Paediatric and neonatal life support

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Resuscitation of infants and children is different from adult resuscitation. Although there may be many similarities in the methodologies used in the resuscitation procedures with those used in adults, paediatric life support is governed by the fact that it begins from a different starting point. Adult sequences are based on the observation that the majority of cases are primarily cardiac in origin; arrest is therefore rapid and immediate in onset giving little or no warning of occurrence and usually requiring rapid defibrillation to achieve any measure of success. In infants and children the cause is usually primarily a respiratory event which leads to the final cardiac arrest if not recognized and dealt with promptly. Primary cardiac arrest in children is rare and ventricular fibrillation and ventricular tachycardia have been reported in less than 15% of the young. The aetiology and pathogenesis of sudden death in this age group is therefore important. Many children have a relatively long “pre-arrest” phase, cardiac arrest signalling the end of a progressive physiological decline. It could be argued that in such events many deaths could be prevented by early recognition and aggressive therapy in this “pre-arrest” phase but, unfortunately, some remain irreversible despite all efforts.

Trauma is the one cause of cardiac arrest that occurs in both children and adults and is the most common cause of death in the first four decades of life. It could be argued that trauma is preventable and, more importantly, cardiac arrest secondary to trauma can in some cases be prevented by careful correct management of the airway, breathing and circulation of the trauma victim before managing the secondary injuries.

The outcome of paediatric life support is disappointingly low with survival rates between 3 and 17%. These poor survival results are even more dismal when the majority show significant neurological impairment after arrest. The variability in results is attributed to whether the primary event was respiratory in nature, which has a better outcome, or a primary cardiac event, which has a worse prognosis.

Furthermore, events occurring outside hospital have a poorer outcome than those occurring in hospital. Audit and analysis of paediatric life support events are complex. Resuscitation is relatively uncommon and many studies have collected data for several years and still have small sample sizes. In the BRESUS study in the UK, only 2% of victims were aged less than 14 yr. In an American study surveying 15 yr of prehospital events, only 7% of victims were less than 30 yr of age and 3.7% were less than 8 yr old. Furthermore, definitions used in evaluating events are inconsistent and often not comparable from study to study. In an effort to improve our knowledge of paediatric life support and its outcome, a revised reporting template was formulated. It is hoped that these paediatric Utstein style guidelines will help to standardize the reporting of outcomes of paediatric life support and thereby provide an evidence-based practice of comparable data sets to establish the true worth of these events.

One conclusion is clear; infants and children who progress to cardiac arrest have a very poor prognosis. Because of the aetiology of resuscitation in these age groups it is important that the pre-event symptoms are recognized early and treated effectively before respiratory collapse and the inevitable cardiac arrest. Therefore, in paediatric life support, prevention and early recognition of the impending event are major factors for overall survival.

Paediatric life support

Guidelines for paediatric life support have been published by several national organizations. In 1992, an International Liaison Group was established to examine the basic scientific data, analyse national differences and formulate recommendations based on science which would form the basis of international guidelines to be used in the future by individual national organizations. In 1997 the International Liaison Committee on Resuscitation (ILCOR), a multi-national committee comprised of members representing most of the major national resuscitation organizations, published a series of advisory statements, including a paediatric statement. In paediatric life support the committee found very few areas of serious controversy. It is


Key words
hoped that the paediatric ILCOR advisory statement will form the foundation to build national procedures and to highlight areas which need further scientific investigation and research.

**Age definitions**

Paediatric life support deals with the resuscitation of infants and children. Because of the wide variation in anatomy, physiology and epidemiology throughout the paediatric age range, it is therefore important to define various age ranges in an effort to rationalize treatment.

**ANATOMY**

The size of a child is an obvious important consideration in determining the practical resuscitation procedure to be followed. Two categories are suggested: (1) infants less than 1 yr of age; and (2) children aged 1–8 yr.

The upper age limit of 8 yr for children has been proposed as a watershed, particularly in relation to the technique of chest compression. A small child less than 8 yr of age probably receives adequate chest compressions using a “one-handed” technique. An older or larger child probably requires a “two-handed” (adult) technique to achieve adequate depth of compression. None the less, because of the variability in size of children, no definitive upper age limit can be set and the rescuer must judge the effectiveness of the resuscitation and adapt the technique appropriately.

