



Course: Key Competences

Background:

In 2007, the Royal College of Paediatrics and Child Health (RCPCH) published a new curriculum for postgraduate medical education, which has been approved by the Postgraduate Medical Education and Training Board ¹. In addition, the RCPCH has devised an assessment strategy that uses multisource feedback tools to map specifically to assessment standards.

By the completion of Level One training, all trainees are expected to be able to initiate therapy in an infant presenting with Upper Airway Obstruction. This scenario/workshop has been designed to assess competence in management of this key condition of childhood.

Curriculum Elements Addressed:

The management of Upper Airway Obstruction can be separated into five distinct phases:

- **Assessment**
- **Recognition of the condition**
- **Formulation of differential diagnoses**
- **Investigation**
- **Definitive therapy**

Assessment (Expected)

Brief history should be obtained.

Baby should be examined thoroughly. Key features of examination:

- stridor and barking cough.
- Moderate to severe respiratory distress with intercostals, subcostal and sternal recession.
- Tachycardic (160) and unsettled. Sats when measured are 93%.

Recognition of condition (Expected)

Should attempt to give oxygen without disturbing the child. Should recognise as probably mod- severe croup. Ought to get some senior help and give steroids (oral or by neb)

Formulation of differential diagnosis (Expected)

Differential diagnosis should include:

- Croup
- Epiglottitis
- bacterial tracheitis
- foreign body.

Useful to pause scenario after assessment and discuss differential diagnosis.

¹ A Framework of Competences for Level 1 Training in Paediatrics.
<http://www.rcpch.ac.uk/Training/Competency-Frameworks>



Investigations (Expected)

Cardiovascular monitoring
Pulse oximetry

Definitive Therapy (Expected)

Steroids (oral or neb)
IV fluids – discuss pros and cons of inserting IV
Adrenaline neb when has further deterioration
Need for senior assessment and observation in a HDU environment

Assessment Domains:

RCPCH Standards	Level of Achievement		
	Good	Adequate	Poor
Effective skills in paediatric assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge of common and serious paediatric conditions and their management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective initial management of ill-health and clinical conditions in paediatrics, seeking additional advice and opinion as appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe practical skills in paediatrics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced Neonatal and Paediatric Life Support Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication and interpersonal skills with colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scenario: Upper Airway Obstruction

Learning Objectives: At the end of the session candidates should be able to:

1. **Structured ABCD approach to acutely ill child**
2. **Recognise Upper Airway Obstruction**
3. **Know differential diagnoses of acute upper airway obstruction in children**
4. **Understand importance of recognition of Acute Epiglottitis**
5. **Be able to describe and recognise the differences between croup and epiglottitis**
6. **Demonstrate the management of a child with acute stridor**
7. **Understand importance of seeking help early**

Faculty Script:

A 1 year boy is brought to A+E by his mother at 10pm. He has had coryzal symptoms for the last 48 hours and this evening has developed a cough and noisy breathing. Over the past hour he has had increasing difficulty in breathing and has been very unsettled. He is a bit hot and sweaty.

Candidate is expected to evaluate patient, realise that he has acute stridor and institute treatment including O₂, Steroids and Adrenaline nebs whilst taking care to not distress the patient.

If treatment not instituted or patient distressed by IV access / cap gas apply **PAUSE and PERFECT** principle by pausing scenario, discussing reasons for patient deteriorating and solutions before restarting scenario.





Patient Demographics:

Name: Joshua Franklin
Gender: M **Age:** 1 year **Weight:** 12kg

Candidate Brief:

Presenting History (Candidate Storyboard):

A 1 year boy is brought to A+E by his mother at 10pm. He has had coryzal symptoms for the last 48 hours and this evening has developed a cough and noisy breathing. Over the past hour he has had increasing difficulty in breathing and has been very unsettled. He is a bit hot and sweaty.

