



## Parenteral nutrition via an arteriovenous bypass graft

Delivery of nutritional support via prolonged venous access can often pose a significant problem. We report a case of polytetrafluoroethylene (PTFE) grafting from the axillary artery to the inferior vena cava (IVC) to provide parental nutrition to a young patient with intestinal failure.

### HISTORY

A 19 year old woman was first admitted with non-specific abdominal pain. She repeatedly presented with recurrent small bowel obstruction thought to be secondary to inflammatory adhesions.

In 1997, a Hartmann's procedure was performed for a perforated distal sigmoid colon. Histology was suggestive of Crohn's disease (CD). Over the next two years she was treated for CD. Once symptom free and without evidence of active CD she underwent subtotal colectomy with ileorectal anastomosis. Subsequent admissions with non-specific abdominal pain and weight loss failed to respond to steroid maintenance. Barium follow through showed slow small bowel transit with a lack of small bowel tonicity resulting in dilatation and no features of CD.

Initial investigations revealed no specific cause for her gut dysmotility and malabsorption. She was initially diagnosed with unexplained intestinal failure. Later a full thickness small bowel biopsy would determine the presence of vacuolated longitudinal and transverse muscle fibres, thus establishing the diagnosis of intestinal myopathy.

In view of her significant malabsorption and an initial body mass index of 15 kg/m<sup>2</sup>, she was referred to us for nutritional assessment. She developed a left femoral deep vein thrombosis and pulmonary embolus, for which she was anticoagulated. She failed to gain weight with nasogastric feeding and a PEG was placed which became infected. It was felt that enteral feeding was unsuccessful due to malabsorption and therefore total parenteral nutrition (TPN) was introduced. Subsequent subclavian and internal jugular vein lines resulted in episodes of sepsis. All were treated by line removal and peripheral intravenous antibiotics. Thereafter, attempts at subclavian cannulation failed. Imaging revealed an extensive network of established thrombus throughout the upper body. A thrombophilia screen was negative and anticoagulation continued. A further line was passed via the right external iliac vein into the IVC but

became infected and again was removed. Further imaging revealed a thrombosed IVC distal to the renal veins despite anticoagulation.

In July 2001, an arteriovenous 8 mm externally supported PTFE graft was inserted to provide access to the circulation for parenteral nutrition (see fig 1). Placement was determined by very limited availability of patent veins. The IVC was exposed through a right loin incision and the junction with the renal vein defined. The venous end of the graft was anastomosed to the IVC just caudal to the renal vein. The external reinforcement was removed from lengths of the graft where it would be appropriate for needling but left in situ where the graft crossed the costal margin. The graft was then tunnelled over the lateral chest wall towards the axilla and there anastomosed end on side to the axillary artery.

This allowed administration of hyperosmolar TPN solution by intermittent puncture with a non-coring 20 gauge injection site needle. The patient was taught self administration into the graft that remained patent 12 months after insertion. She was discharged from hospital in November 2001 with a body mass index of 22 kg/m<sup>2</sup>. She was monitored regularly and there were no positive cultures from the graft, but unfortunately she died of a stroke in August 2002.

### DISCUSSION

Chronic idiopathic intestinal pseudo-obstruction is a rare syndrome of ineffectual motility due to a primary disorder of the enteric nerve or muscle, resulting in the non-mechanic obstruction of the

small bowel or colon. Due to malnutrition, many require nutritional support, with a significant number receiving home parental nutrition (HPN).<sup>1</sup> When compared with other diseases underlying HPN, gut dysmotility is said to be more associated with line sepsis. Infected lines are the most common cause of thrombosis and as a result vascular access problems do occur.<sup>2</sup>

The use of a PTFE graft to create an arteriovenous shunt was first described in 1979 but may be more widely used in the future.<sup>3</sup> Complications of long term HPN remain catheter related sepsis and liver failure. Jeppesen *et al* reported 75% five year survival rates in a cohort of patients on HPN.<sup>4</sup> The ultimate treatment for intestinal failure remains small bowel transplantation. For those experiencing severe progressive complications of PN it is an established life saving therapy. Survival rates after intestinal transplantation have improved significantly over the past decade (54% at five years).<sup>5</sup>

Therefore, while small bowel transplantation remains the last resort in the treatment of intestinal failure, synthetic grafts may extend the utilisation of HPN, delaying and perhaps preventing the need for intestinal transplantation.

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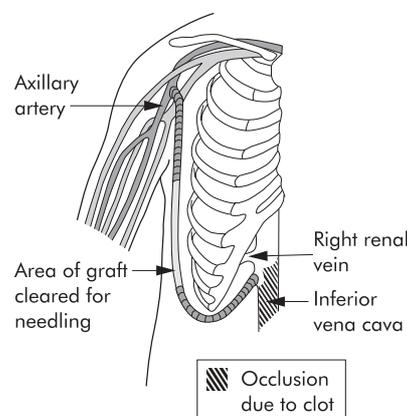
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**Figure 1** Diagrammatic representation of the polytetrafluoroethylene graft.