**PHYSIOLOGY**

From a physiological point of view it could be suggested that the upper age limit should be puberty. Although this has been considered carefully, evidence has shown that the physiological changes of puberty have little effect on paediatric life support. In the newborn the physiological differences are obvious; the non-compliant newborn lungs require a unique sequence of resuscitation procedures, which although superficially still follow the same “ABC” sequence, require the development of a different practice.

**EPIDEMIOLOGY**

Much has already been written on the differences in resuscitation epidemiology between adults and children. Considering the epidemiology, it could be suggested that older children, adolescents and young adults have the same underlying causes of collapse and arrest which are more aligned to paediatric than adult procedures. In the newborn it is important to establish the first breath and maintain effective ventilation and oxygenation. In the infant and child, airway and breathing problems predominate and lead rapidly to bradycardia and asystolic cardiac arrest. Primary cardiac events should be considered only when there is a pre-existing history of heart disease. The conclusion is simple; the resuscitation sequence must be determined by the most likely cause of the event. The common aims of all forms of paediatric life support are establishment of a clear airway and oxygenation of the lungs; these are prerequisite to all other forms of treatment.

**Basic life support (fig. 1)**

**ASSESS RESPONSIVENESS**

Before starting a resuscitation procedure it is vital to evaluate the situation for any danger or physical hazards. The first step is to assess the level of responsiveness. Gentle but firm stimulation must be given and this alone may be sufficient to awaken the child or stimulate respiration. Infants should not be shaken vigorously nor children with a suspected spinal injury. If the child is unresponsive, shout for help. Only move the child if he is in a dangerous location.

**AIRWAY**

The tongue is the most common cause of airway obstruction in children. Simple head-tilt–chin lift or jaw thrust manoeuvres establish the paediatric

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**Figure 1** Algorithm for paediatric basic life support.
airway; only the jaw thrust procedure is recom-
mended when trauma is the cause of collapse. More
recently, a tongue–jaw lift manoeuvre has been
described accompanied by visual inspection of the
mouth, but further evaluation has yet to establish
the value of this procedure.

If a foreign body is obstructing the airway it
should be removed carefully under direct vision.
Blind probing of the child’s airway is likely to impact
the object further or to cause tissue damage, and
should be discouraged. Where complete upper
airway obstruction has occurred as a result of
inhalation of a foreign body, the object is probably
too far into the airway to be seen or removed by
simple means and advanced airway procedures are
needed.

BREATHING

Assessing effective breathing is very difficult and
subject to errors. Three methods are recommended
in assessing respiration.

(1) Look for chest and abdominal movement.

This detects physical movement, but it may not be
coordinated and effective to move air in and out of
the lungs.

(2) Feel at mouth and nose for air movement.

This confirms the effectiveness of the chest move-
ment.

(3) Listen over the airway for breath sounds.

An important manoeuvre which indicates if the
child has large or small airway problems. Absence
or lessening of airway noise could mean that the
problem is improving; alternatively, it could indicate
that the child is moving less air past the obstruction
and that the situation is getting worse.

If the infant or child is not breathing, it is
essential to commence expired air ventilation
immediately. The mouth of the rescuer applied to
the mouth and nose of the infant has been the
conventional teaching, but recently the effective-
ness of the mouth of the rescuer applied to the nose
of the infant has been described. In the child,
mouth-to-mouth expired air ventilation is
recommended. A minimum of two but up to five
breaths may be required. In some situations two
breaths may be sufficient to re-establish signs of life
and spontaneous respiration. Because of the
probable hypoxic aetiology of the event, five
breaths are considered the optimal number of
breaths to oxygenate a child. The breaths should be
slow, each lasting 1–1.5 s. These slow breaths
minimize gastric distension from high-pressure,
high-flow ventilation. It is also important not to
ventilate with excessive tidal volumes as this may
lead to gastric distension and regurgitation of
gastric contents. A simple and effective guideline
is to observe the child’s chest and to stop
ventilation when the chest rises to the equivalent of
a deep breath. If the chest does not rise when
attempting ventilation, realign the airway (over
extension of the neck may occlude the airway) or
consider clearing the airway using the procedures
described in “foreign body airway obstruction”
below.

CIRCULATION

Assessment of the circulation at this point in the
resuscitation sequence has conventionally been by
checking the pulse. Assessment of the brachial pulse
is recommended in infants and assessment of the
carotid pulse in children. Alternatively, the
femoral artery can be palpated. Despite its
apparent simplicity the lay rescuer and even
experienced health care providers have difficulty in
performing the pulse check accurately and the value
of the pulse check during resuscitation has been questioned. For example, if an unrespon-
sive infant does not show obvious signs of recovery
after expired air ventilation is there any point in
delaying chest compressions for a pulse check? The
concept of not performing a pulse check before commencing chest compressions
is difficult and it may appear illogical not to formally
establish cardiac arrest before commencing chest
compressions.