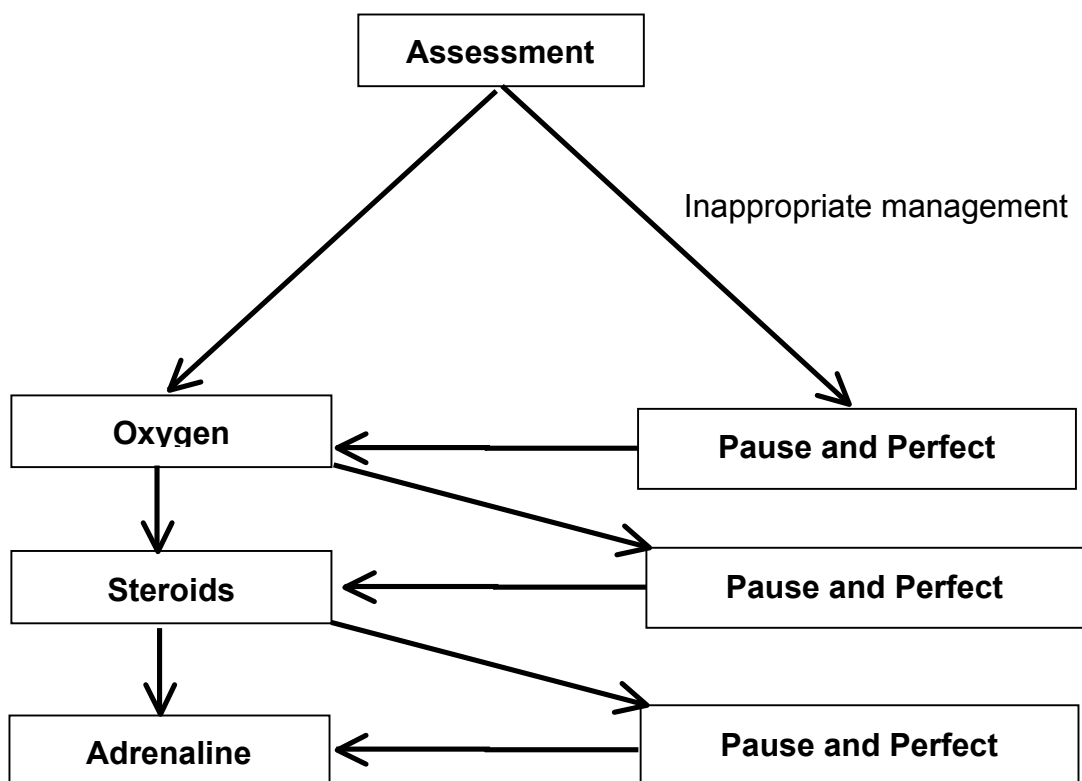
Previous Medical History:

Nil of note

Family Medical History:

Nil of note

Flowchart of Scenario Progression:



Scenario setup and preparation:

Faculty Recommended: Director **Control**

Actor/Confederate(s)

Roles: Parent

ED Nurse

If you have a multiprofessional group of candidate then you should have a multiprofessional faculty.

Participants:

Medical Roles

Paediatric SHO

Nursing Roles

AHP Roles

Location: Children's Emergency Department

Simulator: SimBaby

Monitor Setup: Basic Ward Format

Monitor Parameters Required:

ECG <input checked="" type="checkbox"/>	S _a O ₂ <input checked="" type="checkbox"/>	RR <input checked="" type="checkbox"/>	EtCO ₂ <input type="checkbox"/>	NIBP <input checked="" type="checkbox"/>	ABP <input type="checkbox"/>
CVP <input type="checkbox"/>	PAP <input type="checkbox"/>	ICP <input type="checkbox"/>	CPP <input type="checkbox"/>	Temp (P) <input checked="" type="checkbox"/>	Temp (C) <input type="checkbox"/>
Other:					



Equipment Checklist:

Respiratory:

Nasal Cannula	<input checked="" type="checkbox"/>	O ₂ Facemask	<input checked="" type="checkbox"/>	O ₂ Reservoir Facemask	<input checked="" type="checkbox"/>
Headbox	<input type="checkbox"/>	Wafting O ₂	<input checked="" type="checkbox"/>	Nebuliser	<input checked="" type="checkbox"/>
Suction	<input type="checkbox"/>	Yankuer	<input type="checkbox"/>	Suction Catheter <input type="checkbox"/> size	FG
Self inflating Bag	<input checked="" type="checkbox"/>	Ayers T piece	<input checked="" type="checkbox"/>	Nasopharyngeal airway	<input type="checkbox"/>
Oropharyngeal Airway	<input type="checkbox"/>	LMA	<input type="checkbox"/>		
Intubated?	<input type="checkbox"/>	ETT position		length	0.00cm at
Respiratory Support		Non Invasive			
				➔ Settings:	
				Flow	l/min
				Insp O ₂	%
				PIP	
				PEEP	
		Invasive			
				➔ Settings:	
				iTime	sec
				Insp O ₂	%
				Rate	bpm
				PIP	
				PEEP	

Vascular Access:

Line Type	Site
Peripheral (1)	
Peripheral (2)	
Central Venous	
Arterial	
Intraosseous	

Other Medical Equipment:

Drug Chart	<input checked="" type="checkbox"/>	Emergency Drug Sheet	<input checked="" type="checkbox"/>	Blood gas
Blood Results Sheet	<input type="checkbox"/>	X Rays		Imaging
Other Props:				
Nebuliser for mask				
Nebuliser for T-Piece Circuit				
Equipment for intubation including anaesthetic machine				



IV Fluids:

Setup	Fluid Type
Fluids Running	
Fluids Available (1)	
Fluids Available (2)	0.9% Saline + 40mmol KCl/L
Fluids Available (3)	0.45% Saline + 5% Dextrose
Other Fluids	

Medications: (route, dose/rate)

Infusions (Running)	Dose	Running Rate (ml/hr)
Dexamethasone		

Infusions (Available)	Dose	Running Rate (ml/hr)

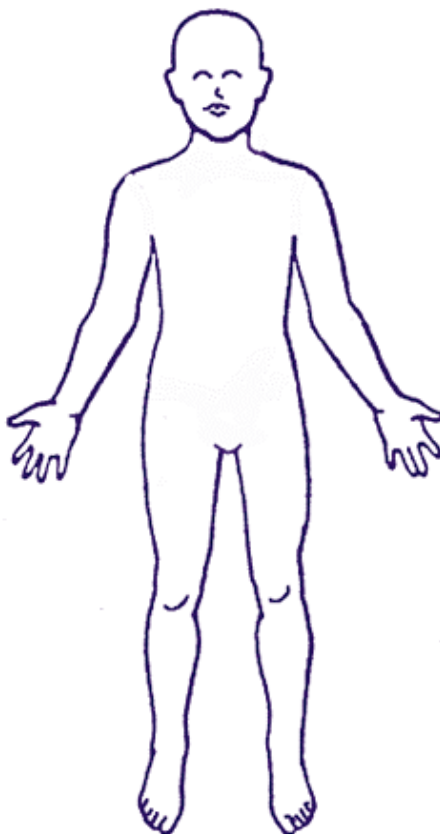
Bolus Drugs (Available)	Dose
Dexamethasone	1.5 – 8mg
Adrenaline Neb	2 – 5ml 1:1000
Pulmicort neb	
Budesonide neb	



Moulage:

Effect needed
In cot with mum comforting him

Draw relevant equipment needed on diagram e.g. cannula, wounds etc.





Scenario States:

Name of State		Assessment				Duration			
Vital Signs									
Rhythm	SR	HR	160	SBP	90	DBP	46	CVP	
Resp Rate	26	SaO ₂	94	ETCO ₂		Temp	37.8	Other	
AVPU	A	GCS	15	Pupils	4 ERL	ICP		NIRS	
Assessment									
Periph Pulses	Normal	Cap refill	2 sec	Skin	warm well perfused				
ECG/Heart	normal heart sounds								
Airway	Inspiratory Stridor			Breathing	regular				
Air entry	Normal			Breath sounds	Inspiratory Stridor				
WOB	Increased			Recession	Subcostal				
Neuro	Irritable			Renal			Hepatic		
Other	Barking cough								
Results									
Hb		WCC		PLT		HCT		CRP	
PH/ H+		PaCO ₂		PaO ₂		HCO ₃		BE	Lactate
Na ²⁺		K ⁺		Cl ⁻		Ur		Cr	Glucose
Ca ²⁺		Mg ²⁺		PO ₄ ⁻					
Expected Outcomes:									
Participants should:	<p>Establish monitoring: Cardiovascular & Pulse oximetry Brief history should be obtained. Baby should be examined thoroughly. Key features of examination:</p> <ul style="list-style-type: none"> • stridor and barking cough. • Moderate to severe respiratory distress with intercostals, subcostal and sternal recession. • Tachycardic (160) and unsettled. Sats when measured are 93%. <p>Formulation of differential diagnosis</p> <ul style="list-style-type: none"> • Croup • Epiglottitis • bacterial tracheitis • foreign body. <p>Should recognise as probably mod- severe croup. Should attempt to give oxygen without disturbing the child. Ought to get some senior help and give steroids (oral or by neb)</p>								
Facilitators should:	<p>If O₂ administered whilst attempting not to upset child move to Oxygen state If tries to place IV etc. Pause and Perfect discussing correct actions before allowing them to manage patient</p>								





Name of State		Oxygen				Duration			
Vital Signs									
Rhythm	SR	HR	162	SBP	86	DBP	39	CVP	
Resp Rate	20	SaO₂	98	ETCO₂		Temp	37.7	Other	
AVPU	A	GCS	15	Pupils	4 ERL	ICP		NIRS	
Assessment									
Periph Pulses	Normal		Cap refill	2 sec		Skin	warm well perfused		
ECG/Heart	normal heart sounds								
Airway	Inspiratory Stridor			Breathing	regular				
Air entry	Normal			Breath sounds	Inspiratory Stridor				
WOB	Increased			Recession	Subcostal				
Neuro	Irritable			Renal			Hepatic		
Other	Barking cough								
Results									
Hb		WCC		PLT		HCT		CRP	
PH/ H+		PaCO₂		PaO₂		HCO₃		BE	PH/ H+
Na²⁺		K⁺		Cl⁻		Ur		Cr	Na²⁺
Ca²⁺		Mg²⁺		PO₄⁻					Ca²⁺
Expected Outcomes:									
Participants should:	Should recognise as probably mod- severe croup. Ought to get some senior help and give steroids (oral or by neb)								
Facilitators should:	Increase SaO ₂ o 98% over 1 minute If steroids administered move to Steroids state If not instituting management plan Pause and Perfect discussing correct actions before allowing them to manage patient.								





Name of State		Steroids				Duration			
Vital Signs									
Rhythm	SR	HR	160	SBP	92	DBP	43	CVP	
Resp Rate	15	SaO₂	98	ETCO₂		Temp	37.7	Other	
AVPU	A	GCS	15	Pupils	4 ERL	ICP		NIRS	
Assessment									
Periph Pulses	Normal		Cap refill	2 sec		Skin	warm well perfused		
ECG/Heart	normal heart sounds								
Airway	Inspiratory Stridor			Breathing	regular				
Air entry	Normal			Breath sounds	Inspiratory Stridor				
WOB	Increased			Recession	Subcostal				
Neuro	Irritable			Renal			Hepatic		
Other	Barking cough								
Results									
Hb		WCC		PLT		HCT		CRP	
PH/ H+		PaCO₂		PaO₂		HCO₃		BE	Lactate
Na²⁺		K⁺		Cl⁻		Ur		Cr	Glucose
Ca²⁺		Mg²⁺		PO₄⁻					
Expected Outcomes:									
Participants should:	Ought to get some senior help and give Adrenaline neb								
Facilitators should:	If Adrenaline administered move to Adrenaline Neb state If not instituting management plan Pause and Perfect discussing correct actions before allowing them to manage patient.								





