# APLS 7e manual updates

**The following are changes made following publication of the APLS 7e manual. Some of these may be incorporated in reprints, but a full list is included here for completeness.**

| **Date** | Reprint updates after first publication of 7e |
|---|---|
| n/a | n/a |

| **Chapter** | **Dates of changes noted below** |
|---|---|
| Inside cover | December 2023 |
| Chapter 1 – Introduction and structured approach to paediatric emergencies | |
| Chapter 2 - Getting it right – non-technical factors and communication | November 2023 |
| Chapter 3 – Structured approach to the seriously ill child | November 2023 |
| Chapter 4 – Airway and Breathing | November 2023 |
| Chapter 5 – Circulation | June 2024 |
| Chapter 6 – Decreased conscious level (with or without seizures) | November 2023, August 2024 |
| Chapter 7 – Exposure | November 2023 |
| Chapter 8 – Structured approach to the seriously injured child | February 2024, August 2024 |
| Chapter 9 – The child with chest injury | November 2023 |
| Chapter 10 – The child with abdominal injury | |
| Chapter 11 – The child with traumatic brain injury | |
| Chapter 12 – The child with injuries to extremities or spine | |
| Chapter 13 – The burned or scalded child | |
| Chapter 14 – The child with an electrical injury | |
| Chapter 15 – Special considerations | |
| Chapter 16 – Basic Life Support | November 2023 |
| Chapter 17 – Support of the airway and ventilation | October 2023, November 2023 |
| Chapter 18 – Management of cardiac arrest | November 2023, January 2024, June 2024 |
| Chapter 19 – Practical Procedures: airway and breathing | December 2023 |
| Chapter 20 - Practical Procedures: circulation | August 2023, November 2023, January 2024, April 2024 |
| Chapter 21- Practical Procedures: trauma | |
| Chapter 22 – Imaging in trauma | November 2023, December 2023, January 2024 |
| Chapter 23 – Structured approach to stabilisation and transfer | November 2023 |
| Appendix A – Acid-base balance and blood gas interpretation | |
| Appendix B – Fluid and electrolyte management | May 2024, October 2024 |
| Appendix C – Paediatric major trauma | February 2024, August 2024 |
| Appendix D – Safeguarding | |
| Appendix E – Advance decisions and end of life | |
| Appendix F – General approach to poisoning and envenomation | September 2024 |
| Appendix G – Resuscitation of the baby at birth | |
| Appendix H – Drowning | November 2023, December 2023 |
| Appendix I – Point of care ultrasound | |
| Appendix J - Formulary | November 2023, December 2023, February 2024, March 2024, Sept 2024 |

**Inside front cover**

<table>
<tr><th>Page</th><th>Change</th><th>Date</th></tr>
<tr><td>Inside front cover</td><td>
Aide memoire – click to see full document<br>
Change fluid cap from 250 ml to 500 ml in fluid column.<br>
Replacement of fluid bolus volume from 250ml to 10 ml/kg for ages 9 - 14 yr.<br><br>
<table>
<tr><td>Age</td><td>Guide weight (kg)</td><td>Fluid 10 ml/kg (ml)</td></tr>
<tr><td>8 years</td><td>24</td><td>240</td></tr>
<tr><td>9 years</td><td>28</td><td>280</td></tr>
<tr><td>10 years</td><td>30</td><td>300</td></tr>
<tr><td>11 Years</td><td>35</td><td>350</td></tr>
<tr><td>12 years</td><td>40</td><td>400</td></tr>
<tr><td>14 years</td><td>50</td><td>500</td></tr>
<tr><td>Adult</td><td>70</td><td>500</td></tr>
</table>
<br>
Change ET tube to Cuffed ET tube and change of all sizes for all ages.<br><br>
<table>
<tr><td rowspan="2">Age</td><td>Cuffed ET tube</td></tr>
<tr><td>Int diameter (mm)</td></tr>
<tr><td>Birth</td><td>3.0 (or uncuffed 2.5-3.0)</td></tr>
<tr><td>1 month</td><td>3.0</td></tr>
<tr><td>3 months</td><td>3.0</td></tr>
<tr><td>6 months</td><td>3.5</td></tr>
<tr><td>12 months</td><td>3.5</td></tr>
<tr><td>2 years</td><td>4.0</td></tr>
<tr><td>3 years</td><td>4.0</td></tr>
<tr><td>4 years</td><td>4.5</td></tr>
<tr><td>5 years</td><td>4.5</td></tr>
<tr><td>6 years</td><td>5.0</td></tr>
<tr><td>7 years</td><td>5.0</td></tr>
<tr><td>8 years</td><td>5.5</td></tr>
<tr><td>9 years</td><td>5.5</td></tr>
<tr><td>10 years</td><td>6.0</td></tr>
<tr><td>11 Years</td><td>6.0</td></tr>
<tr><td>12 years</td><td>6.5</td></tr>
<tr><td>14 years</td><td>7.0</td></tr>
<tr><td>Adult</td><td>8.0</td></tr>
</table>
</td><td>December 2023</td></tr>
</table>

**Chapter 2 – Getting it right: non-technical factors and communication**

| Page | Change | Date |
|---|---|---|
| 19 | Addition of Human Factors Clinical Working Group to the end of the section 2.2 – (website www.chfg.org) | November 2023 |
| 22 | Update to text in shaded box<br><br>Team leader (Liz): *'Michael, can you please connect the ECG, and let me know when you've done it'*<br>Michael: *'Okay, you'd like me to connect the ECG now?'*<br>Team leader: *'Correct'*<br><br>The loop is finally closed when Michael confirms that the specific allocated task has been done:<br><br>Michael (later); *'Liz, the ECG is now connected'*<br>Team leader: *'Noted Michael - thanks'* | November 2023 |

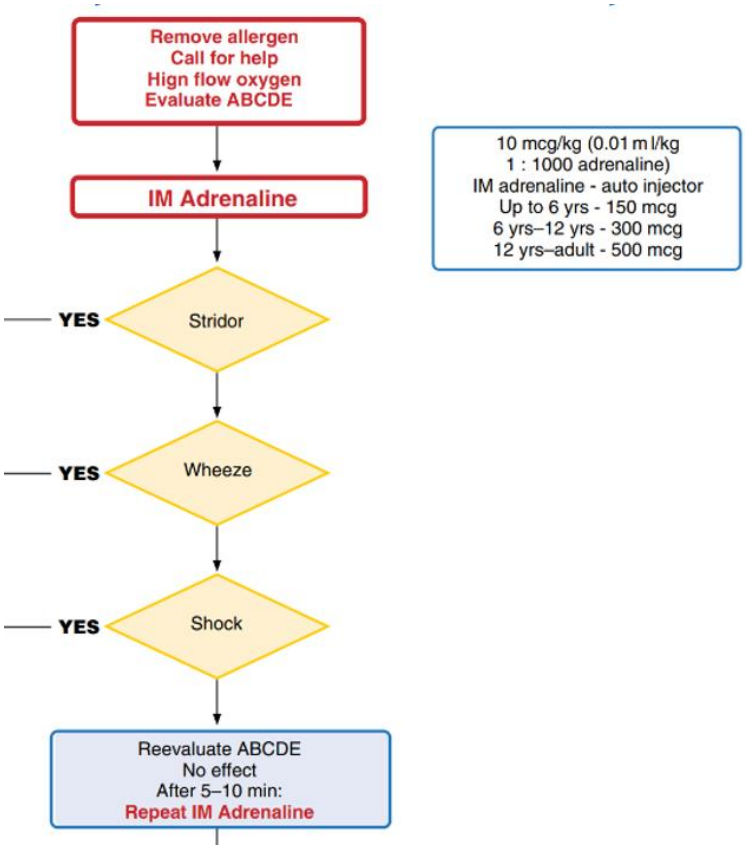
**Chapter 3 – Structured approach to the seriously ill child**

