Resuscitation

January 2017

Acute Presentations (RCEM)

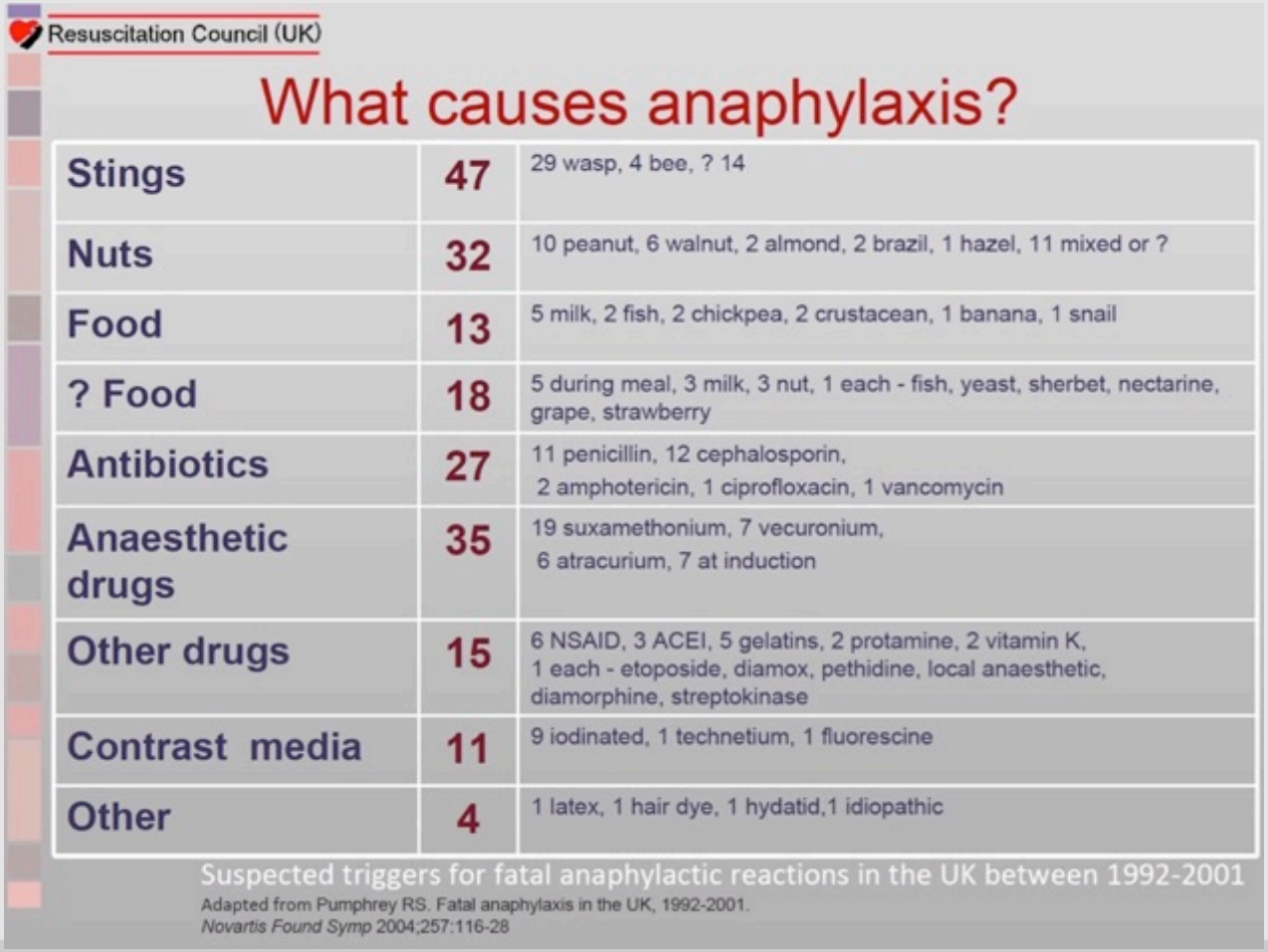
- Anaphylaxis CMP 1
- Unconscious Patient CMP 6
- Emergency Airway Care C3AP6
- Ventilatory Support CAP 35
- Cardio-Respiratory Arrest CMP 2

ANAPHYLAXIS

Anaphylaxis - Introduction

- Severe, life-threatening, generalised or systemic hypersensitivity reaction.
- Rapid life-threatening airway / breathing / circulation problems usually with skin / mucosal changes.
- Most common triggers:
  Foods, Drugs, Bites, Latex

Anaphylaxis - Causes



Anaphylaxis -Pathophysiology

- May be allergic or non allergic:

  Allergic anaphylaxis - immediate type 1 hypersensitivity. (**mast cell activation**… **Histamine** / IL / TNF / other cytokine release).

- Results:

  Increased bronchial smooth muscle tone…wheeze / SOB

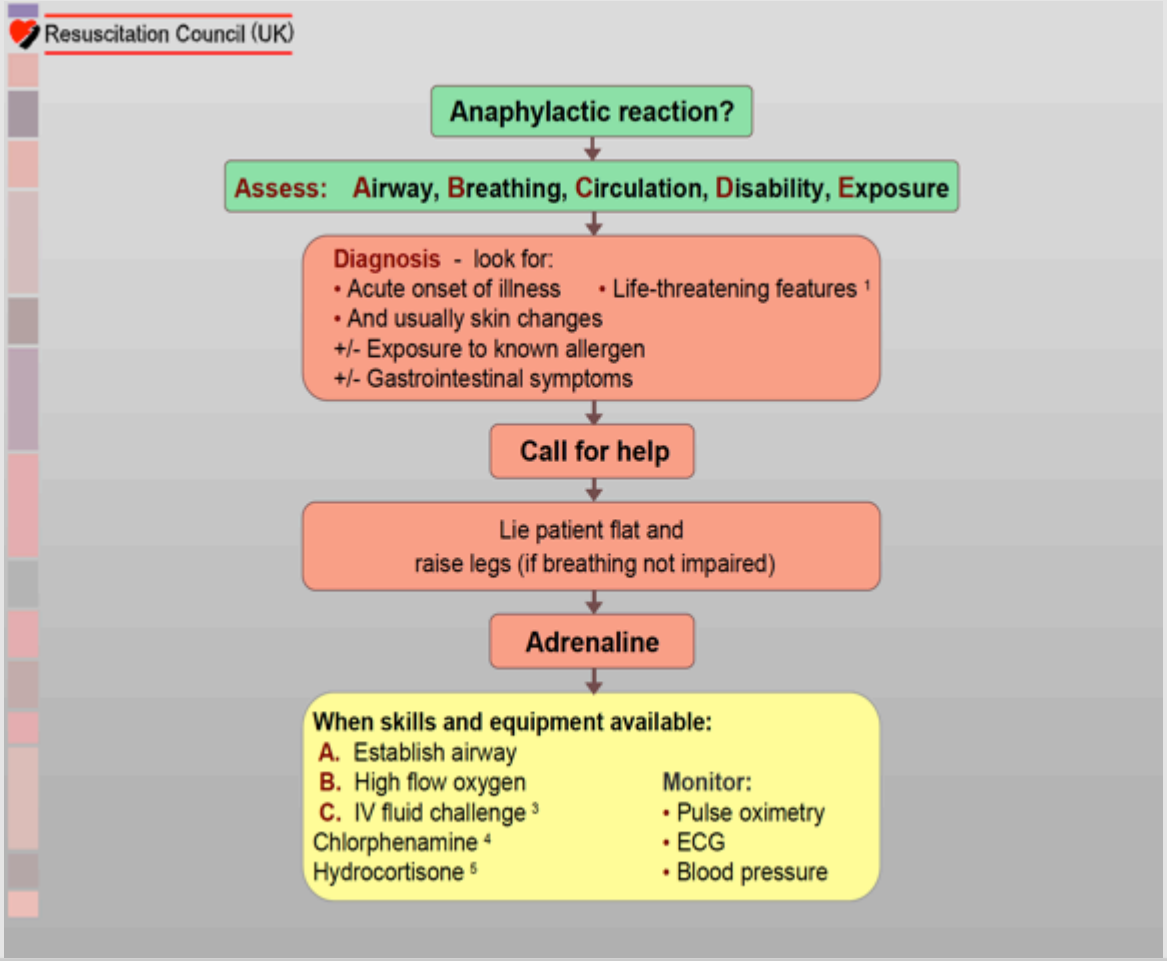
  Decreased vascular tone / increased capillary permeability… hypotension

- The response is usually uniphasic, although a biphasic response occurs in approximately 20% of individuals.

