NSW GOVERNMENT | AGENCY FOR CLINICAL INNOVATION

Emergency - Quality, Education and Safety Teleconference

E-QuEST

29 May 2019

Shortness of Breath in Paediatrics

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Thanks for joining

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House rules

Confidentiality

Respect

AGENDA

- Case reviews
- Underlying causes
- NSW Health guidance

Participation encouraged throughout

(But please turn off camera & mute mic when not talking)

Approach to a child or infant with increased WOB

- EXPOSURE very important
- Keep the child comfortable and as calm as possible

- History is really important and usually leads us to a diagnosis
- A lot of our treatment is supportive so looking at the child from the end of the bed to guide how much support the child needs to be stabilised
- Often the diagnosis confirmed from the child's response to treatment

The ABCs of the Pediatric Assessment Triangle:

Appearance
- Behaviour
- Tone
- Interactiveness
- Consolability
- Look or Gaze
- Speech or Cry

Breathing
- Abnormal breath sounds
- Tripod position
- Retractions
- Tracheal Tug
- Nasal Flaring

Circulation
- Pallor
- Mottling
- Cyanosis

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Case 1 – Initial presentation

6 year old girl BIB father with increased work of breathing at 3am

- Alert
- RR 44
- Sats 96% RA
- T 38.6
- Speaking short sentences
- Moderate increase WOB (tracheal tug, subcostal recession)
- Widespread exp wheeze bilat with reduced breath sounds R Mid Zone
- Directed to Resus

Case 1 – History

Pt is second of three children, all of whom have asthma

- UTRI symptoms for last 36 hours, no fevers
- Sudden onset of increased WOB since midnight
- Has been given 4 puffs via a spacer every half hour

- No exacerbations for 2 years. No longer on preventers or regular salbutamol.
- One admission to hospital at 2yo to regular paediatric ward
- 2-3 other presentations to ED with exacerbations
- No admissions to HDU/ICU
- No co-morbitidies, no known drug or food allergies, IUTD (except flu)

Assessing Severity

	Mild	Moderate	*Severe	*Life-threatening
Altered consciousness	No	No	Agitated	Agitated, confused, drowsy
Accessory muscle use	No	Minimal	Moderate	Severe
Oximetry in air	Greater than 94%	90-94%	Less than 90%	Less than 90%
Talks in	Sentences	Phrases	Words	Words/Unable to talk
Pulse rate	Normal for age	Tachycardia	Marked tachycardia	Marked tachycardia or bradycardia#
Central cyanosis	No	No	Likely to be present	Likely to be present
Wheeze on auscultation	Variable	Moderate-loud	Often quiet	Often quiet
Physical exhaustion	No	No	Yes	Yes

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Assessing Severity

- **Wheeze is not a good marker of severity.**
- Tachycardia may be a sign of severity but is also a SE of salbutamol
- A silent chest with no wheeze may herald imminent respiratory collapse
- Asymmetry on auscultation is often found due to mucous plugging, but warrants consideration of foreign body.

Most important:

- **general appearance/mental state and;**
- **work of breathing (accessory muscle use, recession)**

Case 1 - Treatment

- This patient: Moderate asthma
- Keep pt sat up
- Child's weight: should be weighed or estimate ((Age + 4) x 2)
    - Estimated weight 20kg
- Salbutamol Burst - 12 puffs MDI/spacer every 20 minutes x 3;
    - review 10-20 min after 3rd dose to decide on timing of next dose
- Ipratropium Bromide (21mcg/puff) 8 puffs MDI/spacer Q20min x3 only
- Oral prednisolone 2mg/kg
- Paracetamol (15mg/kg) for fever
- Oxygen if Sats <90%
- Admitted under paediatrics for observation and stretching salbutamol

Case 1 - Treatment

- In the case of deterioration, MDI/spacer can be changed to nebulised salbutamol.