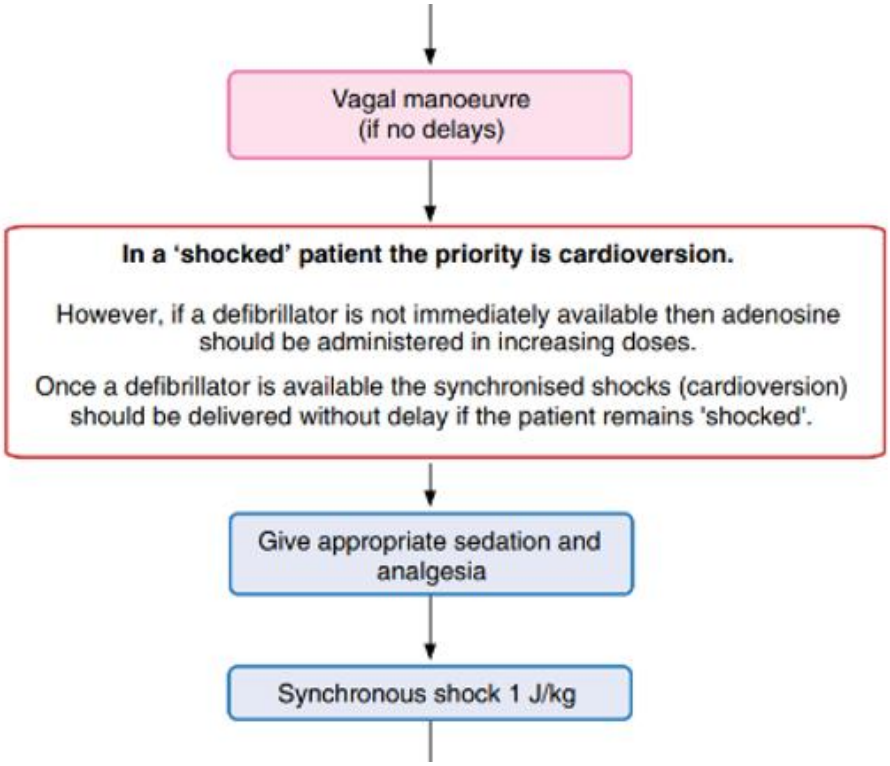
| Page | Change | Date |
|---|---|---|
| 33 | New text to replace text underneath Resuscitation:<br><br>The airway can be made patent by head tilt/jaw thrust or an airway adjunct, but only tracheal intubation or tracheostomy protects/secures the airway. | November 2023 |
| 39 | First heading to change to separate out Airway and Breathing, with the introduction of new Airway text.<br><br>***Airway***<br>• Patent or obstructed<br>• Additional noises | November 2023 |

**Chapter 4 – Airway and Breathing**

| Page | Change | Date |
|---|---|---|
| 51 | Change to must in place of should in red box sentence<br><br>Disturbance of the child, and particularly attempts to lie the child down, examine the throat with a tongue depressor or insertion of an intravenous cannula must only be considered in the presence of appropriate senior support. | November 2023 |

**Chapter 5 – Circulation**

| Page | Change | Date |
|---|---|---|
| 77 | Update to text in shaded blue box at the bottom of page:<br><br>**IM adrenaline 1:1000 dosages**<br>• Up to 6 years: 150 micrograms or 0.15 ml<br>• 6 to 12 years: 300 micrograms or 0.3 ml<br>• Over 12 years: 500 micrograms or 0.5 ml | June 2024 |
| 78 | Change to Emergency treatment of anaphylaxis algorithm – click to see full document<br><br>Change to text in top red box of algorithm to read:<br><br>*Remove allergen, Call for help, High flow oxygen, Evaluate ABCDE*<br><br>Change colour of second text box from blue with blue background to red with white background, moved down to line up with second red box and change of text to read:<br><br>*IM Adrenaline*<br><br>Change of background colour of top right-hand box from blue to white.<br><br>Change to text in middle blue box of algorithm to read:<br><br>Reevaluate ABCDE, No effect, After 5–10 min: Repeat IM Adrenaline<br><br>  <br> | June 2024 |

| | | |
|---|---|---|
| 88 | Change to Management of supraventricular tachycardia algorithm – click to see full document<br><br>Removal of middle arrow and 'YES' text.<br><br>Replacement of yellow diamond text box with red rectangular text box with white background on the shockable arm of Management of supraventricular tachycardia algorithm. Text to read:<br><br>In a 'shocked' patient the priority is cardioversion.<br>However, if a defibrillator is not immediately available then adenosine should be administered in increasing doses.<br>Once a defibrillator is available the synchronised shocks (cardioversion) should be delivered without delay if the patient remains 'shocked'.<br><br>  <br> | June 2024 |
| 89 | Revision of text to the final paragraph in ***Emergency treatment for SVT*** section which should read:<br><br>If the child is ***shocked*** with SVT, then a *synchronous* DC shock of 1 J/kg should be delivered, followed by 2 J/kg up to a maximum of 4 J/kg. Ensure anaesthesia/intensive care are involved for appropriate sedation and support for the DC shock. If there is going to be a delay in delivering a *synchronous* DC shock then give adenosine once vascular access is available, in escalating doses as per algorithm until DC cardioversion is available. Ventricular function may remain impaired even after successful DC cardioversion, so vasoactive support and intubation may be required. All these cases should be discussed with local paediatric critical care services. | June 2024 |

**Chapter 6 – Decreased conscious level (with or without seizures)**

| Page | Change | Date |
|---|---|---|
| 111 | Decreased consciousness: 6th bullet point in section **In all cases** - Replace "Give sodium chloride (3-5 ml/kg of 3% solution)" with:<br>"Give 2.7 – 3% sodium chloride (3ml/kg)"<br><br>Maximum dose of IV Midazolam should be 10 mg not 10 g.<br><br>Correction to second bullet point in Five minutes from seizure onset (max. 10 mg)<br>Correction to second bullet point in Five minutes after first dose of benzodiazepine (max. 10 mg) | August 2024<br><br>November 2023 |

**Chapter 7 – Exposure**

| Page | Change | Date |
|---|---|---|
| 121 | Changing amount and strength of lidocaine in second sentence.<br>"A buffered solution (i.e. 10 ml of 1% lidocaine with 1 ml of 8.4% sodium bicarbonate)". | November 2023 |

**Chapter 8 – Structured approach to the seriously injured child**

| Page | Change | Date |
|---|---|---|
| 139 | Addition of text to third bullet in the fifth row in Paediatric major trauma table to add the word 'pack' so it reads …"consider stopping surgery, pack/splint and transfer to PCCU":<br><br>M \| Metabolic \| • Avoid acidosis<br>• Base excess guides resuscitation<br>• If lactate more than 5 mmol/litre or rising, consider stopping surgery, pack/splint and transfer to PCCU<br>• Monitor blood glucose<br><br>Correction of text to second bullet in the final row in Paediatric major trauma table to change the dose from 0.2 to 0.5ml/kg:<br><br>C \| Calcium gluconate \| • Maintain ionised calcium more than 1.0 mmol/litre<br>• Administer 0.5 ml/kg 10% calcium gluconate over 10 minutes as required<br>• Give calcium routinely after MHP pack one | August 2024<br><br>February 2024 |

**Chapter 9 – The child with a chest injury**

| Page | Change | Date |
|---|---|---|
| 153 | Correction of text to thoracotomy NOT thoracostomy:<br><br>If personnel are not available to carry out an emergency thoracotomy | November 2023 |

**Chapter 16 – Basic Life Support**

| Page | Change | Date |
|---|---|---|
| 212 | Revision of text in airway section, with addition of text in bold:<br><br>"If a child is not breathing, it may be because the airway has been blocked by the tongue falling back and obstructing the pharynx. Correction of the obstruction can result in rapid recovery without further intervention. An initial attempt to open the airway should be made using the head tilt/chin lift manoeuvre. The rescuer places the hand nearest to the child's head on the forehead and applies pressure to tilt the head back gently. The fingers of the other hand should be placed under the chin and the chin should be lifted upwards in an attempt to lift the tongue base away from the posterior pharynx, thus improving airway patency. **Care should be taken not to potentially cause further obstruction of the airway by pushing on the soft tissue below the chin. Ensure that fingers are placed on the bony aspect of the mandible before lifting.** As this action can close the child's mouth, it may be necessary to use the thumb of the same hand to part the lips slightly. An infant's airway is usually optimised by tilting the head into a neutral position, while the older child's airway is better placed with the neck more extended in the 'sniffing' position. These are shown in Figures 16.3 and 16.4" | November 2023 |

**Chapter 17 – Support of the airway and ventilation**

| Page | Change | Date |
|---|---|---|
| 228 | Correction to text of fourth bullet point in the Breathing section<br>• Perform chest decompression if necessary | October 2023 |
| 229 | Changing text of second bullet point and sub-bullet in Airway section<br>• If evidence of obstruction **(e.g. snoring, secretions, stridor)** or altered consciousness:<br>o Perform airway-opening manoeuvres (common)<br>o Consider suction and foreign body removal (common), **especially if no improvement with airway opening manoeuvre** | November 2023 |
| 229 | Correction to text of sub-bullet point in the Breathing section<br><br>If evidence of tension pneumothorax:<br>• perform immediate **thoracostomy** or needle decompression | October 2023 |

