

Some Common Paediatric Emergencies for the General Practitioner – HM Coovadia

Summary

Acute, life-threatening conditions are not too frequent in general practice, but the GP does need to develop the ability to handle them effectively as it can mean the difference between survival and death. These skills are required of graduates from medical schools – a list of their 5 objectives is given. The author dealt mainly with abrupt onset of severe problems in children, referable to 3 main systems: respiratory, central nervous, and gastro-intestinal tract.

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KEYWORDS:

Emergencies; Paediatrics; Respiratory System; Central Nervous System; Gastro-intestinal System; Physicians, family.

Acute and life-threatening conditions are infrequent in general practice, but when they do occur, they require competent care as faulty treatment or delays in management, can mean the difference between survival and death. Indeed, so central is the ability to handle effectively Paediatric Medical Emergencies to the health professional, that it is one of the main skills required of graduates from our medical schools. The desired qualities in the individuals we train is given in the following objectives which are more or less subscribed to by the academic fraternity in the country:

- i) The core doctor must remain a *student* and become a *teacher*.
- ii) He must be competent in dealing

with *common* and *life-threatening* conditions which affect all sections of the community.

- iii) He must be able to assess health problems scientifically, especially by acquiring *problem-solving-skills*.
- iv) He must develop adequate *communication* skills.
- v) He must develop the proper *attitudes* to patients, their families and society.

In this paper I will deal with the abrupt onset of severe problems referable to 3 systems:

1. Respiratory System
2. Central Nervous System
3. Gastro-intestinal Tract

Of course, there are many other emergencies seen in general practice but the foregoing are the commonest.

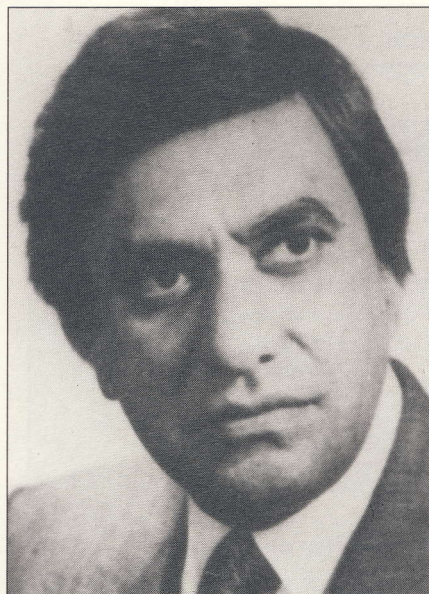
1. Respiratory System

The child presents with difficulty in breathing. It is essential to establish the site of the disease: is it upper or lower airways/parenchyma/pleura? Figure I indicates the differences between upper and lower airways obstruction.

Upper Airways Disease

The causes of upper airway disease are shown in Table I.

The attending doctor must be particularly vigilant about danger signals which require urgent intervention. Obstruction becomes significant when retraction of suprasternal, subcostal and intercostal soft tissues occurs. The pulse and respiratory rates rise and



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Curriculum vitae

Prof Hoosen M Coovadia started his medical career in India with a MBBS in Bombay. He then received a MSc in Immunology in Birmingham, UK and then came to the RSA where he obtained a MD in Natal and FCP (College of Medicine of SA) Paediatrics/Child Health. Prof Coovadia has published many scientific papers relating to nutrition, infection and kidney diseases. He has also contributed to quite a few textbooks. He is currently Head of Paediatrics and Child Health at the University of Natal and has been actively involved in many community organizations such as the Phoenix Settlement Trust, the Organization for Progressive Primary Health Care in South Africa, Nusas, Namda, etc.

