and it thereby performs a double service. Henry plaques by aspiration before restoration of antegrade flow, angioplasty or stent placement, allows recovery of liberated needed to prevent atherosclerotic microemboli from passing function [5]. During the intervention, a measure was evidence of ischaemia, and to allow recovery of renal maintain normal renal architecture without any histological evidence of ischaemia, and to allow recovery of renal function [5]. During the intervention, a measure was needed to prevent atherosclerotic microemboli from passing distally into the renal capillary beds [6]. The GuardWire arm, a device for transient distal balloon occlusion during angioplasty or stent placement, allows recovery of liberated plaques by aspiration before restoration of antegrade flow, and it thereby performs a double service. Henry et al. announced that this new approach may end up being the standard of care in the near future [7].

An application of the PSGW system aimed at minimizing the effects of distal embolization is worthy of consideration in BRAO in ARF patients.

We would like to strongly recommend combining stent implantation with adjunctive distal protection, something essential for obtaining a complete restoration of distal blood flow in elderly patients with BRAO and azotemia, even if there is sufficient collateral blood flow.

Conflict of interest statement. None declared.

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Conventional haemodialysis significantly lowers toxic levels of phenobarbital

SIR,

Phenobarbital overdose management involves therapy designed to enhance elimination of the drug. Haemoperfusion is generally viewed as the most effective means for the removal of the drug [1]. We report a case of severe barbiturate overdose where haemodialysis led to a significant decrease in blood drug levels. We feel that this report illustrates that haemodialysis is an effective measure in the treatment of barbiturate overdose and that charcoal haemoperfusion cannot be considered as the sole indicated extracorporeal therapy.

A 79-year-old man was admitted in our ICU after phenobarbital overdose complicated by aspiration pneumonia. He was unconscious and needed mechanical ventilation. His blood pressure was 104/61 mmHg and heart rate was 120 beats/min. There was no focal neurological defect. Serum phenobarbital level at admission was 180 mg/l (therapeutic level: 15–30 mg/l). Haemodialysis was performed on day 1 for 6 h with an internal jugular dual-lumen catheter (Arrow, Reading, PA). A 1.1 m polyamide haemodialysis membrane (Polyflux S; Gambro, Hechingen, Germany) was used for the procedure. The blood flow rate was 180 ml/min and the dialysate flow rate was 500 ml/min. A second haemodialysis was performed for 4 h with the same membrane and parameters, except the blood flow value was 200 ml/min. Barbiturate blood levels were determined before and after each procedure and decreased from 53% and 38%, respectively (Figure 1). The patient was discharged from ICU on day 22, the prolonged hospitalization time was due to a Pseudomonas ventilator-associated pneumonia.

Whereas charcoal haemoperfusion is considered as the recommended form of extracorporeal therapy in phenobarbital overdose, its pharmacokinetic effects and feasibility remain a matter of debate. Haemodialysis, a widely available procedure in ICU, is also recommended when the phenobarbital level exceeds 150 mg/l [2], but its efficiency seems lower [3].

However, Palmer et al. showed that the use of a high-efficiency dialyser with high blood flow rates (400 ml/min) is effective for patients with life-threatening phenobarbital poisoning, leading to a 59% decrease in phenobarbital blood levels in 4 h. Nevertheless, the use of a high blood flow rate is

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Fig. 1. Phenobarbital levels during the hospitalization. The timing of the haemodialysis procedure is indicated. HD, haemodialysis.
not always possible in the acute setting, but our data show that conventional haemodialysis remains effective, leading to similar phenobarbital blood level reduction, and should be considered as a valuable therapeutic option in patients with severe phenobarbital overdose.

Conflict of interest statement. None declared.

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Possible involvement of cross-linking advanced glycation endproducts in long-term CAPD peritoneal degeneration

Sir,

It has been demonstrated that advanced glycation end-products (AGEs) are generated in the peritoneal tissue of continuous ambulatory peritoneal dialysis (CAPD) patients [1], and they are closely related to pathological phenomena, such as enhanced solute transport state, ultrafiltration failure (UFF) and mesothelial damage. Sclerotic degeneration of the peritoneum, known as ‘tanned peritoneum’, has been observed in patients undergoing long-term CAPD treatment; however, the exact mechanism of its progression has not been elucidated. In this respect, whether AGE formation and furthermore what kind of AGE is involved in this pathology is a question that has yet to be answered. Among the characteristics for AGEs, cross-linking with proteins is well known. To explain this cross-linking phenomenon, dimer formation by carbonyl compounds has been reported. For these cross-linking substances, glyoxal lysine dimer (GOLD) and methylglyoxal lysine dimer (MOLD) have recently been cited [2]. Therefore, in the present study, representative non-cross-linking AGEs [\(\text{N}^-\text{carboxymethyl}\text{lysine (CML)}\) and \(\text{N}^-\text{carboxyethyl}\text{lysine (CEL)}\)], as well as cross-linking AGEs (GOLD and MOLD), were evaluated in the peritoneal tissue of four patients undergoing regular dialysis, including one suffering from encapsulating peritoneal sclerosis (EPS).

The clinical characteristics of the four patients were the following: case 1 was a 60-year-old male treated with CAPD for 2 years. CAPD was then discontinued because of abdominal surgery unrelated to PD. Case 2 was a 56-year-old male who was on maintenance haemodialysis (HD) for 6 years. He had never undergone PD. He succumbed to septicemia caused by a pacemaker wire-related infection. Case 3 was a 57-year-old male on CAPD for 6 years. This treatment was subsequently discontinued due to UFF. Case 4 was a 59-year-old male on CAPD for 12 years. He was switched to HD because of UFF and developed EPS 1 year later. He received a corticosteroid treatment for 6 months, which failed to relieve ileus symptoms. Two years after the development of EPS, surgical enterolysis was performed. Tissue samples were collected from the parietal peritoneum of cases 1, 2 and 3. In case 4, the sclerotic serosa over the terminal ileum (a and b) was collected from a sample resected during surgery. The histological finding in case 4 was a thick sclerosis of the ileal surface with new collagenous layers over the surface and hyper-vascularization.

\(6\ \text{N HCl}\) was added to samples, and they were completely hydrolysed for 24 h at 110°C. Then the product was concentrated by evaporation under reduced pressure to measure AGEs (CML and CEL:GC-MASS measurement, GOLD and MOLD:HPLC method). The results of the analysis for each AGE are shown in Figures 1 and 2. Non-cross-linking AGEs (CML and CEL) and cross-linking...