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Conceptual study on CROUP in children w.r.t. its management in Ayurvedic and Contemporary Sciences

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ABSTRACT

Background: Croup is a common respiratory condition in children, typically caused by a viral infection, most commonly the parainfluenza virus. It leads to inflammation and narrowing of the upper airway, primarily the trachea and larynx, which can result in distinctive symptoms like Barking cough, Stridor, hoarseness, labored breathing, Fever. Laryngotracheitis, laryngotracheobronchitis, and laryngo-tracheo-broncho-pneumonitis are all included in the spectrum of croup. **Aims and Objectives:** To study the etiology, progression of Croup, to study the signs & symptoms of Croup, to study the investigations and management by Ayurvedic and contemporary sciences. **Materials & Methods:** Authentic books and *Samhitas* along with the articles published is referred for the detailed information related to topic. **Discussion:** Diagnosis of Croup is typically diagnosed based on the child's symptoms and physical examination. In some cases, X-ray or other imaging tests is recommended. Ayurveda treats Croup in multiaspect correlating with *Kasa* and *Shwasa Roga*. *Snehan* by *Lavangadi Taila*, *Swedan*. Use of *Kasa- Shwashara Kalpa* like, *Talisadi Churna*, *Shwaskuthar Rasa*, *Kanakasava*. *Panchakarma* procedures such as *Dashmool Niruha Basti*, *Mrudu Vaman*, *Virechan*. Contemporary science treats it by humidified Air, corticosteroids, nebulized epinephrine, rest and Fluids. **Conclusion:** Croup in children is a common and usually mild respiratory condition caused by viral infections. While it can be distressing, most cases can be managed effectively at home with humidified air and, in some cases, corticosteroids. Knowing the symptoms and when to seek medical attention is crucial for parents and caregivers to ensure the well-being of their children.

Key words: Croup, Laryngotracheobronchitis, Kasaroga, Shwasaroga

INTRODUCTION

Croup is a common respiratory condition in children, typically caused by a viral infection, most commonly the parainfluenza virus. It causes inflammation and narrowing of the upper airway, primarily the trachea and larynx, which can result in distinctive symptoms like Barking cough, Stridor, hoarseness, labored breathing, Fever. Laryngotracheitis, laryngotracheobronchitis, and laryngo-tracheo-broncho-pneumonitis

are all included in the spectrum of croup. Croup includes an infection of the upper airway, which becomes narrow, making it harder to breathe. Croup also causes a cough that sounds like barking. It is a self-limited disease that is seen in children less than age of 5 years.

The cough and other signs and symptoms of croup are the result of swelling and irritation around the voice box (larynx), windpipe (trachea) and bronchial tubes (bronchi). When a cough forces air through this narrowed passageway, the swollen vocal cords produce a noise a seal barking. Taking a breath often produces a high-pitched whistling sound called stridor. When the upper airway is infected with the virus that causes croup, tissues around the voice box (larynx) and the windpipe (trachea) will swell. When a cough forces air through this narrowed passageway, it may sound like a seal barking. Croup is usually caused by a viral infection, most often a parainfluenza virus.^[1] A child may get a virus by breathing infected respiratory droplets coughed or sneezed into the air. Virus particles in these droplets may also survive on toys and

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other surfaces. If your child touches a surface with a virus on it, and then touches the eyes, nose or mouth, an infection may follow. Uncommon complications may include bacterial tracheitis, pneumonia, pulmonary edema, and rarely, death. This activity reviews the evaluation and management of croup and highlights the role of the interprofessional team in improving care for patients with this condition. Ayurveda treats Croup in multispect corelating with *Kasa* and *Shwasa Roga*. Early intervention is necessary in case of *Kasa* as it is a potential *Nidanarthakara Vyadhi* to produce *Kshaya*.^[2] Croup can be correlated to the description of *Kasa* in Ayurveda. It is the most frequent symptom of respiratory disease. The main vitiating factors in the *Kasa* are *Kapha* and *Vata*. the increased *Kapha* forms a sort of *Upalepa* in *Pranavaha Srotas* obstructing the normal pathway of *Vayu*, leading to its vitiation. *Kasa* may develop as an independent disease, may be a *Lakshana* associative to other disease, sometimes may develop as *Upadrava* of a disease. Early intervention is necessary in case of *Kasa* since untreated *Kasa* leads to complications like-*Shwasa*, *Kshaya*^[3]etc. *Shwasa Roga* is condition where in the patient experiences an abnormal or distressful breathing. When *Vata Dosha* gets associated with *Kapha* and does the obstruction to the channels of circulation and then being itself obstructed, the aggravated in *Shwasa*.^[4]

Bronchiectasis and Ayurveda

In Ayurveda, croup is considered a disease that occurs in the *Pranavaha Srotas*. Croup can be correlated to *Swasa* along with *Kasa*. Ayurveda has several formulations to treat this condition and is in practice with proven efficacy.

