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Croup (Laryngotracheobronchitis)

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Abstract **Review Article**

The paper reviews the guidelines for Croup with the aim to make primary care clinicians aware of signs and symptoms of Croup, and how to manage these in the community.

Keywords: Croup, clinicians aware, laryngotracheobronchitis.

Aim of Study

Croup is a frequent cause of acute respiratory distress in young children especially between the ages of 6 months and 3 years.

Croup affects 3% children per year with a peak in hospital admissions in late autumn (September to December), but cases occur all year round.

Parainfluenza virus epidemics happens every other year, resulting in a 50% increase in the number of children admitted with croup during these periods. The aim of this study is to make clinicians aware of the assessment, diagnosis, and the management of Croup without missing out the risk factors.

Aetiology:

- Croup also known as, laryngotracheobronchitis, is most commonly caused by a virus in 80% of patients, typically by parainfluenza virus types 1 or 3, in 75% of all cases, with type 1 being the commonest cause.
- Other viral causes include influenza A and B, adenovirus, respiratory syncytial virus, rhinovirus, and enterovirus.
- Though bacterial croup is less common but may be caused by *Mycoplasma pneumoniae* and *Corynebacterium diphtheriae*.
- Viral infection leads to inflammation, swelling of upper airways larynx, vocal cords and trachea inside trachea which interferes normal breathing and produces oedema, leading to narrowing of the subglottic region.

Prevelance:

- Croup is a frequent cause of acute respiratory distress in young children especially between the ages of 6 months and 3 years, uncommon after the age of 6 years, boys are affected slightly more than girls, with a ratio of 1.4 to 1. However, infants under 6months of age, teenagers and, very rarely, adults can get croup.
- There is a peak in Hospital admissions in late autumn (September to December), but cases occur all year round.
- In an observational study in a US paediatric group practice found croup to be the confirmed diagnosis in 15% of all cases of lower respiratory infection [Denny, 1983].
- Parainfluenza virus epidemics happens every other year, resulting in a 50% increase in the number of children admitted with croup during these periods.

Risk Factors:

- Young age most commonly affects children aged between 6 months and 3 years. However, it has been reported to occur in infants younger than 6 months, adolescents, and, more rarely, in adults.,
- Male sex
- Previous intubation, a weak link has been suggested between a history of previous intubation and croup but the evidence for this is currently considered to be weak.

Presentation:

- Croup normally starts with prodromal nonspecific symptoms of viral upper respiratory

tract infection (URTI), such as runny nose, sore throat, fever, and cough.

- Over the course of a couple of days, this progresses to characteristic barking cough and hoarseness. Symptoms are typically worst at night.
- Fever might be present from mild to moderate. Hence Check vital signs (including temperature, pulse, and blood pressure).
- A barking cough and hoarse cry are nearly always present.
- Stridor (harsh, low-pitched noise heard during inspiration) may be heard at rest or only when the child is agitated or active.
- Chest sounds are usually normal but can be reduced if there is severe airflow limitation.
- Respiratory distress with marked tachypnoea and intercostal recession may be present. It is worth to note that improving stridor or disappearance of intercoastal recession might be sign of worsening airways obstruction. In this case a child is at high risk of complete airway occlusion.
- Drowsiness, lethargy, and cyanosis despite increasing respiratory distress are considered as red flags for impending respiratory failure.
- The illness usually lasts for about 3-7 days but can persist for up to two weeks.

Differential Diagnoses:

- Epiglottitis, if epiglottitis is suspected, Do Not examine the oropharynx or manipulation of the neck as it may precipitate further airway obstruction.
- Upper airway foreign body.
- Inhaled noxious substance.
- Acute anaphylaxis.
- Bacterial tracheitis.
- Diphtheria.
- Laryngomalacia or another congenital cause of upper airway stenosis (eg, aortic arch abnormality causing external airway compression).
- Peritonsillar abscess (quinsy).
- Retropharyngeal abscess.
- Angioneurotic oedema.
- Laryngeal mucosal lesions such as laryngeal web, papillomata, and haemangioma.
- Vocal cord paralysis.

Diagnosis:

Croup is diagnosed clinically based on a compatible history and examination findings. Investigations are rarely helpful.

Suspect croup in a child with a sudden onset of a seal-like barking cough. Hoarse voice is also common.