**Chapter 18 – Management of cardiac arrest**

| Page | Change | Date |
|---|---|---|
| 248 | Revision of text in the bullet points of final paragraph at the bottom of the page:<br>The only reasons to briefly interrupt CPR include:<br>• To reassess the cardiac rhythm - every 2 minutes<br>• To deliver a direct current (DC) shock - at the 2-minute rhythm check if needed<br>• To perform rapid endotracheal intubation | January 2024 |
| 249 | Revision of text to the second sentence of the second paragraph: 0.1 ml changed to 0.1 ml/kg.<br>Adrenaline should be administered every 4 minutes at a dose of 10 micrograms/kg (0.1 ml/kg of 1:10 000 solution, max. 1 mg/dose). | November 2024 |
| 250 | Change to the text of fifth bullet point in the 'Reversible causes'<br>• **T**ension pneumothorax and cardiac **T**amponade are especially associated with PEA and should be suspected in a cardiac arrest as a result of trauma (see Chapter 9). Cardiac **T**amponade should also be considered in children with percutaneous intravenous central catheters and babies with umbilical venous catheters. | January 2024 |
| 254 | Revision of text in Shock resistant VF/pVT section, with addition of text in bold:<br><br>**Shock resistant VF/pVT**<br>If there is still resistance to defibrillation, different paddle positions or another defibrillator may be tried. In the infant in whom paediatric **pads/**paddles have been used, larger **pads/**paddles applied to the front and back of the chest may be an alternative. **Shocks escalating up to 8 J/kg may be used on expert advice.** | June 2024 |
| 254 | Revision of text to the first sentence in the 4th paragraph of the Antiarrhythmic drugs section: DC cardioversion changed to Defibrillation.<br><br>Defibrillation, not the action of antiarrhythmic drugs, converts the heart back to a perfusing rhythm. | November 2024 |
| 255 | Text in Capnography section rewritten:<br><br>**Capnography**<br>Monitoring of end-tidal $CO_2$ ($ETCO_2$) during cardiac arrest has several benefits. Absence is likely to indicate oesophageal intubation, whereas presence is likely to indicate tracheal placement. Even in the presence of a waveform, care must be taken to establish that bronchial intubation or supraglottic placement has not occurred. This is through careful calculation of appropriate tube depth and auscultation of the chest. Whilst CPR is ongoing, chest x-ray is not a suitable method for confirming position.<br>$ETCO_2$ is also a marker for pulmonary perfusion and so cardiac output. Presence of $ETCO_2$ relies on adequate CPR taking place. A low value, of less than 2kPa (15mmHg), should prompt attention to chest compression adequacy. Administration of adrenaline may cause a transient decrease in levels and sodium bicarbonate a transient increase. If a sharp rise in $ETCO_2$ is seen, it may indicate a return of spontaneous circulation. A threshold $ETCO_2$ should not be used as an indicator for stopping resuscitation. | November 2023 |

**Chapter 19: Practical Procedures: airway and breathing**

| Page | Change | Date |
|---|---|---|
| 265 | Figure 19.5 (a) and (b) replaced.<br>(a)  (b)  | December 2023 |
| 268 | Revision to text in rapid sequence induction:<br>Addition of "*and controlled RSI procedure outlined below is recommended*" so that the paragraph now reads:<br>Hypoxia is a greater threat to children than aspiration during the induction of anaesthesia, and for this reason classic RSI should be avoided and controlled RSI procedure outlined below is recommended. Ventilation should be maintained after induction and cricoid pressure omitted, although the intubator may use external laryngeal manipulation during laryngoscopy to improve the view of the vocal cords. | January 2025 |

**Chapter 20: Practical Procedures: circulation**

| Page | Change | Date |
|---|---|---|
| 281 | Revision to text in Humeral access procedure:<br>Step 7 changed to read:<br>7. Hold the drill and needle at 45° to the bone surface and push through the skin without drilling, until the bone is felt. **The 5mm mark must be visible above the skin for confirmation of an adequate needle set length** (Figure 20.6). If not use a longer needle.<br>Addition of Step 8:<br>8. Follow steps 5-11 of the procedure using a powered device as in the tibial access section. | April 2024 |
| 282 | Revision to text in Intraosseous fluid infusion procedure:<br><br>Paragraph now reads " It should be noted that rapid infusion of fluid may be painful for the conscious patient and if this proves to be the case lignocaine (see formulary) may be infused slowly prior to medication/fluid administration to combat this." | January 2024 |
| 287 | Figure 20.14 (a) updated - lymph node now labelled. | November 2023 |

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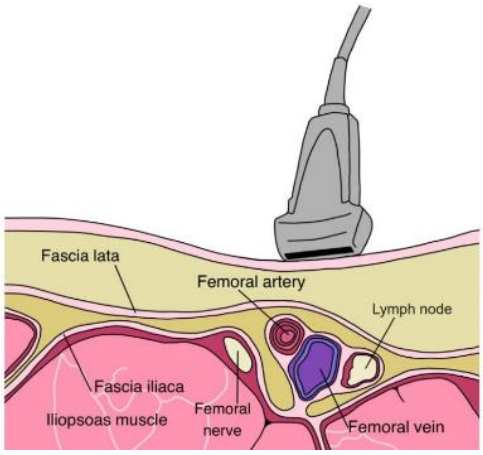
|---|---|---|
| |  | |
| 287 | Revision to text in step 3 of the Femoral vein procedure with ultrasound guidance.<br><br>"3. Wash hands before donning a sterile gown and gloves. Clean the skin at the appropriate site with a sterile wipe. Apply sterile drapes (if available)." | November 2023 |
| 288 | Revision to text in step 3 of the Femoral vein procedure without ultrasound guidance.<br><br>"3. Wash hands before donning a sterile gown and gloves. Clean the skin at the appropriate site with a sterile wipe. Apply sterile drapes (if available)." | November 2023 |
| 289 | Revision to text in step 4 of the Internal jugular vein procedure with ultrasound guidance.<br><br>"4. Wash hands before donning a sterile gown and gloves. Clean the skin at the appropriate side of the neck with a sterile wipe. Apply sterile drapes (if available)." | November 2023 |
| 290 | Text edits as follows:<br><br>Remove "without ultrasound" from the title of the section.<br><br>Changes to the list as noted:<br><br>1. If the child is responsive to pain, provide pain relief.<br>2. Place the child in a 15-30$^{o}$ head-down position<br>3. Turn the head away from the site that is to be cannulated and restrain the child as necessary.<br>4. Put a small roll under the shoulder and pull down the arm towards the knee on the ipsilateral side i.e. the side where you are attempting insertion.<br>5. Wash hands before donning a sterile gown and gloves. Clean the skin over the upper side of the chest and neck with a sterile wipe. Apply sterile drapes (if available).<br>6. Identify the puncture site. This is 1cm lateral to the midpoint of the clavicle.<br>7. Attach the needle to the syringe and puncture the skin at the appropriate place.<br>8. Under supraclavicular ultrasound guidance (where available) direct the needle medially towards the clavicle, and "stepping down" off the bone, pass the needle under the clavicle. | November 2023 |

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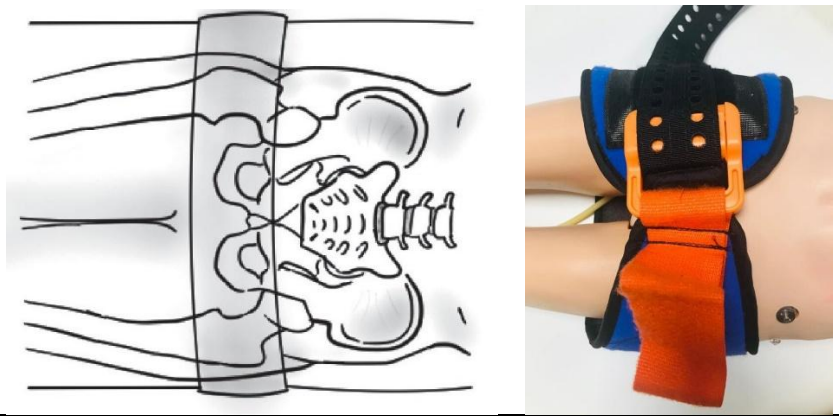
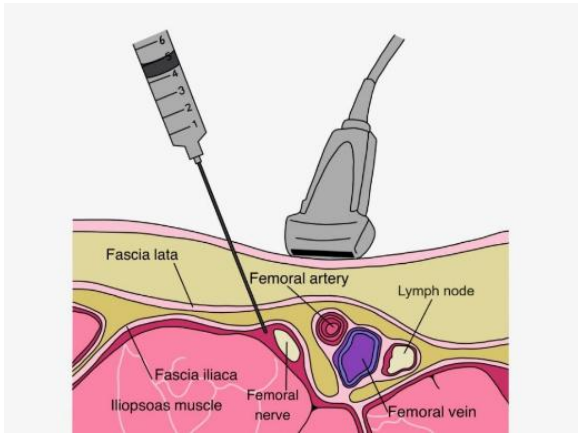
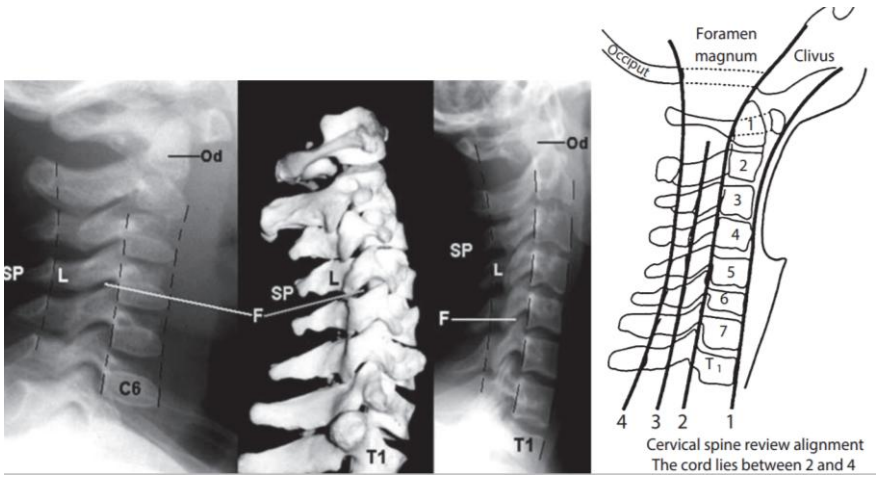
|---|---|---|
| | 9. Under continued ultrasound guidance (if available) direct the needle toward the suprasternal notch/contralateral shoulder and advance as superficially as possible, pulling back on the plunger of the syringe at the same time.<br><br>Renumber remaining points from (and including) previous point 9, starting renumbering at 10. | |
| 291 | Radial artery cannulation text - edit to fourth bullet under Cannula:<br>Adolescent to adult: 20 gauge | November 2023 |
| 294 | Edits to the procedure:<br><br>**Procedure: hands-free defibrillation**<br>Basic life support should be interrupted for the shortest possible time (steps 8–11).<br>**1.** Apply adhesive monitoring electrodes to the correct positions whilst compressions continue.<br>**2.** Turn on the defibrillator<br>**3.** Briefly stop compressions to assess the rhythm.<br>If VF/pulseless VT: Move to step 4 to prepare to deliver a shock.<br>If PEA/Asystole, then jump to 11.<br>**4.** Select the correct energy level required whilst compressions continue.<br>**5.** Shout "CHARGING, oxygen away, continue compressions".<br>**6.** Press the charge button whilst compressions continue.<br>**7.** Wait until the defibrillator is charged.<br>**8.** Shout "Stop compressions, everybody stand clear, (visual glance of monitor to check still shockable) SHOCKING".<br>(If PEA/Asystole do not shock, but disarm/dump the charge and jump to 11)<br>**9.** Check all personnel are clear and that the oxygen has been removed.<br>**10.** Deliver the shock *whilst observing the patient*.<br>**11.** Recommence CPR. | August 2023 |

