

Theatre Checklists - Routine & Emergency

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Sources

Australian Resuscitation Council - www.resus.org.au

Difficult Airway Society UK - www.das.uk.com

National Patient Safety Foundation - www.apsf.net.au

Theatre Checklists - Routine & Emergency

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Although not a fan of 'cookbook medicine', there is no doubt that checklists can help eliminate simple errors or oversight in even the most experienced doctor - particularly when task-loaded in an emergency. These checklists & aide memoires have been compiled from a variety of sources to be used in theatre or ED both routinely and in an evolving crisis.



GENERAL PRINCIPLES

RAPID SEQUENCE INTUBATION

OBESE / ASTHMA / DSI

DIFFICULT AIRWAY ALGORITHM

UNEXPLAINED HYPOXIA

ELEVATED or DECREASED ETCO₂

ELEVATED AIRWAY PRESSURES

BRADYCARDIA

TACHYCARDIA

CARDIAC ARREST

MYOCARDIAL ISCHAEMIA

SEVERE HYPO- or HYPERTENSION

MAJOR HAEMORRHAGE

ANAPHYLAXIS

MALIGNANT HYPERTHERMIA

TURP SYNDROME

OBSTETRIC ANAESTHESIA

OBSTETRIC CRISIS

INFUSION PROTOCOLS

DRUG FORMULARY

**KNOW, MODIFY and OPTIMISE
THE ENVIRONMENT**

*establish protocols and procedures
ensure room set up is conducive to crisis - layout, equipment etc
how can things be improved (this includes equipment)*

**ANTICIPATE and
PLAN FOR A CRISIS**

*patient - procedure - equipment - drugs - personnel - retrieval
- global plans
- specific plans*

**ENSURE LEADERSHIP and
ROLE CLARITY**

*assign leader
preferably not responsible for tasks ie: has an overview of the situation
leader decides, prioritises and assigns tasks to team*

**COMMUNICATE
EFFECTIVELY**

*leadership and followership aided by clear communication
eye contact, use names, clear instructions, ensure understanding and report back
close the loop - upstream/downstream communication*

**CALL FOR HELP or
SECOND OPINION EARLY**

*call for help early - even if not in a crisis
second opinion may be reassurance enough or suggest alternatives
avoid therapeutic inertia*

**ALLOCATE ATTENTION and
USE AVAILABLE INFORMATION**

*fixation errors common
beware attentional tunnelling / situational overload
if you are stressed you are likely to be missing something*

**DISTRIBUTE WORKLOAD and
USE AVAILABLE RESOURCES**

*maintain situational awareness
delegate tasks, use external resources (telemedicine/retrieval)
if all else fails, think laterally - improvise/adapt/overcome*

PRINCIPLES OF CRISIS MANAGEMENT

	SCARE	SCAN	CHECK	ALERT/READY	EMERGENCY
C	Colour, Circulation, Capnography	BP, HR, Rhythm, ETCO2 SpO2, Colour	Radial pulse, correlate, SPO2 dislodged?	Allocate roles - IV access Arrest trolley	LARGE BORE IVs, FLUIDS, DEFIB, DRUGS
O	Oxygen Supply & O2 Analyser	FiO2, Rotameter, O2 analyser matches FiO2	Increase FiO2, watch MAC	FiO2 100% Maintain anaesthesia?	HIGH FLOW OXYGEN AVOID AWARENESS
V	Ventilation & Vaporisers	Ventilation - RR, TV Vaporiser & Mix	Check circuit & vaporiser, ventilate by hand	Self-inflating bag, turn off vaporiser (use propofol?)	VENTILATE BY BAG
E	ETT tube & Eliminate Machine	ETT position & security Able to Eliminate (bag)?	Distance in cm? Kinked? Bag and O2 available?	Switch ETT or use LMA Eliminate circuit/machine	ENSURE ETT PLACED OR ALTERNATIVE
R	Review - Monitors & Equipment	Review monitors, update records, review equipment	Review monitors, review equipment - any changes?	Emergency Equipment RETRIEVAL?	DELEGATE OPERATION OF EQUIPMENT
A	Airway (face or laryngeal mask), meticulous attention to ETT	Airway position, patent? Distance in cm	Observe & palpate neck, ETT position, cuff	Aspiration, Laryngospasm Obstruction, ETT/LMA	AIRWAY PATENT & PROTECTED
B	Breathing (SV/IPPV)	Breathing pattern OK?	Observe, palpate & auscultate chest. ETCO2?	Bronchospasm, Oedema, Hypoxia, Hypoventilation	ADDRESS HYPOXIA, HYPOVENTILATION
C	Circulation, IV, Blood loss, ECG	Circulation - trends, fluids and blood loss	Cross check BP, IV, losses & response to Rx/surgery	Hypo/Hypertension Arrhythmia, Arrest Algorithm	CRYSTALLOID, BLOOD VASOPRESSORS, CPR
D	Drugs - consider all given & not given, check emergency drugs	Drugs given & appropriate response?	Check drugs (error?) and patency IV line. Flushed?	Drug error? Antidote? ANAPHYLAXIS?	ATROPINE 10mcg/kg ADRENALINE 10mcg/kg
A	Be Aware of Air and Allergy	Awareness - Patient Asleep, Self OK?	Awareness, Air Embolism, Anaphylaxis, Air in Pleura?	Awareness, Air Embolism, Anaphylaxis, Air in Pleura?	MAINTAIN SITUATIONAL AWARENESS
SWIFT CHECK	Check Patient, Surgeon, Processes & Responses	Progress of Surgeon and of Operation	Question surgeon, review old Notes	Notify Surgeon & Mobilise Staff	DEFINITIVE SURGERY OTHER CRISIS?

COVER ABCD - A Swift Check

BEFORE INDUCTION

Nurse & Anaesthetist

Has patient confirmed identity, site, surgery and consent?

Yes ☐

Is the surgical site marked?

Yes ☐ Not applicable ☐

Is the anaesthetic machine & medication check complete?

Yes ☐

Are pulse oximeter, BP & ECG on the patient, functioning & acceptable?

Yes ☐ Snapshot taken? ☐

Does the patient have a known allergy?

No ☐ Yes ☐

Difficult airway or aspiration risk?

No ☐ Yes & equipment/help available ☐

Risk > 500ml blood loss (7ml/kg children)?

No ☐ Yes & 2 IVs sited, blood available ☐

BEFORE INCISION

Nurse, Surgeon & Anaesthetist

Confirm all team members name & role

Yes ☐

Confirm patient name & nature of surgery

Yes ☐ Not applicable ☐

Confirm antibiotic prophylaxis given

Yes ☐

ANTICIPATED CRITICAL EVENTS

To Surgeon

What are critical or non-routine steps? ☐

How long will case take? ☐

Anticipated blood loss? ☐

To Anaesthetist?

Any patient-specific concerns? ☐

Eyes taped, pressure points protected? ☐

To Nursing Team

Has sterility been confirmed? ☐

Any equipment issues or any concerns? ☐

Is appropriate imaging displayed? ☐

BEFORE LEAVE OT

Nurse, Surgeon & Anaesthetist

Nurse verbally confirms :

Name of the procedure ☐

Equipment, sponge & sharp counts correct ☐

Specimens labelled? ☐

Any equipment issues arising? ☐

To surgeon, anaesthetist & nurse

What are the key concerns for this patient in recovery and ongoing management?

Recovery staff

Patient awake & adequate ventilation? ☐

Drug chart completed? ☐

Antibiotics and analgesia addressed? ☐

DVT thromboprophylaxis? ☐

Responsible Doctor identified & available? ☐

SAFE SURGERY CHECKLIST

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

Prepare Patient

Is position optimal?

- ear to sternum
- ramp if obese
- MILS for trauma

Is preoxygenation adequate?

- apnoeic oxygenation ready with nasal specs high flow?

Can this patient's condition be optimised any further prior to intubation?

- O₂, Haemoglobin
- Cardiac contractility, rate
- Afterload, Preload
- PEEP
- IV access adequate & secure

How will anaesthesia be maintained post induction?

- vaporisers full & checked
- adequate IV medications
- pump sets available

Prepare Equipment

Is patient monitoring applied, functioning and values acceptable?

- SpO₂
- ECG
- BP
- ETCO₂
- BIS required?

Is equipment checked and immediately available?

- self-inflating bag
- appropriate sized Guedel/NPO
- laryngoscope working & spare
- ET tube and alternatives
- Suction
- Bougie

Do you have all the necessary drugs, including vasopressors?

- Amnesic and/or Analgesic
- Induction agent
- Neuromuscular blockade

Prepare Team

Delegate and brief team :

- team leader
- intubator
- assistant
- cricoid pressure / OEML
- MILS
- drug administration
- extra assistance required

ARTICULATE AIRWAY PLAN
Request prompts if difficulty

How do we get further help if required?

- other theatre staff available?
- other doctors available?
- retrieval service notified?

LEMON Assessment

Look - beard, no neck, dentition
Evaluate - thyromental distance
Mallampati score : I - IV
Obstruction or Obesity
Neck Movement - collar/arthritis

Anticipate Problems

If airway is difficult, can we wake this patient?

Yes ☐ No ☐

If intubation is difficult, how to maintain oxygenation?

Plan A - Intubate & Ventilate
Plan B - iLMA/VL/Fibreoptic
Plan C - Oxygenation with BMV
Plan D - CICO, Surgical Airway

Is the necessary equipment immediately available?

Yes ☐ No ☐

Are there any specific problems anticipated?

- awareness, aspiration
- profound desaturation
- hypotension, arrhythmias
- patient positioning/transfer
- other?