The current recommendations cover the difficulty
in making an accurate pulse check by stating that if a
pulse is not confidently detected within 10 s, further
resuscitation interventions should not be delayed.
Furthermore, in the infant, if the pulse rate is slow
(less than 1 s⁻¹ or 60 min⁻¹), cardiac output should
be considered to be ineffective and full resuscitation
commenced.

CHEST COMPRESSIONS

Chest compressions are performed on the lower
half of the sternum. In the infant, compression is
performed using two fingers placed 1 finger’s
breadth below an imaginary line joining the nipples.
In the child, the heel of one hand is used and
positioned 1 finger’s breadth up from the
xiphisternum. In the older child (more than 8 yr
of age) and in the larger young child, this one-
handed compression technique may be found to
be inadequate and the two-handed compres-
sion technique (as used in adult resuscitation)
may be required to produce effective chest
compression.

The depth of compression should be judged in
relative rather than absolute terms. For infants and
small children it is recommended to compress the
chest to one-third of its resting diameter. The
efficacy of chest compression can be judged by
palpation of the femoral vessels but this may reflect
venous and not arterial blood pulsation. More
effective assessment can be made by analysis of the
arterial waveform or evaluation of the expired carbon
dioxide tracing.

The compression rate is 100 compressions
per minute. A single expired air ventilation
should be given after every five compressions.
This provides adequate ventilation and
oxygenation for the infant or child. In the older
child, where two hands are required for
effective chest compression, the adult ratio of
15 compressions to two ventilations can be
used, compressing the chest at a rate of 100 per
minute.
Activation of the emergency medical services

Ideally, the call for help given during the assessment of responsiveness should have activated the emergency medical services. In reality this is not always the case, and the priority in paediatric life support is to establish an airway, commence effective breathing and circulate oxygenated blood. In paediatric life support therefore, resuscitation is started and the emergency medical services activated after approximately 1 min of resuscitation. Thus paediatric procedures have adapted the “phone fast” rather than “phone first” philosophy based on aetiological considerations of the resuscitation event. This is a general recommendation but local emergency medical services’ circumstances or the availability of “dispatcher-guided CPR” may override these recommendations.

Basic life support must continue without further interruption until experienced help arrives or until signs of life return.

Foreign body airway obstruction

Aspiration of food or vomit, or inhalation of a foreign body compromises the paediatric airway. Spontaneous coughing to clear the material should be encouraged but if this fails, back blows and chest thrusts in infants and back blows together with alternate cycles of chest thrusts and abdominal thrusts in children may provide sufficient vibration to loosen the material and enough expiratory force to expel the obstruction. Abdominal thrusts are not recommended in infants less than 1 yr of age as damage to the abdominal contents may occur. The importance of checking the mouth, formally opening the airway and attempting expired air ventilation after each cycle has been highlighted by the need to assess constantly that the airway is actually obstructed. These checks are also required to assess if the clearing manoeuvres have dislodged the material sufficiently to allow air pass the obstruction. The precise sequence for relief of airway obstruction has not been assessed formally.

Advanced life support (fig. 2)

Basic life support in an essential prerequisite to the paediatric life support sequence. Advanced life support provides the definitive management of the various resuscitation modalities in the hope of restoring spontaneous cardiac activity. Unlike adult resuscitation, the paediatric procedure emphasizes the importance of the airway and oxygenation. Furthermore, the paediatric procedures regard asystole as the primary arrhythmia; ventricular fibrillation has been documented in less than 10% of paediatric arrest calls4 23 25 34 103 even when the cardiac rhythm is assessed within 6 min of activation of the emergency medical services.57 64

AIRWAY

The simple basic procedures of head tilt, chin lift or jaw thrust remain the mainstay of airway management. Insertion of an oropharyngeal airway, correctly sized from the centre of the mouth to the angle of jaw, may be of use to aid simple airway control in the short term.

Tracheal intubation is the most effective method of securing the paediatric airway. Using a straight bladed laryngoscope and a plain plastic tracheal tube of the appropriate size (internal diameter (mm) = (age in years/4) + 4) is a technique which requires a skill only developed by formal training and regular practice. Intubation must be achieved rapidly and accurately without prolonged delay to basic life support. Any attempt lasting longer than 30 s should be abandoned and the child’s lungs reoxygenated before another attempt is made. Having achieved tracheal intubation the tube needs to be fixed carefully in place to prevent accidental removal or displacement.