**Chapter 22 – Imaging in Trauma**

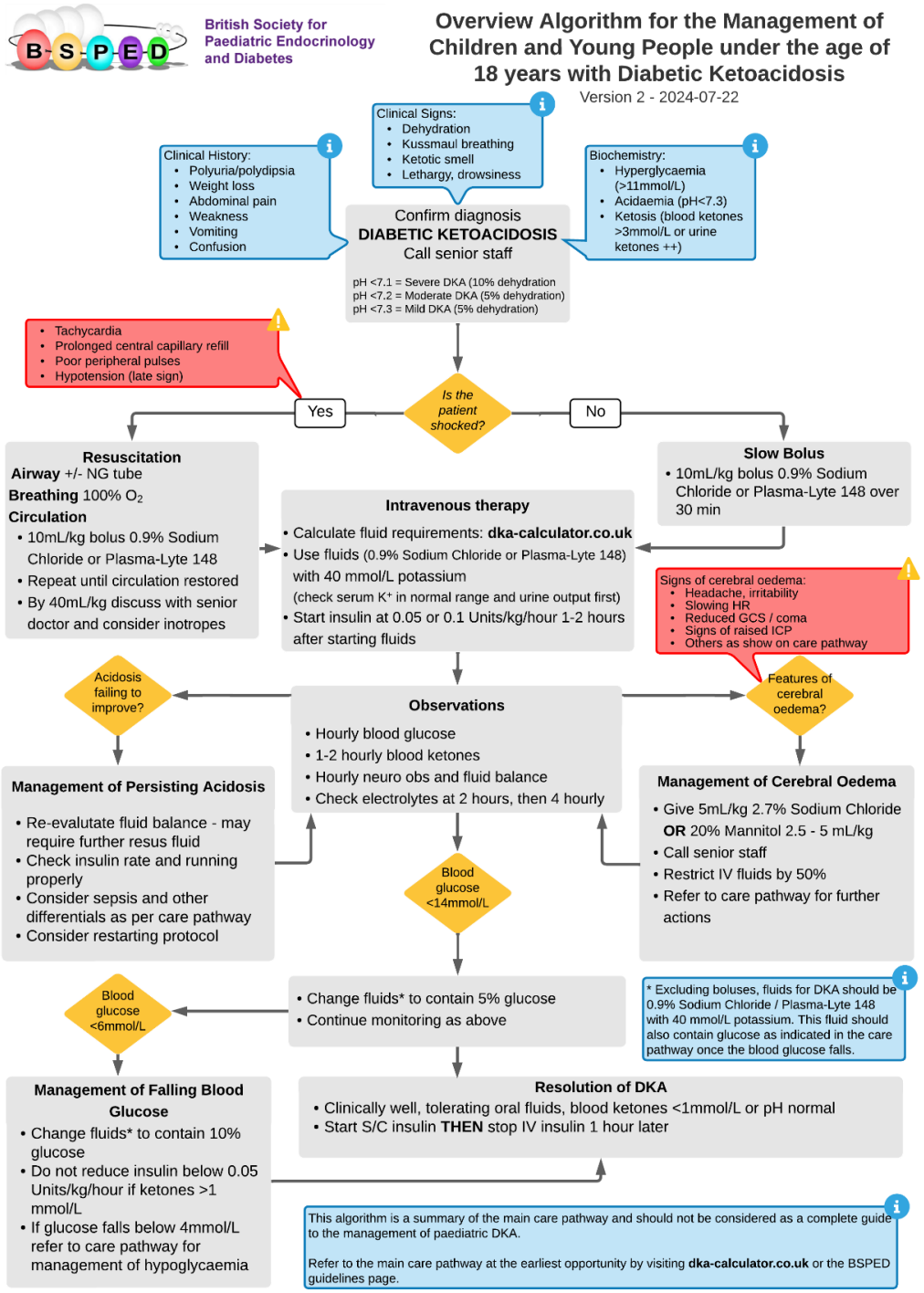
| Page | Change | Date |
|---|---|---|
| 297 | Replacement image Figure 21.2 Pelvic binder<br><br>  | December 2023 |

| | | |
|---|---|---|
| 299 | Replacement of images, new Figure 21.4 20° tilt (four-person technique)<br>  | January 2024 |
| 305 | Figure 21.11 updated - lymph node now labelled.<br>  | November 2023 |
| 315 | Under abdominal imaging header, the last sentence in first paragraph change to:<br><br>However, a formal USS of the abdomen performed by a radiologist may be helpful. | November 2023 |
| 319 | Figure 22.6 line drawing updated to invert it to correlate with the X-rays.<br>  | December 2023 |

## Chapter 23 – Structured approach to stabilisation and transfer

| Page | Change | Date |
|---|---|---|
| 324 | Change to text in Airway and Breathing section, first bullet point, opening sentence:<br><br>The endotracheal tube (ETT) should have a small leak until the cuff is inflated. | November 2023 |

## Appendix B – Fluid and electrolyte management

| Page | Change | Date |
|---|---|---|
| 367 | Update to algorithm from BSPED<br><br>  <br> | October 2024 |

| | | |
|---|---|---|
| 369 | Change to text in Management of diabetic ketoacidosis section. Point 6 changed to read:<br><br>6. Avoid hypokalaemia; all maintenance and replacement fluids (but not the initial fluid boluses to treat shock) should contain 40mmol/l KCl, as long as the serum potassium is less than 5.5 mmol/l and there is a history of patient passing urine. | May 2024 |

**Appendix C – Paediatric Major Trauma**

| Page | Change | Date |
|---|---|---|
| 372 | Row 6, column 3 of table, F-Fluids:<br>Change text (5 ml/kg blood) to (10 ml/kg blood)<br><br>Row 11, column 1 of table, Saline:<br>Change text (Saline 3%) to (Saline 2.7% - 3%)<br><br>Row 11, column 2 of table:<br>Delete line (NUH: 2.7% sodium chloride)<br><br>Row 12, column 2 of table, Calcium gluconate:<br>Change text (0.2 ml/kg) to (0.5 ml/kg) | February 2024 |
| 372 | Row 11, column 1<br>Replace text “Saline 3% Hypertonic saline” with “Hypertonic sodium chloride (2.7% - 3%)”<br>Delete “over 40kg: 250 ml bolus”<br><br>Row 12, column 1 of table,<br>Add (10%) so it reads Calcium gluconate (10%):<br>Change text (0.2 ml/kg) to (0.5 ml/kg) | August 2024 |
| 373 | Blood - Row 3, column 1 – change text 5 ml/kg to 10 ml/kg. Values in the following columns all changed from 5 ml/kg to 10 ml/kg up to 250 ml – see table below.<br><br>Calcium gluconate – Row 6, column 1 – change text 0.2 ml/kg to 0.5ml/kg. Values in the following columns all changed from 0.2 ml/kg to 0.5 ml/kg up to 10 ml – see table below.<br><br>Paracetamol – Row 9, column 1 – added text <10kg:10mg/kg. Values in columns 2 – 5 changed from 15 mg/kg to 10 mg/kg – see table below. | February 2024 |
| 373 | Edit to title to add a line below the title - ‘(16 years and above use adult doses)’<br><br>Addition of a new column for 13yr with appropriate values – 45, 450 ml, 1g, 135 ml, 10 ml, 2-10 mg, 50-100 mcg, 675 mg. (see table below).<br><br>Edit to column 20 row 2 to replace ‘Adult’ with ‘15 yr’<br><br>Edit to column 20 row 3 to replace ‘70’ with ‘55’<br><br>Edit to first column of the fourth row – replace “(FFP)” with “products” so it reads “Blood products 10ml/kg”<br>Edit fourth row to change values in 14th – 20th columns from ‘250 ml’ to ‘280 ml, 300 ml, 350 ml, 400 ml, 450 ml, 500 ml, 500ml’. | August 2024 |