Anaphylaxis – Differentials

- Allergic reaction
- Panic attack
- Asthma
- Angioedema
- Sepsis

Anaphylaxis – Management



Anaphylaxis - Treatment

- IM Adrenaline
- Fluids (e.g. 20mls/kg 0.9% Saline)
- Hydrocortisone (e.g. 100-200mg IV)
- Anti-histamine (e.g. 10mg Chlorphenamine IV)

Anaphylaxis - Adrenaline

Intra-muscular adrenaline

Adrenaline

IM doses of 1:1000 adrenaline (repeat after 5 min if no better)

• Adult or child more than 12 years:	500 micrograms IM (0.5 mL)
• Child 6 -12 years:	300 micrograms IM (0.3 mL)
• Child 6 months - 6 years:	150 micrograms IM (0.15 mL)
• Child less than 6 months:	150 micrograms IM (0.15 mL)

N.B. **IV adrenaline** is for **Cardiac Arrest** or **Consultant / ICU** use **ONLY**

Anaphylaxis – Diagnosis - NICE

1.1.4 After a suspected anaphylactic reaction in adults or young people aged 16 years or older, take timed blood samples for mast cell tryptase testing as follows:

- a sample as soon as possible after emergency treatment has started
- a second sample ideally within 1–2 hours (but no later than 4 hours) from the onset of symptoms.

Anaphylaxis – Follow up - NICE

1.1.9 After emergency treatment for suspected anaphylaxis, offer people a referral to a specialist allergy service (age-appropriate where possible) consisting of healthcare professionals with the skills and competencies necessary to accurately investigate, diagnose, monitor and provide ongoing management of, and patient education about, suspected anaphylaxis.

1.1.10 After emergency treatment for suspected anaphylaxis, offer people (or, as appropriate, their parent and/or carer) an appropriate adrenaline injector as an interim measure before the specialist allergy service appointment.

Anaphylaxis – Discharge - NICE

1.1.7 Adults and young people aged 16 years or older who have had emergency treatment for suspected anaphylaxis should be observed for 6–12 hours from the onset of symptoms, depending on their response to emergency treatment. In people with reactions that are controlled promptly and easily, a shorter observation period may be considered provided that they receive appropriate post-reaction care prior to discharge.

1.1.11 Before discharge a healthcare professional with the appropriate skills and competencies should offer people (or, as appropriate, their parent and/or carer) the following:

- information about anaphylaxis, including the signs and symptoms of an anaphylactic reaction
- information about the risk of a biphasic reaction
- information on what to do if an anaphylactic reaction occurs (use the adrenaline injector and call emergency services)
- a demonstration of the correct use of the adrenaline injector and when to use it
- advice about how to avoid the suspected trigger (if known)
- information about the need for referral to a specialist allergy service and the referral process

RCEM Curriculum & Assessment

CMP1 Anaphylaxis

The trainee will be able to identify patients with anaphylactic shock, assess their clinical state, produce a list of appropriate differential diagnoses, initiate immediate resuscitation and management and organise further investigations		
Knowledge	**Assessment Methods**	**GMP Domains**
Identify physiological perturbations causing anaphylactic shock	E, C, Mi, ACAT	1
Recognise clinical manifestations of anaphylactic shock	E, C, Mi, ACAT	1
Elucidate causes of anaphylactic shock	E, C, Mi, ACAT	1
Know anaphylaxis guidelines	E, C, Mi, ACAT	1
Define follow-up pathways after acute resuscitation	E, C, Mi, ACAT	1
Skills		
Recognise clinical consequences of acute anaphylaxis	Mi, C, S	1
Perform immediate physical assessment (laryngeal oedema, bronchospasm, hypotension)	Mi, C, D, S	1
Institute resuscitation (adrenaline/epinephrine), oxygen, IV access, fluids)	Mi, C, D, S	1
Arrange monitoring of relevant indices	Mi, C, S	1
Order, interpret and act on initial investigations (tryptase, C1 esterase inhibitor etc.)	Mi, C	1
Be an ALS provider	L	1
Behaviour		
Exhibit a calm and methodical approach	ACAT, C, Mi, S	3
Adopt leadership role where appropriate	ACAT, C, Mi, S	2,4
Involve senior and specialist allergy services promptly	ACAT, C, Mi, S	2, 3

Assessment Method Glossary

AA	Audit Assessment
ACAT	Acute Care Assessment Tool
C	Case Based Discussion (CBD)
D	Direct observation of procedural skills (DOPS)
E	Examination
ESLE	Extended supervised learning event
L	Life support course
Mi or A	Mini-clinical evaluation exercise or anaesthesia clinical evaluation exercise (Mini-CEX or Anaes-CEX)
M	Multi-source feedback (MSF)
PS	Patient Survey
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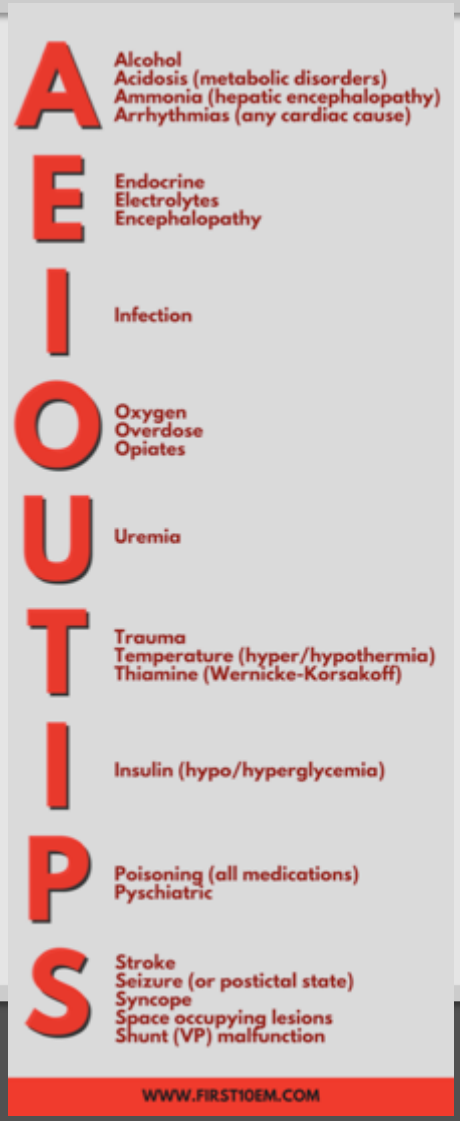
W	Web based, RCEMLearning Hub and KnowledgeBank http://www.rcemlearning.co.uk

THE UNCONSCIOUS PATIENT

Unconscious Pt. - Differentials



- Hypoglycaemia
- Drugs & Alcohol
- Head Injury
- Seizure
- Stroke
- Sepsis
- Hypothermia
- Psychiatry

D.E.F.G.