RAPID SEQUENCE INTUBATION

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

SET UP

Monitoring - BP, ECG, SpO2, ETCO2	Check <input type="checkbox"/>
Nasal Cannulae at 15l/min PLUS Mask O2	Check <input type="checkbox"/>
Pre-oxygenation for FOUR minutes	Check <input type="checkbox"/>
Suction checked working & available	Check <input type="checkbox"/>
Position optimised - ear-to-sternum	Check <input type="checkbox"/>
Ramping needed?	Check <input type="checkbox"/>
360 degree access to patient & monitors visible	Check <input type="checkbox"/>
Cricothyroid membrane palpated and marked	Check <input type="checkbox"/>

IV & DRUGS

IV Cannula connected to fluid & running	Check <input type="checkbox"/>
NIBP on contralateral arm and BP seen	Check <input type="checkbox"/>
Spare cannula <i>in situ</i>	Check <input type="checkbox"/>
INDUCTION AGENT drawn up, dose checked	Check <input type="checkbox"/>
SUX or ROC drawn up, dose checked	Check <input type="checkbox"/>
VASOPRESSORS drawn up, labelled	Check <input type="checkbox"/>
POST INTUBATION drugs drawn up & labelled	Check <input type="checkbox"/>

INTUBATION EQUIPMENT

BVM connected to oxygen	Check <input type="checkbox"/>
PEEP valve for BMV available	Check <input type="checkbox"/>
Oropharyngeal and 2 Nasopharyngeal Airways available	Check <input type="checkbox"/>
Laryngoscope blade selected, light working	Check <input type="checkbox"/>
ET tube size chosen, cuff tested	Check <input type="checkbox"/>
Alternate tube size chosen & cuff tested	Check <input type="checkbox"/>
20ml Syringe for cuff inflation	Check <input type="checkbox"/>
Stylet straight-to-cuff and/or Bougie with RapiFit connectors	Check <input type="checkbox"/>
Gooseneck, filter, inline ETCO2 (or EasyCap)	Check <input type="checkbox"/>
Tube ties & tape available	Check <input type="checkbox"/>
Ventilator settings determined & set up	Check <input type="checkbox"/>

TEAM BRIEF

Team roles allocated	Check <input type="checkbox"/>
Anticipated difficult airway plan's A/B/C/D discussed	Check <input type="checkbox"/>
Agree prompts if SpO2 < 95% or > 3 intubation attempts	Check <input type="checkbox"/>
Difficult airway kit immediately available & checked	Check <input type="checkbox"/>

Medications	Normotensive Dose	Hypotensive Dose
Ketamine	2 mg/kg	0.5mg/kg
Propofol	1-3 mg/kg	0.25mg/kg <i>or ketamine</i>
Fentanyl	3 mcg/kg	consider if high ICP
Succinylcholine	1.5-2 mg/kg	2 mg/kg
Rocuronium	1.2 mg/kg	1.6 mg/kg

Roc 1.2 mg/kg - will give same intubating conditions as sux at 60s but not reversible & causes prolonged paralysis - consider RISK/BENEFIT

ADRENALINE 'PUSH DOSE'

draw up 9ml N/saline in 10 ml syringe
to this, add 1ml of 1/10,000 (cardiac arrest) adrenaline
shake syringe hard & label as 'ADRENALINE 10mcg/ml'

ADRENALINE INFUSION

6mg 1/1000 vial in 100ml N/saline at 2-20ml/hr - aim MAP 70
(use 3mg in 50ml syringe if using Niki T34L syringe driver)

RAPID SEQUENCE INTUBATION

TRAUMA / CRITICALLY ILL PRE-RSI CHECKLIST

(can do this whilst pre-oxygenating)

SET UP

Monitoring - BP, ECG, SpO2, ETCO2	CHECK	<input type="checkbox"/>
Nasal Cannulae at 15l/min PLUS Mask O2	CHECK	<input type="checkbox"/>
Pre-oxygenation for FOUR minutes	CHECK	<input type="checkbox"/>
Suction checked working & available	CHECK	<input type="checkbox"/>
Position optimised	CHECK	<input type="checkbox"/>
Ramping needed?	CHECK	<input type="checkbox"/>

IV & DRUGS

IV Cannula connected to fluid & running	CHECK	<input type="checkbox"/>
NIBP on contralateral arm and BP seen	CHECK	<input type="checkbox"/>
Spare cannula in situ	CHECK	<input type="checkbox"/>
INDUCTION AGENT drawn up, dose checked	CHECK	<input type="checkbox"/>
SUX or ROC drawn up, dose checked	CHECK	<input type="checkbox"/>
VASOPRESSORS drawn up, labelled	CHECK	<input type="checkbox"/>
POST INTUBATION drugs drawn up & labelled	CHECK	<input type="checkbox"/>

INTUBATION EQUIPMENT

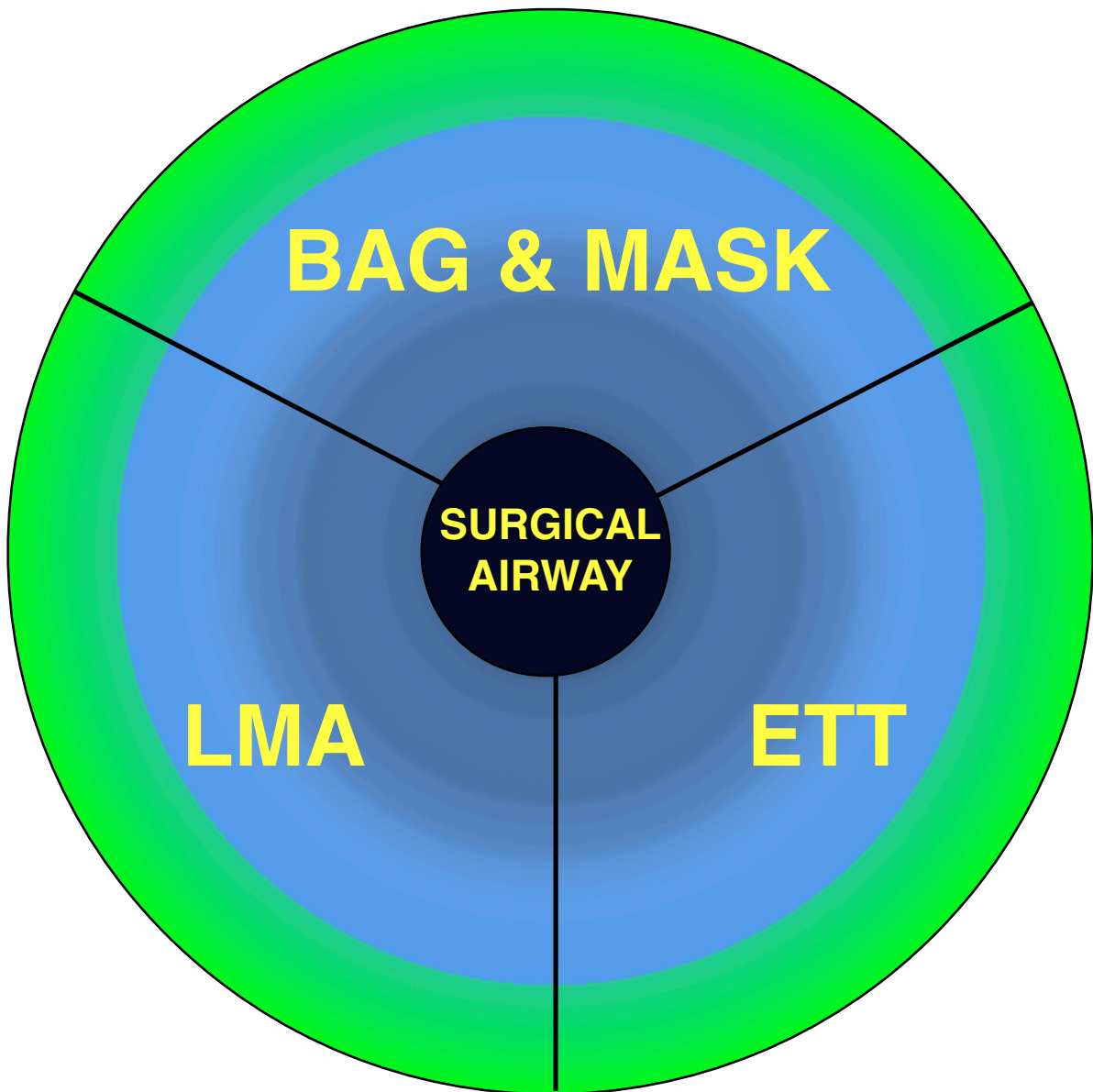
BVM connected to oxygen	CHECK	<input type="checkbox"/>
PEEP valve for BMV available	CHECK	<input type="checkbox"/>
Guedel airways & two NPO airways available	CHECK	<input type="checkbox"/>
Laryngoscope blade chosen, light working	CHECK	<input type="checkbox"/>
ET tube size chosen, cuff tested	CHECK	<input type="checkbox"/>
Alternate tube size chosen & cuff tested	CHECK	<input type="checkbox"/>
Syringe for cuff inflation	CHECK	<input type="checkbox"/>
Stylet & Bougie available	CHECK	<input type="checkbox"/>
Gooseneck, filter, inline ETCO2 (or EasyCap)	CHECK	<input type="checkbox"/>
Tube Tie available	CHECK	<input type="checkbox"/>
Ventilator settings determined	CHECK	<input type="checkbox"/>

TEAM BRIEF

In-line immobilisation person briefed	CHECK	<input type="checkbox"/>
Cricoid pressure person briefed	CHECK	<input type="checkbox"/>
Drug giver briefed	CHECK	<input type="checkbox"/>
Anticipated difficult airway plan's A/B/C/D discussed	CHECK	<input type="checkbox"/>
Post RSI care brief & maintenance of anaesthesia ready	CHECK	<input type="checkbox"/>
Anaesthetic assistant ready	CHECK	<input type="checkbox"/>

DIFFICULT AIRWAY KIT AVAILABLE AND PREPARED TO USE IT?	CHECK	<input type="checkbox"/>
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VORTEX AIRWAY CHECKLIST



USE AS COGNITIVE AID IN AIRWAY PLANNING AND CRISIS MANAGEMENT

Start with whichever of the three non-surgical airway supports (mask, LMA, ETT) is appropriate.

No more than THREE attempts at each airway support technique (mask, LMA, ETT) Check ☐

For each airway support, consider whether changes in the following will help :

<i>Manipulation (head/neck, larynx, device)</i>	Check	<input type="checkbox"/>
<i>Adjuncts (oro/nasopharyngeal airways, stylet/bougie, videolaryngoscope etc)</i>	Check	<input type="checkbox"/>
<i>Size/Type</i>	Check	<input type="checkbox"/>
<i>Suction</i>	Check	<input type="checkbox"/>
<i>Pharyngeal muscle tone</i>	Check	<input type="checkbox"/>

The aim is to ensure alveolar oxygenation and allow the team to rapidly manage an airway crisis. Move from each of the three non-surgical options (BMV-LMA-ETT) attempting to remain in green zone and avoid deterioration into surgical airway as a rescue for 'can't intubate, can't oxygenate'

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

PREOPERATIVE EVALUATION - SLEEP APNOEA & OTHER RISKS?

