Cardiac tamponade—knowing how far to insert the wire

Sir,

It is instructive to read the report by Quinn and colleagues [1]. Many of the clinical features they describe mirror a similar case I previously reported and which they partially referenced [2]. In both cases, cardiac tamponade occurred following the rewiring of a central venous catheter and both the immediate clinical assessment and plain chest radiograph did not allude to the presence of this complication. It is reassuring that in their case, further imaging was performed and undue reliance was not placed on the chest radiograph, one of the key points to my original report. I am also pleased that Quinn and colleagues re-emphasize the fact that guidewires should not be inserted too far. They mention the use of graduated guidewires to reduce this risk, with which I would concur, but add the caveat that the user must still be aware of the distance that a wire can safely be inserted and the variation that occurs in persons of varying size [3].

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Treatment of severe theophylline poisoning with the molecular adsorbent recirculating system (MARS)

Sir,

Theophylline poisoning is a potentially life-threatening emergency. Successful treatment has been described with both haemodialysis and charcoal haemoperfusion. However, the efficiency of haemodialysis may be reduced, as theophylline is extensively protein-bound. We report a case of serious theophylline overdose successfully treated with the molecular adsorbent recirculating system (MARS).

A 45-year-old male presented following a deliberate overdose of 9 g of modified release aminophylline. On arrival, the patient was conscious and haemodynamically stable. Initial laboratory tests were within normal limits. Plasma theophylline levels collected at the time of arrival to the emergency department were 370 μmol/l (67 mg/l). Soon after initial assessment, the patient’s BP dropped to 89/50 mmHg. Despite aggressive resuscitation, he remained hypotensive.

Six hours after admission the patient was referred to Nephrology services. In view of the high theophylline levels (which had risen to >100 mg/l) and cardiovascular instability, it was decided to commence the patient on treatment with MARS (Gambro-Hospal, Mirandola, Italy). During MARS treatment theophylline levels decreased rapidly, as shown in Figure 1. In response, the patient’s BP rapidly improved. Following completion of an 8 h MARS treatment plasma theophylline levels remained low, although it was necessary to administer intravenous potassium and magnesium supplements.

Removal of theophylline from the circulation is possible with haemodialysis or charcoal haemoperfusion, because the drug has a small volume of distribution, although 50–60% is protein-bound. As such, haemodialysis is only moderately effective at removing theophylline, clearing approximately 50% of drug delivered to the dialyser [1]. Charcoal haemoperfusion is less widely available, will not correct electrolyte disturbances sometimes seen with theophylline toxicity and is associated with bleeding complications.

The MARS consists of a closed circuit containing an albumin-rich solution which permits diffusion of protein-bound and water-soluble substances from the patient’s circulation. The albumin solution is then regenerated by passing it through a standard dialyser plus ion-exchange and charcoal columns. MARS has been described as a treatment for poisoning with Amanita phalloides, paracetamol and phenytoin, but in all of these cases the poisoning was associated with fulminant hepatic failure [2–4]. Our case report demonstrates that MARS led to a rapid reduction in plasma theophylline levels and therefore was an effective alternative to the standard extracorporeal therapies. We hypothesized that MARS should remove both free and protein-bound theophylline, with the charcoal filter clearing additional drug over that removed by dialysis [5]. Certainly the presence of the charcoal filter was important in drug removal when MARS was employed in a case of phenytoin toxicity [3]. As can be seen from Figure 1, drug levels had fallen significantly by 4 h and it is possible that treatments shorter than 8 h may provide adequate drug removal.

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Fig. 1. Plasma theophylline levels in response to MARS treatment.
In conclusion, we have reported for the first time that MARS is an effective therapy for severe theophylline poisoning, with theoretical advantages over the current extracorporeal treatments.

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**Right superficial femoral artery to superior vena cava graft using a polytetrafluoroethylene graft: a new technique in a complicated dialysis access patient**

Sir,

The expansion of haemodialysis includes older patients with comorbidities, poor quality vessels, unsuitable for transplantation or peritoneal dialysis. Vascular access complications account for 20% of hospital admissions [1]. With exhausted sites in upper extremities, unusual sites for arteriovenous grafts formation are used [2]. The present case illustrates management of severe access difficulties with the first femoral artery to right atrium bypass graft for dialysis access.

A 44-year-old gentleman with end-stage renal failure had poor compliance, severe learning and behavioural difficulties, and failure of peritoneal dialysis and renal transplantation. Brachiocephalic arteriovenous fistulae, brachioaxillary arteriovenous fistulae, right brachial artery to left internal jugular vein bypass graft and finally right axillary artery to common iliac vein bypass graft had all previously failed. Central venous catheters were complicated by infection and thrombosis. He was referred for severe access difficulties.

Venography demonstrated bilateral axillary vein, superior vena cava (SVC), inferior vena cava (IVC) and femoral vein thrombosis. A right superficial femoral artery to vena cava (SVC), inferior vena cava (IVC) and femoral vein to iliac vein, thrombosis. A right superficial femoral artery to patent portion of the SVC at the junction with the azygos vein bypass graft was formed. The right atrium and SVC were dissected through a median sternotomy and pericardial incision. Common, superficial and profunda femoral arteries were dissected through a right femoral triangle incision. A subcutaneous tunnel was formed along the lateral aspect of the abdomen and chest wall for the 80 cm, 6 mm Intering PTFE GoreTedx graft. The top anastomosis was constructed end-to-side with the superficial femoral artery just after the profunda. The bottom anastomosis was formed just above the right atrium on the last centimetre of the SVC, after the connection of the azygos vein. The thorax was closed with steel wire. Post-operative care was in intensive care unit with dialysis using a femoral artery catheter. A fistulogram confirmed patency and ultrasound dilution monitoring with the Transonic device (Ithaca, NY, USA) was carried out bimonthly. The graft was successfully needed after 2 weeks, and the patient resumed his previous life. At 5 months, the inflow was <600 ml but the patient refused intervention.

We assumed that the azygos vein was patent, allowing the anastomosis to be made on the last centimetre of the SVC just above the right atrium, which reduced the risk of atrial or ventricular arrhythmias. Using the superficial femoral artery just after the profunda, rather than the common femoral artery for the top end anastomosis, reduced the risk of steal syndrome. Bimonthly access monitoring, with early referral for fistulogram is vital [3].

This illustrates an alternative dialysis access procedure in extreme circumstances. Right atrial bypass grafting was successful for central venous obstruction associated with upper extremity graft malfunction or thrombosis [4]. In different circumstances, radiological intervention may have prevented thrombosis. Complex mental health issues and long-standing difficulties in compliance ultimately led to graft failure.

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