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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 Shwas Roga. Snehan by Lavangadi Taila, Swedan. Use of Kasa- Shwashara Kalpa like, Talisadi Churna, Shwaskuthar Rasa, Kanakasave. 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. 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...
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 multiaspect 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 Upadra 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 Dosh 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 Abhigatha

- 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

<table>
<thead>
<tr>
<th>Types of Kasa[5]</th>
<th>Types of Shwasa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vataja</td>
<td>Kshudra Shwasa</td>
</tr>
<tr>
<td>Pittaja</td>
<td>Tamak Shwasa</td>
</tr>
<tr>
<td>Kaphaja</td>
<td>Chinna Shwasa</td>
</tr>
<tr>
<td>Kshataja</td>
<td>Maha Shwasa</td>
</tr>
<tr>
<td>Kshayaja</td>
<td>Urdhwa Shwasa</td>
</tr>
</tbody>
</table>

Prodromal symptoms of Kasa

पूर्वरुपं भवेतेः शुकपूर्वगलास्यताः। कण्ठे कण्ठूष्णा क्षेत्रवानवातीभोजनविपत्तेऽपभावः प्रतिपातः। (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]

इष्टार्थोऽसि: श्रृवो शुक्लवाच्छेदनकरो भृषम। श्रुवभोऽः श्रृवक्षणविपत्ते प्रतिपातः। (वाशिष्यदेशन/कास)
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Pittaja Kasa

PitajnasheenavakrantaHittikasaarvamayah: Urdhvaagamayam tuvaranam. Darho mohini svarbhargam:
Prattan kasmaman Hitvareendrach vashayatna (PCh. 18/9-11)

Kaphaja Kasa

Mandadyutwachacchardhrinasaotokashegore: Tastasvarakhetrestarudhayatum: Bubunahisvarhin
Shayatiyam: Kasmaman hasegka: Sarpurnamakshayate
(PCh. 18/16-18)

Kshataja Kasa

S purnah kastanae shuddha tata: Sevamandhakshiyatam: Kshsthanasuktaantvariturvanaye
dvaragajakamanakshayata. Svarabheda: Sarpurnamakshayate
(KCh. 18/8/19-21)

Kshayaja Kasa

1. S gataastrulshuravahamohan pramanakshaya chowpamkhet kasisi. Shuyathavishishityata dusvarastusthrihamashavah kshushyate samasamagre: Sarpurnamakshayate
dvah: (PCh. 18/25)

Lakshana

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

Shwasa Kutar Rasa

- Swarabhedha - Hoarseness of voice
- 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

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 \[^{[12]}\]

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

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 steeple sign, because of the subglottic stenosis, which resembles a steeple 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 corelating 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 vitiated *Kapha* forms a sort of *Upalepa* in *Pranavaha Srotas* ob structing 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 barky 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 givers 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.

**REFERENCES**


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