Nidan of croup

- Exposure to dust and smoke
- *Sheetasthana Vasa* (Residing in cold region)
- *Sheetambu Sevana*
- *Aniyamita Bhojan*
- *Marma Ghata*
- *Uro Abhighata*

- *Vegavarodha*

Purvarupa of Croup

- Pain in the chest
- Aversion towards food
- Restlessness
- Pain in the flanks
- Bad taste in the mouth

Samprapti

Due to the causative factors, *Pranavata* combined with *Kapha* leaves its path and begins to move in the upward direction, giving rise to breathing difficulty, cough etc.

Types of Kasa and Shwasa

Types of Kasa ^[5]	Types of Shwasa
<i>Vataja</i>	<i>Kshudra Shwasa</i>
<i>Pittaja</i>	<i>Tamak Shwasa</i>
<i>Kaphaja</i>	<i>Chinna Shwasa</i>
<i>Kshataja</i>	<i>Maha Shwasa</i>
<i>Kshayaja</i>	<i>Urdhwa Shwasa</i>

Prodromal symptoms of Kasa

पूर्वरूपं भवेतेषां शूकपूर्णगलास्यता । कण्ठे कण्डूश्च
भोज्यानामवरोधश्च जायते ॥ (माधवनिदान /कास)

Premonitory signs and symptoms of *Kasa*

1. Sensation as if throat and mouth are filled with *Shooka* (Thorns)
2. Itching sensation in the throat.
3. Inability to swallow food.

Signs and symptoms of Kasa

Vataja Kasa^[6]

हृत्पाश्वोरः शिरः शूलस्वेदभेदकरो भृशम् । शुष्कोरः
कण्ठवक्त्रास्यहृष्टलोम्नः प्रताम्यतः ॥११॥ निर्घोषदैर्न्यक्षामस्य
दोर्बल्यक्षयमोहकृत् । शुष्ककासः कफं शुष्कं कृच्छ्रान्मुक्त्वाल्पतां

व्रजेत् ।। स्निग्धाम्ललवणोष्णैश्च भुक्तमात्रे प्रशाम्यति ।
ऊर्ध्ववातस्य जीर्णोऽन्ने वेगवान्मारुतो भवेत् ।। (च.चि.१८/९ -११)

Pittaja Kasa^[7]

पीतनिष्ठीवनाक्षत्वं तिकास्यत्वं स्वरामयः । उरोधूमायनं तृष्णा
दाहो मोहोऽरुचिर्भमः ।।

प्रततं कासमानश्च ज्योतीषिव च पश्यति । श्लेष्माणं पित्तसंसृष्टं
निष्ठीवति च पैतिके ।। (च.चि.१८/१३,१४)

Kaphaja Kasa^[8]

मन्दाग्नित्वारुचिच्छार्दपीनसोत्क्लेशगौरवैः ।
लोमहर्षास्यमाधुर्यक्लेदसंसदनैर्युतम् ।। बहुलं मधुरं स्निग्धं
निष्ठीवति घनं कफम् । कासमानो ह्यरुग् वक्षः संपूर्णमिव मन्यते ।।
(च.चि.१८/१६-१७)

Kshataja Kasa^[9]

स पूर्व कासते शुष्कं ततः शीवेत् सशोणितम् । कण्ठेन रुजताऽत्यर्थं
विरुग्णेनेव चोरसा ।। सूचीभिरिव तीक्ष्णाभिस्तुद्यमानेन शूलिना ।
घामका ला दुःखस्पर्शनं शूलेन भेदपीडाभितापिना ।।
पर्वभेदज्वरश्चासतृष्णावैस्वर्य पीडितः । पारावत इवाकूजन्
कासवेगात्क्षयोद्भवात् ।। (च.चि.१८/१९-२१)

Kshayaja Kasa^[10]