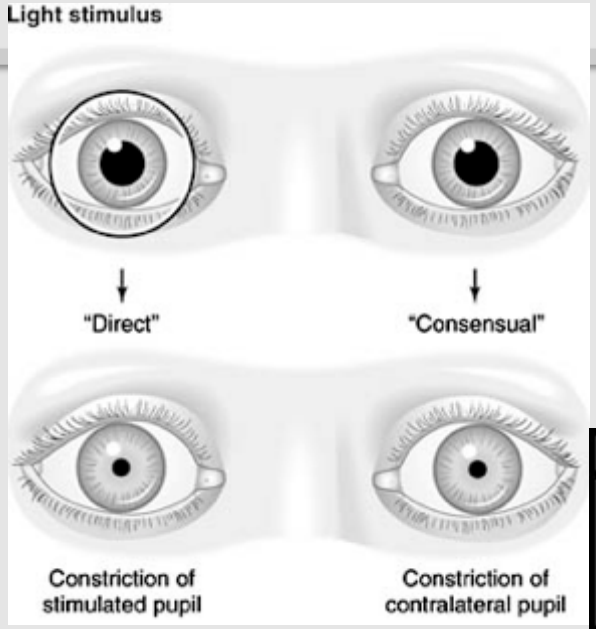
Unconscious Pt. - Management

Unconscious Pt. - Management

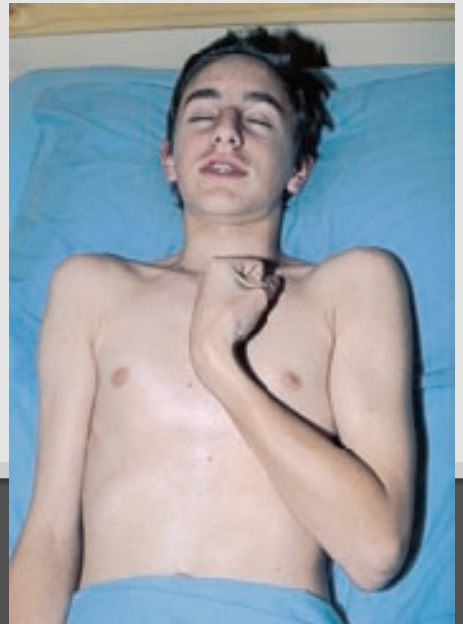
Unconscious Pt. - Management

Unconscious Pt. - Management

Unconscious Pt. - Management



Glasgow Coma Scale		
Eye Response	Open Spontaneously	4
	Open to Verbal command	3
	Open in response to pain	2
	No response	1
Verbal Response	Talking / Orientated	5
	Confused speech / Disorientated	4
	Inappropriate Words	3
	Incomprehensible sounds	2
	No response	1
Motor Response	Obeys commands	6
	Localizes pain	5
	Withdraws from pain	4
	Abnormal flexion	3
	Extension	2
	No response	1



Unconscious Pt. - Management

D.E.F.G.

RCEM Curriculum & Assessment

CMP6 Unconscious Patient

The trainee will be able to promptly assess the unconscious patient to produce a differential diagnosis, establish safe monitoring, investigate appropriately and formulate an initial management plan, including recognising situations in which emergency specialist investigation or referral is required		
Knowledge	**Assessment Methods**	**GMP Domains**
Identify the principal causes of unconsciousness (metabolic, neurological)	E, C, Mi, ACAT	1
Recognise the principal sub-causes (drugs, hypoglycaemia, hypoxia; trauma, infection, vascular, epilepsy, raised intra-cranial pressure, reduced cerebral blood flow, endocrine)	E, C, Mi, ACAT	1
List appropriate investigations for each	E, C, Mi, ACAT	1
Outline immediate management options	E, C, Mi, ACAT	1
Skills		
Make a rapid and immediate assessment including examination of coverings of nervous system (head, neck, spine) and Glasgow Coma Score	Mi, D	1
Initiate appropriate immediate management (A,B,C, cervical collar, administer glucose)	Mi, C	1
Take simple history from witnesses when patient has stabilised	Mi, C	1
Prioritise, order, interpret and act on simple investigations appropriately	Mi, C	1
Initiate early (critical) management (e.g. control fits, manage poisoning) including requesting safe monitoring	Mi, C	1
Behaviour		
Recognise need for immediate assessment and resuscitation	ACAT, C, Mi	1
Assume leadership role where appropriate	ACAT, C, Mi	2,3
Involve appropriate specialists to facilitate immediate assessment and management (e.g. imaging, intensive care, neurosurgeons)	ACAT, C, Mi	3

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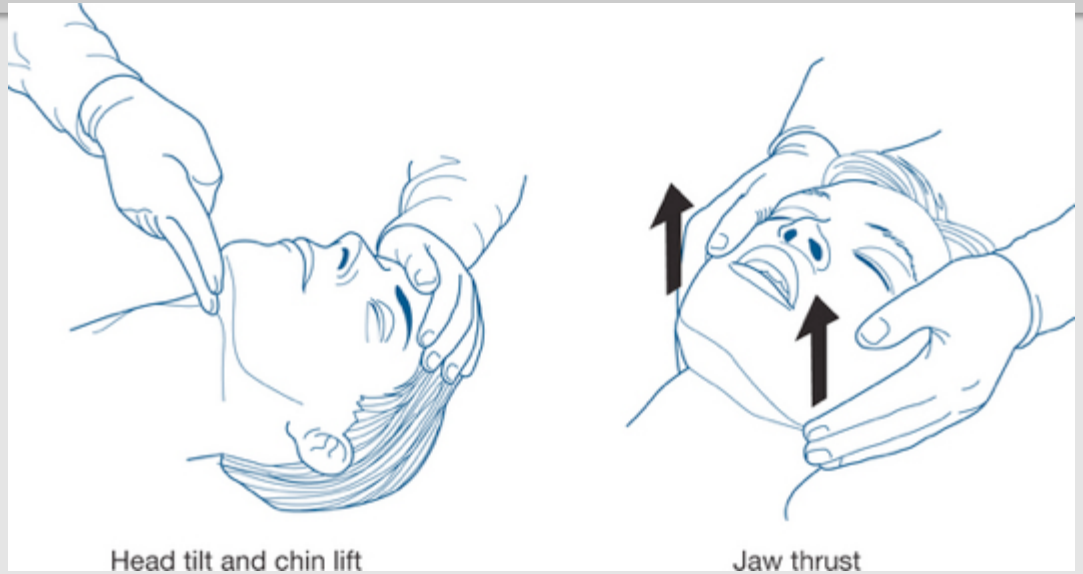
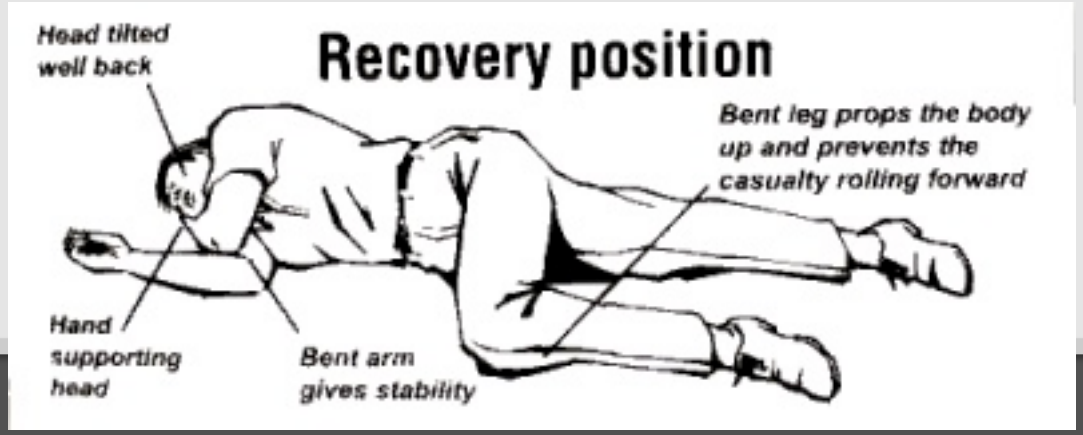
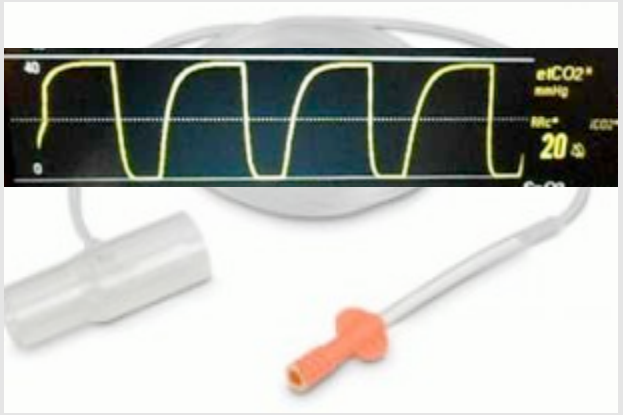
EMERGENCY AIRWAY CARE

