

Croup Diagnosis and Severity Assessment in Primary Care

Dr Syed Murad Ahmed Sohail^{1*}, Dr Syed Moazzam Hussain Zaidi¹

¹Consultant Family Medicine, Primary Health Care Corporation, Qatar

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*Corresponding author: Dr Syed Murad Ahmed Sohail

Consultant Family Medicine, Primary Health Care Corporation, Qatar

Abstract

Review Article

Croup is a common respiratory ailment which is viral in origin and is caused by inflammation in the larynx and subglottic airway. Typical symptoms include a hoarse or raspy voice, barking cough, stridor, coryza, low grade fever. Early treatment with steroids significantly improves the symptoms and outcome. Early assessment of severity helps in deciding the treatment options and we have discussed how the severity can be assessed using Westley score to improve the management and outcomes. Most cases of croup are mild which can be managed in primary care and discharged home with appropriate safety netting advise.

Keywords: Croup diagnosis, Stridor, Westley croup score.

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INTRODUCTION

Croup is a common respiratory ailment usually seen between 6 months to 3 years of age. It is viral in origin and is caused by inflammation in the larynx and subglottic airway. Symptoms include a hoarse or raspy voice, barking cough, stridor, coryza, low grade fever and varying degrees of discomfort in breathing that can escalate quickly. The use of corticosteroids in croup management has decreased hospital admissions and enhanced clinical outcomes for paediatric patients. Accurate assessment of disease severity remains fundamental to effective croup treatment.

Epidemiology:

In immunocompetent children, Croup is typically self-limiting. It is seen more commonly during cold weather. Boys are affected more than girls [1.5:1 ratio]. The incidence of croup is highest between six months and three years of age, although it can occur in children up to six years of age, or earlier than six months in some atypical cases. About 85% of cases are defined as mild, whereas less than 1% meet criteria for severe croup [1].

Aetiology:

Croup is viral in origin, detected in 80% of cases. Approximately 75% of cases are attributable to Parainfluenza Virus Types 1 to 3 [1, 2], with human parainfluenza virus type 1 being the most prevalent. Other viral aetiologies include influenza A and B, adenovirus, respiratory syncytial virus, rhinovirus and enterovirus. Mycoplasma pneumoniae and Corynebacterium diphtheriae are cause of Bacterial Croup but it is less common. Infection leads to inflammation and oedema in subglottic region and laryngeal mucosa, this decreases air movement and leads to respiratory distress and stridor. The type of infectious agent does not usually change outcomes or initial management [1].

Signs and Symptoms:

Symptoms include a hoarse or raspy voice, barking cough, stridor, coryza, low grade fever and varying degrees of discomfort in breathing that can escalate quickly. Rapid and good assessment of general appearance, vital signs, pulse oximetry, airway stability, breathing difficulty, mental status are necessary to identify different severities of croup. NICE Traffic light system for identifying risk of severe illness in under 5s is a good tool for spotting a sick child generally [3].

Differential Diagnosis:

Foreign Body	Sudden onset of dyspnoea and stridor, usually no prodromal symptoms, history of foreign body ingestion.
Bacterial Tracheitis	Symptoms include fever, sudden onset stridor and respiratory distress. Patient might be recovering from viral illness but becomes acutely unwell. They have toxic or septic look [1,2, 4]
Epiglottitis	This can present with sudden onset high fever, dysphagia, drooling and non-barking Cough. Patient prefers to sit upright. This is not commonly seen due to wide intake of Haemophilus Influenza B vaccine [4]
Allergic Reaction	May present with sudden onset of dysphagia, dyspnoea and cutaneous manifestations. There might be history of similar episode before [4]

Severity Assessment

Croup management is determined by the severity of presenting symptoms. The decision to refer a patient to secondary care or paediatric emergency services is also based on symptom severity. Several validated scoring systems are utilized to assess and classify the severity of croup. Westley Croup Score is widely used and recommended. Based on the Westley scoring system, croup is divided into Mild, moderate, Severe and Impending *Respiratory Failure*. *Stridor, Cyanosis, Level of consciousness, Air entry and retractions* are the Five factors used for scoring [1,4,5,6].

Mild Croup [Westley score 0-2] may have occasional barking cough, no audible stridor at rest, and either no or mild retractions.

Moderate Croup [Westley Score 3-7] may have frequent barking cough, audible stridor at rest, suprasternal and sternal wall retractions at rest, no or minimal agitation.

Severe Croup [Westley Score 8-11] Frequent barking cough, prominent inspiratory stridor, marked retractions, significant agitation, and distress.

Impending Respiratory Failure [12 and above] Lethargy, decreased consciousness, stridor, retractions may not be marked, may have supplemental oxygen requirement.

Westley Croup Score	
Clinical sign	Score
Level of consciousness:	
Normal (including sleep)	0
Disorientated	5
Cyanosis:	
None	0
With agitation	4
At rest	5
Stridor:	
None	0
With agitation	1
At rest	2
Air entry:	
Normal	0
Decreased	1
Markedly decreased	2
Retractions:	
None	0
Mild	1
Moderate	2
Severe	3
TOTAL SCORE	CROUP SEVERITY
≤2	Mild
3 to 7	Moderate
8 to 11	Severe
≥12	Impending respiratory failure

Management:

Most cases of mild croup can be managed in community but there might be some exceptions to consider hospital referral; like if a child is dehydrated, has underlying chronic lung or heart condition, is immunocompromised, under three months of age or there are concerns about parental capability to look after the child [4].

After initial management, moderate to severe cases and those with impending respiratory failure are referred to paediatric emergency department [4]. Steroids are cornerstone of Croup treatment; their introduction has seen a significant reduction in hospital admissions and improved outcomes for children [1]. Dexamethasone is preferred choice of steroids [4]

All Children with Croup [mild, moderate or severe] should receive a single dose of dexamethasone 0.15 mg/kg as soon as the diagnosis is made, if oral route is not possible IM injection can be used. Nebulised budesonide 2 mg can also be used as single dose [2,4,5]. In worsening moderate cases and severe cases, child is treated with nebulised adrenaline solution 1:1000 [1 mg/mL] a dose of 400 micrograms/kg, maximum 5 mg. [2,4,5]

NICE previously recommended a single oral dose of prednisolone [1 mg/kg] as an alternative to dexamethasone. NICE no longer recommends this, possibly due to higher re-presentation rates with prednisolone [29%] compared with dexamethasone [7%; $P \leq 0.01$] in a randomised controlled trial. [7]

CONCLUSION

Most croup cases can be effectively managed within primary care settings. However, thorough

assessment is essential, utilizing criteria such as the Westley Croup score to distinguish among mild, moderate, and severe croup, as well as to identify impending respiratory failure for appropriate and timely intervention and treatment.

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