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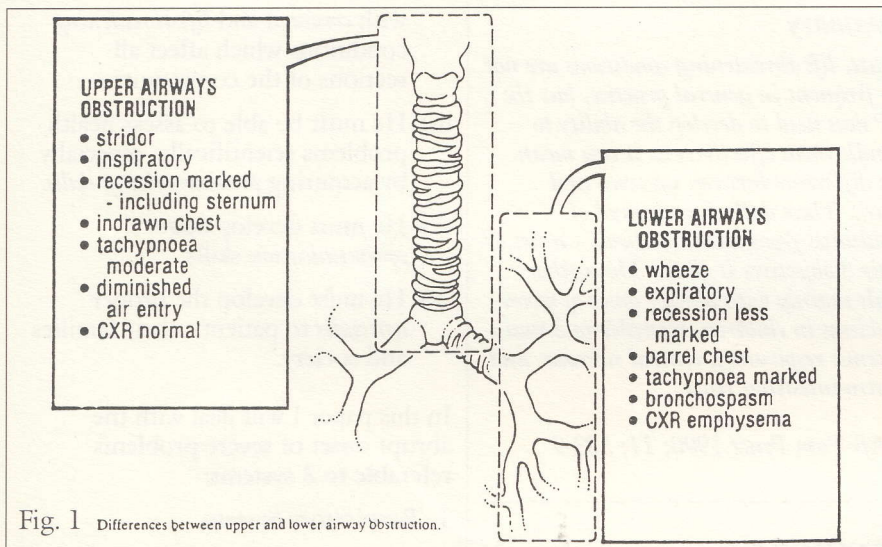


Fig. 1 Differences between upper and lower airway obstruction.

pulsus paradoxus may occur. Anxiety and restlessness indicate hypoxaemia, but as exhaustion supervenes, respiratory effort decreases and hypotonia occurs. Cyanosis is a late sign of respiratory decompensation.

These cases can seldom be managed outside hospital; therefore they must be referred at once to the nearest centre with facilities for:

- (i) Nursing in a cool mist.

- (ii) Oxygen.
- (iii) Physiotherapy.
- (iv) Antibiotics.
- (v) Steroids.
- (vi) Adrenaline Inhalation.
- (vii) Intravenous fluids.
- (viii) Endotracheal Intubation.

The indications for Endotracheal Intubation differ from unit to unit:

Table 2. Severity of Airway Obstruction in Croup

Severity	Clinical Signs			Treatment
	Inspiratory Obstruction	Expiratory Obstruction	Palpable Pulsus Paradoxus	
Grade I	+			O ₂
Grade II	+	PASSIVE		Adrenaline
Grade III	+	ACTIVE	+	Intubation
Grade IV	Marked retractions, apathy, cyanosis			Intubation

Table I. Common Causes of Upper Airway Obstruction

Neonate

- Choanal atresia
- Pierre-Robin syndrome
- Paralysis of vocal cord
- Aspiration of meconium liquor
- Congenital laryngeal stridor
- tracheomalacia
- flabby glottis

Infants and Children

Infections:

Viral:

- Measles, para-influenza
- Influenza, adenovirus, RSV

Bacterial:

- Diphtheria
- Epiglottitis (*H influenzae* type b)
- Retropharyngeal abscess
- Paratracheal lymph node enlargement

Mechanical:

- Foreign body
- Laryngeal papillomatosis
- Tracheal, laryngeal stenosis (post-intubation)

Allergic:

- Angioneurotic oedema

Trauma:

- Thermal and chemical

the absolute indications used in Durban are:

- Cyanosis
- Hypotonia
- Impaired level of consciousness.

Table 2 shows the guidelines used in Cape Town:

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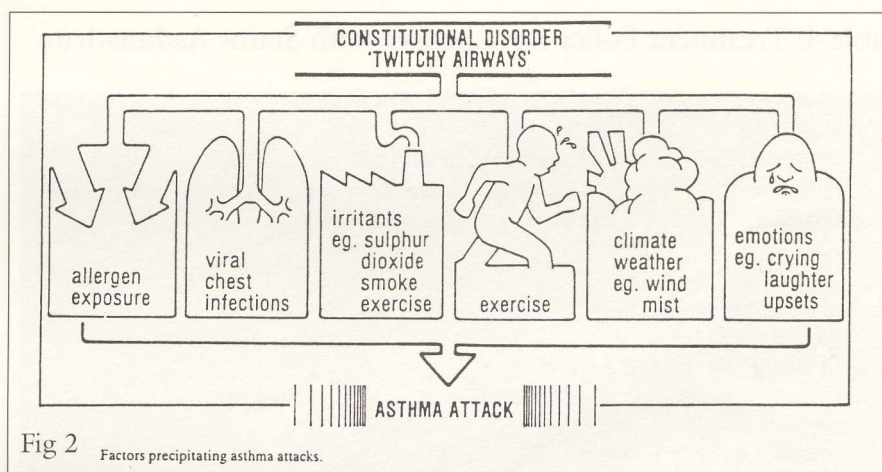


Fig 2 Factors precipitating asthma attacks.