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|---|---|---|
| | Edit to first column of the sixth row:<br>Replace text “Hypertonic Saline (2.7-3%) with “Hypertonic sodium chloride (2.7% - 3%)”, Delete “>40kg: 250 ml”<br><br>Edit sixth row to change values in 17th – 20th columns from ‘250 ml’ to ‘120 ml, 135 ml, 150 ml, 175 ml’.<br><br>Edit to first column of the seventh row to add (10%) to read Calcium gluconate (10%)<br><br>Edit to 17th column of tenth row to replace ‘800 mg’ with ‘600 mg’<br><br>**Paediatric major trauma and analgesia calculations**<br>(16 years and above use adult doses)<br><br>Please note: All doses can be given via INTRAVENOUS (IV) or INTRAOSSEOUS (IO) route<br><br>| |

| Age | Birth | 1/12 | 3/12 | 6/12 | 1 yr | 2 yr | 3 yr | 4 yr | 5 yr | 6 yr | 7 yr | 8 yr | 9 yr | 10 yr | 11 yr | 12 yr | 13 yr | 14 yr | 15 yr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weight (kg) | 3.5 | 4 | 5 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 23 | 24 | 28 | 30 | 35 | 40 | 45 | 50 | 55 |
| Blood products 10 ml/kg | 35 ml | 40 ml | 50 ml | 80 ml | 100 ml | 120 ml | 140 ml | 160 ml | 180 ml | 200 ml | 230 ml | 240 ml | 280 ml | 300 ml | 350 ml | 400 ml | 450 ml | 500 ml | 500 ml |
| Tranexamic Acid (TXA 15 mg/kg) | 52.5 mg | 60 mg | 75 mg | 120 mg | 150 mg | 180 mg | 210 mg | 240 mg | 270 mg | 300 mg | 345 mg | 360 mg | 420 mg | 450 mg | 525 mg | 1 g | 1 g | 1 g | 1 g |
| Hypertonic sodium chloride (2.7–3%) 3 ml/kg over 10-20 mins | 10.5 ml | 12 ml | 15 ml | 24 ml | 30 ml | 36 ml | 42 ml | 48 ml | 54 ml | 60 ml | 69 ml | 72 ml | 84 ml | 90 ml | 105 ml | 120 ml | 135 ml | 150 ml | 175 ml |
| Calcium Gluconate (10%) 0.5 ml/kg over 10-20 mins >20kg: 10 ml | 1.75 ml | 2.0 ml | 2.5 ml | 4.0 ml | 5.0 ml | 6.0 ml | 7.0 ml | 8.0 ml | 9.0 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml |
| Morphine 50–100 mcg/kg >40 kg: 2–10 mg | 0.175–0.35 mg | 0.2–0.4 mg | 0.25–0.5 mg | 0.32–0.8 mg | 0.5–1 mg | 0.6–1.2 mg | 0.7–1.4 mg | 0.8–1.6 mg | 0.9–1.8 mg | 1–2 mg | 1.15–2.3 mg | 1.2–2.4 mg | 1.4–2.8 mg | 1.5–3 mg | 1.75–3.5 mg | 2–4 mg | 2–10 mg | 2–10 mg | 2–10 mg |
| Fentanyl 0.5–1 mcg/kg >40 kg: 50–100 micrograms | 1.75–3.5 mcg | 2–4 mcg | 2.5–5 mcg | 3.2–8 mcg | 5–10 mcg | 6–12 mcg | 7–14 mcg | 8–16 mcg | 9–18 mcg | 10–20 mcg | 11.5–23 mcg | 13–26 mcg | 14–28 mcg | 15–30 mcg | 17.5–35 mcg | 20–40 mcg | 50-100 mcg | 50–100 mcg | 50–100 mcg |
| Paracetamol 15 mg/kg IV infusion <10kg:10mg/kg >50 kg: 1 g | 35 mg | 40 mg | 50 mg | 80 mg | 150 mg | 180 mg | 210 mg | 240 mg | 270 mg | 300 mg | 345 mg | 360 mg | 420 mg | 450 mg | 525 mg | 600 mg | 675 mg | 1 g | 1 g |

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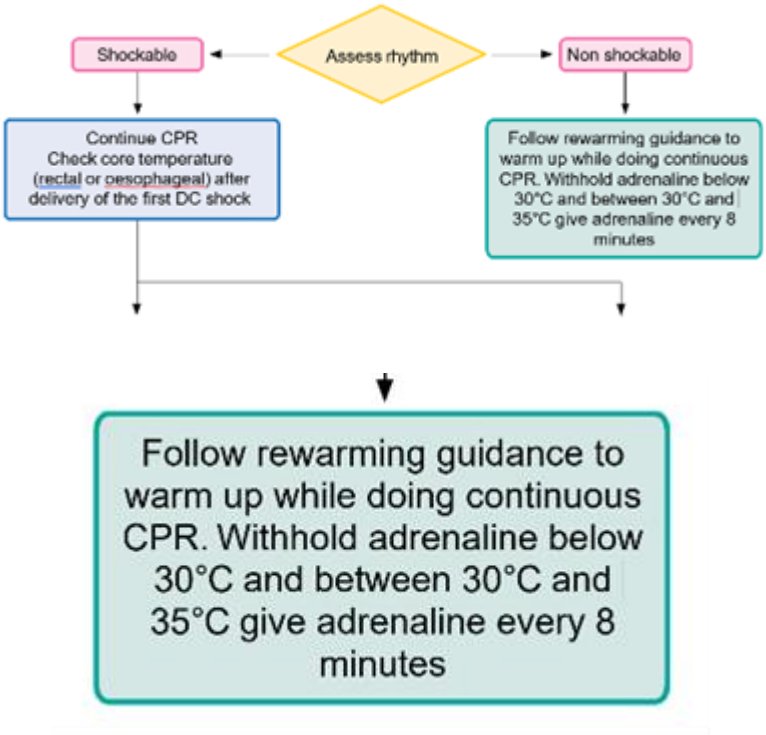
Please see the updated table here

## Appendix F – General approaches to poisoning and envenomation

| Page | Change | Date |
|---|---|---|
| 403 | Edit to Naloxone dose in Opiates (including Methadone) section:<br>In second sentence change 10 to 100 micrograms/kg so that it reads:<br><br>An initial bolus dose of 100 micrograms/kg should be given. | September 2024 |

**Appendix H – Drowning**

| Page | Change | Date |
|---|---|---|
| 442 | Change to text in green box on the non-shockable arm of Hypothermic child in cardiac arrest algorithm – click to see full document.<br><br>Follow rewarming guidance to warm up while doing continuous CPR. Withhold adrenaline below 30°C and between 30°C and 35°C give adrenaline every 8 minutes.<br><br>  | November 2023 |
| 443 | Revision of text in H.5 Emergency treatment and stabilisation in drowning section, final sentence of third paragraph:<br><br>When an infection is suspected, appropriate intravenous antibiotic therapy should be started after repeating blood and sputum cultures. | December 2023 |

**Appendix J - Formulary**

| Page | Change | Date |
|---|---|---|
| 458 | Adenosine<br>Addition of text to the table for Neonates and 1 – 11 months:<br>The SVT algorithm has an initial dose of 100 micrograms/kg; infants may be less responsive to this dose and may require escalation to higher doses quickly as per the algorithm.<br><br>Addition of text to the Notes:<br>Doses above reflect references from the BNFc however the SVT algorithm has a standard initial dose for all ages of 100 microgram/kg. | June 2024 |

