

Croup – handle it with care

Paediatric respiratory specialists Dr Peter Greally and Dr Montasser Nadeem offer primary care colleagues a clinical update on croup



Definition of Croup

Most clinicians recognize croup as an acute viral illness of the larynx in infants and young children which manifests as an acute onset of barking cough, respiratory distress and stridor. Unfortunately, the term croup has been used to cover a variety of upper respiratory conditions in children, including laryngitis, laryngotracheitis/laryngotracheobronchitis, bacterial tracheitis, and spasmodic croup. In another era, the term was used when diphtheria affected the larynx. The principle entities to be considered are:

- Laryngotracheitis (croup) refers to inflammation of the larynx and trachea. Although lower airway signs are absent, the typical barking cough will be present.
- Laryngotracheobronchitis (LTB) occurs when inflammation extends into the bronchi, resulting in lower airway signs (e.g., wheezing, crackles, air trapping, increased tachypnoea) and sometimes a more severe illness than laryngotracheitis alone. This term commonly is used interchangeably with laryngotracheitis, and the entities are often indistinct clinically. Bacterial superinfection may occur and become manifest as pneumonia, bronchitis, bronchopneumonia, or bacterial tracheitis.
- Bacterial tracheitis (sometimes referred to as bacterial croup) describes bacterial infection of the subglottic trachea, resulting in a thick, purulent exudate, which causes symptoms of upper airway obstruction. The bronchi and lungs are typically involved, as well (i.e., bacterial tracheobronchitis). It may complicate an initial viral infection.
- Spasmodic croup is characterized by the sudden onset of inspiratory stridor at night, short duration (several hours), and sudden cessation. This is often in the setting of a mild upper respiratory infection, but without fever or inflammation. A striking feature of spasmodic croup is its recurrent nature, hence the alternate descriptive term, “recurrent croup.” Because of some clinical overlap with atopic diseases, it is sometimes referred to as “allergic croup.” These children often have increased bronchial hyperresponsiveness.

Epidemiology

The annual incidence of croup is 1.5-6/100 in children < six years of age. Children as young as 3 months and as old as 15 years of age can be affected, with the age between 6 months and 3 years being the most common². Male to female ratio is 1.4:1. Croup typically occurs in late autumn and early winter.

Aetiology

Parainfluenza virus type 1 is the most common cause of acute laryngotracheitis, especially the fall and winter epidemics.

Parainfluenza type 2 sometimes causes croup outbreaks, but usually with milder disease than type 1. Parainfluenza type 3 causes sporadic cases of croup that often are more severe than those due to types 1 and 2. Respiratory syncytial virus, influenza virus, coronavirus, human metapneumovirus and Mycoplasma pneumoniae were also isolated in appreciable numbers.²

Clinical Features

Most children with croup experience sudden onset of barking cough, stridor, hoarseness, respiratory distress and mild to moderately pyrexia, but not drooling. Symptoms commonly occur at night.¹

There are many scoring systems to define severity in croup. They are based on the presence or absence of: stridor, chest wall retractions and agitation/lethargy. Children with impending respiratory failure may experience lethargy or decreased level of consciousness and often cyanosis.

Differential diagnosis

Important differential diagnoses include bacterial tracheitis and epiglottitis. The yearly incidence of bacterial tracheitis is 4 and 8 per 1,000,000 for children aged 0-15 and 0-5, respectively.⁵ Staphylococcus aureus and Haemophilus influenzae type b are the predominant pathogens.^{6,5} Those, with bacterial tracheitis typically become worse after mild-moderate illness and exhibit toxic appearance, fever and stridor, the latter does not respond to nebulised adrenalin.⁶

The incidence rate of acute epiglottitis in children decreased dramatically from 4.9/100,000 before to 0.02/100,000 after introduction of H influenzae type b vaccination.⁷ Infected children will look sick and may experience stridor (without barking cough), high fever, drooling, dysphagia, and a preference to sit up in a tripod position.