The laryngeal mask airway has been assessed as an effective airway adjunct in adult resuscitation and is a technique that can be taught easily to doctors, nurses and paramedic staff.2 20 21 59 75 89 Small-sized laryngeal masks are available for infants and children but their effectiveness in paediatric resuscitation has yet to be established. They are probably most significant where intubation is difficult or where the health care provider is not proficient in paediatric tracheal intubation.

![Figure 2: Algorithm for pediatric advanced life support.]

BLS = Basic life support.
OXYGENATION

Although expired air resuscitation provides some oxygenation, the sooner ventilation with high inspired oxygen concentrations can be established the better. Ventilation using a self-inflating bag–valve–mask with supplementary oxygen provides higher concentrations of inspired oxygen. Concentrations of up to 90% may be achieved if the self-inflating bag is fitted with an oxygen reservoir system. Face masks for use with a self-inflating bag should be of clear plastic so that the airway can be observed through the mask, and the circular design mask with a soft seal rim has been found to be most efficient, especially for the inexperienced operator.

Although many anaesthetists are experienced in the use of the Ayre’s T-piece with the Jackson–Rees modification for paediatric ventilation, this system is not recommended for the less experienced and should not be part of the routine resuscitation equipment. Furthermore, this system requires a constant reliable gas delivery system to be functional and this may not always be immediately available. The self-inflating resuscitation bag can function independently and has the advantage that it can be operated safely and effectively by less experienced operators.

CIRCULATION

There are few procedures more fraught with difficulty in resuscitation than the establishment of venous access in an infant or small child during resuscitation. Yet circulatory access is of prime importance to effective advanced life support. The i.v. or intraosseous routes for drug delivery are the preferred options. The site of venous access has to be balanced against the resuscitation skills and relative difficulty and risks of the technique. Experimental data have demonstrated that vascular access draining into the superior vena cava from either peripheral or central routes is preferable during resuscitation. Drugs given via the inferior vena cava take longer to reach the heart.

Similarly, drugs administered centrally act more rapidly than those administered via the peripheral route. However, access above the diaphragm is difficult and fraught with potential problems. Peripheral access, especially via veins in the lower limbs, is usually easier during resuscitation. Drugs administered via the peripheral route should be followed by a fluid flush to move them rapidly into the circulation. Therefore, when judging the advantages of different access points and deciding which to select it must be remembered that accuracy, safety and speed are the key priorities.

Intraosseous access has gained popularity in the past few years. It is relatively easy to perform and generally safe. Resuscitation drugs and fluids administered by this route reach the heart in a time comparable with direct peripheral venous access. Although originally recommended for children less than 6 yr of age, the intraosseous route has been used in older age groups and in adults during cardiac resuscitation. When establishing intraosseous access it is important to recognize the criteria for successful entry into the bone marrow. There should be loss of resistance as the marrow cavity is entered, the needle should remain upright without support, bone marrow should be aspirated into a syringe and there should be free flow of drugs and fluid without subcutaneous infiltration around the entry point.

Almost all drugs and infusions can be administered via the intraosseous route except dextrose and drugs via the intraosseous route. However, this is now regarded as a last resort, only to be used when there has been, or is likely to be, a significant delay in establishing venous access and thus administration of drugs. Therefore, during resuscitation of the small infant or child it could be argued that the first important dose of adrenaline should be given by the tracheal route while venous access is being established. There has been little research on the efficacy of drugs administered via the tracheal route in children. The optimal dose of drug, its volume and concentration have yet to be established.

Although direct intracardiac injection still has its advocates, it is now regarded as a last resort, only to be used when all other methods have failed.

TREATMENT ALGORITHMS

Administration of adrenaline plays a pivotal role in the advanced life support algorithms of paediatric resuscitation. Adrenaline is the drug of choice in any paediatric event as, by its alpha adrenergic action, it improves coronary perfusion. Therefore, when judging the advantages of different access points and deciding which to select it must be remembered that accuracy, safety and speed are the key priorities.