STOP-BANG > 5

Snore loudly?	Check <input type="checkbox"/>	BMI > 35?	Check <input type="checkbox"/>
Tired during daytime?	Check <input type="checkbox"/>	Age > 50?	Check <input type="checkbox"/>
Observed to stop breathing in sleep?	Check <input type="checkbox"/>	Neck circumference > 40cm?	Check <input type="checkbox"/>
Pressure high (BP)?	Check <input type="checkbox"/>	Gender male?	Check <input type="checkbox"/>

OTHER

poor functional capacity, abnormal ECG, uncontrolled BP/IHD,
SpO₂ < 94% air, previous DVT/PE, poorly controlled COPD or asthma
Diabetes control

OPERATIVE MANAGEMENT

CONSIDER

Antacid prophylaxis?	Check <input type="checkbox"/>
Pre-op analgesia?	Check <input type="checkbox"/>
DVT prophylaxis?	Check <input type="checkbox"/>
Careful glucose control?	Check <input type="checkbox"/>

EQUIPMENT

Bariatric trolley/personnel to lift	Check <input type="checkbox"/>
Gel padding	Check <input type="checkbox"/>
Large BP cuff	Check <input type="checkbox"/>
Ramping of patient (pillows)	Check <input type="checkbox"/>
PEEP for Pre-Ox and BMV	Check <input type="checkbox"/>
Pressure support ventilation	Check <input type="checkbox"/>

RAMPING

Ear-to-sternum
Reduces difficult ETT
Improves ventilation



TECHNIQUE

Self-position on table	Check <input type="checkbox"/>
Pre-oxygenate RAMPED	Check <input type="checkbox"/>
Use PEEP valve on BMV	Check <input type="checkbox"/>
Minimise induction-ventilation time	Check <input type="checkbox"/>
Avoid spontaneous ventilation	Check <input type="checkbox"/>
Desflurane if available or Propofol TCI	Check <input type="checkbox"/>
Short-acting opioids	Check <input type="checkbox"/>
Multimodal analgesia	Check <input type="checkbox"/>
PONV prophylaxis	Check <input type="checkbox"/>
Ensure full reversal of NMB	Check <input type="checkbox"/>
Extubate & recover head up	Check <input type="checkbox"/>
Use IBW (except for sux)	Check <input type="checkbox"/>

IDEAL BODY WEIGHT

Men	Height (cm) - 100
Women	Height (cm) - 105

NB for Propofol Infusion, use Servin's formula
Add 40% of excess weight to IBW
ie : IBW + 0.4(TBW-IBW)

ANAESTHESIA for OBESE BMI > 35 kg/m²

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

B	Buy time	<i>Sit up, use non-rebreather, increase FiO₂, NIV, PEEP (BMV or vent)</i>
I	Indication	<i>Do we really need to intubate? Can it wait? Options : wait for help - videolaryngoscopy - iLMA or <u>Proseal</u> - awake intubation</i>
G	Get help	<i>Extra hands. Talk to retrieval.</i>
R	Ramp	<i>Use pillows, ear to sternum, flat on top - RAMP RAMP RAMP!</i>
A	<u>Apnoeic O₂</u>	<i>Oxygenation via nasal specs at 10-15 l/min during RSI</i>
M	Minimal drugs	<i><u>Nebulise lignocaine</u> & spray the cords! <u>Ketamine/Propofol</u> (100mg each in 20ml syringe)</i>
P	<u>Preoxygenate</u>	<i>With NIV for 3-5 mins max</i>
P	Paralysis	<i>Only if needed. <u>Sux</u> 1mg/kg or Roc 1.2mg/kg</i>
P	Plan for failure	<i>Plan B - Plan C - Plan D (CICV)</i>
P	Post intubation	<i>NGT, IDC, IV lines, central line / arterial line? sedation/paralysis for transfer paperwork for transfer</i>



OBESE INTUBATION

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

STEP ONE

Continuous nebulised salbutamol - use O2 not air for nebs
Nebulised ipratropium - 500mcg x3 20 minutely, then hourly
Hydrocortisone 100mg IV (alternative DXM 20mg IV or IM)
MgSO4 2g (50mg/kg max 2g) IV - given over 20 minutes

if no better, proceed to

STEP TWO

Adrenaline 0.5 mg IM (0.01mg/kg) = 0.5ml of 1:1000
Fluid bolus 20 ml/kg
CXR, ECG, VBG, Electrolytes, FBC

if no better, proceed to NIPPV

STEP THREE AGITATED PATIENT

ketamine 1.5 mg/kg IV over 30 s
then 1 mg/kg/hr titrate to effect

if no IV, 5mg/kg IM

IF WORSENING

NIPPV
iPAP PS 8cm H2O
ePAP PEEP 3 cm H2O

continue nebs through NIPPV

STEP THREE COOPERATIVE PATIENT

NIPPV
iPAP PS 8cm H2O
ePAP PEEP 3 cm H2O

continue nebs through NIPPV

IF WORSENING

ketamine 1.5 mg/kg IV over 30 s
then 1 mg/kg/hr titrate to effect

if no IV, 5mg/kg IM

Consider differential diagnoses

*heart failure, ACS, arrhythmia
pulmonary embolism
PTX, pericardial tamponade,
obstruction, foreign body
anaphylaxis*

AVOID INTUBATION IF POSSIBLE

BUT IF YOU HAVE TO INTUBATE

Indications - fatigue, resp distress, deterioration, arrest

Maximise preoxygenation
Optimise first pass success
Largest ETT possible
Beware breath stacking

Ketamine 2mg/kg IV
Rocuronium 1.2 mg/kg or Sux 2mg/kg IV

Assist control / Volume control
RR 8 TV 5-7 ml/kg IBW
PEEP 2cm H2O IE 1:5 FiO2 100%

permissive hypercarbia
Ext chest compression
Pplat < 30cm H2O
Aggressive suctioning of ETT, check K
NGT

LIFE THREATENING ASTHMA

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

Plan A:
Initial tracheal
intubation plan

Direct laryngoscopy

succeed

Tracheal intubation

failed intubation

Plan B:
Secondary tracheal
intubation plan

ILMA™ or LMA™

succeed

Confirm - then
fibreoptic tracheal
intubation through
ILMA™ or LMA™

failed oxygenation

failed intubation

Plan C:
Maintenance of
oxygenation, ventilation,
postponement of
surgery and awakening

Revert to face mask
Oxygenate & ventilate

succeed

Postpone surgery
Awaken patient

failed oxygenation

Plan D:
Rescue techniques
for "can't intubate,
can't ventilate" situation

LMA™

improved
oxygenation

Awaken patient

increasing hypoxaemia

or

Cannula
cricothyroidotomy

fail

Surgical
cricothyroidotomy



MAXIMUM THREE ATTEMPTS

CHANGE POSITION - BLADE - OPERATOR
USE BOUGIE - CONSIDER STYLET - VL

SECONDARY INTUBATION PLAN

Intubating LMA (iLMA) - FastTrach or AirQ II
KingVision Videolaryngoscope

BAG MASK VENTILATION
USE TWO HANDS

CAN YOU WAKE THE PATIENT ?

RESCUE TECHNIQUES

Declare a CICO Emergency

Continue to use LMA to attempt oxygenation

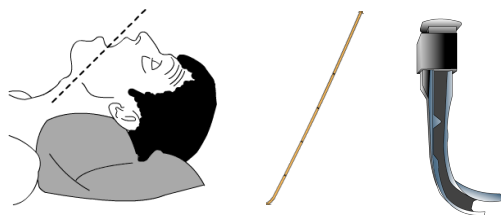
Identify cricothyroid membrane
Needle or Scalpel-Bougie-ETT Technique

Frova (oxygenating bougie) O2 at 2 l/min

DIFFICULT AIRWAY PLAN

PLAN A TRACHEAL INTUBATION PLAN

max 3 attempts RSI
max 4 attempts ELECTIVE

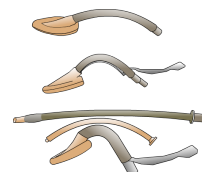


Ramp - Ear to Sternum
Stylet 'straight-to-cuff' - Frova Oxygenating Bougie
Change Blade Size
Consider Miller or McCoy
KingVision VL

Re-Position - Use a Bougie - Videolaryngoscope

PLAN B SECONDARY INTUBATION PLAN

not in RSI
maintain oxygenation & ventilation



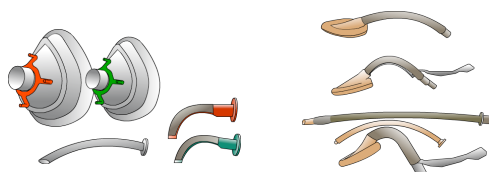
ETT via iLMA blind or fiberoptic

Use LMA - Classic or Supreme

Intubating LMA - FastTrach or Air Q II
Blind intubate thro' iLMA or fiberoptic assist if available
Use Parker tip ETT if available

PLAN C AWAKEN

re-group
postpone surgery



two handed BMV - Adjuncts - LMA

Bag Mask Ventilate
Oropharyngeal &/or Nasopharyngeal Airway
LMA (any)

Suggamadex at 4-8mg/kg if available

PLAN D CICO/CICV

needle or
surgical airway



Consider USS to locate & mark cricothyroid membrane
14 G jelco and O2 connection with 3-way tap
high pressure O2 device
Size 22 scalpel - Bougie - size 6.0 ETT

DIFFICULT AIRWAY - KIT CHECKLIST

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

Oxygen supply

Check :

- Pressure gauges
- Flow meters
- FiO₂
- Vaporizer housing

Anaesthetic machine

Check Ventilator :

- VT
- Rate
- Airway Pressures
- Mode

Anaesthetic circuit

Check Circuit :

- connections
- one-way valves
- filter
- soda lime

Patient Airway

Check Airway :

- Exclude obstruction
- in native airway
- in filter
- in airway devices
- Exclude secretions/plugging - pass suction catheter beyond end of ETT

Ventilation of patient

Ensure adequate ventilation:

- exclude bronchial intubation
- look/listen for bilateral AE
- assess adequacy of MV
- exclude bronchospasm
- recheck airway pressures
- exclude pneumothorax

Patient Lungs

Consider Gas Exchange :

- aspiration
- pulmonary oedema
- consolidation
- atelectasis

Consider Embolism

- of thrombus, air or fat

Patient Circulation

Circulation

- low cardiac output

Anaemia

- reduced O₂ carriage
- high O₂ extraction
- decreased mixed venous PO₂

Patient Tissues

Tissue Uptake of O₂

- Increased metabolism
- fever
- thyroid crisis
- etc

UNEXPLAINED HYPOXIA - SpO₂ < 90% or decrease > 5% during anaesthesia

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

ELEVATED ETCO2

Inhaled / Exogeneous CO2

Check capnograph for return to baseline ?
Laparoscopic CO2 insufflation ?
NaHCO3 administration ?
Inspired CO2 (soda lime exhausted) ?
Incompetent valves or Patient Re-breathing ?

Hypoventilation

Respiratory depression ?
Increased mechanical load on lungs ?
(decreased compliance, increased resistance in system)
Inadequate IPPV - check TV/RR/PEEP ?
Increased dead space - anatomical/physiological ?

Increased Production of CO2

Fever ?
Parenteral nutrition ?
Malignant hyperthermia ?

Malignant Hyperthermia checklist

NB : Apnoea causes rise of PaCO2 8-15mmHg first min, then 3mmHg/min

DECREASED or ABSENT ETCO2

Airway

Exclude inadvertent oesophageal intubation ?

Circuit

Air entrainment (leak) ?
Dilution of gas (sampling problem) ?
Sampling line connected to circuit & monitor ?

Ventilator

Check settings, exclude raised RR ?

Gas Exchange Problem

Profound Hypotension ?
Pulmonary Embolism ?
Cardiac Arrest ?