Basic Airway Care- Manoeuvres





Basic Airway Care - Adjuncts



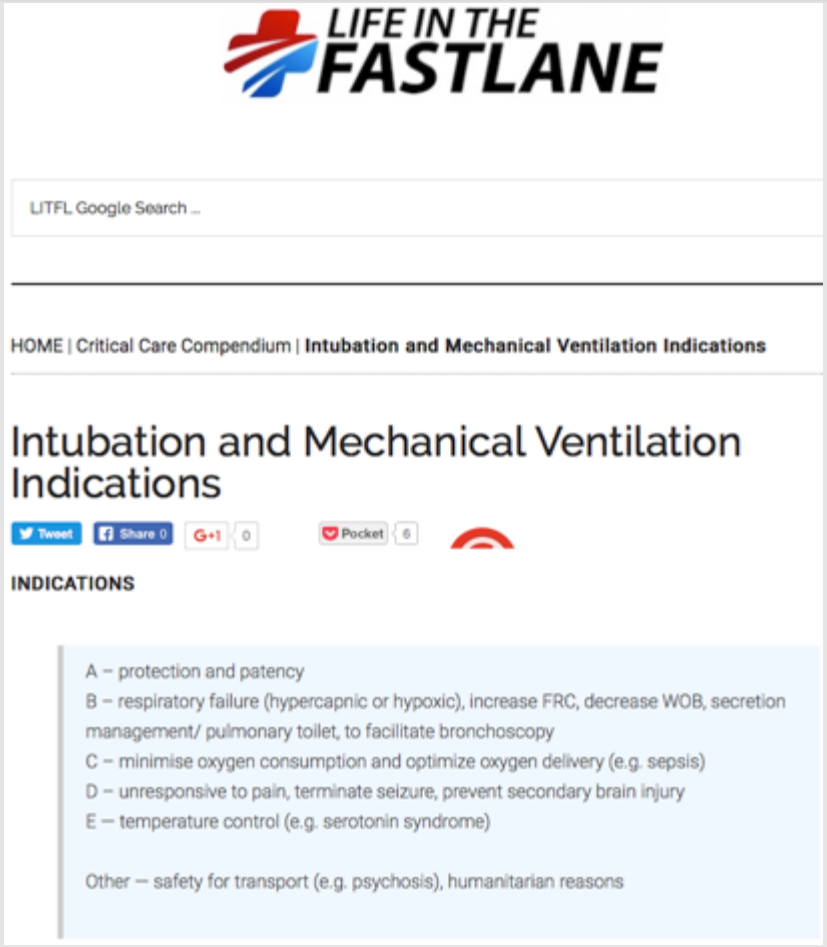
Basic Airway Care - Oxygen

low oxygen device

Delivers 25-45% FIO2 at 1-6 L/min flow

1. Flow 0 liters per minute: 21% (Room Air)
2. Flow 1 liters per minute: 25%
3. Flow 2 liters per minute: 29%
4. Flow 3 liters per minute: 33%
5. Flow 4 liters per minute: 37%
6. Flow 5 liters per minute: 41%
7. Flow 6 liters per minute: 45%

Emergency Airway Care - Intubation



LIFE IN THE FASTLANE

LITFL Google Search ...

HOME | Critical Care Compendium | **Intubation and Mechanical Ventilation Indications**

Intubation and Mechanical Ventilation Indications

Tweet Share 0 G+1 0 Pocket 6

INDICATIONS

A – protection and patency
B – respiratory failure (hypercapnic or hypoxic), increase FRC, decrease WOB, secretion management/ pulmonary toilet, to facilitate bronchoscopy
C – minimise oxygen consumption and optimize oxygen delivery (e.g. sepsis)
D – unresponsive to pain, terminate seizure, prevent secondary brain injury
E – temperature control (e.g. serotonin syndrome)

Other – safety for transport (e.g. psychosis), humanitarian reasons

N.B. Patients die from failure to oxygenate, not lack of a tube (ETT)

Emergency Airway Care - RSI

- Rapid Sequence Induction Vs 'Crash' tube

- Induction agents:
  Ketamine 1.5-2 mg/kg
  Fentanyl 2-10 mcg/kg
  Midazolam 0.1-0.3 mg/kg
  Propofol 1-2.5 mg/kg
  Thiopental 3-5 mg/kg

- Neuromuscular blockers:
  Suxamethonium 1-2 mg/kg
  Rocuronium 0.6-1.2 mg/kg
  Vecuronium 0.15-0.25 mg/kg

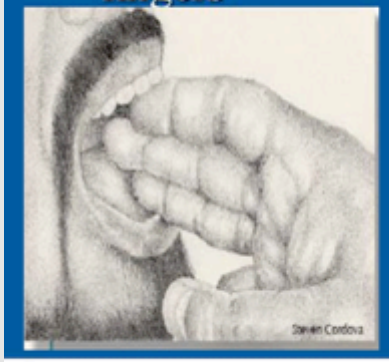
DO NOT USE any of these drugs unless you have the skills and experience necessary to manage the results / complications

Emergency Airway Care - Difficulty

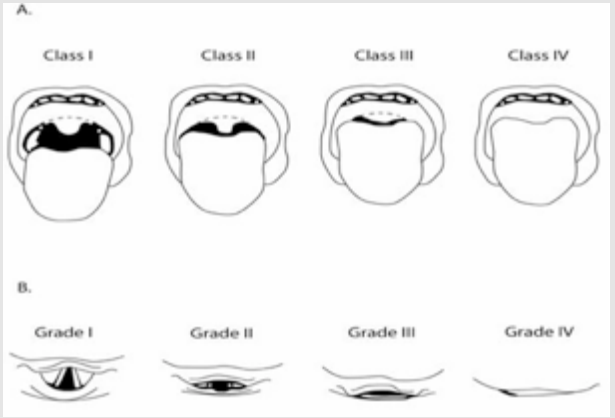
Airway Evaluation

LEMON Law - Evaluate 3-3-2 rule

- Mouth opening ≥ 3 fingers
- Tip of the chin to the hyoid bone ≥ 3 fingers
- Hyoid bone to the top of the thyroid cartilage ≥ 2 fingers