If facilities are unavailable one could manage Grade I patients at home with steam from boiling water.

Lower Airways Disease

Many children continue to die from asthma because of inappropriate therapy and improper utilisation of inhalers at home. Figure 2 depicts precipitants of asthma.

The most common error made by doctors is to underestimate the severity of the attack.

Signs of severity are:

Tachycardia; restlessness; poor air entry on auscultation; pulsus paradoxus (a sign of severe airways obstructions); hypotonia.

The severity of asthma can be judged by the criteria in Table 3:

Table 3: Assessment of Severity of Asthma

Symptoms and Signs	Scoring System	
	0	1
Loss of exercise tolerance	No problem	Present
Using accessory muscles, tracheal tug	Absent	Present
Wheezing	Absent	Present
Respiratory rate/minute	< 30	> 30
Pulse rate/minute	< 120	> 120
Palpable pulsus paradoxus	Absent	Present
Peak expiratory flow rate l/min	> 100	< 100

A score of 4 or more is severe asthma.

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Table 4: Treatment Policy for Children with Status Asthmaticus

1. Sympathomimetic drugs Nebulized salbutamol 5mg of 0,5% solution diluted to 2 ml in nebulizer — repeat 4-hourly or Subcutaneous adrenalin 0,01 ml/kg OXYGEN BY FACE MASK	Omit if already given or marked tachycardia
2. Aminophylline 4 mg/kg iv over 10 mins (Beware of previous theophylline medication)	Omit if already given iv or good response to (1).
3. Hydrocortisone 2mg/kg iv over 5 mins and oral prednisone 2mg/kg/day	Omit if rapid response to (1) or (2)
4. Continuing asthma iv fluids 100 ml/kg/day Aminophylline® 1 mg/kg/hour Hydrocortisone 2 mg/kg/hour Convert to oral therapy with improvement	DANGER SIGNS Rising arterial pCO ₂ Rising heart rate Restlessness Fatigue 'Silent chest' Coma Chest pain (intrathoracic air leak)

Treatment of severe asthma or status asthmaticus is given in Table 4.

Children with severe asthma should be referred to hospital after initial therapy with some of the drugs given in Table 5.

Such children are intubated according to the criteria of severity given.

Emergencies Relating to the Parenchyma or Pleura

The most frequent signs are:

- Fast breathing.
- Chest Indrawing
- Cyanosis.

'Too sick to feed'

The following criteria (Table 6) can be used to determine if children with these problems require referral to hospital.

If the chest is silent on auscultation, the problem is likely to be pneumothorax or empyema. An emergency aspiration can be done with a size 18 needle (Medicut, Jelco, etc). Aspiration is safest in the 3rd intercostal space, mid axillary line for pneumothorax and over the site of maximum dullness for empyema.

Rapid breathing may be due to the following which should be clinically identified:

- Cardiac Failure
- Acidosis
- Neurological Diseases.

2. Central Nervous System

The most important emergency of this organ is Seizures. The management of Seizures requires the following approach:

1st Step: Immediate Supportive Measures.

2nd Step: Stop Fits.

3rd Step: Determine Aetiology

The 1st Step:

- Ensure Adequate Ventilation.
- Maintain Clear Airway.
- Oxygen.
- Clear Nasopharyngeal Secretions.
- Place in Semi-prone Position.
- Do Blood Sugar (Dextrostix^R); treat.