**Hypotension, Myocardial
Ischaemia checklists**

Decreased Production

Cardiac Arrest checkiist

Hypothermia
Decreased metabolism

ELEVATED or DECREASED / ABSENT END TIDAL CO2

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

Gas supply

Check Gas Supply:

- check O2 bypass
- ensure O2 flush not jammed
- eliminate other high pressure source

Anaesthetic circuit

Check Circuit :

- bag / ventilator switch?
- obstruction to expiration in circuit/ventilator/scavenger system?
- PEEP valve & settings?
- exclude circuit & machine by ventilating with bag

Patient airway

Exclude Obstruction :

- filter
- airway
- ETT
- secretions / foreign body

Patient lungs

Bilateral chest expansion?

Endobronchial intubation, PTX

Breath sounds?

Bronchospasm, atelectasis, aspiration, pulmonary oedema, endobronchial intubation

Patient pleural space

Consider and exclude :

- pneumothorax
- haemothorax

14G needle (2nd ICS MCL)

Finger or tube thoracostomy
(ant axillary line 5th ICS)

Patient chest wall

Exclude inadequate chest wall relaxation

- inadequate muscle relaxation
- opioid-induced rigidity
- malignant hyperthermia
- obesity

Surgical procedure

Raised intrathoracic pressure

- surgical intervention
- insufflation
- patient position
- assistant leaning on chest !

HIGH AIRWAY PRESSURES

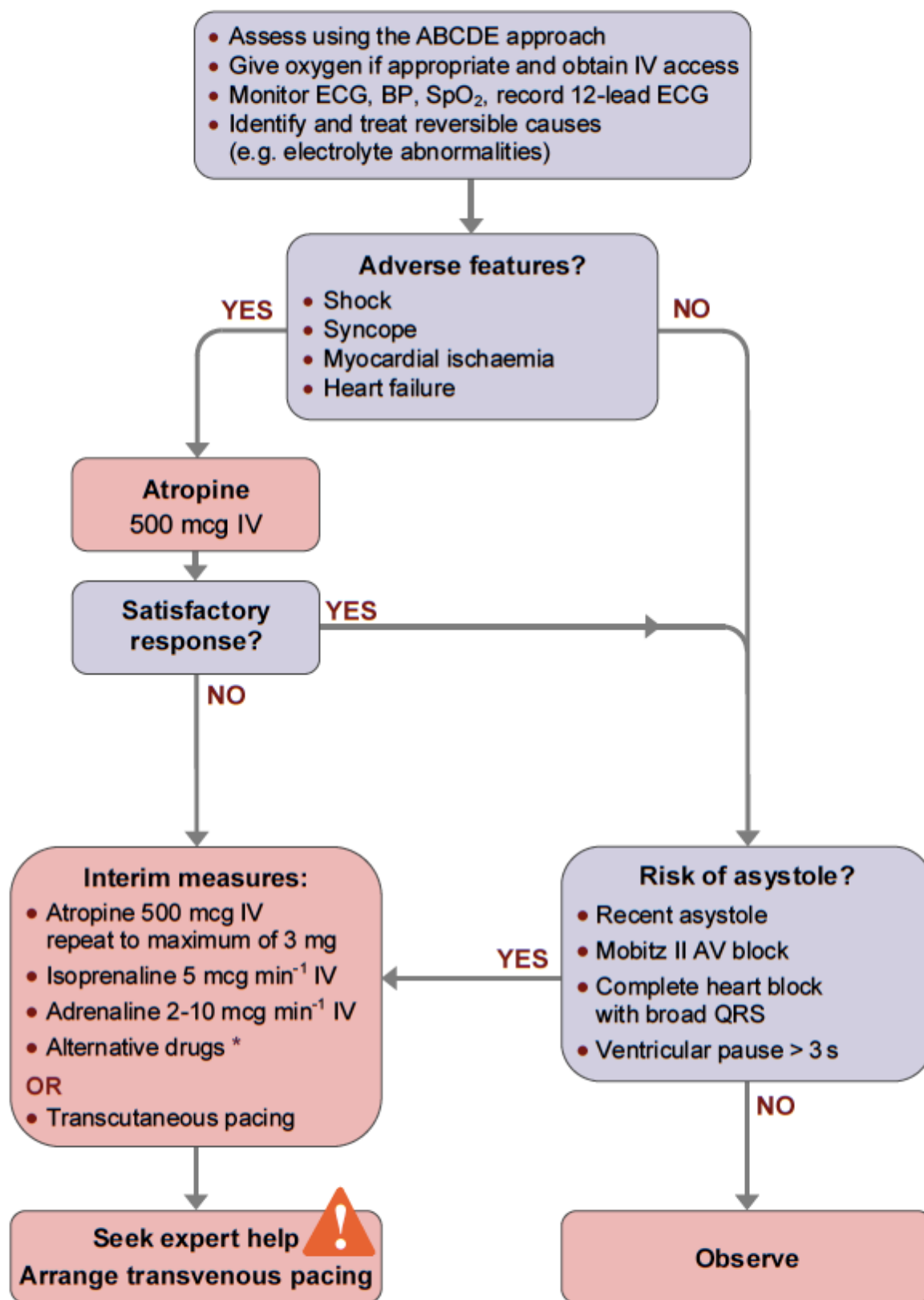
Difficulty ventilating patient
decreased compliance in bag
poor chest expansion
reduced tidal volume
high airway pressure alarm

Hypoxia
(due to hypoventilation)

Circulatory collapse
(high intrathoracic pressure)

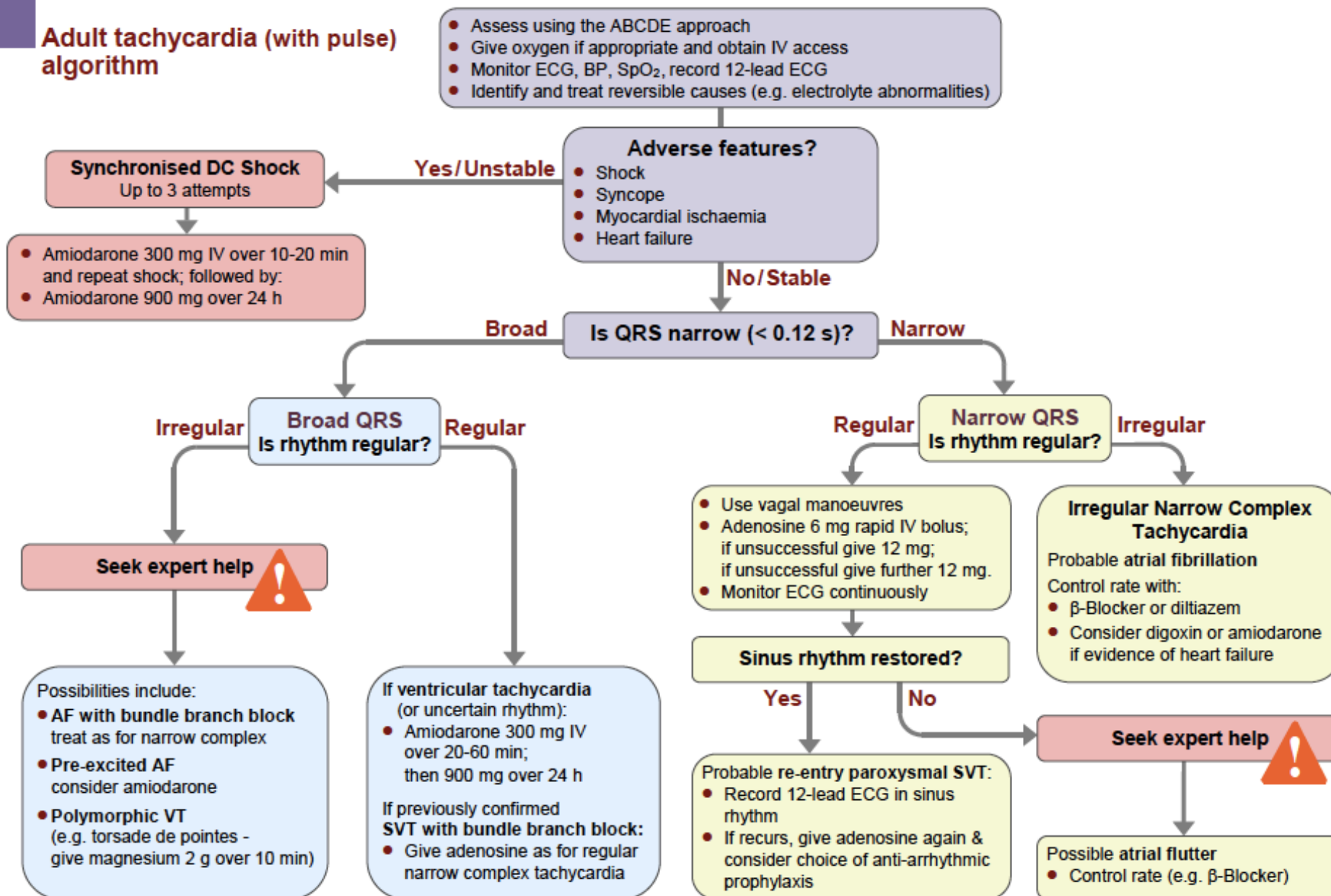
Tachycardia

ELEVATED AIRWAY PRESSURE

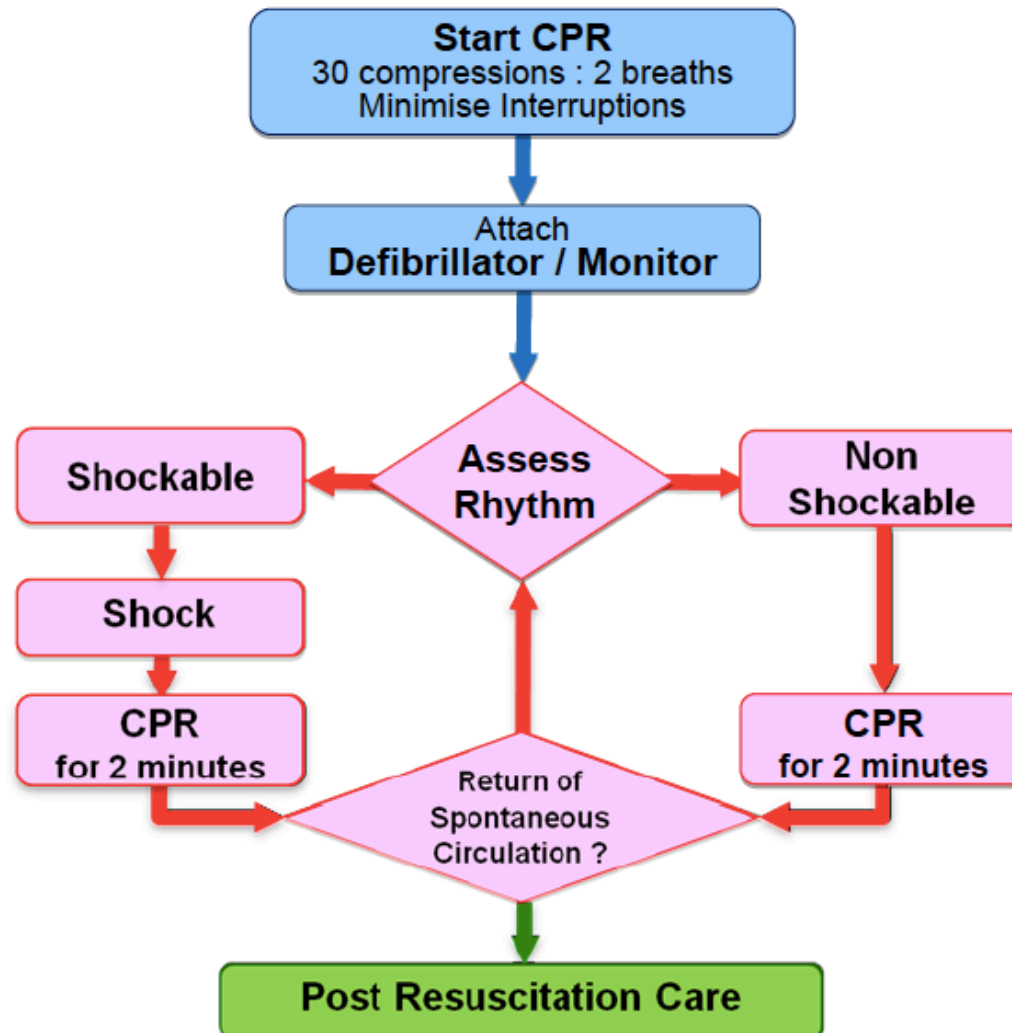
**Adult bradycardia algorithm***** Alternatives include:**