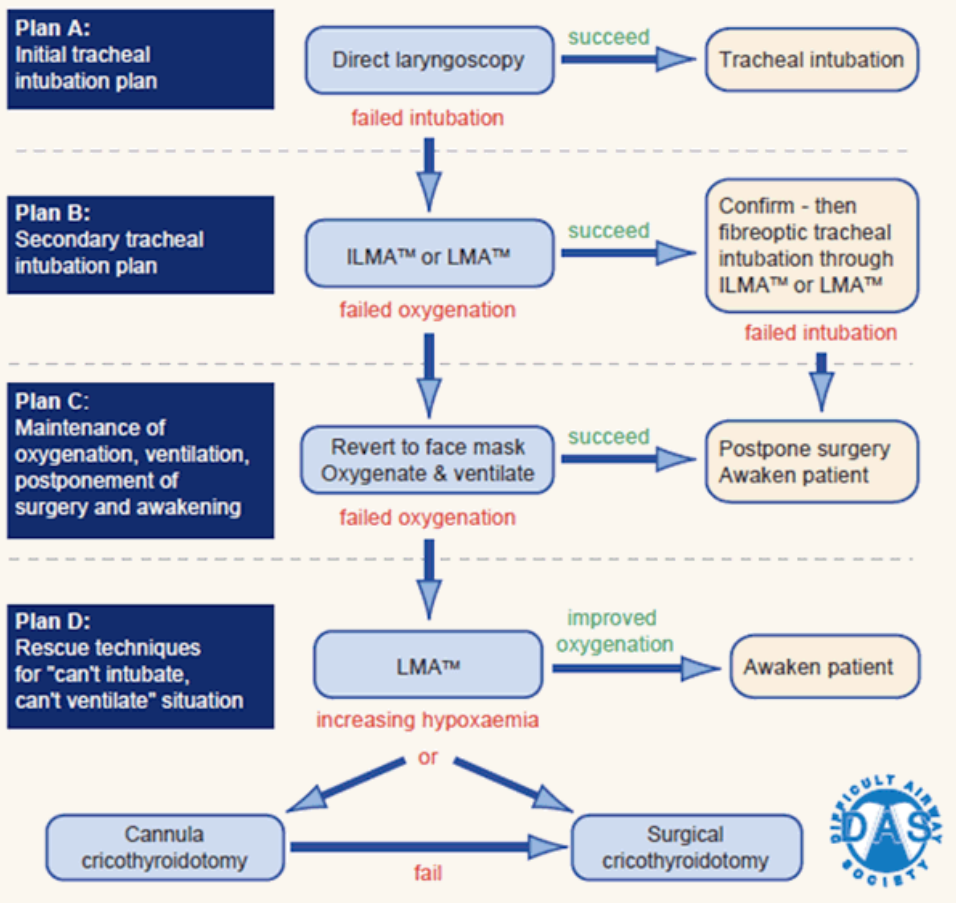
Middle East Critical Care Assembly

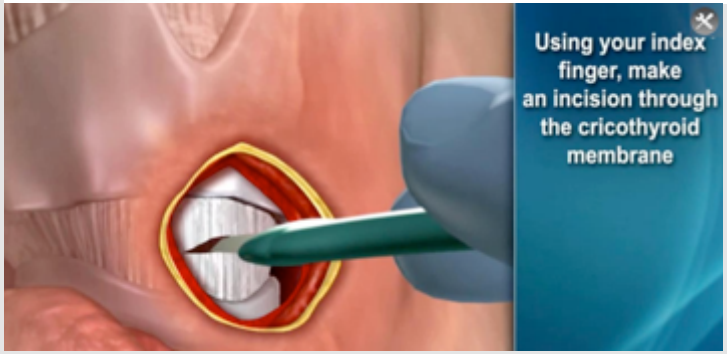


Emergency Airway Care – Pre-RSI

Airway assessment completed, patient positioned	Checked
Senior ED Doctor +/- ICU Aware	Checked
Adequate Oxygen Supply	Checked
C-Circuit connected and functioning. BVM available	Checked
Oral and Nasal airways sized and available	Checked
Suction working	Checked
IV access x2 sited and checked, fluids running	Checked
Induction agent ready(= Dose=)	Checked
Muscle relaxant ready (= Dose=)	Checked
Maintainance drugs ready, EtCO2 & Vent ready	Checked
Emergency Drugs available	Checked
Laryngoscope working, backup available	Checked
Bougie	Checked

Emergency Airway Care – Failed RSI





Emergency Airway Care - Ventilation

- RSI Technique
- Complex / Difficult scenarios
- Ventilator ‘Knobology’
- Maintainance of anaesthesia
- Troubleshooting

RCEM Curriculum & Assessment

C3AP6 Emergency airway care (CT3 and covers HST)

Airway care is a key skill in daily use for all Emergency Physicians. Trainees will build upon and regularly revisit the competences acquired during the first two years of the ACCS programme. They will become more experienced in the identification of patients who need intubation and predicting those with a difficult airway. They will become more knowledgeable of the impact of life-threatening conditions on rapid sequence induction techniques. Always working closely with a competent airway expert, trainees play an increasing role within the airway team.

The trainee will be able to evaluate the patient who presents with emergency airway problems, and be able to provide a patent airway working within an airway team		
Knowledge	**Assessment Methods**	**GMP Domains**
Be able to identify those patients who need intubation	E, ACAT, AA, C, Mi	1
Be able to identify the potentially difficult airway	E, ACAT, AA, C, Mi	1
Knows the pharmacology of induction agents and paralysing agents used in the resuscitation room	E, ACAT, AA, C, Mi	1
Skills		
Can initiate monitoring and preparation for RSI	Mi, C, D	1
Can intubate and use LMA	Mi, C, D, S	1
Knows the failed airway drill including LMA needle and surgical cricothyroidotomy	Mi, C, D, S	1
Knows how to maintain sedation and paralysis post intubation	Mi, C, D	1
Can use simple transport ventilators	Mi, C, D	1
Can recognise and anticipate the difficulties associated with RSI in the resuscitation room e.g. asthmatic	Mi, C	
Behaviour		
Building on ACCS training, becomes integral part of the airway team which **always** includes a senior competent airway practitioner	Mi, C	1,2
Maintains a log book of all airway interventions	Mi. C	1,2

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VENTILATORY SUPPORT

Ventilatory Support

- Supplemental Oxygen

- Non-invasive:
  CPAP
  BiPAP

- Invasive

Ventilatory Support - NIV

How CPAP Works

- Maintains constant level of airway pressure
- Keeps alveoli open (asthma, COPD)
- Moves fluid into vasculature (pulmonary edema)
- Improves gas exchange
- Buys time for medications to work

Ventilatory Support - CPAP

Indications for CPAP

- The general indication for NIPPV is dyspnea accompanied by early respiratory failure in patients with intact protective airway reflexes and mental status.
- CHF
- Pulmonary Edema
  - Near Drowning
  - Inhalation Exposure
- COPD
- Asthma
- Pneumonia

Ventilatory Support - BiPAP

BiPAP is suitable for COPD patients with type 2 respiratory failure

Note: If considering non-invasive ventilation, inform SENIOR CLINICIAN now

Inclusion Criteria

- ☐ Patient with acute exacerbation of COPD
- ☐ ABG showing acidosis pH<7.35
- ☐ Type II Respiratory Failure PaCO2 >6.0 kPa
- ☐ On maximal medical therapy
- ☐ Emergency Department Consultant (or MG out of hours) informed and has reviewed patient

Absolute Contraindications

- ☐ Cardio / Resp arrest or Peri-Respiratory arrest
- ☐ Airway obstruction
- ☐ Metabolic acidosis
- ☐ Untreated pneumothorax
- ☐ Recent upper GI or cranio- facial surgery
- ☐ Facial / airway burns
- ☐ Vomiting / aspiration risk

