manifest, and which could determine a variety of structural changes with different effects upon transporter activity – thus giving rise to clinical conditions of different degrees of severity.[4]

It should be pointed out that the diagnosis is established in adult life, with scant prior clinical expression. This contrast with the severity of hypopotassemia and hypomagnesemia, and the usually intense physical activity of the patients – reflecting the scant correlation found in most cases between the biochemical alterations and the clinical picture.[5] Therefore, this diagnosis must be considered in all cases of hypopotassemia with inappropriately high potassium elimination in urine, in the absence of arterial hypertension. The condition was initially not suspected, despite the recording of a plasma potassium concentration of 1 mEq/l (infrequent even in severe diarrhea), because of the lack of a urinary potassium measurement that constitutes a key element in the diagnosis.


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## Extravascular misplacement of the tunneled hemodialysis catheter

*Nefrología* 2008; 28 **(6)** 660-661

**To the editor:** The use of central venous catheters for long-term vascular access is an increasingly common practice. The most frequent complications associated with the use of such catheters include aspects relating to their insertion.[1]

We report two complications of tunneled catheter placement. In both cases the catheter was successfully removed in the operating room.

### CASE 1

A 58-year-old male presented with chronic kidney failure secondary to diabetic nephropathy, subjected to hemodialysis since April 2006 through a tunneled catheter inserted in the right innominate vein. The patient was admitted to our Service on December 20, 2006, due to sepsis probably related with the catheter. Despite antibiotic treatment, the fever failed to subside, and the catheter was therefore removed. Following clinical improvement of the patient, an attempt was made to tunnel a new catheter to the right innominate vein. The vein was punctured, and after drawing blood of venous appearance, the catheter was positioned. The catheter failed to function, however, and chest X-rays revealed an extravascular position of the tip, with a right pneumothorax. Withdrawal in the operating room was decided jointly with the Services of Chest Surgery and Vascular Surgery.

Following contrast administration via the axillary vein, the catheter was seen to traverse the subclavian vein (fig. 1a). Removal of the former was then carried out under imaging control. The post-withdrawal radiological control revealed linear contrast leakage tracing the cathe-

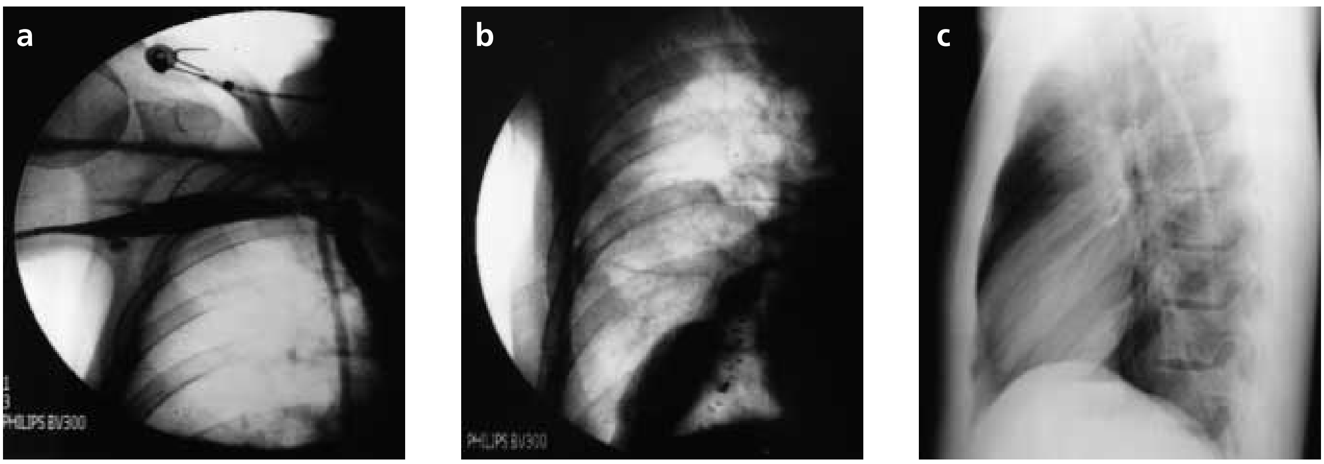


**Figure 1.** a) Catheter traversing the subclavian vein; b) Contrast leakage following withdrawal; c) Radiological control after catheter insertion in the right innominate vein.

ter trajectory and accumulating within the pleural cavity (fig. 1b). A right infraclavicular incision was made for direct compression of the subclavian vein and the application of hemostatic material. The vein leakage was seen to disappear, and a right pleural drain was placed - followed by a favorable clinical and radiological course.