- Aminophylline
- Dopamine
- Glucagon (if beta-blocker or calcium channel blocker overdose)
- Glycopyrrolate can be used instead of atropine

Adult tachycardia (with pulse) algorithm



Advanced Life Support for Adults



During CPR

Airway adjuncts (LMA / ETT)
Oxygen
Waveform capnography
IV / IO access
Plan actions before interrupting compressions
(e.g. charge manual defibrillator)

Drugs

Shockable

- * Adrenaline 1 mg after 2nd shock
(then every 2nd loop)
- * Amiodarone 300 mg after 3rd shock

Non Shockable

- * Adrenaline 1 mg immediately
(then every 2nd loop)

Consider and Correct

Hypoxia
Hypovolaemia
Hyper / hypokalaemia / metabolic disorders
Hypothermia / hyperthermia
Tension pneumothorax
Tamponade
Toxins
Thrombosis (pulmonary / coronary)

Post Resuscitation Care

Re-evaluate ABCDE
12 lead ECG
Treat precipitating causes
Re-evaluate oxygenation and ventilation
Temperature control (cool)

December 2010

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

AT RISK

Ischaemic heart disease
Hypertension
Fluid losses
Diabetes
Smoker, Lipids, FHx etc.

MITIGATION

Perioperative Beta-block
Hb > 10g/dL
Adequate Oxygenation
BP in 3 digits,
HR 2 digits,
BGL 1 digit
Regional Anaesthesia?

SHOULD THIS ANAESTHETIC BE GIVEN HERE?

TAKE A SNAPSHOT BEFORE START

Lead position "white is right;
smoke (black) above fire (red)"
on the L side

OH CRAP !

Oxygen, Haemoglobin
Contractility, Rate, Afterload, Preload

MANAGEMENT

Are SpO2, BP, HR, Hb, PEEP optimised?	Check <input type="checkbox"/>
ECG changes verified with ECG?	Check <input type="checkbox"/>
Surgeon aware of problem?	Check <input type="checkbox"/>
Defibrillator & Pacing available ?	Check <input type="checkbox"/>
RATE CONTROL (box) addressed?	Check <input type="checkbox"/>
BLOOD PRESSURE (box) addressed?	Check <input type="checkbox"/>
CARDIOLOGIST CONSULTED?	Check <input type="checkbox"/>
Specific therapy agreed ASPIRIN, HEPARIN, NITRATES etc	Check <input type="checkbox"/>
Plan for Extubation & Recovery?	Check <input type="checkbox"/>

*Lead II is best for detecting arrhythmias.
CM5 detects 89% of ST-segment ischaemic changes
(right arm electrode on manubrium, left arm electrode on V5
and indifferent lead on left shoulder).*

RATE CONTROL

EXCLUDE hypovolaemia, awareness,
or raised CO2 as cause of tachycardia Check ☐

NEXT

BETA-BLOCKADE (aim for HR < 60) Check ☐

Esmolol - 0.25-0.5 mg.kg bolus
25-300 mg/kg/min infusion

Metoprolol - 1-15 mg titrated over 15 mins

If beta-blockade contra-indicated use verapamil
2.5 mg - repeat if needed

FILLING

Optimise filling, consider need for PEEP Check ☐

CAUTION USE OF VASOPRESSORS Check ☐

For hypertension, consider Check ☐
GTN - sublingual (0.3-0.9 mg)
IVI (0.25 - 4 mg/kg/min - titrate to effect)

Clonidine Check ☐
(30 mg every 5 minutes up to 300 mg)

CARDIOLOGY ADVICE 13STAR

MYOCARDIAL ISCHAEMIA

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

HYPERTENSION

Pre-existing hypertension

treated or untreated ? Check ☐
medication taken ? Check ☐

Sympathetic reflex response

light anaesthesia? Exclude vaporizer leak, IV disconnect Check ☐
Hypoxia or hypercarbia ? Check SpO2, ETCO2 Check ☐
cerebral event? Check ☐
raised ICP ? Check ☐
ischaemia ? Check ☐
vasospasm ? Check ☐

Sympathomimetic effect?

Exogenous ie : administration of vasopressor Check ☐
Endogenous eg: phaeochromocytoma Check ☐

Surgical

stimulus Check ☐
tourniquet Check ☐
position eg: Trendelenburg Check ☐

HYPOTENSION

Hypovolaemia

blood loss ? Check ☐
fluid deficit ? Check ☐

Cardiogenic

contractility, rate, dysthymia ? Check ☐
anaesthetic agent ? Check ☐
vasodilators? Check ☐

Distributive (vasodilation)

drugs ? Check ☐
sympathetic block ? Check ☐
sepsis ? Check ☐
anaphylaxis ? Check ☐

Obstructive

high intra-thoracic pressures ? Check ☐
tamponade ? Bilateral pneumothorax? Check ☐
pulmonary embolus ? Check ☐
aortocaval compression from 18/40 onwards Check ☐

Whilst vasopressors elevate BP, treatment should be directed to cause

BLOOD PRESSURE

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

ACCESS TO THE CIRCULATION

Two wide bore IVs	Check	<input type="checkbox"/>
Consider intraosseous with Bone Injection Gun	Check	<input type="checkbox"/>
Consider venous cutdown	Check	<input type="checkbox"/>
Consider Rapid Infuser Catheter	Check	<input type="checkbox"/>

PARAMETERS

Permissive hypotension MAP 65-70 mmHg may be acceptable (unless TBI/spinal injury/exsanguination)	Check	<input type="checkbox"/>
t > 35, pH > 7.2, Lactate < 4, BE < -6	Check	<input type="checkbox"/>
Ca > 1.1, Plt > 50, INR < 1.5 Fibrinogen > 1	Check	<input type="checkbox"/>

FIND THE BLEEDING, STOP THE BLEEDING

Minimise time to Surgery	Check	<input type="checkbox"/>
Use tourniquets /direct pressure to control peripheral bleeding		
Tamponade bleeding eg: pelvic binder, direct pressure, sutures	Check	<input type="checkbox"/>
Tranexamic acid 1g load in first 4 hrs	Check	<input type="checkbox"/>
If PPH - Uterine massage, oxytocin infusion, ergometrine, misoprostol, TXA	Check	<input type="checkbox"/>
Transfuse blood at a 1:1 ratio of PRCs : FFP	Check	<input type="checkbox"/>
Crystalloid 250 ml bolus titrate to radial pulse	Check	<input type="checkbox"/>
Send FBE, X-Match, Venous Gas, Calcium, Coags	Check	<input type="checkbox"/>
Arterial line, consider Calcium (citrate toxicity)	Check	<input type="checkbox"/>

WARM FLUIDS / WARM THE ROOM / CATHETERISE THE BLADDER	Check	<input type="checkbox"/>
--	-------	--------------------------

**USEFUL MEDICATIONS**

Hartmanns 250ml bolus
Packed cells or Whole Blood
Tranexamic acid 1g load

PPH

Oxytocin 5 U IV or 10 U IM
Oxytocin Infusion 40 U / litre @ 250 ml/hr
Ergometrine 250 mcg IV or 500 mcg IM
Misoprostol 200 mcg x 5 PR (1mg)

see also PPH checklist

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

EXCLUSIONS

Anaesthetic circuit obstruction

- filter
- kinked ETT
- cuff herniation
- tube migration

Disconnect circuit and ventilate directly with self-inflating bag

Check ☐

if pressure still high, problem is in airway or ETT

Foreign body in airway?

Air embolism?

Tension PTX?

Severe bronchospasm?

IMMEDIATE MANAGEMENT CHECKLIST

STOP TRIGGERS

colloids/latex/antibiotic/blood/NMB

Check ☐

MAINTAIN ANAESTHESIA with **INHALATIONAL AGENT** if possible

Check ☐

Call for **HELP**, note **TIME**

Check ☐

Give 100% **OXYGEN**, give **FLUIDS**

Check ☐

Check ☐

ADRENALINE 50-100mcg IV (0.5ml-1ml of 1/10,000)
titrate to response or
0.5mg IM (thigh) if no IV access

Check ☐

ANTIHISTAMINE, HYDROCORTISONE 200mg 6/24

Check ☐

SALBUTAMOL 250 mcg IV or 2.5-5mg nebuliser into circuit

Check ☐

ADRENALINE INFUSION

1:1000 ADRENALINE
vial (1 mg / ml)

Add 3 mg (3 vials 1:1000)
to total 50 mls N Saline (60 mcg/ml)

Run at 2 - 20 ml / hr aim MAP > 70

PRESENTATION

Wide range of possible presentations
Most common include :

*cardiovascular collapse or hypotension (88%)
erythema (48%)
bronchospasm (40%)
angioedema (24%)
cutaneous rash (13%)
urticaria (8%)*

ADRENALINE CONCENTRATIONS

1ml of 1/1000 = 1mg
10ml of 1/10,000 = 1mg

IV BOLUS DOSE
50 - 100 mcg

IM DOSE
0.5mg IM

ANAPHYLAXIS

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

PRESENTATION

masseter spasm
tachypnoea in spontaneous breathing patient
rise in ETCO2 in ventilated patient
unexplained tachycardia, progressing to hypoxaemia
raised temperature
arrhythmias

EXCLUSIONS

Inadequate anaesthesia / analgesia
Infection / Sepsis
Tourniquet Ischaemia
Anaphylaxis (exclude hypotension)
Pheochromocytoma or Thyroid Storm