Relative Contraindications

- ☐ Excess bronchial secretions
- ☐ Confused and unco-operative
- ☐ GCS < 8
- ☐ Hypotension SBP < 90mmHg
- ☐ Bullae (known or seen on X-ray)

RCEM Curriculum & Assessment

CAP35 Ventilatory Support

The trainee will describe or demonstrate their approach to the patient requiring ventilatory support		
Knowledge	**Assessment Methods**	**GMP Domains**
Recalls and understands the principles of ventilatory support strategies and local protocols, including but not limited to: oxygen therapy, CPAP, NIV,IPPV	E, C, Mi, ACAT	1
Knowledge of the conditions which mayrequire ventilatory support in the critically ill, including but not limited to: acute respiratory distress syndrome (ARDS)/acute lung injury, exacerbation ofairflow obstruction, infection, trauma	E, C, Mi, ACAT	1
Understands the concepts of oxygen delivery and utilisation and work of breathing	E, C, Mi, ACAT	1
Recalls appropriate monitoring and investigation of the patient requiring ventilatory support, including but not limited to: clinical assessment, arterial blood gases, blood tests, radiography	E, C, Mi, ACAT	1
Central venous pressure monitoring and moreadvanced haemodynamic monitoring	E, C, Mi, ACAT	1
Outline immediate management optionsincluding: increasing inspired oxygen fraction, increasedrespiratory monitoring, initiation of non-invasive ventilation or CPAP, role of invasive mechanicalventilation	E, C, Mi, ACAT	1
Knowledge of problems associated with ventilatory support (e.g. ventilator-associated pneumonia, ventilator- associated lung injury), and strategies available to limitsuch problems	E, C, Mi, ACAT	1

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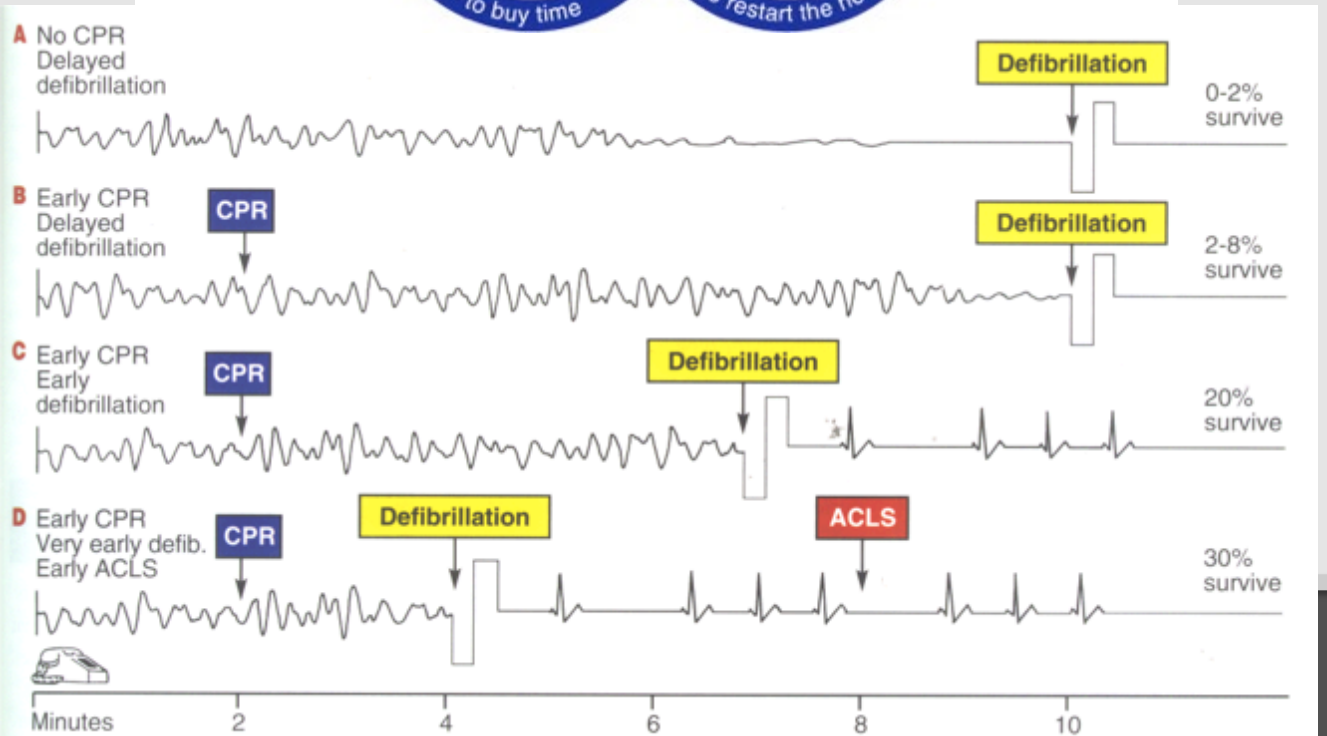
CARDIO-PULMONARY RESUSCITATION

Cardiac Arrest – Survival



Cardiac Arrest - Causes

- **Most common cause is IHD**
- Respiratory failure
- Overdose
- Metabolic derangements
- Trauma
- Hypovolaemia
- Immersion
- Hypothermia

- Incidence (USA) 1.24 :1000 Popu

Differential Diagnosis:

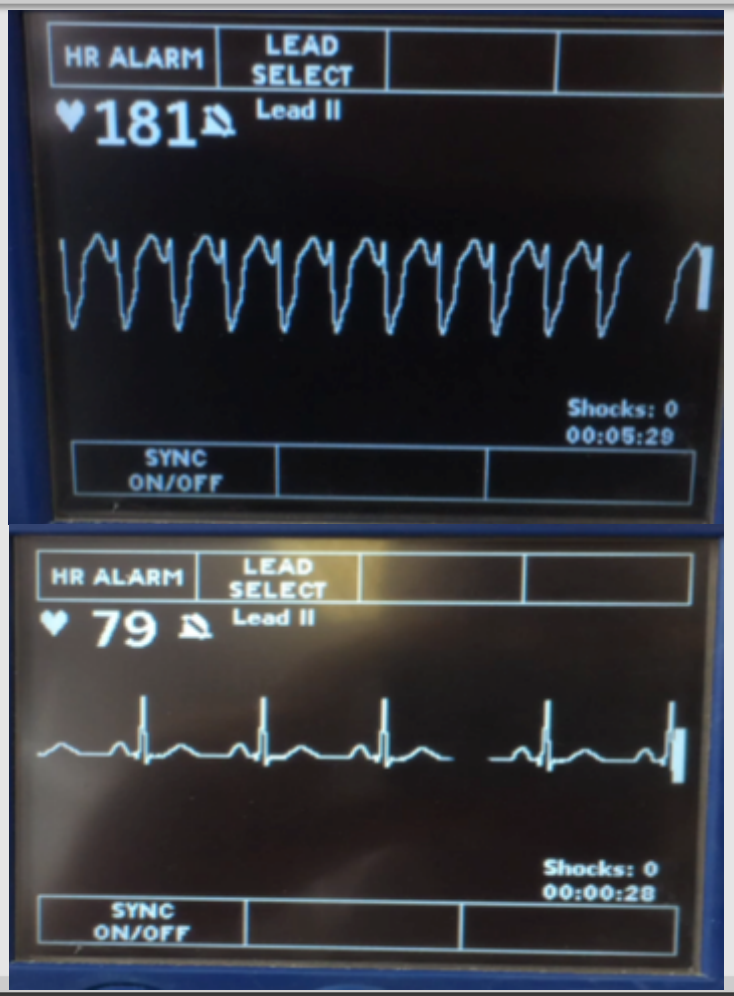
6 Hs & 6 Ts

- Hypovolemia
- Hypoxia
- Hydrogen ions (acidosis)
- Hyper/ hypokalemia
- Hypothermia
- Hypoglycemia
- Toxins
- Tamponade
- Tension PTX
- Thrombosis (coronary)
- Thrombosis (pulmonary)
- Trauma