## CASE 2

A 19-year-old male presented with chronic renal failure secondary to acute renal failure in the context of meningococcemia. A left radiocephalic fistula was prepared on March 27, 2007, with poor venous development. In view of the need to start dialysis, tunneled catheter placement was programmed for May 18, 2007. Following vein puncture and the drawing of blood of venous appearance, the catheter was positioned but was found to function poorly. The chest X-rays showed the catheter tip to be located in a right paravertebral position, with no firm evidence of pneumothorax (fig. 1c). Emergency surgical removal was carried out, with no evidence of leakage at phlebographic control.

Since 1996, we access the right internal jugular vein as described by Apsner et al.[2] for the placement of tunneled catheters, since localization is easy and the procedure has few complications. Puncture is carried out at the confluence between the right internal jugular vein and the subclavian vein, at the so-called right innominate vein. We use fluoroscopic control only in those cases presenting insertion difficulties. In the 10 years during which we have applied this technique, there have been few complications – the above two cases being the only examples of extravascular positioning registered in our experience.

In our review of the subject, we have found few cases of extravascular placement of central venous catheters for hemodialysis.[3] Complications of this kind could be avoided by using ultrasound or fluoroscopic control on a systematic basis.


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# Improvement of intradialytic arrhythmias after combined conductivity and ultrafiltration profiling without secondary overhydration

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**To the editor:** Hemodynamic instability (arrhythmias, hypotension) is one of the most frequent complications found during dialysis. For years, the usefulness of ultrafiltration and/or conductivity profiling to prevent the appearance of such problems has been the subject of debate.

We report the case of a 75-year-old male initially subjected to peritoneal dialysis due to chronic renal failure secondary to diabetic kidney disease who required transfer to hemodialysis because of peritonitis, with a poor course one year after treatment. After starting hemodialysis, and as a result of nutritional problems, dry weight began to decrease (over 4 kg), with good hemodynamic tolerance. However, after two months the heart rate – which at the start of the session was 60-70 bpm – suddenly increased in the last hour to 110-120 bpm. In some cases this situation was accompanied by severe hypotension. Continuous electrocardiographic monitorization of several hemodialysis sessions was thus decided. In the first three hours the patient showed sinus rhythm with a heart rate of 60-70 bpm, though after the third hour rapid atrial fibrillation was recorded that only reverted after conclusion of the dialysis session. The previous and posterior blood pressure values remained at 120-130/70-80 mmHg. In view of this situation, the dialysis machine conductivity and ultrafiltration parameters were changed during the session, applying a descending logarithmic profile for conductivity (start 15.7 mS/cm, end 13.8 mS/cm) and ultrafiltration (dialysis previously being carried out with a constant conductivity of 14.2 mS/cm). This measure improved tolerance during the sessions, with no severe hypotension and presenting a stable heart rate. Over the following four months the patient gained 2 kg in dry weight, but the blood pressure did not increase (110-120/70 mmHg); no antihypertensive medication was needed, and no edema or other signs of volume expansion were noted. Likewise, there were no increases in pre-dialysis sodium level (134-135 mEq/l in the determinations with constant conductivity at 14.2 mS/cm versus 135 mEq/l in those made with the exponential profile).

The use of conductivity and ultrafiltration profiling during hemodialysis has been studied by a number of authors. The objective of such profiling is to improve hemodynamic tolerance by preventing vascular depletion secondary to sodium loss during dialysis.[1] However, the different series found in the literature report quite variable results – reflecting the use in many cases of very different profiles. Some studies have reported no significant differences in hemodynamic tolerance on applying combined conductivity and ultrafiltration profiles.[2] Other studies involving linear profiles starting with high conductivities (15-15.5 mS/cm) and ending with values close to 14 mS/cm have observed a reduction in hypotensive episodes – though at the