Name of State		Adrenaline Neb				Duration			
Vital Signs									
Rhythm	SR	HR	175	SBP	100	DBP	49	CVP	
Resp Rate	24	SaO₂	98	ETCO₂		Temp	37.7	Other	
AVPU	A	GCS	15	Pupils	4 ERL	ICP		NIRS	
Assessment									
Periph Pulses	Normal		Cap refill	2 sec		Skin	warm well perfused		
ECG/Heart	normal heart sounds								
Airway	Inspiratory Stridor			Breathing	regular				
Air entry	Normal			Breath sounds	Inspiratory Stridor				
WOB	Increased			Recession	Subcostal				
Neuro	Irritable			Renal			Hepatic		
Other	Barking cough								
Results									
Hb		WCC		PLT		HCT		CRP	
PH/ H+		PaCO₂		PaO₂		HCO₃		BE	Lactate
Na²⁺		K⁺		Cl⁻		Ur		Cr	Glucose
Ca²⁺		Mg²⁺		PO₄⁻					
Expected Outcomes:									
Participants should:									
Facilitators should:	<p>Increase Heart rate to 175bpm AND Bloodpressure to 100/49 over 1 minute. Post Adrenaline neb stridor becomes less and work of breathing decreases.</p>								

Educational Material:



Clinical Guideline

CROUP MANAGEMENT

SETTING Trustwide – primary and secondary care
FOR STAFF GPs and Acute Paediatric staff
PATIENTS Children with a clinical diagnosis of croup

GUIDANCE

Croup is a clinical syndrome resulting from upper airway inflammation. It is a clinical diagnosis characterised by a barking cough, inspiratory stridor and a hoarse voice. A moderate fever may be present. It is usually viral in cause (80% parainfluenza virus).

This guidance is only applicable once a diagnosis of croup has been established and important differential diagnoses have been excluded.

Establishing croup diagnosis – consider differential diagnoses

	Croup	Epiglottitis	Tracheitis
Time course	Days	Hours	Hours - days
Prodrome	Coryza	None	Coryza
Cough	Barking	Slight, if any	Harsh
Feeding	Can drink	No	Not usually
Mouth	Closed	Drooling saliva	No drooling
Toxic	No	Yes	Yes
Fever	< 38.5°C	> 38.5 °C	>38.5°C
Stridor	Rasping	Soft	Worsening
Voice	Hoarse	Weak/ silent	Hoarse
Pathogen	Parainfluenza	Haemophilus influenzae	Staphylococcus or Haemophilus influenzae

Other differentials include:

- Foreign body inhalation
- Anaphylaxis
- Laryngomalacia (and other congenital causes of upper airway obstruction)
- Subglottic stenosis (especially in ex-preterm neonates)
- Peritonsillar abscess (quinsy)
- Retropharyngeal abscess
- Vocal cord paralysis
- Laryngeal mucosal lesions
- Diphtheria

Signs of impending respiratory failure?

- Change in mental state, pallor or duskiness
- Decreased recession, decreased breath sounds or decreased stridor in the context of a child with severe symptoms previously

YES

Primary care: Immediate ambulance transfer to hospital (stay with child until ambulance arrives)

Secondary care: Involve a senior doctor and PICU review

NO

Assess severity using Westley Clinical Scoring System – add up total score for all 5 parameters

Inspiratory stridor: Not present When agitated/active At rest	0 1 2	Air entry: Normal Mildly decreased Severely decreased	0 1 2	Cyanosis: None With agitation or activity At rest	0 4 5
Intercostal recession: Mild Moderate Severe	1 2 3	Level of consciousness: Normal Altered	0 5		

Total score

Score ≤2
MILD

Score 3 – 6
MODERATE

Score > 6
SEVERE

In primary care, initiate steroid therapy (if possible) and arrange urgent transfer to hospital.

Single dose **oral dexamethasone (0.15mg/kg)**

(If unavailable, **oral prednisolone 1-2mg/kg** can be used - a repeat dose may be required at 12 hours)

MILD croup

MODERATE croup

- Minimise stress:
sit upright, on parent's lap, minimal examination. **Do not examine throat.**

No stridor at rest
No recession
Normal obs

NO

Observe for up to 4 hours.

