3-4 Bronchospasm v.2

Signs and symptoms include: expiratory wheeze, prolonged expiration, increased inflation pressures, desaturation, hypercapnia, upsloping capnograph trace, silent chest. Can occur alone or as part of another problem.

START

1. Call for help and inform theatre team of problem.
2. Give 100% oxygen.
3. Stop surgery / other stimulation.
4. Fully expose the chest and perform a rapid systematic examination:
   - Inspect, percuss, palpate, auscultate.
   - Absence of wheeze may indicate severe bronchospasm with no air movement.
5. Deepen anaesthesia:
   - Bronchospasm may be a consequence of light anaesthesia.
   - Inhalational anaesthetic agents are bronchodilators.
   - Avoid isoflurane or desflurane if possible – airway irritant if increased rapidly.
6. Exclude malpositioned or obstructed tracheal tube or supraglottic airway
   - Consider whether there could be endobronchial or oesophageal intubation.
7. If anaphylaxis suspected → **3-1**
8. If airway soiling/aspiration suspected airway see Box A.
9. Treat bronchospasm (Box B). First line is salbutamol by metered dose inhaler or by nebuliser; i.v. route is second line. Other drugs at clinician discretion.
10. Consider alternate diagnoses causing or mimicking bronchospasm (Box C).
11. Use appropriate ventilation strategy (Box D).
12. If raised airway pressure and/or desaturation persists, consider → **2-2 Hypoxia/ desaturation/cyanosis.**
13. Obtain a chest X-ray as soon as clinically safe to do so.
14. Plan appropriate placement for post-procedure care.

Box A: ACTIONS IF AIRWAY SOILING/ASPIRATION

Consider tracheal intubation and tracheal toilet
Use nasogastric tube to aspirate gastric contents
Chest X-ray
Consider post op level of care and follow-up

Box B: DRUG DOSES

Drug	Dose
Salbutamol	Nebuliser: Child <5 yr, 2.5 mg; Adult and >5 yr 5 mg i.v. bolus: Adult 250 µg diluted, slowly; Child 1-23 months 5 µg.kg^{-1} once over 5 mins; Child 2-17 years 15 µg.kg^{-1} once over 5 mins (max. 250 µg) Adult i.v. infusion: 5-20 µg.min^{-1} Child i.v. infusion: 0.5-1 µg.kg^{-1}.min^{-1} (max. 20 µg.min^{-1})
Ipratropium	Neb: 2-12 yr 0.25 mg; Adult 0.5 mg
Adrenaline	Neb: Child 0.5 ml of 1:1000 Neb: Adult 5 ml of 1:1000 i.m.: <6 mo 50 µg; <6 yr 120 µg; <12 yr 250 µg; Adult 500 µg Slow i.v. bolus: 0.1 - 1 µg.kg^{-1} (Adult 10-100 µg)
Magnesium	i.v. over 20 min: 50 mg.kg^{-1} (Adult 2 g)
Ketamine	Bolus: Adult 20 mg i.v. Infusion: 1-3 mg.kg^{-1}.hr^{-1}
Aminophylline	i.v. over 20 min: 5 mg.kg^{-1} (omit if already on theophylline) i.v. infusion: <9 yr 1 mg.kg^{-1}.hr^{-1}; <16 yr 0.8 mg.kg^{-1}.h^{-1}; Adult 0.5 mg.kg^{-1}.h^{-1}
Hydrocortisone	4 mg.kg^{-1} (Adult 200 mg)

Box C: ALTERNATES and MIMICS

Wheeze: pulmonary oedema; misplaced airway device; ARDS; laryngospasm
Raised airway pressure: obstruction of larynx, trachea or bronchi; obstruction of breathing system (any part); decreased lung compliance; pneumothorax

Box D: VENTILATION STRATEGIES

Increase expiratory time to allow complete expiration
Pressure control ventilation may be better
Be alert to 'breath stacking'
Permissive hypercapnia may be appropriate

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