The 2nd Step is the Management of Status Epilepticus (Table 7)

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Table 5. Drug Therapy in Asthma

	Parental	Oral	Aerosol
<i>Sympathomimetic agents</i>			
Adrenaline	Subcut. 1.1000; 0,01 ml/kg can be repeated twice at 20 minute intervals		
<i>β₂ agonists</i>			
Sabutamol (Ventolin®)	iv 10 µg/kg/ over 10 mins. Maintenance 0,2 µg/kg/ min, can be raised in increments of 0,1 µg/kg every 15 minutes to a maximum of 2 µg/kg/min	2 mg per 5 ml syrup 0,1 to 0,15 mg/kg/dose 3 to 4 times a day	0,5% solution; 0,01 to 0,03 ml/kg to a maximum of 1 ml diluted with saline to 2 ml up to 4 times a day.
Theophylline	iv 7 mg/kg diluted in saline over 15 mins. Maintenance 0,65 mg/kg/hr	16-24 mg/kg/24 hrs given every 6 hrs	
Sodium cromoglycate		1 Spincap 3 to 4 times a day	1% solution 2ml 4 times daily
<i>Steroids</i>			
Hydrocortisone	iv 5 to 7 mg/kg stat. Maintenance 0,5 to 1 mg/kg/hr		
Prednisone		2mg/kg to start; reduce to minimum possible after 5 to 7 days	
Beclomethasone dipropionate			80 to 160 µg 4 times daily

Table 6. Criteria for Referral to Hospital

Signs	Respiratory rate/min	Rx
● Cough	< 50	Expectorant/antipyretic - Home
● Cough	> 50	Proc. penicillin - Out-patient
● Chest indrawing	.	Benzyl penicillin - In-patient
● Cyanosis, 'Too sick to feed'	.	Chloramphenicol or cephalosporin, O ₂ Fluids - In-patient

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Table 7. Management of Status Epilepticus

Drug	Route	Dose
Diazepam	per rectum intravenous	0,5 mg/kg 0,2-0,3 mg/kg/dose repeat after 20-30 minutes if necessary.
<i>If no response to the above then give</i>		
Phenytoin	iv	10-15 mg/kg over 20-30 minutes not exceeding 50 mg/min. (may precipitate cardiac arrhythmias.)
<i>or</i>		
Phenobarbitone	iv/im	5 mg/kg - give half iv and half im, repeat im dose in 30 min.
<i>or</i>		
Paraldehyde	im/rectal	1 ml/year of age up to 5 ml 6-8 hrly (4 doses)
<i>or</i>		
Heminevrin infusion (chlormethiazole edisylate)		8 g/l in an aqueous solution of 4% dextrose at a rate of 5-10 mg/kg/hr by titrating fits with appropriate infusion rates.
<i>or</i>		

Refer to Respiratory Unit for IV pentothal and ventilatory support.

The 3rd Step:

Do the following investigations to determine the cause:

- CSF
- FBC
- Ca
- PO4
- Mg
- Pb
- Urea
- Electrolytes
- Liver functions
- CT Scan
- Skull Xray

When is a CT scan done?

1. Focal Neurological lesion (detected by seizures, signs, EEG).
2. Raised Intracranial Pressure.
3. Features suggestive of neurodegenerative disorders, neurocutaneous disorders, cysticercosis.

One extremely important cause of seizures is Simple Febrile Convulsions. These are characterised by:

- Fever.
- Occur at onset of illness.
- Generalized.
- Occur once only per illness
- < 10 minutes.
- No subsequent neurological deficit.
- 0,5 to 5 year olds.

Treatment of Simple Febrile Convulsions:

- Reduce Temperature.
- Diazepam (0,2 to 0,3 mg/kg/dose)
Rectal
Repeat in 20 minutes