In severe cases, add:

- IV Aminophylline
  - Loading dose: 10 mg/kg (maximum dose 500 mg) over 60 min.
- IV Magnesium sulphate 50% (500 mg/mL)
  - Dilute to 200 mg/mL (by adding 1.5mLs of sodium chloride 0.9% to each 1mL of Magnesium Sulphate) for intravenous administration
  - 50 mg/kg (equivalent to 0.2mmol/kg) over 20 mins
- Consider Adrenaline. 10 microg/kg or 0.01mL/kg of 1:1000 (maximum 0.5mL) IM, into lateral thigh

Case 1 - Disposition

Consider consultation with paediatric service if:

- Assessed as moderate or severe asthma
- Poor response to inhaled salbutamol
- Oxygen requirement

Consider consultation with NETS for transfer when:

- Severe or critical asthma requiring IV treatment or respiratory support
- Escalating O_2 requirement
- Poor response to salbutamol or unable to wean salbutamol requirement
- Children requiring care above the level of comfort of the local hospital

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NETS ***1300 36 2500***

Case 1 - Disposition

Consider discharge from ED when:

- Children who are well and have stretched to 3 hours between salbutamol doses
- Adequate oxygenation: mild hypoxia (SpO2 90-94) acceptable if child is clinically well and has responded well to treatment
- Adequate oral intake
- Adequate parental education and ability to administer salbutamol via spacer

Case 1 - Disposition

Discharge requirements:

- Each child should have a written Asthma Action Plan.
- Observe inhaler and spacer technique before discharge.
- Advise parents to seek further medical attention should the child's condition deteriorate or if there is no significant improvement within 48 hours.
- Ensure follow-up arranged with a GP and/or paediatrician.
- Ensure written discharge instructions with weaning regime

ASTHMA ACTION PLAN

Take this **ASTHMA ACTION PLAN** with you when you visit your doctor

NAME .....

DATE .....

NEXT ASTHMA CHECK-UP DUE .....

DOCTOR'S CONTACT DETAILS

EMERGENCY CONTACT DETAILS

Name .....

Phone .....

Relationship .....

WHEN WELL *Asthma under control (almost no symptoms)*

ALWAYS CARRY YOUR RELIEVER WITH YOU

Your preventer is: .....
(NAME & STRENGTH)

Take ..... puffs/tablets ..... times every day

☐ Use a spacer with your inhaler

Your reliever is: .....
(NAME)

Take ..... puffs .....

When: You have symptoms like wheezing, coughing or shortness of breath

☐ Use a spacer with your inhaler

Peak flow* (if used) above:

OTHER INSTRUCTIONS
(e.g. other medicines, trigger avoidance, what to do before exercise)

.....

.....

.....

.....

WHEN NOT WELL *Asthma getting worse (needing more reliever than usual, having more symptoms than usual, waking up with asthma, asthma is interfering with usual activities)*

Keep taking preventer: .....
(NAME & STRENGTH)

Take ..... puffs/tablets ..... times every day

.....

☐ Use a spacer with your inhaler

Your reliever is: .....
(NAME)

Take ..... puffs .....

.....

☐ Use a spacer with your inhaler

Peak flow* (if used) between and

OTHER INSTRUCTIONS ☐ Contact your doctor
(e.g. other medicines, when to stop taking extra medicines)

.....

.....

.....

.....

IF SYMPTOMS GET WORSE *Severe asthma flare-up/attack (needing reliever again within 3 hours, increasing difficulty breathing, waking often at night with asthma symptoms)*

Keep taking preventer: .....
(NAME & STRENGTH)

Take ..... puffs/tablets ..... times every day

.....

☐ Use a spacer with your inhaler

Your reliever is: .....
(NAME)

Take ..... puffs .....

.....

☐ Use a spacer with your inhaler

Peak flow* (if used) between and

OTHER INSTRUCTIONS ☑ **Contact your doctor today**
(e.g. other medicines, when to stop taking extra medicines)

Prednisolone/prednisone:

Take ..... each morning for ..... days

.....

.....

.....

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nationalasthma.org.au

Questions?