<table>
<tr><td>Adenosine</td><td></td><td>Neonates</td><td>1-11 months</td><td>1-11 years</td><td>12-18 years</td><td></td></tr>
<tr><td>Antiarrhythmic to terminate supraventricular tachycardia and to elucidate mechanism of tachycardia</td><td>Rapid IV injection</td><td>150 micrograms/kg<br>If necessary repeat every 1-2 minutes increasing the dose by 50-100 micrograms/kg until tachycardia terminated or max. single dose of 300 micrograms/kg given</td><td>150 micrograms/kg<br>If necessary repeat every 1-2 minutes increasing the dose by 50-100 micrograms/kg until tachycardia terminated or max. single dose of 500 micrograms/kg given</td><td>100 micrograms/kg<br>If necessary repeat every 1-2 minutes increasing the dose by 100 micrograms/kg to a max. of 12 mg</td><td>Initially 3mg; if necessary followed by 6 mg after 1-2 minutes and then by 12 mg after a further 1-2 minutes.<br>In some children over 12 years a 3 mg dose is ineffective (e.g. if small peripheral vein used) and higher initial dose may be used</td><td>Single dose</td></tr>
<tr><td></td><td></td><td colspan="2">The SVT algorithm has an initial dose of 100 micrograms/kg; infants may be less responsive to this dose and may require escalation to higher doses quickly as per the algorithm.</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="5">Notes:<br>Drug should be given rapidly over 2 seconds followed by rapid sodium chloride 0.9% flush. A large vein is required.<br>Caution should be executed when considering adenosine in the asthmatic child<br>Children who have had a heart transplant are very sensitive to the effects of adenosine<br>Children receiving dipyridamole should receive a quarter (1/4) of the usual dose of adenosine.<br>Doses above reflect references from the BNFc however the SVT algorithm has a standard initial dose for all ages of 100 microgram/kg.</td></tr>
</table>

| | | |
|---|---|---|
| 467 | Levetiracetam - maximum dose of IV Levetiracetam should be 3 g not 4.5 g<br><br>Correction to Maximum single dose 3 g | November 2023 |

| | | |
|---|---|---|
| 470 | Naloxone<br>Changes to the dosing table to change the age bands, dose and route for postpartum infants and children. | September 2024 |

| Naloxone | | Postpartum | Neonate-12 years | 12-18 years | |
|---|---|---|---|---|---|
| | IM<br>*See notes below table | 200 micrograms | - | - | IM |
| | | Notes:<br>Use 400 micrograms/ml naloxone preparation<br>Gradual onset of action (3–4 minutes) but the effect is prolonged | | | |
| | IV bolus | - | 100 micrograms/kg (max. dose 2 mg) | 400 micrograms | Single dose |
| | | - | Then, if no response:<br>100 micrograms/kg at 1-minute intervals to max. of 2 mg | Then, if no response after 1 minute:<br>800 micrograms<br>Then, if no response after a further 1 minute:<br>800 micrograms<br>Then, if no response after a further 1 minute:<br>2 mg (4 mg may be required in a seriously poisoned child) | Single dose |
| | | Notes:<br>Then review diagnosis; further doses may be required if respiratory function deteriorates<br>Due to short half-life of naloxone, repeat doses as necessary to maintain opioid reversal<br>Observe for recurrence of central nervous system and respiratory depression<br>If IV not possible use IM or SC | | | |
| | IV infusion | - | 5–20 micrograms/ kg/h | Infuse a solution of 4 micrograms/ml at a rate adjusted according to response | Continuous |

*Notes:
Specifically indicated for the reversal of respiratory depression in a newborn infant whose mother has received narcotics within

<table>
<tr><td></td><td>4 hours of delivery. It is generally preferred to give an IM injection for a prolonged effect<br>Do not administer to newborns whose mothers are suspected of narcotic abuse, as a withdrawal syndrome may be precipitated<br>Always establish and maintain adequate ventilation before administration of naloxone</td><td></td></tr>
<tr><td>471</td><td>Correction to wording in infusion to “Use 1:1000 (1 mg/ml) noradrenaline concentrate”</td><td>February 2024</td></tr>
<tr><td>472</td><td>Paracetamol – rectal loading dose for 2-12 years should be 125-500 mg not mg/kg</td><td>December 2023</td></tr>
<tr><td>472</td><td>Paracetamol<br>Changes to the IV dosing information and age categories<br><table><tr><td rowspan="3">Paracetamol</td><td rowspan="3">IV</td><td>Neonate 32 weeks corrected gestational age and above</td><td>Neonate</td><td>Infant and Child (up to 10 kg)</td><td>Child (10–50 kg)</td><td>Child (50 kg and above)</td></tr><tr><td>7.5 mg/kg every 8 hours, dose to be administered over 15 minutes.</td><td>10 mg/kg</td><td>10 mg/kg</td><td>15 mg/kg</td><td>1 g</td></tr><tr><td colspan="4">Notes: Every 4-6 hours<br>Give over 15 minutes<br><10kg: max. daily dose 30mg/kg<br>10-50 mg/kg: max. daily dose 60mg/kg<br>>50 kg: max. daily dose 4g</td></tr></table></td><td>March 2024</td></tr>
</table>

Paediatrics

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# APLS Aide Memoire

| Age | Guide weight (kg) | A Cuffed ET Tube | | C Joules | C Fluid | C Adrenaline | D Lorazepam | D Glucose | RR At rest Breaths per minute 5th-95th centile | HR Beats per minute 5th-95th centile | BP systolic | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Int. diameter (mm) | Length (cm) | 4 J/kg | 10 ml/kg (ml) | 0.1 ml/kg of 1 : 10 000 (ml) | 0.1 mg/kg Max 4 mg (mg) | 3 ml/kg of 10% glucose (ml) | | | 5th centile | 50th centile | 95th centile |
| **Birth** | 3.5 | 3.0 (or uncuffed 2.5-3.0) | 9 | 20 | 35 | 0.4 | 0.4 | 10.5 | 25-50 | 120-170 | 65-75 | 80-90 | 105 |
| **1 month** | 4 | 3.0 | 9 | 20 | 40 | 0.4 | 0.4 | 12 | 25-50 | 120-170 | 65-75 | 80-90 | 105 |
| **3 months** | 5 | 3.0 | 10 | 30 | 50 | 0.5 | 0.5 | 15 | 25-45 | 115-160 | 65-75 | 80-90 | 105 |
| **6 months** | 8 | 3.5 | 12 | 30 | 80 | 0.8 | 0.8 | 24 | 20-40 | 110-160 | 65-75 | 80-90 | 105 |
| **12 months** | 10 | 3.5 | 13 | 40 | 100 | 1.0 | 1.0 | 30 | 20-40 | 110-160 | 70-75 | 85-95 | 105 |
| **2 years** | 12 | 4.0 | 13 | 50 | 120 | 1.2 | 1.2 | 36 | 20-30 | 100-150 | 70-80 | 85-100 | 110 |
| **3 years** | 14 | 4.0 | 14 | 60 | 140 | 1.4 | 1.4 | 42 | 20-30 | 90-140 | 70-80 | 85-100 | 110 |
| **4 years** | 16 | 4.5 | 14 | 60 | 160 | 1.6 | 1.6 | 48 | 20-30 | 80-135 | 80-90 | 85-100 | 110 |
| **5 years** | 18 | 4.5 | 14 | 80 | 180 | 1.8 | 1.8 | 54 | 20-30 | 80-135 | 80-90 | 90-110 | 110-120 |
| **6 years** | 20 | 5.0 | 15 | 80 | 200 | 2.0 | 2.0 | 60 | 20-30 | 80-130 | 80-90 | 90-110 | 110-120 |
| **7 years** | 23 | 5.0 | 15 | 100 | 230 | 2.3 | 2.3 | 69 | 20-30 | 80-130 | 80-90 | 90-110 | 110-120 |
| **8 years** | 24 | 5.5 | 16 | 100 | 240 | 2.4 | 2.4 | 72 | 15-25 | 70-120 | 80-90 | 90-110 | 110-120 |
| **9 years** | 28 | 5.5 | 16 | 120 | 280 | 2.8 | 2.8 | 84 | 15-25 | 70-120 | 80-90 | 90-110 | 110-120 |
| **10 years** | 30 | 6.0 | 17 | 120 | 300 | 3.0 | 3.0 | 90 | 15-25 | 70-120 | 80-90 | 90-110 | 110-120 |
| **11 years** | 35 | 6.0 | 17 | 140 | 350 | 3.5 | 3.5 | 100 | 15-25 | 70-120 | 80-90 | 90-110 | 110-120 |
| **12 years** | 40 | 6.5 | 18 | 150 | 400 | 4.0 | 4.0 | 100 | 12-24 | 65-115 | 90-105 | 100-120 | 125-140 |
| **14 years** | 50 | 7.0 | 21 | 150 | 500 | 5.0 | 4.0 | 100 | 12-24 | 60-110 | 90-105 | 100-120 | 125-140 |
| **Adult** | 70 | 8.0 | 24 | 120-150 Joules biphasic | 500 | 10 ml (i.e. 1 mg) | 4 mg | 100 ml | 12-24 | 60-110 | 90-105 | 100-120 | 125-140 |

**TIP: If a child is particularly big, go up one or two years; particularly small, go down one or two years**
**The final responsibility of delivery of the correct dose remains that of the physician prescribing and administering the drug**

