Topic Overview: Paediatric Respiratory Case Management

Module P6

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Topic overview (Handout)

Bronchiolitis

Bronchiolitis is the most common respiratory tract infection affecting children up to the age of 2. It is due to a viral infection of the bronchial tree and smaller airways, with Respiratory Syncytial Virus (RSV) being the most common pathogen (50-80%). The infection causes obstruction of the small airways with consequent respiratory distress, hypoxia and risk of the child tiring with the increased effort.

The pathophysiology of the disease is that where a viral infection, RSV, metapneumovirus or parainfluenza virus triggers an inflammatory response in the small airways. The increased mucous secretion, lymphocytic infiltration and submucosal oedema cause narrowing and obstruction of the airways. There is decreased ventilation to the obstructed portion of the lung, causing a ventilation perfusion (V/Q) mismatch. Coughing and airflow change the area of obstruction and contribute to the variability of the clinical picture. With time the cells begin to regenerate and the debris causing the obstruction is cleared.

The diagnosis of bronchiolitis is based on clinical signs and symptoms, with most cases occurring in the winter months. The clinical course of the condition, worsening over the first 3-4 days of illness, with a duration of 7-12 days. The clinical features include

- Rhinorrhea, where obstruction of the nasal passages can impair feeding
- Tachyopnea
- Fevers
- Tachycardia
- Increased work of breathing, including tracheal tug, subcostal and intercostal recession.
- Auscultation of the chest reveals crackles and an expiratory wheeze.
- Apnoeas may present in the very young child.
- Clinical assessment of dehydration is essential.

The differential diagnosis for acute bronchiolitis includes asthma, infections of pneumonia and pertussis, foreign body aspiration, congenital cardiac disease, tracheo-oesophageal fistula, bronchogenic cysts, gastro-oesophageal reflux and mediastinal masses. Other conditions causing metabolic acidosis, with increases the respiratory rate should be considered as part of the differential diagnosis.

Once the diagnosis is confirmed an assessment of severity and risk will direct the management of the child. With bronchiolitis, classification of mild, moderate, severe or life threatening is performed. The social circumstances of the child and parents will also be taken into consideration when planning a management strategy. An understanding of the clinical course, where the symptoms increase over the first 3-4 days, also influences the decision for early admission. The NSW Health guideline for bronchiolitis uses the following initial severity assessment chart.

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Symptoms	Mild	Moderate	Severe
Appearance	Well	Mildly Unwell	Unwell
Respiratory Rate	Mild tachypnoea	Moderate tachypnoea	Moderate-severe grunting
Oxygen Saturations	Above 95% RA	90-95% RA	Less than 90% RA
Heart Rate	Normal	Mild Tachycardia	Tachycardia >180
Feeding	Normal or slightly decreased	Difficulty Feeding but >50% usual intake	Difficulty feeding less than 50% of normal feed.

Risk factors for severe disease

- Prematurity
- First 12 weeks of life
- Underlying respiratory disease
- Congenital heart disease
- Immunodeficiency
- Clinical features of severe disease
- Presentation with apneoa

Management

The goals of management are

- Provide adequate hydration to prevent dehydration
- Maintain oxygenation above saturations of 95%
- Ensure deterioration is recognised and managed appropriately
- Regular review for complications of bronchiolitis

The management is based on the risk and severity assessment and the expected clinical course. Children with higher inherent risk, such as the very young or premature infant, or the child with co-morbidities should be managed as a higher risk patient.

Mild brochiolitis is usually managed in the home environment with regular smaller feeds, as there is no oxygen requirement in these children. The parents should be advised to return to medical care should the child deteriorate clinically or there is other concern, it is essential to confirm that there is the ability to return to care.

Parents should be taught nasal suction with saline drops and nasal suction catheters.

A trial of bronchodilators, observed in the emergency department, with continuation only if there is a clearly observed effect. This trial is thought to be controversial and their use has been found not to reduce need for hospitalisation. Observation for deterioration is essential following the use of bronchodilators.

Moderate bronchiolitis should be admitted to the hospital under the care of paediatric service. These children are at risk of dehydration and may require supplemental feeds or oxygen during feeds.

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Severe bronchiolitis will usually require discussion with a tertiary paediatric service as they are at very high risk of severe dehydration and may have apnoeic episodes.

Nasal CPAP and high flow oxygen therapy may reduce respiratory effort and improve atelectasis. It is well tolerated in this population and reduces the pCO2. Any child receiving this therapy should be admitted to hospital under the care of a paediatrician and may require discussion with a tertiary centre.

Treatment for dehydration may include small, more frequent feeds, naso gastric supplemental feeding and intravenous fluids. It is important to check regularly for hydration status and measure the blood sugar level in children who have a significant increased work of breathing.

References

NSW Health guideline on bronichiolitis

Paediatric Emergency Medicine Practice, March 2011

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