LONG LINES
Supporting information

What are the advantages and disadvantages of these lines?
Silastic catheters are much finer than, for example, Broviac catheters and are less likely to occlude veins, especially when inserted peripherally (Anon, 1991). Silastic is more likely than polyurethane to cause thrombus formation or sepsis (Wheeler, 1991), but is softer and thus more suitable for use in neonates (Goutail-Flaud, 1991). Silastic is less thrombogenic than the older type of PVC catheter (Boros, 1975).


Evidence Level: V

What is the optimum position and the best way of determining the position once placed?
The tip of silastic catheters should be placed just behind the confluence of the superior-inferior vena cava and the right atrium (Hausdorf, 1987), or alternatively in the superior vena cava (Anon, 1991). There is an increased risk of systemic air and fat embolism if the tip is in or close to a patent foramen ovale (Hausdorf, 1987). Ultrasonography accurately confirms positioning of even the thinnest catheters, and reduces the need for radiography (Soong, 1991; Hausdorf, 1987).


Evidence Level: V

How should any infections be managed? When should the lines be removed?
Catheter infection is more than twice as common in neonates than in older children (Mulloy, 1991), and infection rates as high as 45% have been recorded (Puntis, 1990; Grisoni, 1986). Exit-site infections can be treated with antibiotics, but tunnel infections usually require the catheter to be removed (Anon, 1991). A prospective study of 35 patients (Klein, 1992) included 4 with bacteraemia. Two of these needed catheter removal to clear their infections, but the other 2 were cured by the administration of antibiotics through the catheter. Prophylactic vancomycin or teicoplanin reduces the incidence of catheter-related infection in neonates (Moller, 1995). However, a Cochrane review (Jardine, 2008) found that antibiotic prophylaxis had no effect on overall mortality (RR 0.68, 95% CI 0.31 – 1.51).


Jardine LA, Inglis GD, Davies MW. Prophylactic systemic antibiotics to reduce morbidity and mortality in neonates with central venous catheters. The Cochrane Database of Systematic Reviews 2008, Issue 1. CD006179

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Evidence Level: V

What are the most common complications and how can they be avoided?
The most common serious complications of vascular access are infection (Moller, 1995) and catheter occlusion secondary to thrombus formation at the catheter tip (Sherman, 1983). The first prospective study of silastic catheters in neonates, using only peripheral veins of the scalp and extremities (Durand, 1986), found an overall incidence of mechanical complications of 26.4%. These consisted of blockage of the catheter or accidental displacement. Of 53 catheterisations, 4 (7.5%) were complicated by infections.

A study of 535 catheterisations with an average indwelling time of 23 days (Neubauer, 1995) noted one complication for every 153 indwelling catheter days. The most common complication was sepsis, on 22 occasions (4.1%).

A large Chinese study of 1,318 catheterisations (Soong, 1995) found a lower rate of sepsis (2.7%), which was still the most common complication.

The jugular vein route is particularly associated with thrombosis, which was detected in 8 of 24 patients receiving a silastic catheter in a study of 40 neonates (Rand, 1994). Lines in infants needing total parenteral nutrition or multiple intravenous infusions are particularly susceptible to infection and their use “should be avoided if possible” (Mulloy, 1991). Broviac catheters may be more suitable in these patients (Anon, 1991).

A prospective study of catheter sepsis (Puntis, 1991) found that education of staff in appropriate practice and the utilisation of specialist nurses reduced the rate of infection from 45% to 8% over a 12 month period.

A randomised, controlled, double-blind, single-centre trial in 210 infants (Birch, 2010) compared TPN with heparin (n=102) to TPN without heparin (n=108). There was a statistically significant reduction in all episodes of culture-positive, catheter-related sepsis in those infants with heparin added to the TPN, compared with those without heparin (p=0.04; RR 0.57, 95% CI 0.32 to 0.98; NNT 9, 95% CI 4.6 to 212.4).

A Cochrane review of 2 trials in 267 neonates (Shah, 2008) found some evidence for the prophylactic use of heparin in prevention of thrombotic complications; treatment was associated with a reduced risk of catheter occlusion (RR 0.28, 95% CI 0.15 – 0.53; NNT 5, 95% CI 3 – 8). The only previous systematic review (Randolph, 1998) was not confined to infants.


Birch P; Ogden S; Hewson M. A randomised, controlled trial of heparin in total parenteral nutrition to prevent sepsis associated with neonatal long lines: the Heparin in Long Line Total Parenteral Nutrition (HILLTOP) trial. Arch Dis Child Fetal Neonat Ed 2010;95:F252-7


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Neubauer AP. Percutaneous central i.v. access in the neonate: experience with 535 silastic catheters. Acta Paediatr 1995;84:756-60


Evidence Level: V  

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