RISK FACTORS

Family history
Death under anaesthesia in family
Volatiles and Suxamethonium

INVESTIGATIONS

ABG, U&Es, CK, FBC, Clotting
Muscle biopsy

IMMEDIATE MANAGEMENT

DISCONTINUE VOLATILES

Check ☐

and give

100% OXYGEN VIA HIGH FLOW

Check ☐

CALL FOR HELP - MH BOX

Check ☐

ALLOCATE TASK CARDS

Check ☐

MAINTAIN ANAESTHESIA with PROPOFOL and OPIOID

Check ☐

EXPEDITE SURGERY

Check ☐

DANTROLENE 2.5mg/kg IV until hypermetabolism resolved

Check ☐

COOLING - AXILLA / GROIN / NECK

Check ☐

COLD FLUSH NGT and IDC

Check ☐

MOBILISE ALL AVAILABLE STAFF
NOTIFY medSTAR 13STAR
MH EMERGENCY KIT & TASK CARDS

MALIGNANT HYPERTHERMIA

PRESENTATION

Excess absorption of fluid during TURP

EARLY MANIFESTATIONS

CVS

bradycardia, hypertension

GI

nausea & vomiting, abdominal distension

CNS

*anxiety/confusion, headache,
dizziness, slow waking GA*

LATE MANIFESTATIONS

CVS

hypotension, angina, cardiac failure

RESP

dyspnoea, tachypnoea, cyanosis

CNS

twitching, visual changes, seizures, coma

GU

renal tubular acidosis, reduced urine output

EXCLUSIONS

Congestive cardiac failure

All other causes of confusion

RISK FACTORS

Absorption 1-2 litres fluid per 40 mins operating

Large prostate

Prolonged operation > 60 mins

Hypotonic fluids given IV

Volume of irrigation > 30 litres

Inexperienced surgeon

Height of irrigation > 60cm above patient

Comorbidities - liver disease, renal stones, UTI

Immediate Management

High index of suspicion

ABC - 100% Oxygen

Stop irrigation fluid infusion, catheterise

Check **Na** and **Hb** regularly & correct them

Frusemide 40mg IV

TURP SYNDROME

Emergency GA LSCS CHECKLIST

- CITRATE GIVEN? ☐
- LARGE BORE IV ACCESS AND SECURED? ☐
- FLUIDS PRELOADED? ☐
- TABLE IN LEFT LATERAL TILT? ☐
- PREOXYGENATED 100% O2 > 4 MINUTES? ☐
- ETT - STYLET - BOUGIE - TAPE ☐
- SUCTION - ETCO2 - MONITORING ☐
- FAILED RSI PLAN DISCUSSED? ☐
- RSI ☐
- CRICOID ☐
- PROPOFOL 2mg/kg ☐
- SUXAMETHONIUM 1mg/kg ☐
- ETT PLACEMENT CONFIRMED WITH ETCO2 ☐
- VOLATILE ☐
- ONGOING NEUROMUSCULAR BLOCKADE ☐
- OXYTOCIN available post-delivery ☐
- 40 UNITS / 1000ml @ 250ml/hr if needed ☐
- NEONATAL RESUS ANTICIPATED? ☐

Emergency SPINAL LSCS CHECKLIST

- CITRATE GIVEN? ☐
- LARGE BORE IV ACCESS AND SECURED? ☐
- FLUIDS PRELOADED? ☐
- TABLE IN LEFT LATERAL TILT? ☐
- L4-5 INTERSPACE IDENTIFIED? ☐
- PREP - DRAPE - GOWN - GLOVES - MASK - HAT ☐
- ANTISEPTIC REMOVED FROM SPINAL TRAY ☐
- LOCAL ANAESTHETIC 2% XYLOCAINE/ADRENALINE ☐
- 2.5ML BUPIVACAINE 0.5% with OPIATE ☐
- FENTANYL 20-25 mcg or MORPHINE 125 mcg ☐
- SKIN INFILTRATION ☐
- INTERSPINOUS LIGAMENT IDENTIFIED ☐
- CLEAR CSF then INJECT & BARBOTAGE ☐
- OXYTOCIN available post-delivery ☐
- 40 UNITS / 1000ml @ 250ml/hr if needed ☐
- NEONATAL RESUS ANTICIPATED? ☐

CAESAREAN SECTION

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

Prepare patient & partner

IV access 16G, warm IV fluids on pump set
Sodium citrate drink
Left lateral tilt to avoid aorto-caval hypotension

Consider need for extra help for **neonate**

Consider need for **extra blood**

*Position of placenta, Previous LSCS/scarring, Multiparous
Gestational DM, Sepsis, Traumatic delivery, Other*

Prophylactic antibiotics 30 mins before KTS

Documentation

Time called & time arrived
Consent to anaesthesia
Time anaesthesia initiated
GGMG, Prep, Drape, asepsis
Positioning
Time of KTS
Time of delivery
Time of drugs
If conversion to GA offered, document risks,
time and specify if declined

Any complications?

Post-op DVT prophylaxis and analgesia charted
SC heparin withheld for 24 hrs after spinal
Epidural catheter tip sighted & intact

NEURAXIAL SECTION

Spinal 2.5ml 0.5% bupivacaine + 25mcg fentanyl
(or 125mcg spinal morphine)
Top up existing epidural (T10) to T4 for LSCS
supplemental nitrous if needed 50:50 N2O/O2

GA SECTION

*Preoxygenate - 100% oxygen
Anticipate difficult airway and rapid desaturation
Cricoid pressure
RSI : Propofol - Suxamethonium - ET Tube
Once sux wears off use nondepolarising NMB*

Give antibiotics unless contraindication
Oxytocin 3-5 U IV once baby out (check not twins!)
Oxytocin infusion - 40U/1000ml @ 250ml/hr
Postoperative Analgesia & DVT Prophylaxis

NEONATAL RESUS

HR 60-100 assisted ventilation
HR < 60 start CPR 3:1
Adrenaline 10mcg/kg IV (use the 1V, not 2A)

PPH

*Consider Tone - Trauma -
Tissues - Thrombin*

Oxytocin for all - 5 U IV once
uterus empty
Oxytocin infusion 40U @ 10U/hr

Check placenta
Fundal rub to uterus
Ergometrine 250mcg IV
or 500mcg IM

Misoprostol 1000mcg PR

Tranexamic acid 1g load

Check Chem 8, INR

**CONSIDER SURGICAL
OPTIONS?**

Pre-Eclampsia

4g MgSO4 over 15 mins,
then 1g/hr IVI
Labetalol 50mg IV
+/- Hydralazine 5mg IV

LSCS CHECK LIST

EPIDURAL CHECKLIST

- IV ACCESS, SECURED & FLUIDS PRELOADED? ☐
- VALID INDICATION, RECENT VE & CONSENT? ☐
- APPROPRIATE POSITION? ☐
- L4-5 INTERSPACE IDENTIFIED? ☐
- PREP - DRAPE - GOWN - GLOVES (8) - MASK - HAT ☐
- ANTISEPTIC REMOVED FROM EPIDURAL TRAY ☐
- SALINE AVAILABLE if LORTS APPROACH ☐
- EPIDURAL CATHETER PRIMED with LA ☐
- SKIN LA 2% XYLOCAINE with 1/200,000 ADRENALINE ☐
- INTERSPINOUS LIGAMENT IDENTIFIED ☐
- SLOW ADVANCE WITH TUOHY NEEDLE
8cm, 16G/18G slow advance to LORTS(A) in epidural space ☐
- Note CATHETER DEPTH advance CATHETER +5cm ☐
- SECURE, TEST DOSE 3ml LA 2% Xylo 1/200,000 Adr ☐
- BUPIVACAINE 0.125%/100mcg fentanyl (20ml premix) ☐
- TEST ADEQUACY OF BLOCK : LT > COLD, IDC ☐
- TOP UP for LSCS - 2% xylo with 1/200,000 10-20ml ☐

EMERGENCY SPINAL LSCS CHECKLIST

- ANTIBIOTICS & CITRATE GIVEN? ☐
- IV ACCESS, SECURED & FLUIDS PRELOADED? ☐
- CONSIDER EPHEDRINE or PHENYLEPHRINE ☐
- TABLE POSITION, may need L lateral to open interspace ☐
- L4-5 INTERSPACE IDENTIFIED? ☐
- PREP - DRAPE - GOWN - GLOVES - MASK - HAT ☐
- ANTISEPTIC REMOVED FROM SPINAL TRAY ☐
- LOCAL ANAESTHETIC 2% XYLOCAINE/ADRENALINE ☐
- INTERSPINOUS LIGAMENT IDENTIFIED ☐
- CLEAR CSF, SWIFT INJECTION with BARBOTAGE ☐
- 2.5ML BUPIVACAINE 0.5% with FENTANYL 20-25MCG
(or spinal morphine 125mcg) ☐
- TEST ADEQUACY OF BLOCK : LT > COLD ☐
- CALF COMPRESSORS and INDWELLING CATHETER ☐
- OXYTOCIN 3-5 U post-delivery (+/-40U/L @ 250ml/hr) ☐
- POST-OP MULTIMODAL ANALGESIA ☐
- CLEXANE 40mg sc OD > 4 hrs post spinal or catheter out ☐

NEURAXIAL BLOCKADE - Labour EPIDURAL & SPINAL for LSCS

START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

CONSIDER POTENTIAL CAUSES & SUGGEST TO MIDWIFE & OBSTETRICIAN

Abnormalities of uterine contraction	70%
Retained products of conception or invasive placenta	10%
Genital tract trauma	10%
Abnormalities of coagulation	1%
Abnormalities of uterine contraction	70%
Retained products of conception or invasive placenta	10%
Genital tract trauma	10%
Abnormalities of coagulation	1%

Resuscitate A - B - C

Oxygen 15 l/min NRB and IV Access 16G x 2

5 minutely Obs HR/BP/RR/SpO2

Mobilise OBS Dr - ANAES Dr - MW - RN - EN - Consider need for THEATRE TEAM, BLOOD, WARMED FLUIDS, INFUSION PUMPS x 2

INITIAL MEASURES

Basic resus as above, also ensure :

- Fundal pressure / rub up contraction ☐
- Check uterus not inverted ☐
- Check placenta is intact ☐
- Lay flat, reverse Trendelenburg ☐
- Set up EnFlow fluid warmer ☐
- Infuse Hartmann's ☐
- Consider need for BLOOD ☐
- Syntocinon 5U IV / 10U IM ☐
- Ergometrine 250mcg IV / 500mcg IM ☐
- Oxytocin IVI 40u/L @ 250ml/h ☐
- Misoprostol 5 x 200mcg PR ☐

BLEEDING despite CONTRACTED UTERUS?

Look for other causes :

- Move to theatre ☐
- Ensure adequate anaesthesia ☐
- Lithotomy position, IDC ☐
- Adequate light, equipment ☐
- Inspect looking for genital tract trauma ☐
- Exclude uterine rupture ☐
- Suture & repair as necessary ☐
- Consider need for BLOOD ☐
- Consider coagulopathy & sepsis (GBS) ☐
- Check Chem 8, INR, Hb, Lactate ☐
- Warm OT, Bair Hugger, EnFlow warmer ☐
- TRANEXAMIC ACID 1g load over 10' ☐

STILL BLEEDING?