**Paediatric major trauma and analgesia calculations** (16 years and above use adult doses)

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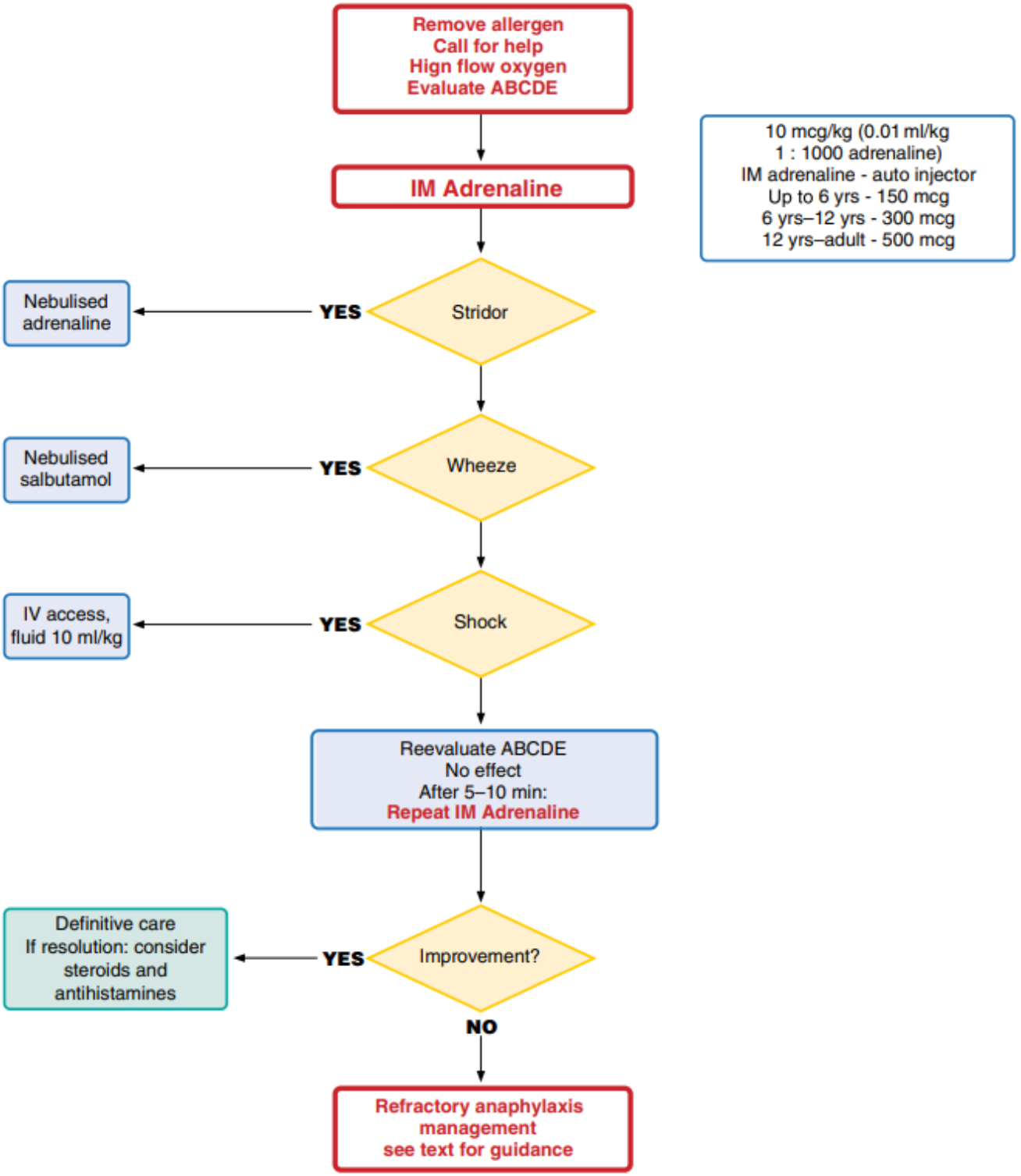
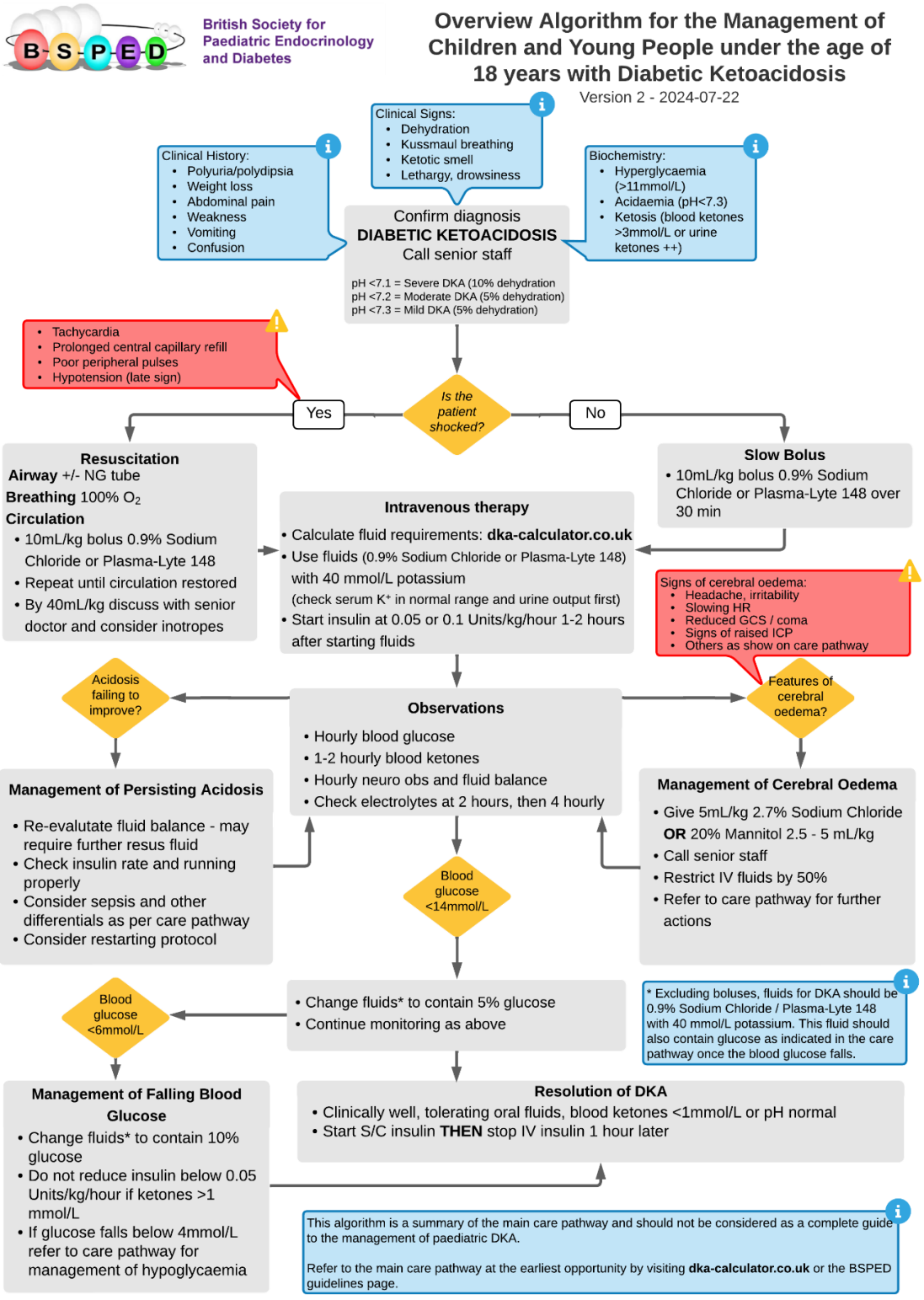
**Please note: All doses can be given via INTRAVENOUS (IV) or INTRAOSSEOUS (IO) route**

| Age | Birth | 1/12 | 3/12 | 6/12 | 1 yr | 2 yr | 3 yr | 4 yr | 5 yr | 6 yr | 7 yr | 8 yr | 9 yr | 10 yr | 11 yr | 12 yr | 13 yr | 14 yr | 15 yr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weight (kg)** | 3.5 | 4 | 5 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 23 | 24 | 28 | 30 | 35 | 40 | 45 | 50 | 55 |
| **Blood products 10 ml/kg** | 35 ml | 40 ml | 50 ml | 80 ml | 100 ml | 120 ml | 140 ml | 160 ml | 180 ml | 200 ml | 230 ml | 240 ml | 280 ml | 300 ml | 350 ml | 400 ml | 450 ml | 500 ml | 500 ml |
| **Tranexamic Acid (TXA 15 mg/kg)** | 52.5 mg | 60 mg | 75 mg | 120 mg | 150 mg | 180 mg | 210 mg | 240 mg | 270 mg | 300 mg | 345 mg | 360 mg | 420 mg | 450 mg | 525 mg | 1 g | 1 g | 1 g | 1 g |
| **Hypertonic sodium chloride (2.7–3%) 3 ml/kg over 10-20 mins** | 10.5 ml | 12 ml | 15 ml | 24 ml | 30 ml | 36 ml | 42 ml | 48 ml | 54 ml | 60 ml | 69 ml | 72 ml | 84 ml | 90 ml | 105 ml | 120 ml | 135 ml | 150 ml | 175 ml |
| **Calcium Gluconate (10%) 0.5 ml/kg over 10-20 mins >20kg: 10 ml** | 1.75 ml | 2.0 ml | 2.5 ml | 4.0 ml | 5.0 ml | 6.0 ml | 7.0 ml | 8.0 ml | 9.0 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml | 10 ml |
| **Morphine 50–100 mcg/kg >40 kg: 2–10 mg** | 0.175–0.35 mg | 0.2–0.4 mg | 0.25–0.5 mg | 0.32–0.8 mg | 0.5–1 mg | 0.6–1.2 mg | 0.7–1.4 mg | 0.8–1.6 mg | 0.9–1.8 mg | 1–2 mg | 1.15–2.3 mg | 1.2–2.4 mg | 1.4–2.8 mg | 1.5–3 mg | 1.75–3.5 mg | 2–4 mg | 2-10 mg | 2–10 mg | 2–10 mg |
| **Fentanyl 0.5–1 mcg/kg >40 kg: 50–100 micrograms** | 1.75–3.5 mcg | 2–4 mcg | 2.5–5 mcg | 3.2–8 mcg | 5–10 mcg | 6–12 mcg | 7–14 mcg | 8–16 mcg | 9–18 mcg | 10–20 mcg | 11.5–23 mcg | 13–26 mcg | 14–28 mcg | 15–30 mcg | 17.5–35 mcg | 20–40 mcg | 50-100 mcg | 50–100 mcg | 50–100 mcg |
| **Paracetamol 15 mg/kg IV infusion <10kg:10mg/kg >50 kg: 1 g** | 35 mg | 40 mg | 50 mg | 80 mg | 150 mg | 180 mg | 210 mg | 240 mg | 270 mg | 300 mg | 345 mg | 360 mg | 420 mg | 450 mg | 525 mg | 600 mg | 675 mg | 1 g | 1 g |