SECTION 4

Asthma

If life-threatening activate your local rapid response protocol immediately

Clinical severity prompts	*History prompts*
■ Correspond with either mild, moderate, severe or life-threatening scale as described below	■ Onset
■ Representation within 24 hours	■ Associated symptoms
■ Pre hospital treatment	■ Relevant past history
■ Inability to maintain own airway	■ Medication history
	■ Trigger factors
	■ Past presentation/s admission/s (ICU/HDU/intubation)
	■ Allergies
	■ Age less than 12 months (exclude differential diagnosis)
	■ Parental concern
	■ Immunisation status

Case 2 - Presentation

5 month old boy presents with increasing shortness of breath and difficulty feeding

- Cough and runny nose 2 days
- T 38.1
- HR 160
- RR 60
- Sats 95% RA
- Alert, not toxic looking
- Moderate tracheal, intercostal recession
- Bilat biphasic wheeze and crackles

Case 2 - History

- *Other important aspects of history?*
- *Likely diagnosis?*

Bronchiolitis

- Disease of winter months in children <2yrs old
- Usually caused by RSV (50-80%), as well as parainfluenza (especially PIV3), human metapneumovirus, influenza, rhinoviruses and adenovirus

Differentials

- Pneumonia
- Congestive heart failure
- Pertussis
- Pneumothorax
- Bronchial foreign body

Bronchiolitis – Examination/ Assessment

- Increased WOB
- Auscultation of the lungs may reveal a wheeze and transmitted upper airway sounds. A focal zone with decreased air entry or coarse crackles are more consistent with pneumonia.
- Difficulty feeding
- Poor UO/signs of dehydration

Investigations are generally not warranted unless working up febrile infant <2 months or suspecting another diagnosis.

Bronchiolitis – Assessing severity

Symptoms	Mild	Moderate	Severe
Behaviour	Normal	Some/intermittent irritability	Increasing irritability and/or lethargy /fatigue
Respiratory Rate	Normal – mildly increased respiratory rate	Increased respiratory rate	Marked increase or decrease in respiratory rate
Use of accessory muscles	Nil to mild chest wall retraction	Moderate chest wall retractions Tracheal tug Nasal flaring	Marked chest wall retractions Marked tracheal tug Marked nasal flaring
Oxygen Saturation **Oxygen Requirement**	O_2 saturations >92% (in room air)	O_2 saturations 90 - 92% (in room air)	O_2 saturations < 90% (in room air) Hypoxemia, may not be corrected by O_2
Apnoeic Episodes	None	May have brief self-limiting apnoea	Increasingly frequent or prolonged apnoea
Feeding	Normal or slightly decreased	Difficulty feeding but able to take > 50% of normal feeds	Significant difficulty feeding with intake < 50% of normal feeds

Positioning

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Bronchiolitis – Clinical Course

- Typical course of bronchiolitis lasts 7-10 days, with night 2-3 being the most severe
- 2-4 days URTI symptoms.
- 2-4 days wheeze, tachypnea, ↑WOB, moist cough and fevers. Poor feeding, dehydration and apneas may be present.
- 2-4 days URTI symptoms associated with cough which may last up to 4 weeks.
- Be suspicious of any presentation that does not follow this “script” or a child who has initially improved then deteriorated again.

Bronchiolitis – Risk Factors for increased severity

- Gestational age <37 weeks
- Chronological age at presentation <10 weeks of age
- Postnatal exposure to cigarette smoke
- Breast fed for < 2 months
- Failure to thrive
- Chronic lung, heart or neurological disease
- Immunodeficiency
- Indigenous ethnicity - Aboriginal, Torres Straight Islanders, Pacific and Maori infants.

Bronchiolitis – Management

Admit:

- Any child with moderate to severe increased WOB for observation, particularly if apnoeas are observed or if the child is early in the illness course

Monitor:

- Standard paediatric observations
- Continuous pulse oximetry is not required unless there is severe increased WOB

Bronchiolitis – Management

Respiratory Support

- Oxygen therapy (initially via NP) should be administered when oxygen saturations are persistently less than 92%.
- Brief desaturations are not a reason to commence oxygen therapy.
- Heated humidified high flow oxygen/air via nasal cannulae (HFNC)
    - Consider in the presence of hypoxia and moderate to severe chest wall recessions.
    - Evidence is not strong however it is accepted practice.
    - Rate of 1-2/kg/min (which provides a small amount of PEEP 4-8cmH2O)

Bronchiolitis – Management

Hydration/Feeding

- Short, frequents feeds
- Consider normal saline drops at the nares prior to feeds if necessary
- If non-oral hydration is required, IV or NG hydration is appropriate
- Remember if on HFNP, maintenance hydration must be reduced to 60% of full maintenance rate
- Use 0.9% Normal saline with 5% Dextrose for maintenance IV hydration

Bronchiolitis – Management

Not much else!