१. स गात्रशूलज्वरदाहमोहान् प्राणक्षयं चोपलभ्येत कासी ।
शुष्यान्विनिष्ठीवति दुर्बलस्तु प्रक्षीणमांसो रुधिरं सपूयम् ।। तं
सर्वलिंगं भृशदुश्चिकित्स्यं चिकित्सितजाः क्षयजं वदन्ति ।।
२. दुर्गन्धं हरितं रक्तं शीवेत् पूयोपमं कफम् । स्थानादुत्कासमानश्च
हृदयं मन्यते च्युतम् ।। अकस्मादुष्णशीतार्तो बहाशी दुर्बलः कृशः
। स्निग्धाच्छमुखवर्णत्वक् श्रीमद्दर्शनलोचनः ।। पाणिपादतलैः
क्षक्षणैः सततासूयको घृणी । ज्वरो मिश्राकृतिस्तस्य पार्श्वरुक्
पीनसोऽरुचिः ।। भिन्नसंहतवर्चस्त्वं स्वरभेदोऽनिमित्ततः । इत्येष
क्षयजः कासः क्षीणानां देहनाशनः ।। (च.चि. १८/२७)

Lakshana

- Croup can be called in Ayurveda as *Shwasa* and *Kasa*
- Wheezing sound - *Ghurghuraka*
- Breathing difficulty

- *Swarabheda* - Hoarseness of voice

Shaman Chikitsa

- *Talisadi Churna*
- *Pippali Churna*
- *Haridra Khanda*
- *Guduchi Satva*
- *Kantakari Ghruta*
- *Dhatri Loha*
- *Kanakasava + Pushkaramoolasava*
- *Tribhuvana Keerti Rasa*
- *Shwasa Kutar Rasa*

Panchakarma for Croup

- *Dashamoola Niruha Basti* is best in *Vata Kapha Roga Chikitsa*
- *Mrudu Vamana*
- *Mrudu Virechana*
- *Karpooradi Taila* application on chest region during breathing difficulty

Clinical presentation of Croup^[11]

Croup is characterized by a "seal-like barking" cough, stridor, hoarseness, and difficulty breathing, which typically becomes worse at night. Agitation worsens the stridor, and it can be heard at rest. Other symptoms include fever and dyspnea, but the absence of fever should not reduce suspicion for croup. Respiratory rate and heart rate may also be increased with a normal respiratory rate being between 20 to 30 breaths per minute. Visual inspection of nasal flaring, retraction, and rarely cyanosis increases suspicion for croup.

- 1-2 days of upper respiratory infection (URI) followed by barking cough and stridor
- Low-grade fever
- No drooling or dysphagia
- Duration is 3 to 7 days with the most severe symptoms on days 3 or 4

Symptoms of Croup^[12]

Mild	Moderate	Severe
Barky cough: occasional	Barky cough: frequent	Barky cough: frequent
Stridor: none to limited at rest	Stridor: easily audible at rest	Stridor: prominent inspiratory and occasionally expiratory
Indrawing (suprasternal/intercostal): none to mild	Indrawing (suprasternal/intercostal): visible at rest	Indrawing (suprasternal/intercostal): marked or severe
	Distress or agitation: none to limited	Distress or agitation: substantial
		Lethargy may be present

Clinical diagnosis

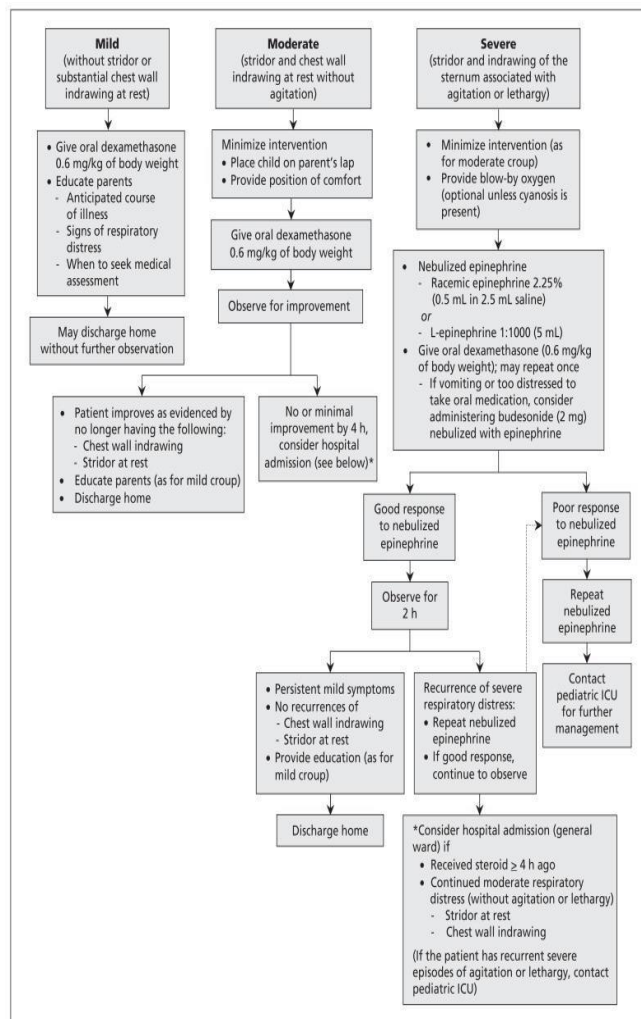
- Consider nasal washings for influenza, Respiratory virus, and parainfluenza serologies.
- Rule out other obstructive conditions in nasal cavity
- Characteristic narrowing of the trachea in 50% of cases, known as the steple sign, because of the subglottic stenosis, which resembles a steple can rarely be diagnosed by X-ray.
- Blood tests and viral culture are advised against, as they may cause unnecessary agitation and lead to further airway swelling and obstruction, viral cultures.