Minimal improvement

Good response: Observe for at least 4 hours to monitor for rebound symptoms

Severe respiratory distress despite adrenaline:

2nd nebulised adrenaline
Reconsider alternative diagnoses (e.g. epiglottitis, tracheitis, foreign body).

YES

Significant Improvement:
No stridor at rest
No recession
Normal obs

Discharge home with an advice sheet

Senior review prior to discharge
Consider admission if:

- Stridor at rest
- Poor response to treatment
- Recurrent presentations in past 24 hours
- Inadequate fluid intake
- Uncertain diagnosis
- Parental anxiety
- Structural airway abnormality
- Late evening presentation

Recurrence: Admit

Poor response

Involve PICU (ext 28018)

Background:

- Common childhood illness affecting children age 6 months to 12 years (peak incidence during second year of life and occasionally affects adolescents).
- More common in boys.
- Peak incidence in autumn and spring.
- Symptoms usually worse at night and when the child is agitated or upset.
- Symptoms usually peak on second or third night and may persist for up to one week.
- Majority are managed in the community (<5% are admitted).
- 1-2% of those admitted to hospital will require intubation.

Classification:

1. Infectious croup

- a. Viral (80% parainfluenza) – common

Treatment:

- **Minimize agitation:** Croup is worse when a child is agitated or upset so it is important to minimise stress. It is best to sit the child upright, on their parent's lap and keep examination to a minimum. Avoid examination of the child's throat.
- **Adrenaline:** Nebulised adrenaline should be reserved for children with severe croup. It has been shown to reduce respiratory distress within ten minutes of administration. Once nebulised adrenaline has been given, the child should be monitored for rebound symptoms for **at least four hours**. Adverse effects include tachycardia and hypertension so caution should be taken when treating children with heart conditions and arrhythmias.

Dose of nebulised adrenaline is 5ml of 1:1000 and may be repeated as needed. Repeat dosing is likely to indicate need for PICU review if this has not already occurred.

- **Glucocorticoids:** Corticosteroids reduce the frequency and duration of hospitalization, the need for intubation and inhaled adrenaline and reduce repeat visits to medical care.
 - Evidence shows both dexamethasone and budesonide are effective in relieving symptoms. Dexamethasone is preferred as it is usually easier to administer, less stressful for the child and less expensive. Dexamethasone is effective in all severities of croup and is effective for 24-48 hours after a single dose.
 - **Dexamethasone dose** of 0.15mg/kg/day can be repeated every 24 hours until symptoms have settled.
 - Doses of dexamethasone up to 0.6mg/kg/day have been used but not shown to be superior to lower dose.

- If dexamethasone is unavailable, oral prednisolone can be used as an alternative. A repeat dose may be required at 12 hours, reflecting its shorter half life
 - Nebulised budesonide may have a role in severe croup where persistent vomiting or respiratory distress prevent administration of oral dexamethasone or in children with recurrent spasmodic croup to reduce the number of systemic steroid courses
 - In near respiratory failure, nebulized budesonide and adrenaline can be administered simultaneously
 - **Budesonide dose** is 2mg twice daily.
-
- **Oxygen:** Give as necessary to maintain saturations above 92%. It is important to minimize distress and wafting oxygen may be the best way to administer therapy.
 - **Steam treatment:** There is little evidence supporting the use of steam therapy in croup and there is a risk of children being scalded by treatment. Consequently, steam therapy is **not advised** for the treatment of croup.