- No suctioning
- Salbutamol – there is no benefit in using salbutamol in infants with bronchiolitis (and some evidence of adverse effects)
- Nebulised adrenaline – no benefit
- Nebulised hypertonic saline – not recommended
- Glucocorticoids – no benefit
- Antibiotics – not recommended

Bronchiolitis – Disposition

Consider transfer when:

- Severe bronchiolitis
- Risk factors for more severe illness
- Apnoea
- Children requiring care above the level of comfort of the local hospital

Children can be discharged when they are:

- Maintaining adequate oxygenation
- Maintaining adequate oral intake
- Children early in the disease & Infants <8/52 are at risk of representation
- Provide written discharge instructions/factsheets and ensure follow-up

Bronchiolitis

Management			
Likelihood of Admission	Suitable for discharge Consider risk factors	Likely admission, may be able to be discharged after a period of observation Management should be discussed with a paediatrician	Requires admission and consider need for transfer to an appropriate children's facility/PICU Referral is determined by: -Senior review -Local **CERS** response
Observations Vital signs (respiratory rate, heart rate, O2 saturations, temperature)	Assessment in ED prior to discharge (minimum two sets of observations on SPOC)	Hourly Referring to SPOC	Continuous cardiorespiratory and oximetry monitoring and assessment
Hydration/Nutrition	Small frequent feeds	Not feeding adequately (< 50% over 12 hours), Administer NG or IV hydration	Not feeding adequately (< 50% over 12 hours) or unable to feed, Administer NG or IV hydration
Oxygen	Nil requirement	Administer O_2 to maintain saturations ≥ 92%	Administer O_2 to maintain saturations ≥ 92%
Respiratory Support		If a trial of NPO_2 is ineffective consider HFNC after paediatrician review	Consider HFNC or CPAP after paediatrician review
Disposition/Escalation	Consider further medical review if early in the illness and any risk factors are present or if child develops increasing severity after discharge	Decision to admit should be supported by clinical assessment, social and geographical factors and phase of illness	Requires admission or transfer, escalate as per local **CERS** if: -Severity does not improve -Persistent desaturations -Significant or recurrent apnoeas with desaturation

If no improvement consult NETS 1300 36 2500

Investigations have no usual role in the management of bronchiolitis (see page 7)

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Infants and Children - Acute Management of Bronchiolitis – NSW Health Guideline 2018

QUESTIONS?

Guideline

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Infants and Children - Acute Management of Bronchiolitis

Summary	This guideline provides the best evidence based, clinical direction for clinicians in the acute management of bronchiolitis in infants.
Document type	Guideline
Document number	GL2018_001
Publication date	10 January 2018
Author branch	Agency for Clinical Innovation
Branch contact	(02) 9424 5944
Review date	10 January 2023
Policy manual	Patient Matters Manual for Public Health Organisations
File number	H17/51287
Status	Active
Functional group	Clinical/Patient Services - Baby and Child, Medical Treatment, Nursing homes
Applies to	Affiliated Health Organisations, Board Governed Statutory Health Corporations, Local Health Districts, Public Health Units, Specialty Network Governed Statutory Health Corporations
Distributed to	Divisions of General Practice, Ministry of Health, Private Hospitals and Day Procedure Centres, Public Health System, Tertiary Education Institutes
Audience	Emergency Departments, Medical, Clinicians, Nursing

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https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2018_001.pdf

Case 3 – Presentation

4 yo boy BIB dad at 1230am

- Woke abruptly during the night with increased WOB and distress
- RR 42
- Stats 96% RA
- HR 145
- T 37.5
- Barking cough
- Resting stridor
- Tracheal tug & Subcostal recession
- Eyes wide, looks fearful but comfortable with dad.
- Father gives history. Child nods or shakes head to answer questions.