Children with peri-tonsillar abscess may experience sore throat, dysphagia, peritonsillar bulge, uvular deviation, and a muffled voice.⁹ Retro-pharyngeal abscess can present with stridor, dysphagia, drooling, torticollis. Allergic reactions or angioneurotic oedema is suggested by a history of allergy or family history of angioneurotic oedema and the presence of cutaneous allergic signs in child with stridor. Acute onset stridor in a preschool child without hoarseness, barking cough, or fever should raise the possibility foreign body aspiration.

Investigations

The diagnosis of croup is essentially a clinical one, based on history and clinical examination. IV cannulation, blood tests and radiological assessments may increase anxiety and promote respiratory distress and contraindicated in typical cases.⁴



Management of Croup

Antiinflammatory therapy with topical (Budesonide) or systemic corticosteroid therapy (Dexamethasone, Prednisolone) is the mainstay of treatment. Adrenalin by nebulization will produce transient effects on mucosal oedema via alpha- adrenoreceptor stimulation and can be used to buy time while steroid therapy takes effect. Intubation with admission to ICU may occasionally be required.

General Principles

- Minimal handling, reduce anxiety and don't examine the throat
- Regular monitoring with pulse oximetry and clinical observation for signs of deterioration
- There is insufficient evidence to support the use of mist therapy, may provoke anxiety and agitation¹¹

- Oxygen therapy is reserved for children with hypoxia and significant respiratory distress. It should never be forced on a child, especially if it results in significant agitation¹¹
- The evidence regarding the effects of humidified air is inconclusive.¹²
- Humidification by hot steaming is to be discouraged as this has been associated with reports of scalds.

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A full list of references and a longer version of this article is available at www.paediatricsireland.ie

Literature Review

Signposting relevant paediatric papers of particular note



Paediatric eczema and rhino-conjunctivitis increases in Cork children

A joint study conducted in 24 Cork City schools has revealed a worrying rise in rhino-conjunctivitis and eczema in 6-to-9-year-olds and a significant associated health burden. Researchers noted a dearth of pre-existing data and analyses regarding asthma and allergic disorders in Irish children. Teams at the Department of Paediatrics and Child Health and the Department of Epidemiology and Public Health in UCC joined with the Department of Early Childhood Studies, Mary Immaculate College, Limerick to compare the rates of these conditions in children between 2002 and 2007.

Rhino-conjunctivitis increased from 7.6 per cent to 10.6 per cent and eczema instances also rose markedly from 8.9 per cent to 13.5 per cent. Prevalence of asthma remained static between 2002 and 2007. *Paediatric Allergy & Immunology: 2012 March.*

Majority of vaccination referrals could have been community-delivered

A study of cases referred to an emergency department vaccination service for children with a history of allergy or anaphylaxis, or in whom there is a significant adverse reaction concern, has concluded the majority could have been safely managed in the

community. Researchers at Our Lady's Children's Hospital in Dublin reviewed admissions from January 2006 to December 2010 in one of the largest studies looking at childhood vaccinations performed in a hospital setting for "at-risk" children. A total of 446 vaccines were administered in 374 patients. Of these, 310 (69.5%) were Measles, Mumps, Rubella (MMR). The majority of patients (348, 93%) were referred from the community. Suspected egg allergy was the reason for the majority of referrals for MMR (261/310 (84.2%). Just 6% of patients (1.3%) experienced an immediate reaction to a vaccination. All reactions were minor leading the authors to conclude a significant number were unwarranted. *Acta Paediatrics: May 2012*

Paediatric IBD rising sharply in Ireland

A sustained rise over a relatively short period of time in the number of ulcerative colitis and Crohn's disease among Irish children has been noted by researchers at the National Centre for Paediatric Gastroenterology, Hepatology and Nutrition in Our Lady's Children's Hospital (OLCH), Crumlin. The team set out to assess whether the presenting disease phenotype and outcomes have altered in the past 10 years in children with inflammatory bowel disease (IBD). Incidence of the condition was found to

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