Considerations after admission:

- Regular monitoring of respiratory status (observations and clinical assessment of respiratory distress)
- Consider IV fluids in children with severe respiratory distress
- Secondary bacterial infection such as pneumonia and tracheitis occur in less than 1 in 1000

Follow up:

- Most children do not require follow up
- Follow up with GP or in outpatient / ED clinic if stridor persists for more than one week
- Consider Respiratory or ENT referral +/- laryngoscopy to investigate for anatomical abnormalities if:
 - Noisy breathing/ abnormal voice between episodes of croup
 - Frequent episodes (more than 3 or more episodes a year)
 - Progressively more severe croup
 - Children who were intubated during the neonatal period for any reason
 - Children under 4 months old
 - Longstanding history of stridor
- Children should be discharged from the wards or Emergency Department with a copy of the croup Parent's Information Leaflet and with instructions to return to hospital if symptoms worsen

References:

Ausejo, M., et al., The effectiveness of glucocorticoids in treating croup: meta-analysis. *BMJ*, 1999. 319: 595-600.

Bjornson C, Klassen M, Williamson J, Brant R, Mitton C, Plint A, Bulloch B, Evered L, Johnson D. A Randomized Trial of a Single Dose of Oral Dexamethasone for Mild Croup. *The New England Journal of Medicine*. 2004; 351: 1306-13.

Geelhoed, G. and Macdonald W. Oral and inhaled steroids in croup: a randomized, placebo-controlled trial. *Pediatr Pulmonol*, 1995. 20: 355 - 361.

Johnson, D.W., et al., A comparison of nebulized budesonide, intramuscular dexamethasone, and placebo in moderately severe croup. *N Eng J Med*, 1998. 339: 498-503.

Klassen, T.P. Nebulized budesonide and oral dexamethasone for treatment of croup: a randomized controlled trial. *JAMA*, 1998. 279: 1629-32.

Moore M, Little P. Humidified air inhalation for treating croup. *Cochrane Database of Systematic Reviews*. 2006; (3): CD002870.

Russell K, Wiebe N, Saenz A, Segura M, Johnson D, Hartling L, Klassen P. Glucocorticoids for croup. *Cochrane Database of Systemic Reviews*. 2004; (1)s: CD001955.

Sparrow A, Geelhoed. Prednisolone versus dexamethasone in croup: a randomised equivalence trial. *Arch Disease Childhood*. 2006; 91: 580-583.

RELATED DOCUMENTS

Glucocorticoids for croup. *Cochrane Database of Systemic Reviews*.
<http://www2.cochrane.org/reviews/en/ab001955.html>

Humidified air inhalation for treating croup. *Cochrane Database of Systematic Reviews*.
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.cd002870>

Croup Information leaflet
<http://www.avon.nhs.uk/dms/download.aspx?did=585>

QUERIES

Emergency Department: 0117 342 8078 at any time, day or night.

Ward 33: 0117 342 8333

Ward 38: 0117 342 8338

This Guideline has been produced by members of the Departments of Paediatric Respiratory Medicine, General Paediatrics, Emergency Department and General Practice especially Dr.s E Jenkins, N Sargant, S Tan, E Lunts, L Goldsworthy, G Haythornthwaite, R Bragonier and S Langton Hewer.

Bristol PICU Drug Sheet

Name	Joshua Franklin		
Date of Birth		October	2011
Weight	12 kg	Height	
Age	1 year		(SA estimated from weight alone. Enter height for accurate SA)



Resuscitation Doses	
Adenosine	0.4 ml (100 mcg/kg). Can use up to 1ml (250mcg/kg)
Adrenaline	1.2 ml 1:10000 (subsequent doses 1:10000)
Atropine	240 mcg (20 mcg/kg) = 0.4 ml (600mcg/ml)
Amiodarone	60 mg over 3 min = 1.2 ml (50mg/ml)
Bicarb 8.4%	12 mmol - give and reassess (12 ml of 8.4%)
Ca Gluc 10%	6 ml - give and reassess
Lignocaine	12 mg (1mg/kg) = 1.2 ml of 1%
Naloxone	120 mcg (10 mcg/kg) = 0.3 ml (400mcg/ml)
Vasopressin	4.8 Units (0.4 Units/kg) = 0.24 ml (20 Units/ml)

