

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 \geq 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

≤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
≥9	Severe	Admit PICU - Racemic epi or L Epi, steroids, oxygen, consider heliox, consider intubation