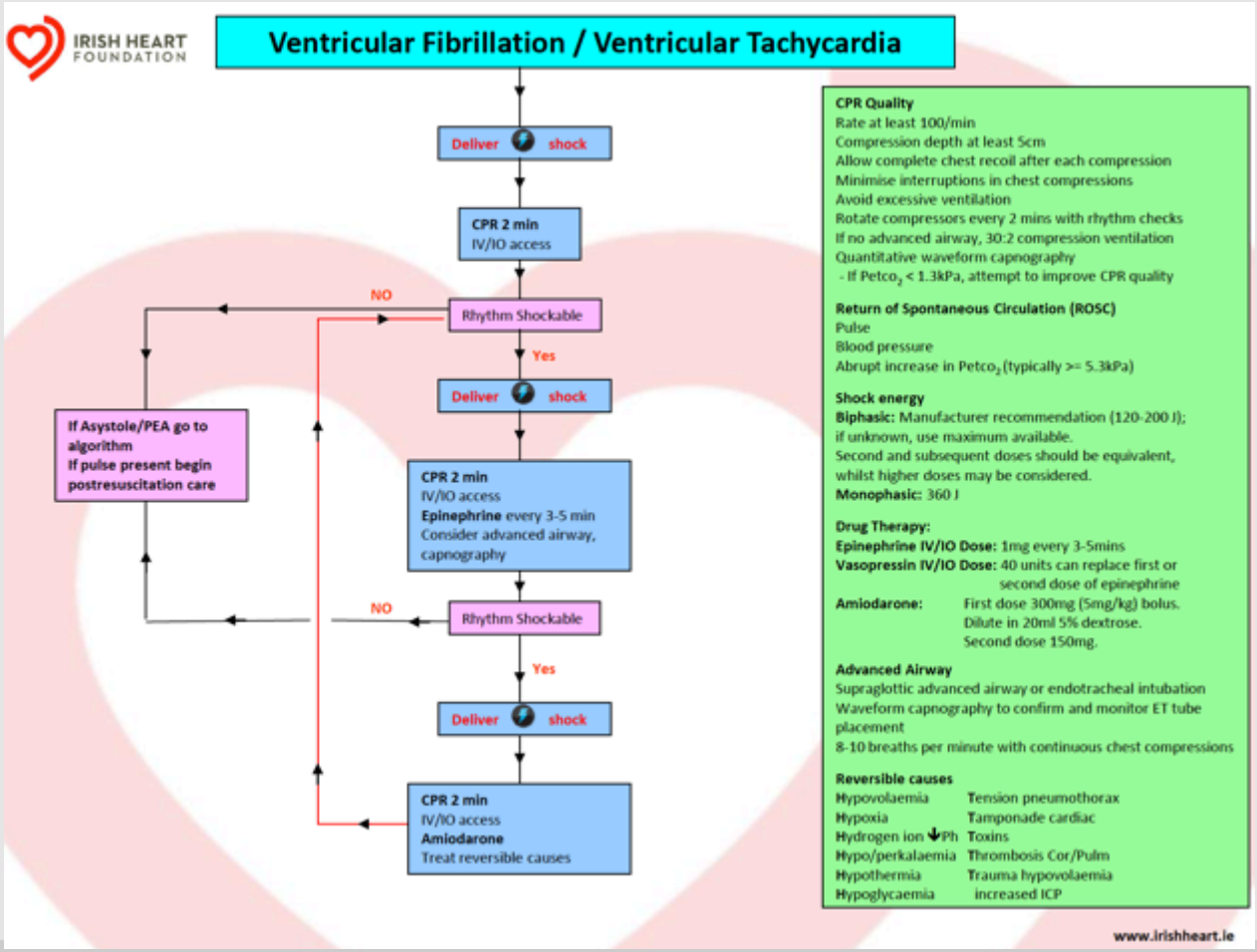
Cardiac Arrest - Treatment

- Electricity
- CPR
- Treat the cause
- Drugs

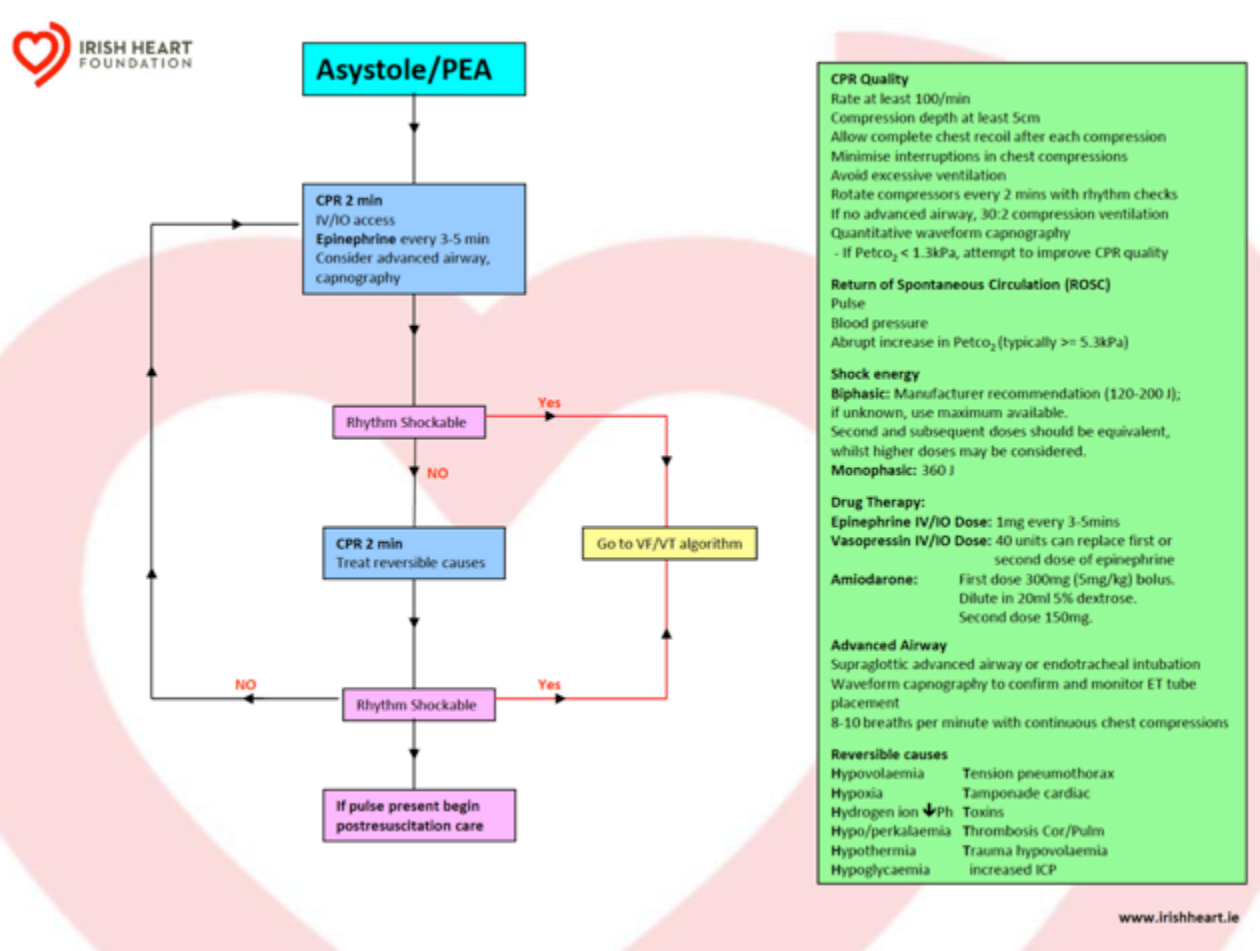
Cardiac Arrest - Rhythm



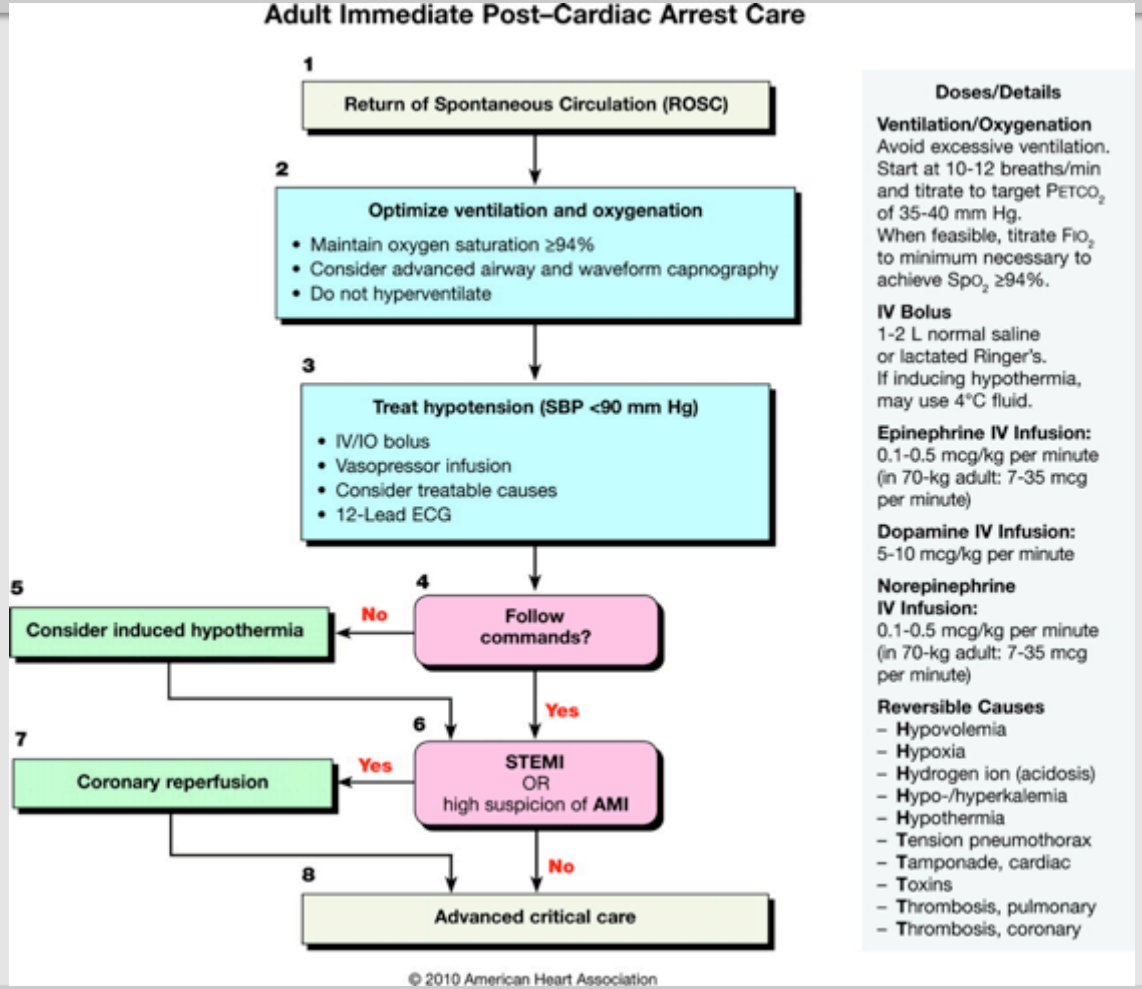
Cardiac Arrest – VF / VT



Cardiac Arrest – PEA / Asystole



Cardiac Arrest - ROSC



Cardiac Arrest – When to stop

When is enough, enough

- Prolonged CPR
- Poor baseline (Cardiogenic shock, CA, Renal failure, Sepsis, Stroke, Advanced age)
- ALS efforts lasting >30min without ROSC at any point unlikely to be sucessful

EXCEPT: Hypothermia, Overdose, Thrombolysis

RCEM Curriculum & Assessment

CMP2 Cardio-Respiratory Arrest

The trainee will have full competence in the assessment and resuscitation of the patient who has suffered a cardio-respiratory arrest, as defined by the UK Resuscitation Council		
Knowledge	**Assessment Methods**	**GMP Domains**
Demonstrate knowledge of the causes of cardiac arrest including special situations, e.g. hypothermia, trauma,overdose Be able to identify and correct reversible causes. Demonstrate knowledge of the outcomes of pre-hospital and in-hospital arrest	E, C, Mi, ACAT	1
Demonstrate familiarity with the ALS and APLS algorithms and pharmacology	E, C, Mi, ACAT	1
Outline indication and safe delivery of drugs used asper ALS and APLS algorithms	E, C, Mi, ACAT	1
Know how to manage the patient post- arrest with ROSC Be able to diagnose and treat peri-arrest arrhythmias and know the indication, contraindications and side effects of the drugs used	E, C, Mi, ACAT	1
Know of tissue and organ donation	E, C, Mi, ACAT	1
Skills		
Rapidly assess the collapsed patient in terms of ABC, airway, breathing and circulation	Mi, D, L	1
Perform basic life support competently as defined by Resuscitation Council (UK): effective chest compressions, airway manoeuvres, bag and mask ventilation	Mi, D, L	1