100% fluid requirement = 44 ml/hr

Sedation Infusions		Standard Regime	Calculation	1 ml/hr =
Morphine	1mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	12 mg/50ml	20 mcg/kg/hr
Midazolam	5mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	60 mg/50ml	100 mcg/kg/hr
Vecuronium	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	36 mg/50ml	60 mcg/kg/hr
Atracurium	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	180 mg/50ml	300 mcg/kg/hr
Fent/Vec	Mix 10	mg Vecuronium in 20ml Fentanyl (50 mcg/ml)	N/A	
Fentanyl	neat	(50mcg/ml)	1.2 to 2.4 ml/hr (5 to 10 mcg/kg/hr)	
Thiopentone	neat	(25mg/ml) Bolus: 5mg/kg = 2.4 ml	Infusion: 0.5 to 2.9 ml/hr (1 to 6 mg/kg/hr)	
Cardiac Infusions		Standard Regime	Calculation	1 ml/hr =
Dopamine	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	180 mg/50ml	5 mcg/kg/min
Dobutamine	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	180 mg/50ml	5 mcg/kg/min
Adrenaline	0.3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	3.6 mg/50ml	0.1 mcg/kg/min
Noradrenaline	0.3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	3.6 mg/50ml	0.1 mcg/kg/min
Argipressin	3 Units/kg	made up to 50ml with Glucose 5% or Saline 0.9%	36.0 U/50ml	0.001 U/kg/min
Milrinone	1.5mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	18 mg/50ml	0.5 mcg/kg/min
Dinoprostone	30mcg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	N/A	N/A
(PGE2 / Prostaglandin)				
Epoprostenol	30mcg/kg	made up to 50ml with Saline 0.9% ONLY	360 mcg/50ml	10 ng/kg/min
(Prostacyclin)				
SNP	3mg/kg	made up to 50ml with Glucose 5% ONLY	36 mg/50ml	1.0 mcg/kg/min
GTN	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	36 mg/50ml	1.0 mcg/kg/min
Amiodarone	15mg/kg	made up to 25ml with Glucose 5% ONLY	180 mg/25ml	10 mcg/kg/min
Lignocaine	neat	1% Lignocaine	0.6 to 3.6 ml/hr	(0.5 - 3.0 mg/kg/hr)
High K+	20mmol	made up to 40ml with Saline 0.9% ONLY	2.4 to 6 ml/hr	(0.1 - 0.25 mmol/kg/hr)
Bronchodilators		Standard Regime	Calculation	1 ml/hr =
Peripheral				
Salbutamol	10 mg	made up to 50ml with Glucose 5% or Saline 0.9%	3.6 ml/hr = 1mcg/kg/min	
Aminophylline	500 mg	made up to 500ml with Gluc 5% or Saline 0.9%	12 ml/hr = 1mg/kg/hr	
Central				
Salbutamol	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	36 mg/50ml	1.0 mcg/kg/min
Aminophylline	50mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	600 mg/50ml	1.0 mg/kg/hr
Bolus Drugs		Intubation Drugs		
Aciclovir	280 mg	mg (500mg/m2, 8h)	Atropine	240 mcg (20 mcg/kg) (0.4 ml)
Adenosine	0.6 mg	mg, to max 3mg	Fentanyl	60 mcg (5 mcg/kg) (1.2 ml)
Ceftriaxone	0.96 g	(80mg/kg, 12h)	Ketamine	24 mg (2mg/kg) (2.4 ml)
Dex 10%	60 ml	bolus for hypoglycaemia	Midazolam	1.2 mg (100mcg/kg) (0.24 ml)
Lorazepam	1.2 mg	mg	Pancuronium	1.2 mg (100mcg/kg) (0.6 ml)
Mannitol	30 ml	of 20% = 0.5g/kg	Propofol	1.2 ml of 1% = 1mg/kg
Mg SO4 50%	2.4 ml	slow iv	Suxamethonium	24 mg (2mg/kg) (0.5 ml)
Phenobarb	180 mg	iv over 30 mins	Thiopentone	2.4 ml = 5 mg/kg
Phenytoin	220 mg	iv over 30 mins	Vecuronium	1.2 mg (100mcg/kg) (0.6 ml)