act of respiration and deglutition. Udana vata is located in the area of diaphragm and thoracic cavity; interact with the movement of pranavayu and

regulation of breathing. Here adaha pratihata vayu indicates the pranavata which has got obstructed, but not apanavata.

So the vitiated pranavata combines with udana vata and acquires urdwagathi which is quality of udana and fills up in the urdha srotas and comes out forcefully through mouth with sound and with or without dosha like kapha, pitta or rakta.

So in general samprapti of all type of kasa explained in samhitas are indicating the mechanism of cough rather than disease process. Pratilomam yada vayu indicates for pranavata but not apana vata as the mechanism is concerned.

The classification of kasa as kshayaja and kshataja in addition to the doshik varieties indicates the symptoms of kasa, which can be manifested by the pathophysiology of these three diseases viz. kasa, rajayakshma and kshataksheena<sup>10</sup>. So the nidana of all three diseases can be, all together taken as the nidana of kasa. In kshayaja and kshataja kasa nidanas like ativyavaya and vishamashana are given importance. These nidanas are on behalf of complete different route of samprapti giving the same out-come of course in case of rajayakshma these nidanas are so powerful and influencing that they lead to more kshaya (depletion) of the body. On the other hand when these nidanas are not so powerful and influencing, they are capable of producing sign and symptoms other than acknowledgeable kshaya and when vyadhi adhishtana is especially pranavaha srotas then samprapthi leads to kasa. Then these are included under the non doshik variety of kasa ie. Kshayaja and kshataja.

#### **Kshataja kasa:**

Person indulging in excessive weight lifting, walking, horse riding, atirookshana there will be injury to the ura pradesha and vitiated vata gets lodged in ura pradesha causing kshataja kasa. Upon these nidana if rookshita person indulges in excessive copulation causes kshaya<sup>11</sup>.

Initially there will be shushka kasa followed by shonitayukta kasa. Severe pain in kanta and urapradesha due to bhagna which is dukkhasparsha(severely tender). This variety of kasa is one among the presentation of sahasaja rajayakshma when vyadhi is located in prana vaha srotas, and the same can be expected in urakshata. Kshata will lead to kshaya of shukra and ojas.

Yuddhadi ayatabalaramba and ativyayama



vata gets lodged in ura pradesha causing kshataja kasa

The symptoms in kshataja kasa are pertained to pranavaha srotas with some systemic presentations like jwara, sandhi vedana. In kshataksheena or urakshata there will be above said symptoms along with other systemic presentations like pravepana, manodainya, vitbheda, shonitha chardi and sarakta mutrata with parshwa and katigraha. In rajayakshma symptoms varies according vyadhi adhishtana.

Acharya caraka says kshataja kasa is an atyayika condition and it should be treated as earliest as possible.

Haemothorax, can be considered as one of the reason of kshataja kasa, as nidana and lakshanas are complementing each other.

#### **Haemothorax:**

Accumulation of frank blood in the pleural cavity is termed as haemothorax. Haemothorax happens when an injury or other factors causes blood to collect in the chest.

#### **Causative factors:**

Most common cause is traumatic injury to the chest, such as a puncture wound from a broken rib or blunt force injuries.

1. Haemothorax either stem from an extra pleural injury or an intra-peritoneal injury.
2. An extra peritoneal injury is caused by damaged to the chest wall tissues on the outside of the pleural space. An intra-pleural injury is due to damage to the inside of the pleural cavity.

As told in classics gaja and ashwa yaana, excessive walking and weight lifting may

**Other causes:**

**Spontaneous haemothorax-**

It can affect the people with,

1. Lung infection s such has tuberculosis.
2. Malignancy – such as lung and pleural cancers.
3. Pulmonary embolism which is a blood clot in the lungs.
4. Defects of blood clotting like haemophilia or due to excessive use of anti-coagulant drugs.
5. Lung tissue dis-function such has pulmonary infraction.
6. Tears in blood vessels in the lungs may cause severely high blood pressure.

**Symptoms:**

1. Chest pain, especially when breathing, heaviness.
2. Cold, pale or clammy skin.
3. Rapid heart rate.
4. Low blood pressure.
5. Tense, rapid or shallow breathing
6. Feeling of restlessness
7. Anxiety.

Bhara, adwa and ativyayama can result in spontaneous haemothorax because of persistant pain and exertion-muscular or vascular rupture in the thoracic wall during heavy exercise implying the indirect injury. In weight lifting the condition was explained by muscular tear and intercostal vessel tear<sup>12</sup>.

In case of Aortic aneurysm rupture and causing due to exertion and hypertension , there will be left sided haemothorax, and haematuria due to rupture of abdominal aortic aneurysm into venacava or due to aorto-caval fistula. Splenic rupture is mainly due to trauma, a traumatic splenic rupture is rare that is spontaneous splenic rupture<sup>13</sup>.

Only haemothorax can considered as kshataja kasa and haemothorax with haemo-peritonium can be considered as kshatakseena.

**Conclusion:-**

Kasa is a both swatantra vyadhi and lakshana, involving dooshana of pranavata and udanavata. Due to etiological factors pranavata gets obstructed in its way and comes upward joining with udanavata. As both prana and udanavata are responsible in the act of respiration and cough reflexes, when there is vitiation of these, there will be increase in their function, presenting kasa vega. Kshayaja and kshataja kasa shares the same nidana and lakshana with kshatakseena and rajayakshma but the bala of nidana and vyadhi adhishtana decides the route of pathology and disease manifestation.

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