

Technologically assisted children

Children requiring technological support such as assisted ventilation and tube feeding are increasingly being cared for at home. Pre-hospital practitioners called to assist such children may be unfamiliar with this equipment but should be aware of the small number of interventions that can be appropriately made in the out-of-hospital setting. Remember that both parents/carers and the child may be able to offer expert advice themselves, and may also provide contact details for professional advice.

Tracheostomy tubes

In the event that a tracheostomy tube becomes obstructed, adopt the following approach:

- 1. Confirm tube is correctly positioned
- 2. Remove the speech-cap from fenestrated tubes
- 3. Suction the tube to remove secretions (use the tube's obturator if suction is not available)
- 4. Remove the tracheostomy tube and replace
- 5. Ventilate to confirm correct position and patency

Ventilated children

In the event of failure of a ventilator, confirm the problem is not due to airway obstruction. In the event of genuine failure of the device, assist breathing with a self-inflating bag with supplementary oxygen and transport to hospital.

Central venous catheters

Central venous catheters may be used for feeding, dialysis or administration of medication. If a catheter becomes dislodged, dress the wound, applying direct pressure as necessary to control bleeding. If bleeding is occurring through a break in the catheter, clamp the tube proximally. Contact the child's hospital team to arrange review.

Infection at the insertion site will present as local reddening, tenderness, or a purulent discharge, which may also be associated with systemic signs of infection. Infection of the catheter itself will often present with signs of a non specific serious infection and septicaemia. Discontinue use of the catheter and refer the child to their medical team. Seriously damaged catheters are likely to require replacement whereas usually every effort is made to preserve the catheter in infection, if possible. Children with signs of septicaemia will require urgent antibiotic and supportive therapy.

In the event that a tube is obstructed, contact and refer the child to hospital. The tube may be subsequently thrombolysed or, as a last resort, replaced. Do not try to force fluid down the tube.. Rule out or treat dehydration and hypoglycaemia in children dependent on the tube for nutrition.

Air embolism may occur as a result of incorrect flushing procedures or a mishap during haemodialysis, and will present as coughing, dyspnoea, and chest pain. Clamp the tube and transfer the child urgently to hospital in a head-down, left-lateral position, with high concentration oxygen therapy. CPR may be necessary.

Ventriculoperitoneal shunts

Ventriculoperitoneal (VP) shunts are surgically implanted in children with hydrocephalus to allow drainage of cerebro-spinal fluid. Obstruction of the shunt will result in raised intra-cranial pressure, the signs of which will include altered affect, high pitched cry, fitting, and falling level of consciousness, similar to the presentation of meningitis. Children with evidence of an obstructed shunt require hospital admission. The presence of Cushing's Triad (bradycardia, hypertension and Cheyne-Stokes ventilation) indicates the ICP is so high that brainstem impairment is occurring. Supportive care should be provided during transfer to the hospital. If the child is very ill this will include airway care and high concentration oxygen therapy. Controlled hyperventilation (at a rate of 5 inflations per minute above the child's normal respiratory rate) should be used only in children with signs of Cushing's Triad. Most children present sooner than this because parents have been trained to look for signs (and sometimes to check the shunt) and less rapid transfer will be more suitable.

Infection around the shunt may also occur, resulting in altered affect, headache, fever, and refusal to take feeds. Septicaemia can also result from shunt infections resulting in lowered level of consciousness and shock. Urgent transfer to hospital with supportive and antibiotic therapy is indicated.

Feeding tubes

Feeding tubes may be positioned through the nose or rarely, the mouth, or be implanted through the abdominal wall. Most parents or carers (and indeed

some children themselves!) in the UK are trained to replace nasogastric tubes, or a local arrangement will have been made for a healthcare professional (for example at the Community hospital or district nurse) to do this. Hospital admission is therefore not usually necessary. Percutaneous tubes will usually require reinsertion in hospital as a matter of some urgency and the relevant unit should be contacted to arrange this.

Infected catheter sites should be cleaned and the hospital contacted to discuss review and to decide on appropriate antibiotic treatment. It is not necessary to discontinue use.

If correct placement of an enteral feeding tube cannot be confirmed, discontinue any infusion until the situation can be resolved (by testing with litmus paper).

Pitfall

If a child is on continuous enteral feeds, remember to monitor for hypoglycaemia if it is necessary to discontinue an infusion