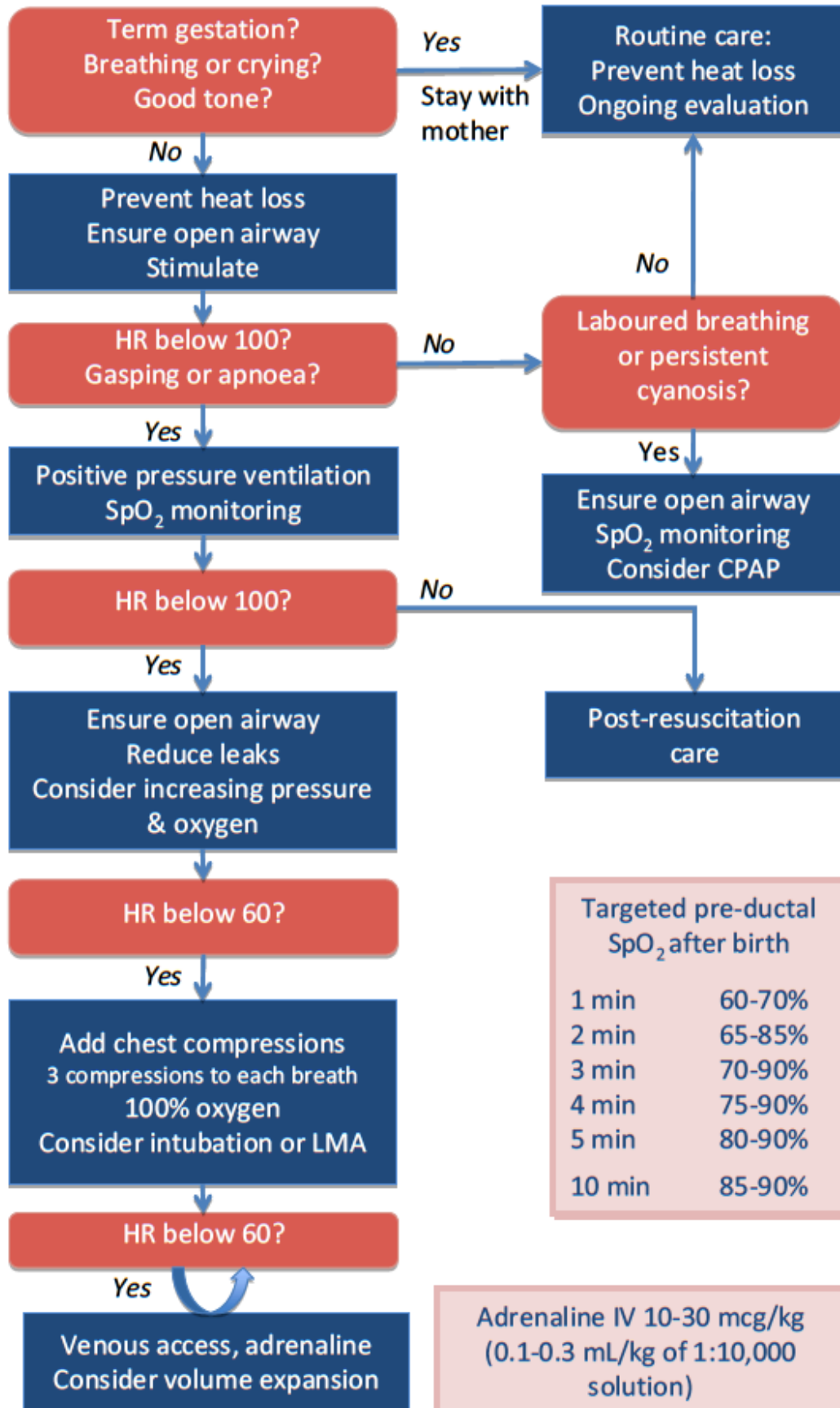
Consider operation & Retrieval

- Bimanual compression ☐
- Expert advice 13STAR ☐
- RSI GA ☐
- Anticipate difficult airway - get DAE kit ☐
- Pass a NGT ☐
- Intramyometrial prostaglandin-F2a 5mg dilute up to 10ml ☐
- 6ml in fundus ☐
- Consider need for BLOOD ☐
- Bakri balloon tamponade ☐
- Explore uterine cavity ☐
- B-lynch suture ☐
- Hysterectomy / ligate int iliacs ☐

POST PARTUM HAEMORRHAGE

Newborn Life Support

At all stages ask: do you need help?



START HERE

Ask 'who will be team leader' & then perform a systematic check of each of following

ADRENALINE

Preparation 1:10,000 = 100 mcg/ml

IV Dose 10 - 30 mcg/kg = 0.1 - 0.3 ml/kg

Via ETT 50 - 100 mcg/kg = 0.5 - 1.0 ml/kg

FLUIDS

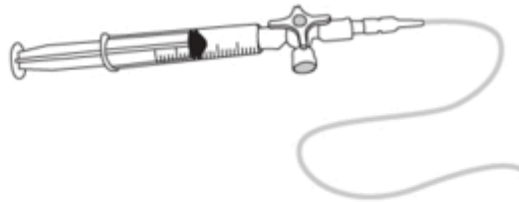
Saline or blood, depending on circumstances

10 - 20 ml/kg via IV or Umbilical Vein Catheter

INTRAOSSEROUS
(quicker than UVC)



SYRINGE & 3-WAY
(to administer fluid bolus / drugs)



Umbilical Vein Catheter
(2 arteries, 1 vein!)



ADENOSINE

first dose 0.05mg/kg
 second dose 0.10mg/kg
 then 0.20mg/kg
GIVE VIA FAST FLUSH

ADRENALINE

IM : < 6 yr 150mcg (0.15ml)
 6-12 yr 300mcg (0.3ml)
 > 12 yr 500mcg (0.5ml)

IV : CAUTION WITH DOSE
 0.01 mg/kg (10mcg/kg)
 1/10,000 - 0.1 ml/kg IV

ETT : 1/1000 - 0.1ml/kg

ADRENALINE INFUSION

0.3mg/kg in 100ml N-saline
 1ml/hr = 0.05mcg/kg/min
 Range 1-20ml/hr

AMIODARONE

5 mg/kg load
 infuse 0.5mg/kg/hr

ATRACURIUM

0.5mg/kg

ATROPINE

20mcg/kg IV (max 600 mcg)
 dilute 0.6 mg to 6 mls
 = 100 mcg/5 mls
 So give 1 ml per 5kg IV

CODEINE

1mg/kg

DEFIBRILLATION

2-4 J/kg – Biphasic

DEXTROSE

0.5 gm/kg
 10% - 5 ml/kg IV
 50% - 1 ml/kg IV

ETT

Length Age/2 + 12cm teeth
 Diameter >1yr - Age/4 + 4 mm

FENTANYL

1 mcg/kg IV (0.5mcg/kg IN)

KETAMINE SEDATION

2-4 mg/kg IM
 0.25 - 0.5 mg/kg IV
 repeat as needed
 INTRANASAL - see over

KETAMINE - ANAES

5-10 mg/kg IM
 1-2 mg/kg IV
 repeat as needed

METARAMINOL

0.01 mg/kg IV
 10mg in 20 mls=0.5 mg/ml

MIDAZOLAM

0.1 - 0.2 mg/kg IV

MORPHINE

0.1 mg/kg IV

NEOSTIGMINE

0.05 mg/kg IV

PARACETAMOL

Load 20mcg/lg first dose
 then 15 mg/kg 6hrly

PROPOFOL

1-3.5 mg/kg IV

REMIFENTANIL

1mg/20ml = 50 mcg per ml
 Run at 10mcg/kg/min

ROCURONIUM

0.6-1.2 mg/kg IV STAT
 0.1 mg/kg boluses

SALBUTAMOL

Undiluted 5mg/5ml
 5mcg/kg over 1 min IV

SUXAMETHONIUM

2 mg/kg IV
 3mg/kg neonate
 4 mg/kg IM

THIOPENTONE

4 mg/kg IV

VECURONIUM

0.1 mg/kg IV

VOLUME EXPANSION

20mls/kg N/saline

WEIGHT (kg)

Infants < 12 months
 (age in months + 9) / 2

Children 1-5 years
 2 x (age in years + 5)

Children 5-12 years
 4 x age in years

EMERGENCY

Adrenaline 10mcg/kg IV
 IM preferred in
 anaphylaxis

Atropine 20mcg/kg

Metaraminol 10mcg/kg

Propofol 2mg/kg

Sux 2mg/kg

Thio 4mg/kg

Fluids 20ml/kg

2-4J/kg Biphasic

PAEDIATRIC EMERGENCY FORMULARY

Adrenaline IM 1/1000
0.01ml/kg to max 0.5ml
IM lateral thigh, repeat 5 minutely

Adrenaline IV 1,10,000
1mg/10ml 1/10,000 IV
10mcg (0.1ml) per kg of 1/10,000

Adrenaline Infusion
1/1,000 = 1mg/ml
3mg in 50ml N saline
0.3mg/kg - 60mcg/ml
2mcg/min = 2ml/hr to
20mcg/min = 20ml/hr

Amiodarone
5mg/kg over 20 min
can push over 2 mins
central access IV

Amiodarone Infusion
600mg in 50mls 5% dextrose
0.5mg/kg/hr central access

Atracurium
0.5 mg/kg (0.3-0.6mg/kg) IV induce,
then 1/3rd dose subsequently

Atropine
600mcg in 6ml NS
10-20mcg/kg kids
300-600mcg adults

Cis-atracurium
0.15mg/kg IV

Dextrose
0.5 gm/kg
10% - 5 ml/kg IV
50% - 1 ml/kg IV

Ephedrine
3-6mg bolus IV

Esmolol
0.5mg/kg
100mg/ml dilute in 10ml = 10mg/ml
100kg=50mg=5ml

ETT Length
Age/2 + 12cm to teeth

ETT Diameter
>1yr - Age/4 + 4

Fentanyl
100mcg/2ml
2-3 mcg/kg IV
0.5-1 mcg/kg intranasal

GTN Infusion
50mg in 50ml 5% dextrose
1mg/ml at 3-12ml/hr

Heparin Infusion
25,000 units in 500ml (50U/ml)
1000U/hr = 20ml/hr

Insulin IVI
50 units in 50ml
5-10 U/hr = 5-10ml/hr

Isoprenaline
1mg in 50ml 5% dextrose
Give 20mcg (1ml)
then infuse at 1-4mcg/min
(3-12 ml/hr)

Ketamine Induction
1-2 mg/kg IV
5-10mg/kg IM

Ketamine Sedation
0.2-0.5 mg/kg IV sedation
2-4mg/kg IM sedation

Ketamine Infusion
0.25mg/kg/hour

Ketamine/Midazolam Infusion
200mg Ketamine : 50mcg fentanyl
in 50ml run @ 2-5ml/hr