Treatment of Croup^[13]

Treatment depends on the severity based on the Westley croup score. Children with mild croup defined as Westley croup score less than 2 are given a single dose dexamethasone. Children with moderate to severe croup defined as a Westley croup score greater than 3 are given nebulized epinephrine in addition to dexamethasone.^[14]

Steroids - Corticosteroids, such as dexamethasone, results in faster resolution of symptoms, decreased

return to medical care, and decreased length of stay. Dexamethasone is superior to budesonide for improving symptom scores, but there is no difference in readmission rates.^[15]



Epinephrine - For moderate to severe cases, nebulized racemic epinephrine has been found to improve symptom scores at 30 minutes, but the benefits may wear off after 2 hours. Current recommendations advocate for a prolonged period of observation in patients receiving racemic epinephrine. If symptoms do not worsen after 4 hours of observation, consider discharge home with close follow-up.^[16]

Oxygen - Deliver oxygen by "blow-by" administration as it causes less agitation than the use of a mask or nasal cannula.

Intubation - Approximately 0.2% of children require endotracheal intubation for respiratory support. Use the tube that is a one-half size smaller than normal for

age/size of the patient to account for airway narrowing due to swelling and inflammation.

Hot Steam - Administration of inhaled hot steam or humidified air has not shown significant improvement

Cough Medicine - Containing dextromethorphan or guaifenesin, are discouraged.

Antibiotics - Antibiotics are reserved for cases when primary or secondary bacterial infection is suspected. In cases of secondary bacterial infection, vancomycin and cefotaxime are recommended. In severe cases associated with influenza A or B, antiviral neuraminidase inhibitors may be used.

DISCUSSION

Ayurveda treats Croup in multi aspect correlating with *Kasa* and *Shwasa Roga*. Early intervention is necessary in case of *Kasa* as it is a potential *Nidanarthakara Vyadhi* to produce *Kshaya*. Croup can be correlated to the description of *Kasa* in Ayurveda. It is the most frequent symptom of respiratory disease. The main vitiating factors in the *Kasa* are *Kapha* and *Vata*. The vitiating *Kapha* forms a sort of *Upalepa* in *Pranavaha Srotas* obstructing the normal pathway of *Vayu*, leading to its vitiation. *Kasa* may develop as an independent disease. Due to the causative factors, *Pranavata* combined with *Kapha* leaves its path and begins to move in the upward direction, giving rise to breathing difficulty, cough etc. It can be treated by various *Kasa Shwasahara Kalpas* and *Panchakarma* procedures like *Dashamoola Niruha Basti* is best in *Vata Kapha Roga Chikitsa*, *Mrudu Vamana*, *Mrudu Virechana*, *Karpooradi Taila* application on chest region during breathing difficulty. Croup is a viral upper respiratory infection, in children. It is characterized by the abrupt onset of barking cough, inspiratory stridor, hoarseness and respiratory distress. Oral corticosteroids reduce the severity and duration of respiratory distress, the need for hospital admission, airway intubations and repeat health care visits. For children with severe respiratory distress, nebulized epinephrine gives rapid but temporary relief. Most children, including many with severe respiratory distress, can be easily treated. There is always a scope of research considering to present scenario.

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