- Symptoms tend to be worst at night and increase with agitation.
- Prodromal, non-specific upper respiratory tract symptoms (coryza, non-barking cough, mild fever) may have been present for between 12 and 72 hours.
- Progressive upper airway obstruction can result in the development of stridor and respiratory distress.

When examining a child with croup:

- Be careful not to frighten the child as agitation can worsen symptoms.
- Make sure child is seated comfortably in the parent/carer's lap.
- Avoid reposition the child from the posture they have naturally adopted as this will be one that minimises airway obstruction.

Categorize the severity of the symptoms and signs to guide management options:

- **Mild** — seal-like barking cough but no stridor or sternal/intercostal recession at rest.
- **Moderate** — seal-like barking cough with stridor and sternal recession at rest; no (or little) agitation or lethargy.
- **Severe** — seal-like barking cough with stridor and sternal/intercostal recession associated with agitation or lethargy.
- **Impending respiratory failure** — minimal barking cough, stridor may become harder to hear. Increasing upper airway obstruction, sternal/intercostal recession, asynchronous chest wall and abdominal movement, fatigue, pallor or cyanosis, decreased level of consciousness or tachycardia. The degree of chest wall recession may diminish with the onset of respiratory failure as the child tires. A respiratory rate of over 70 breaths/minute is also indicative of severe respiratory distress.

Management:

Consider the need for hospital admission.

Moderate or severe illness or impending respiratory failure.

Respiratory rate of over 60 breaths/minute or who have a high fever or 'toxic' appearance.

Hospital admission may be required in some cases such as:

- Chronic lung disease (including bronchopulmonary dysplasia).
- Haemodynamically significant congenital heart disease.
- Neuromuscular disorders.
- Immunodeficiency.
- Age under three months.
- Inadequate fluid intake (50 to 75% of usual volume, or no wet nappy for 12 hours).

- Factors that might affect a carer's ability to look after a child with croup, such as adverse social circumstances, or concerns about the skill and confidence of the carer in looking after a child with croup at home, or the carer being able to spot deteriorating symptoms.
- Longer distance to healthcare (in case of deterioration).

While awaiting admission to hospital:

- Administer controlled supplementary oxygen to all children showing symptoms of severe illness or impending respiratory failure.
- All children should receive a dose of oral dexamethasone (0.15 mg/kg). In case the child is too unwell to receive medication, possible alternatives are inhaled budesonide (2 mg nebulised as a single dose) or intramuscular dexamethasone (0.6 mg/kg as a single dose).

If hospital admission is not indicated (mild illness):

- Prescribe a single dose of oral dexamethasone (0.15 mg/kg) to be taken immediately.
- Advise the parents/carers:
- Symptoms usually resolve within 48 hours, although some episodes may last for up to one week.
- For fever or pain, use Paracetamol or Ibuprofen.
- To encourage the child to take fluids regularly. If child is being breastfed, advise to continue it.
    - Keep checking on the child regularly, including through the night.
    - To take the child to hospital if stridor is present continually, the skin pulling between ribs with every breath, and/or the child is restless or agitated.

Advise the parents/carers to call an ambulance if the child is:

- Turns Very pale, grey, or blue (including blue lips) for more than a few seconds.
- Unusually sleepy or is unresponsive.
- Having breathing difficulty (for example, the belly is sinking in while breathing, or the skin between the ribs or over the windpipe is pulling in with each breath; the nostrils may also be flaring in and out).
- Agitated or restless while struggling to breathe and cannot be comforted easily and quickly.
- Unable to talk or is drooling, is having difficulty in swallowing, or want to sit instead of lie down.

Arrange follow up, using clinical judgment to determine the appropriate interval.

Complications:

- Pneumonia or bacterial tracheitis.
- Pulmonary oedema, pneumothorax, lymphadenitis and otitis media have also been reported.
- Dehydration due to inadequate fluid intake.

Prognosis:

Symptoms of croup usually resolve within 48 hours, although some episodes may last for up to one week.

- Mild croup is usually self-limited without treatment, but Dexamethasone course shortens the duration of disease.
- Moderate croup usually resolves without significant complications, though may cause symptoms of obstruction, which may be frightening for parents.
- The prognosis for severe croup is excellent with combination treatment of dexamethasone and nebulised epinephrine.

Severe upper airway obstruction can, rarely, lead to respiratory failure and arrest.

- In children with impending respiratory failure, intubation is required in 1–3% of cases.
- Death from croup is rare, occurring in no more than 1 in every 30,000 cases.

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