Implantable intravenous access device

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Abstract

The use of a fully implantable device for venous access is described in two infants with transfusion dependent haemolytic anaemia. This device is a possible improvement in the treatment of infants needing long term venous access, although doctors should be aware of the infrequent complications.

An infant with pyruvate kinase deficiency, who required repeated blood sampling and was dependent upon monthly transfusions, presented problems with venous access and became greatly distressed by hospital visits. We decided to employ a means of permanent intravenous access and thought that a fully implantable device would be the correct choice to preserve her otherwise normal and healthy lifestyle. The Infuse-a-port (Novamedix) or Implantofix (Braun), represent small and lighter modifications of the original Port-a-cath (Pharmacia Deltec) so was the appropriate choice. After successful use in this patient the implantable device was chosen for use in a second case as described below.

Case reports

CASE 1

After a normal pregnancy and delivery a mother noted her baby girl to be jaundiced at 8 hours of age. Investigations confirmed haemolysis. The baby required weekly transfusions to maintain a

haemoglobin concentration above 90 g/l. A diagnosis of pyruvate kinase deficiency was made at 3 months of age. Blood sampling by finger prick or venous sampling and venous cannulation was performed for several months with increasing difficulty and distress. The Implantofix catheter and port system was sited and has been used successfully and without complication for over two years.

CASE 2

A boy presented at 3 months of age with pallor. Investigations confirmed haemolysis. A diagnosis of recessive spherocytosis was made and while being investigated peripheral venous access for transfusion was impossible and an indwelling, external-internal Broviac-type central line was inserted.

Unfortunately the fastidious cleanliness required, even with assistant domiciliary care and advice, was not easy in this chubby, healthy baby and the line was complicated by infection within three months.

In view of the previous success of the Implantofix we removed the infected catheter and three weeks later, when the infection had resolved, an Implantofix was successfully inserted.

Methods

The surgical procedure for insertion has been described in detail by Kondi *et al.*¹ The only difference between their procedure and ours was that we used general anaesthesia. Venous access can be gained via the external jugular, internal jugular, cephalic, facial, subclavian, axillary, saphenous or femoral veins for passage of the catheter. The catheter should be already trimmed to the appropriate length and the distal end is then burrowed subcutaneously and fixed to the port which is buried in a subcutaneous pocket. This is usually sited over the chest wall, providing easy access and a firm backing to the port. The position of the catheter is checked by fluoroscopy (or radiography if this facility is not available) at the time of surgery.

The port is accessed immediately and an infusion maintained for 24 hours; this is a routine that we use to be satisfied of free flow. Three intravenous doses of vancomycin 22 mg/kg at intervals of 12 hours are given to avoid perioperative contamination, the first being initiated in the operating theatre. At completion of the infusion the device is 'heparin locked' with injection of 5 ml heparin, 100 U/ml. The weaker strengths of heparin are not sufficient to maintain the anticoagulant effect.

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Figure shows the use of the Implantofix. Sterile procedure is mandatory, and the Huber point, non-coring 'Gripper' needle (Pharmacia Deltec) is being used here to take blood before transfusion. The needle must subsequently be immobilised to prevent dislodgement.

Scrupulous attention to the wounds is given to prevent risk of infection. Heparin locking is performed at weekly intervals for the first month, at least monthly thereafter, and after each sampling or transfusion.

In both babies the device was inserted without complication. The wounds healed well and there have been no infection related or other problems for a patient total of four years. Both children require top-up transfusions at intervals of four to six weeks to maintain adequate haemoglobin concentrations. These and any needle accessing must be performed using the special Huber point, non-coring needles (see figure). As the life of the silicon membrane of the port is said to be 2000 punctures, some years of use can be anticipated. We perform radiography every four months to observe the position and condition of the systems as the children grow.

Discussion

The length of use of the subcutaneous systems, combined with the lack of restriction on lifestyle in otherwise healthy infants, allows their increasing use with great clinical advantage.² Risk of infection is widely reported to be lower for the implanted devices than the subcutaneous tunnelled internal-external lines.³ We suggest that this applies particularly in infancy. Likewise thrombotic occlusion is less frequent⁴ and there is no risk of external fracture. Internal fracture can be anticipated by chest radiography and looking for the 'pinch-off' sign—that is, narrowing of the catheter at any point (usually between clavicle and first rib). If a catheter fragment should embolise it can be safely retrieved using cardiac catheterisation.

Blockage of the catheter can be treated with urokinase, and persistent withdrawal occlusion has also been shown to resolve with thrombolytic treatment when secondary to fibrin sheath formation on the catheter tip.^{5 6} If the catheter and port should separate, surgical remedy is usually required.

The lack of disruption of normal daily activi-

ties after successful implantation is of special importance in children. We have noticed that family stresses are relieved; that is an important aspect of patient care. There is no percutaneous entry site requiring special care or dressing and the child can bathe once the wound has healed. Visits to the hospital are less of a strain because venous access is more readily assured. The onus on medical staff to obtain peripheral venous access in these chubby and otherwise extremely healthy infants is alleviated. Other reports also comment specifically on patient and parent approval and acceptance of these subcutaneous devices.⁴

Provided the physician is aware of the infrequent complications, we hold that insertion of implantable intravenous access devices in infants, who present long term problems, greatly enhances medical care provided for the baby and family. Further experience will show whether these systems provide complication-free access in our patients until they are old enough for elective splenectomy to be considered. Experience thus far suggests that this is a safe and happy way to achieve long term intravenous access to assist in optimal management and promote normal development in growing babies.

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Paediatric psychotherapy: a service in a general outpatient clinic

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Abstract

The service of paediatric psychotherapy to a general paediatric outpatient clinic is described. Using techniques developed to suit paediatric patients a median of nine patients each clinic were treated. Referral symptoms resolved in a median time of four months after a median of seven sessions. This model for the management of paediatric patients with emotional and behavioural difficulties may

allow an effective and efficient use of psychotherapy time.

Emotional and behaviour difficulties in children account for a large proportion of the problems seen in paediatric clinics, 28% in a recent report.¹ After referral, further help may be sought from a child psychiatrist, psychotherapist, clinical psychologist, or social worker, often at

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