Magnesium Sulphate Infusion
4 ampoules (2.47g x 4 = 9.88g) to
100ml N saline = 120ml

Load 4g (50m) over 20 mins
(150ml/hr over 20 mins)
then 1g/hr (12ml/hr)

Metaraminol
0.5mg bolus

Midazolam
0.1-0.2 mg/kg IV

Morphine
0.1 mg/kg IV

Morphine/Midazolam Infusion
50mg each in 50ml NS
1mg/ml (1mg/10ml)
at 10mcg/kg/hr
= 2.5 - 15ml/hr

Naloxone
0.1 to 0.2 mg IV 2-3 minutely to
desired degree of reversal

Neostigmine
0.05mg/kg IV

Paracetamol
20mg/kg first dose
then
15mg/kg PO

Propofol
2mg/kg titrate

Remifentanyl
1mg/20ml = 50 mcg per ml
Run at 0.1mcg/kg/min

Rocuronium
0.6-1.2 mg/kg IV STAT
(get same intubating conditions as
sux if use roc 1.2mg/kg)
0.1 mg/kg boluses thereafter

Salbutamol IV
10mcg/kg IV bolus over 10 mins

Sodium Bicarbonate 8.4%
1-2 ml/kg

Suxamethonium
1 mg/kg adult
2 mg/kg paed

Thiopentone
3-5 mg/kg

Vecuronium
0.1 mg/kg load
bolus every 30m with 5-10mg vec

Vecuronium Infusion
0.1 mg/kg/hr

Volume Expansion
20mls/kg N/saline

FORMULARY

ADRENALINE 1mg/1ml amp	3mg in 50ml N/saline = 60mcg/ml	run at 2 - 20 ml/hr incr. to keep MAP > 70
AMIODARONE 150mg/3ml amp	dilute 600mg (12ml) up to 50ml 5% DEX = 12mg/ml	run at 0.5mg/kg/hr central access
ESMOLOL 100mg/10ml	load 500 mcg/kg over 60secs maintain 50mcg/kg/min	100kg = 5ml (100mg/10ml) 100kg = 30ml/hr
FENTANYL	100 mcg/2ml or 500 mcg/50ml premix	run at 0 - 100 mcg/hr
GTN 50mg/10ml amp	dilute 50mg up to 50ml 5% DEX = 1mg/ml	run at 3 - 12 ml/hr titrate to BP/pain
HEPARIN	25,000 U in 50ml 500 U/ml	load 5000 U IV then 2ml/hr, titrate APTT
INSULIN IVI	50U in 50ml = 1 U/ml	load 10U IV (not kids) then run @ 5-10 ml/hr
ISOPRENALINE	1mg in 50ml 5% DEX = 20mcg/ml	1 ml bolus to response then 3-12 ml/hr
KET/MIDAZ	200mg ketamine /50 mcg fent in 50ml	run at 2-5 ml / hr
MgSO4 (eclampsia)	Add 4 amps (2.47g) to 100ml N/saline = 120 ml total volume (1g/12ml)	bolus 50ml (4g) over 20mins ie : 150ml/hr for 20 mins then 1g/hr (12 ml/hr)
MORPH/MIDAZ	50mg each to 50ml with N/saline (1mg/ml)	run 100 mcg/kg/hr (2.5-15 ml/hr)
PROPOFOL	1-4 mg/kg 500mg/50ml (10mg/ml)	dose range 0.5 mg/kg/hr (use body wt = ml/hr eg 70kg = 70ml/hr)
REMIFENTANIL	1mg in 20ml = 50mcg/ml	run at 0.1 mcg/kg/min (100kg = 12ml/hr)
VECURONIUM	1mg/ml reconstitute in water for injection	0.1 mg/kg/hr eg: 8mg/hr in 80kg patient

INSULIN SLIDING SCALE
50U/50ml = 1U/ml

BGL mmol	RATE U/hr = ml/hr
< 4	0 - STOP IVI
4.1 - 9	2
9.1 - 13	3
13.1 - 17	4
17.1 - 28	6
> 28	8
	check running

(see Sliding Scale above)

INFUSIONS

Ideally use dedicated syringe driver (10 - 50ml capacity) eg Niki T34L

CONSIDER	ANAESTHETIC RISK		
MENTAL HEALTH SAFETY/RISK	LOW thin, fit, fasted	MEDIUM ASA II - III	HIGH old, sick, difficult airway OSA etc
LOW flat, depressed, no Hx violence, low risk suicidal patient "happy" drunk thought disordered but compliant	low risk reassurance mild anxiolytic	restraint monotherapy longer acting agents 1:1 nursing	avoid drugs if possible orientation reassurance 1:1 nursing
MEDIUM intoxicated / disinhibited unpredictable delusional with poor insight anxious +++	sedation needed single agent antipsychotic (+/- benzo)	as above heavier sedation airway adjuncts to hand	airway risk non-pharmacy preferred short acting BDZ tincture of time
HIGH violence /weapons physical threats persecutory delusions around care "big guy" you whom cannot restrain	as above then ketamine sedation or RSI/ETT	as orange but delay until fasted await retrieval?	balance of minimal sedation & own airway vs GA/ETT

Olanzapine - first line oral antipsychotic; wafer 10-20mg oral, rapid onset

Quetiapine - second line oral antipsychotic; mania, behavioural-based agitation or previous use

Haloperidol - 5mg ORAL or 10mg IM to max 50mg; 5-10mg IV up to max 20mg
benztropine 1-2mg IV should be available to treat acute dystonia

Midazolam - IM 5-20mg, IV 0.1-0.2mg/kg in aliquots, IN 0.2mg/kg, ORAL 0.5mg/kg
flumazenil 0.2-0.5mg IV should be available if acute reversal required

Ketamine - PRE-KETAMINE SEDATION ESSENTIAL to MINIMISE DELIRIUM ie : BDZ
IM 5mg/kg, IV 0.5-1.5mg/kg sedation. Ketamine infusion has been used for transport.
Consider antisialogogue adjunct (atropine or glycopyrrolate)

See also : Minh le Cong et al. "Ketamine sedation for patients with acute agitation and psychiatric illness requiring aeromedical retrieval" EMJ May 2011 - ketamine sedation used to avoid RSI/ETT of red/black patients in risk matrix above

MINIMUM SEDATION MONITORING - SpO2, ECG, NIBP. Consider ETCO2 via HM. **SUPPLEMENTAL OXYGEN AT ALL TIMES**
RFDS restraints or net, 45 degree head up to maximise SV and minimise aspiration risk. **CHECK BGL!**

LIAISE WITH RETRIEVAL TEAM

RAPID ASSESSMENT ACUTE AGITATION

AIRWAY?
BREATHING?
CIRCULATION
DISABILITY, DRUGS?
ENVIRONMENT, ECG
FULL BLADDER?
GLUCOSE?
HEAD INJURY?

SUGGESTED ALGORITHM

NO IV ACCESS

oral olanzapine 10-20mg stat
and/or
IMI midazolam 5-10mg
and/or
IMI ketamine 4mg/kg

IV ACCESS OBTAINED

IV midazolam 2-5mg
and/or
IV haloperidol 5-10mg
and/or
IV ketamine 1-1.5mg/kg

repeat every 5-10 mins, target RASS 0 to -3

SAFE PSYCH SEDATION MATRIX

RICHMOND AGITATION SEDATION SCALE

Term	Description	Score
COMBATIVE	overtly combative, violent, immediate danger to self/others	+4
VERY AGITATED	pulls or removes tube(s), catheter(s), aggressive	+3
AGITATED	frequent non-purposeful movement, fights ventilator	+2
RESTLESS	anxious but movements not aggressive or vigorous	+1
ALERT & CALM	Doctor or Nurse	0
DROWSY	Not fully alert, but sustained awakening to voice (eyes open > 10s)	-1
LIGHT SEDATION	briefly awakens with eye contact to voice < 10s	-2
MODERATE SEDATION	movement or eye opening to voice but no eye contact	-3
DEEP SEDATION	no response to voice, but movement or eye opening to physical stimulation	-4
UNROUSABLE	no response to voice or physical stimulation	-5

Procedure

- (i) observe patient - patient is alert, restless, agitated or combative (0 to +4)
- (ii) if not alert, state patient's name and say to open eyes and look at speaker
 - 1 if awakens with sustained eye contact to voice > 10s to voice
 - 2 if awakens with eye contact to voice < 10s
 - 3 if moves or opens eyes to voice but no eye contact
- (iii) if no response to voice, use physical stimulus (shoulder shake, trapezius squeeze, jaw thrust)
 - 4 if any movement to physical stimulation
 - 5 if no response to physical stimulation

TARGET RASS is 0 to -3

**AIRWAY EQUIPMENT and
MONITORING must be available**

1:1 NURSING, 10 minutely obs

LIAISE WITH RETRIEVAL SERVICE

RICHMOND AGITATION SEDATION SCALE

TRANSFER INFORMATION

Sometimes important details can get forgotten. I use the ABC approach to handover to retrieval team, as follows: *“Thank God you’re here! OK, this is John Doe age 21 involved in a motor vehicle accident with prolonged extrication and transferred via ambulance to us. He needs transfer to a trauma centre for a laparotomy for internal bleeding. In terms of summary, here’s his ABC...”*

A - Airway	Intubated on arrival for GCS M3V1E1 - grade I view. Airway now patent, protected with size 8.5 ETT tube 22cm teeth and tied. Cervical collar in situ.
B - Breathing	Paralysed with vecuronium and on volume control TV 600 RR 12 R sided HTX and a 34Fr intercostal catheter in place, drained 400ml blood. SpO2 96%
C - Circulation	Haemodynamically stable after 750ml crystalloid titrated to radial pulse in 250ml aliquots. HR 90 BP 100/70 Bleeding likely from HTX, abdomen and pelvis (binder on)
D - Disability/Drugs	M3V1E1 PEARLA initially, now M1V1E1 on propofol/vecuronium infusion.
E - Exposure	R HTX drained as above. Abdomen tense and tender in LUQ, suspect splenic injury. No other injuries on log roll, pelvic binder applied. Warm blankets and Bair hugger
F - Fluids	3 x 250ml crystalloid aliquots titrated to radial pulse (SBP 70) IDC in situ and drained 300ml clear urine
G - Gut	Last ate 7pm. NG passed and on free drainage.
H - Haematology	Hb 114 on iStat, INR 1.1 No ACoTS.
I - Infusions	Not needed vasopressors On propofol and vecuronium infusions for transport
J - JVP	Not elevated - no signs tPTX/tamponade.
K - Kelvin	Temp is 36 degrees with active warming
L - Lines	14G IV R wrist 8Fr rapid infuser L ACF
M - Micro	Has been given ADT
N - Notes/NOK	His notes are in this envelope, including copies of plain X-rays Next Of Kin (NOK) are aware and here are their contact details.

The above would take 90 seconds and is an ordered summary of the patient for handover.