Competently perform further steps in advanced life support: IV drugs; safe DC shocks when indicated; central line insertion, external pacing, endotracheal drug administration, identification and rectification of reversible causes of cardiac arrest	Mi, D, L	1
Break bad news appropriately (see generic curriculum)	Mi, C, M	3, 4

Behaviour		
Recognise and intervene in critical illness promptly to prevent cardiac arrest (e.g. peri-arrest arrhythmias, hypoxia)	ACAT, AA, C, Mi	1
Maintain safety of environment for patient and health workers	ACAT, C, Mi	2, 4
Hold a valid ALS certificate (MANDATORYREQUIREMENT)	ACAT, AA C, Mi	1
Demonstrate ability to work in a team and succinctly present clinical details of situation to senior doctor	ACAT, C, Mi	3
Demonstrate ability to consult with a senior, seek anaesthetic team support and to act as the patient's advocate when continued Intensive Care Medicine input is needed	ACAT, C, Mi	2, 4
Recognise importance of sensitively breaking bad news to family	ACAT, C, Mi	3, 4

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ACAT	Acute Care Assessment Tool
C	Case Based Discussion (CBD)
D	Direct observation of procedural skills (DOPS)
E	Examination
ESLE	Extended supervised learning event
L	Life support course
Mi or A	Mini-clinical evaluation exercise or anaesthesia clinical evaluation exercise (Mini-CEX or Anaes-CEX)
M	Multi-source feedback (MSF)
PS	Patient Survey
S	Simulation
TO	Teaching Observation
W	Web based, RCEMLearning Hub and KnowledgeBank http://www.rcemlearning.co.uk

QUESTIONS?

References

http://www.rcemlearning.co.uk/references/anaphylaxis/

CEM Guideline – Management of acute allergic reaction

NICE – Anaphylaxis (nice.org.uk/guidance/cg134)

Textbook of Adult Emergency Medicine 3rd Edition - *Cameron et Al.*

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DAS

www.emed.ie

www.rcem.ac.uk

www.irishheart.ie