

# UPPER AIRWAY OBSTRUCTION: CROUP

## OBJECTIVES:

1. Recognize and manage upper airway obstruction.
2. Differentiate croup from other causes of upper airway obstruction.
3. Manage upper airway obstruction caused by croup.

## BACKGROUND:

Croup may be caused by a number of viruses. In general bacterial pathogens are not involved unless as a secondary infection (eg. Bacterial Tracheitis)

CROUP PATHOGENS
Parainfluenza virus
Influenza virus
Adenovirus
Respiratory Syncytial virus
Human metapneumo virus
Measles virus

## DIAGNOSIS

Viral laryngotracheobronchitis (Croup) causes inflammation with erythema and edema develops in the tracheal walls. In addition the vocal cords becomes impaired because of swelling. The narrowest part of a child's upper airway is the subglottic region, which is surrounded by a firm ring of cartilage (cricoid cartilage). A small amount of edema will significantly restrict airflow in a child's airway. This narrowing of the airway leads to audible inspiratory stridor, and the swelling of the vocal cords results in a hoarse voice. Croup can be scored using a standardized 10 point scale and determine management strategies (see below) but clinical judgment takes precedence.

Croup must be differentiated from differentiated from other causes of upper airway obstruction: Consider factor such as: fever, age, season, acute onset.

DIFFERENTIAL DIAGNOSIS OF CROUP	
Febrile Upper Airway Obstruction	Afebrile Upper Airway Obstruction
Epiglottitis	Airway foreign bodies
Peritonsillar abscess	Anaphylaxis (although skin may be warm)
Retropharyngeal abscess	Hypocalcemia w/laryngospasm
Bacterial tracheitis	Dystonic reaction
	Toxic inhalation
	Airway trauma

## MANAGEMENT

Manage airway obstruction caused by croup:

Recognize and Manage upper airway obstruction

Provide humidified air or oxygen, avoid agitating the child.

Use head tilt/chin lift/jaw thrust

Suction nose and mouth

Consider intubation -Rarely indicated. Provides definitive airway protection.

Have several smaller tubes available in case of subglottic edema

Pharmacologic Management of Croup

Dexamethasone (0.6mg/kg/dose) IM/IV/PO.

Reduces need for hospitalization and intubation.

Has been shown to be beneficial in mild croup as well.

Racemic epinephrine (0.05cc/kg, max 0.5cc).

Alpha adrenergic vasoconstriction.

Wears off in 2-4 hours. Can repeat Q20-30min prn

Alternatively can use epinephrine 1:1000 (0.5ml/kg, max 2.5ml for age <4, 5cc if age ≥4, in 3cc of NS).

Must be observed for 3-4 hours for reemergence of symptoms as epinephrine wears off.

CROUP SCORE		
Stridor	None	0
	Only with agitation	1
	Mild at rest	2
	Severe at rest	3
Retractions	None	0
	Mild	1
	Moderate	2
	Severe	3
Air Entry	Normal	0
	Mild decrease	1
	Moderate decrease	2
	Marked decrease	3
Color	Normal	0
	Not applicable	1
	Not applicable	2
	Cyanosis	3
Level of Consciousness	Normal	0
	Restless when disturbed	1
	Restless when un-disturbed	2
	Lethargic	3

**MANAGEMENT BASED ON CROUP SCORE**

$\leq 4$	Mild	Outpatient-- mist therapy, consider steroids
5-6	Mild-Moderate	Outpatient-- mist therapy, steroids
7-8	Moderate	Admit — Racemic Epinephrine or L Epi, steroids
$\geq 9$	Severe	Admit PICU - Racemic epi or L Epi, steroids, oxygen, consider heliox, consider intubation