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Profound bradycardia should therefore be treated in the same way as asystole. Treatment is an initial dose of adrenaline $10 \mu g \text{ kg}^{-1}$ i.v. or by the intraosseous route (or 10 times this dose via a tracheal tube if venous access has not been established) ($10 \mu g \text{ kg}^{-1}$ is $0.01 \text{ mg kg}^{-1}$ or $0.1 \text{ ml kg}^{-1}$ of a $1:10 \text{ 000}$ solution). Recent studies in animals and children have suggested the benefit of a higher dose of adrenaline for the unresponsive asystolic child. Therefore, should the child not respond to the initial dose, another dose of $100 \mu g \text{ kg}^{-1}$ ($0.1 \text{ mg kg}^{-1}$ or $0.1 \text{ ml kg}^{-1}$ of a $1:1000$ solution) is recommended. Further studies have shown that if the child does not respond to this higher dose the eventual outcome is likely to be poor. In reviewing the results of these studies, no children survived to discharge of those given more than two doses of adrenaline. The algorithm may therefore be self-limiting but there is not enough evidence at present to recommend limitation of the time course of resuscitation from non-ventricular fibrillation.

Where there is a cardiac rhythm but no cardiac output (electromechanical dissociation/pulseless electrical activity) it is also necessary to treat any of the underlying reversible causes of the arrest. Hypoxia, hypovolaemia, tension pneumothorax, cardiac tamponade, drug overdose, hypothermia and electrolyte imbalance are all treatable, and resuscitation attempts should not be abandoned until a reasonable attempt has been made to correct these potentially reversible causes of cardiac arrest.

**Ventricular fibrillation and tachycardia**

These rhythms, although common in adults, are relatively rare in infants and children. Although one study reported an incidence of ventricular fibrillation of 23% in children, most other studies have reported an incidence of 0–10%. None the less, the physician must always be aware of the occasional need to treat ventricular fibrillation in children by defibrillation.

The recommended sequence is to give two rapid defibrillatory shocks of $2 \text{ J kg}^{-1}$, followed by a single shock at $4 \text{ J kg}^{-1}$. All further defibrillation attempts should then be made at $4 \text{ J kg}^{-1}$ in a rapid repeated series of three shocks. After the first cycle of three defibrillation attempts adrenaline $10 \mu g \text{ kg}^{-1}$ should be given and another dose of $100 \mu g \text{ kg}^{-1}$ after the second cycle of three shocks and between all subsequent cycles. When ventricular fibrillation occurs in children there is often an underlying cause and correction of hypothermia, drug overdose (tricyclic antidepressant overdose) and electrolyte imbalance (hyperkalaemia) should be considered.

**Resuscitation of the newborn (fig. 3)**

Despite the fact that most newborn infants breathe spontaneously after delivery, it has been estimated that 900,000 infants per year worldwide could be saved from newborn asphyxia by the use of simple airway manoeuvres. Of the 5 million newborn deaths per year worldwide, 56% of which occur in “out-of-hospital births”, 19% of these are caused by birth asphyxia. In the UK, newborn mortality is much lower but, with the increase in “out-of-hospital” deliveries, it is important that the birth attendant not only be fully conversant with obstetric problems but also be proficient in the techniques of resuscitation in the newborn.

The majority of newborn infants cry within a few minutes of birth and require little more than careful drying and wrapping in a warm towel to prevent heat loss. If the baby does not cry, it should be gently stimulated by more vigorous drying with a towel or flicking the soles of the feet. More vigorous stimulation is contraindicated and can be potentially dangerous.

The newborn baby’s initial cry and subsequent efforts at breathing must be assessed carefully to ensure that they result in adequate and sustained oxygenation of the lungs. Gasping without additional efforts at breathing is usually considered inadequate. Abnormal or absent ventilatory patterns require immediate active intervention.

The sequence of resuscitation recommended for
the newborn follows the same ABC sequence as that described for the young infant. The emphasis in the newborn lies with A (airway) and B (breathing). If C (circulation) is needed then more advanced technical interventions, including the use of drugs, are probably required.

AIRWAY

The airway is formally opened by the head tilt, chin lift or jaw thrust manoeuvre. The resuscitator must ensure that the head and neck are not over-extended as this may kink and occlude the soft newborn trachea. Any secretions, mucus or blood should be removed carefully with a suction device but vigorous blind suction of the pharynx must be discouraged as it may induce apnoea and bradycardia.

BREATHING

If clearing the airway does not result in adequate breathing then the birth attendant must commence artificial ventilation as quickly as possible. It is important to recognize that the continued survival of any newborn rests in its ability to take the "first breath" and to continue to breathe. Without the first breath the lungs fail to expand or develop a functional residual capacity. Furthermore, the anatomical changes in the circulation, which in the fetus have enabled blood to bypass the lungs, persist.