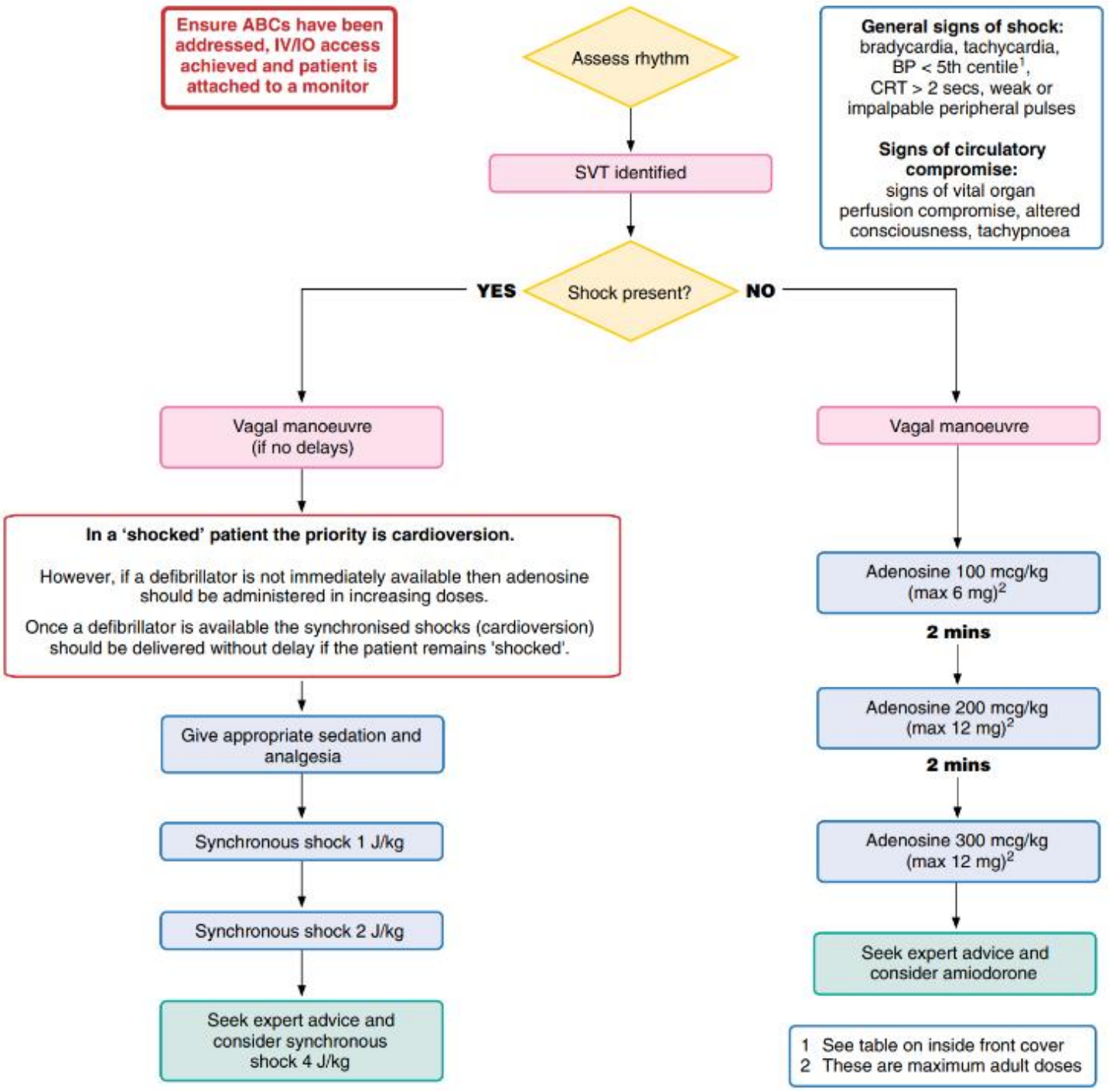
# APLS: Emergency treatment of anaphylaxis



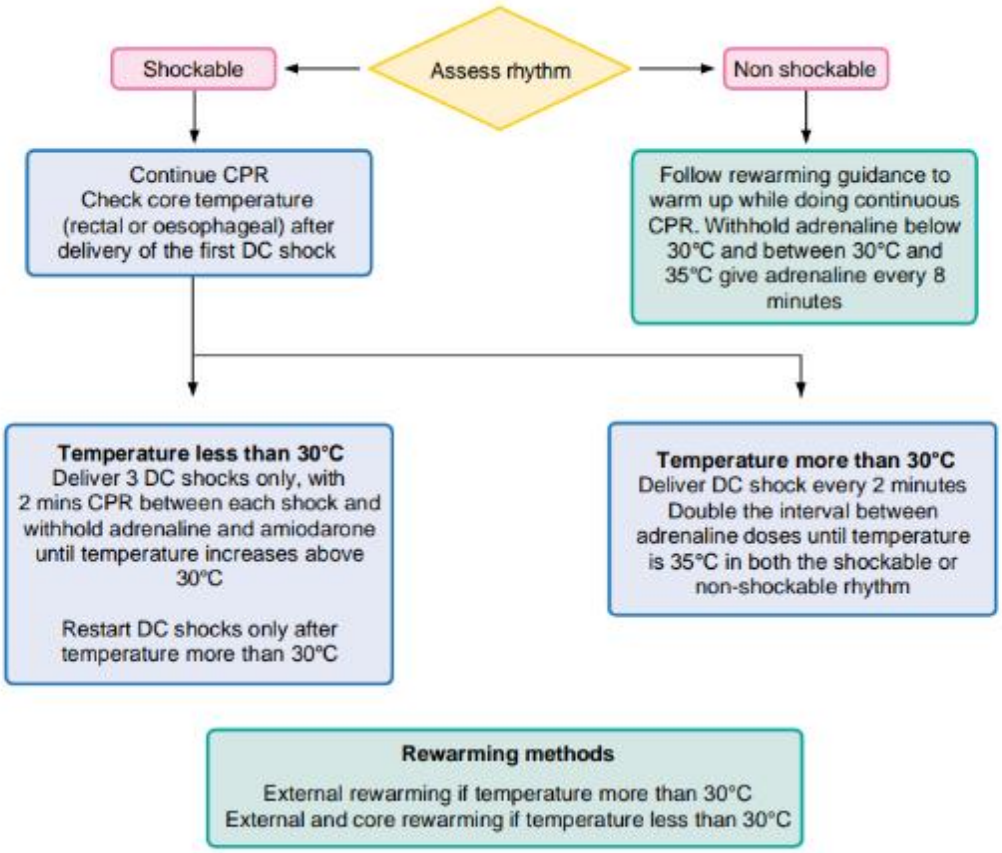
# APLS: Diabetic ketoacidosis



# APLS: Management of supraventricular tachycardia



# APLS: The hypothermic child in cardiac arrest




| External rewarming | Core rewarming |
|---|---|
| • Remove cold, wet clothing<br>• Supply warm blankets<br>• Warm air system<br>• Heating blanket<br>• Infrared radiant lamp | • Warm IV fluids to 39°C<br>• Warm ventilator gases to 42°C<br>• Gastric/bladder lavage with saline at 42°C<br>• Peritoneal lavage with potassium-free dialysate at 42°C, 20 ml/kg with a 15 minute cycle<br>• Pleural or pericardial lavage<br>• Endovascular warming<br>• ECMO (extracorporeal blood rewarming) |
| Temperature to rise by 0.25–0.5°C per hour to reduce haemodynamic instability<br>Aim for normothermia of 35–37°C | |
| If drowning: core temperature of less than 33°C and water temperature of less than 6°C increases chance of survival | |
| Resuscitate until core temperature is 32°C or cannot be raised despite resuscitation and active rewarming<br>(Clinical decision to stop can be made despite inability to raise temperature to 32°C) | |