Case 3 – Presentation

Has been well

Attended daycare today

Had a runny nose and perhaps a low grade fever on going to bed

PMHx:

- Nil significant
- IUTD
- NKA

Social:

- Lives at home with parents, father smokes (outside), has an older sister

Case 3 – Assessing Severity

Clinical manifestations of croup

	Mild	Moderate	Severe
Stridor	Nil or intermittent	Persisting stridor at rest	Persisting stridor at rest
Cough	Barking	Barking	Barking or absent
Increased Respiratory Effort	No	Some tracheal tug and/or chest wall recession	Marked tracheal tug and/or chest wall recession
Cyanosis/pallor	No	No	Possibly
Level of Consciousness	Alert	May be distressed but can be placated	Apathetic or restless agitated decreased LOC

Case 3 – Management of Moderate Croup

- Directed to resus
- Estimate weight (Age + 4) x 2.
    - 16kg in this case
- Keep in the position of comfort/calm
- Nebulised Adrenaline 0.5 mL/kg of 1:1,000 stat (maximum 5 mL undiluted)
- Dexamethasone 0.3 mg/kg stat

Croup (Laryngotracheobronchitis)

- Inflammation of the upper airway, larynx and trachea usually triggered by a virus (most commonly Parainfluenza type 1)
- Generally occurs between 6 months to 6 years
- Often worse at night

- Uncommon < 6 months old, rare < 3 months of age. Consider alternative diagnosis and causes of upper airway obstruction

Croup

- Barking cough
- Inspiratory stridor
- Hoarse voice
- May have associated widespread wheeze
- Increased WOB
- May have fever, but no signs of toxicity

Risk factors for severe croup include:

- Pre-existing narrowing of upper airways
- Previous admissions with severe croup
- Young age

Croup

They should NOT be:

- Toxic looking
- Drooling
- Posturing to protect their airway
- Complain of a sore throat

- Again, if not following the “script” think of other differentials

- Differentials:
    - Acute epiglottitis, Bacterial Tracheitis, Inhaled Foreign Body, Anaphylaxis

Croup Management

Keep the child calm, use minimal handling and limited physical assessment

Mild to Severe

- Dexamethasone 0.3 mg/kg stat OR
    - if unable to tolerate PO steroid give nebulised Budesonide 2 mg stat
- Can use Prednisolone 1mg/kg for 3 days

Moderate to Severe

- Nebulised Adrenaline 0.5 mL/kg of 1:1,000 stat (maximum 5 mL undiluted)
    - This can be repeated after 10mins if resting stridor remains

Croup Disposition

Consult with local paediatric team when:

- Severe airway obstruction
- Child has risk factors or an atypical presentation
- No improvement with nebulised adrenaline or oral steroids

Consider transfer when:

- No improvement following nebulised adrenaline
- Child requiring repeated doses of nebulised adrenaline
- Child requiring care above the level of comfort of the local hospital.

Croup Discharge

- Stridor free at rest

  AND

- FOUR hours post nebulised adrenaline if this has been required

  OR

- 30 minutes post oral steroids

- Parents should be advised to seek medical attention if re-occurrence of stridor at rest despite having received
- Provide written instructions/factsheets

Questions?

SECTION 3

Croup

If life-threatening activate your local rapid response protocol immediately

Clinical severity prompts

- Corresponds with either mild, moderate or severe scale as described below
- Age less than 6 months
- Poor response to initial treatment
- Pre-hospital treatment- manage as more severe than clinical signs indicate
- Inability to maintain own airway

History prompts

- Onset
- Parental concern
- Medication history
- Allergies
- Immunisation status
- Representation within 24 hours
- Previous history of severe croup
- Known structural airway abnormality
- Severe obstruction prior to presentation (also consider foreign body)

CLINICAL TOOLS AND GUIDELINES

https://www.aci.health.nsw.gov.au/networks/eci

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Upcoming Events

« September 2017 »

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2

What's New

ECI Events

Videos and presentations are now available from the 2017 Research Symposium, Nursing Leadership Forum and the first ED Leadership Forum on 9 June

Clinical tools
Latest evidence based
CLICK HERE »

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E-QuESTs so far

- Atypical Chest Pain - ACS
- Sepsis in the elderly
- Abdominal pain in the elderly - AAA & Ischaemic gut
- Scrotal emergencies
- Deadly headaches
- Paediatric deterioration
- Head injuries
- Dangerous Back Pains
- Opthalmological emergencies
- Pulmonary Embolus

Looking to next month, please…

- Share your cases
- Share your patient safety actions
- Spread the word with your colleagues

(or send me their email: lisa.leehorn@health.nsw.gov.au)

What would you like to see / hear about?

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Many thanks!

Next E-QuEST
26 June 08:00 am

Look out for our email survey
We need your responses to guide future work

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