Prophylaxis of Simple Febrile Convulsions

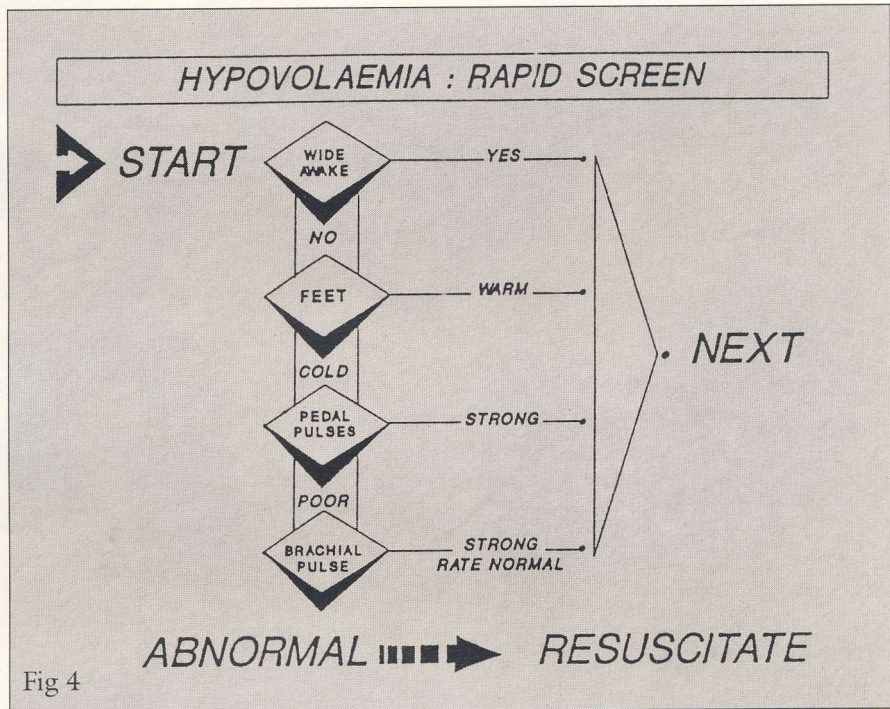
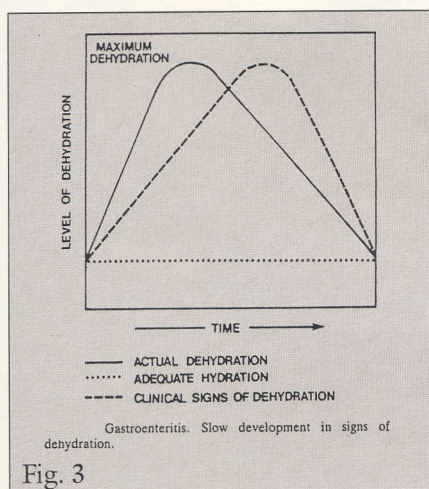
- No continuous drug therapy.
- Reduce Temperature
- Diazepam when child develops a fever: Oral 0,8 mg/kg day in 3 doses x 48 hours
- or
- Rectal 0,3 mg/kg/12 hourly for 2 doses.

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3. Gastro-intestinal Tract

Diarrhoea remains a major cause of morbidity and mortality in the 3rd World. It presents as an emergency with dehydration and shock. Therefore treatment has to be immediate in order to save lives.

Figure 3 indicates that considerable water and electrolytes may be lost from the body *before* the clinical signs of dehydration appear.



A rapid screen used in Cape Town for signs of hypovolaemia is given in Figure 4:

Principles of resuscitation and rehydration are given in Table 8.

Acknowledgements

Some data is based on practice at the Red Cross War Memorial Hospital, Cape Town. Many tables and figures are taken from Coovadia HM, Loening WEK (Eds). "Paediatrics and Child Health" 2nd Edition Oxford University Press, Cape Town.

Table 8. The Principles of Rehydration

	Fluid	Amount	Rate
Resuscitation	Plasma volume expander Sod. bicarbonate	20 ml/kg 2 mmol/kg	Rapid
Replacement	1/2 Str Darrow's in 5% dextrose	<i>% dehydration</i> 5% - 50 ml/kg 10% - 100 ml/kg	Total given over 24 hours at a constant rate
Maintenance	1/2 Str Darrow's in 5% dextrose	1 yr - 120 ml/kg 1-2 years - 100 ml/kg	

The clinical signs of dehydration are familiar to you; these include loss of weight and skin turgor, sunken eyes, dry mucous membranes, oliguria, etc. Some workers rely on poor perfusion, fast breathing and loss of skin turgor as the best indicators of clinical dehydration. Shock or loss of fluid from the intravascular compartment requires immediate resuscitation. Such losses are indicated by:

Altered Consciousness.

Poor perfusion:
slow capillary refill
cold limbs
weak pulses
hypotension.