In extreme circumstances, when no equipment is available, ventilation can be initiated by mouth-to-mouth and nose ventilation. Because the newborn baby is covered in maternal blood and body fluids associated with birth, this represents a significant health infection risk to the rescuer. Therefore, before commencing this form of expired air ventilation, the face and mouth of the infant should be carefully, but rapidly, cleaned. Ideally, and in most cases, the birth attendant should be equipped with a simple ventilation device, either a bag–valve–mask or an expired air T-tube. A circular mask with a soft seal edge is recommended as it has been found to be more effective, especially in the hands of the inexperienced rescuer. Ventilation rate should be 30–60 bpm and each breath delivered should cause the chest to rise visibly. Excessively high airway pressures must be avoided as they may damage the newborn lungs.

Most devices now used for newborn resuscitation are fitted with a pressure limiting valve set at 30–40 cm H₂O. It should be remembered that the first breath may require a slightly higher inspiratory airway pressure to overcome the resistance of the fluid filled airways and the low compliance of the unexpanded lungs.

Continued failure to breathe signals the need for the resuscitator to intubate the trachea with a straight sided tracheal tube of appropriate size using a straight neonatal bladed laryngoscope. Tracheal intubation secures the airway and allows careful controlled ventilation with high concentrations of inspired oxygen. If, on attempting intubation, the trachea is seen to be filled with thick meconium, intubation should continue. Suction is then applied carefully to the tracheal tube as the tube is withdrawn slowly allowing removal of the thick meconium.

CIRCULATION

The newborn heart rate shortly after delivery should be greater than 100 beat min⁻¹. The pulse in the newborn is best assessed by palpating the base of the umbilical cord. Bradycardia should be treated initially by establishing effective ventilation and oxygenation of the lungs but, if there is not rapid recovery of the heart rate, techniques, now considered to be advanced, must be commenced.

Chest compressions in the newborn should be applied only by trained health care providers. If heart rate is less than 60 beat min⁻¹ and not improving, chest compressions should be started. Chest compressions can be applied using the same method as for small infants or by applying two thumbs placed side by side over the sternum at the centre of an imaginary line joining the nipples, each hand circulating the child's chest. Compressions are carried out at a rate of 120 events per minute interposing one ventilation between every three chest compressions (a ratio of 3:1 for newborns).

If heart rate fails to respond to chest compressions accompanied by effective ventilation of the lungs with a high concentration of inspired oxygen, the umbilical cord should be cannulated with a 5-French gauge umbilical catheter.

There is still disagreement as to the first pharmacological intervention in advanced neonatal resuscitation. Adrenaline is the favoured choice at a dose of 10 µg kg⁻¹ (0.1 ml kg⁻¹ of a 1 in 10 000 solution) flushed through the cannula with saline. Some authorities recommend an initial dose of sodium bicarbonate to reverse the acidosis present in the newborn but the dangers of infusing sodium bicarbonate and the adverse effects of giving hyperosmolar fluids to neonates must be considered carefully. If bicarbonate solution is administered it is given in a dose of 1–2 mmol kg⁻¹ (2–4 ml of a 4.2% solution) over 2–3 min. It must be flushed carefully through the umbilical catheter so that it does not inactivate any drug administered subsequently.

Some infants require expansion of their circulating blood volume; 10–20 ml kg⁻¹ of cross-matched blood or albumin usually establishes an effective circulation. If there is a history of opioid administration in the mother before delivery, this could be the cause of respiratory depression in the neonate. Naloxone 100 µg kg⁻¹ should be given and the infant observed carefully to ensure that respiratory depression does not return when the effect of naloxone wears off. All newborn babies who require intervention beyond that of simple early ventilatory support for a short period of time must be admitted to a special care baby unit for observation, monitoring and continuation of care.

Conclusion

Paediatric life support is an essential part of the resuscitation cycle. To be effective, those practising
paediatric resuscitation at basic or advanced levels need to be trained properly and practised in the skills of the procedure. Delay or hesitation in recognizing the need for or performing resuscitation can have disastrous consequences.

The recent publication of International Advisory Statements has simplified the approach to resuscitation by unifying the various national bodies, reviewing the published literature and recommending a single pathway described by the best available evidence. The procedure can have disastrous consequences. Delay or hesitation in recognizing the need for or performing resuscitation can have disastrous consequences.

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