be based on academic and research criteria excluding the students’ role. Therefore, we introduce an index for student participation, defined as the number of publications in which students share the authorship, divided by the total number of students of a given university in the preceding year. This could be an additional criterion for university rankings through which the role of students may be further illuminated.

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Editorial Note: Drs Charon and Wauters declined the invitation to reply to this letter.

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Cardiovascular abnormalities in patients with epilepsy receiving renal replacement therapy with dialysis: a true convergence of clinical cardiology, nephrology and neurology

Sir,
We read with great interest a very comprehensive review article entitled ‘Kidney disease in cardiology’ by Professor Charles Herzog [1] published in the January issue of Nephrology Dialysis Transplantation.

Epilepsy is the most common serious neurological condition. Approximately 50 million people worldwide have epilepsy [2]. In the United States each year, ~100 000 new cases of epilepsy are diagnosed [3,4]. In the UK between 1 in 140 and 1 in 200 people (at least 300 000 people) are currently being treated for epilepsy [5]. Epidemiological studies suggest that between 70 and 80% of people developing epilepsy will go into remission, while the remaining patients continue to have seizures and are refractory to treatment with the currently available therapies [6,7]. The most common risk factors for epilepsy are cerebrovascular diseases, brain tumours, alcohol, traumatic head injuries, malformations of cortical development, genetic inheritance and infections of the central nervous system [8]. In resource-poor countries, endemic infections, such as malaria and neurocysticercosis, seem to be major risk factors [9]. Moreover, the risk of death for a person with epilepsy increases 2- to 3-fold when compared with the risk for the general population [10,11]. Information concerning risk factors for premature death in epilepsy is conflicting, but potential risk factors include age and gender, seizure type and epilepsy syndrome, duration of epilepsy, severity of epilepsy, and congenital neurological deficits and learning disabilities [10]. Additionally, the underlying pathophysiology of premature death in epilepsy is unknown; however, it is very probable that cardiac arrhythmia plays a potential role. In this way, Rugg-Gunn and colleagues, using implantable loop recorders, demonstrated that some patients with refractory partial epilepsy may have potentially life-threatening cardiac arrhythmias [12]. Moreover, it has been established that repetitive seizures can alter the regulation of cardiac activity by the autonomic nervous system (ANS), and ANS dysregulation is thought to be associated with higher morbidity and mortality in patients with epilepsy [13]. From an experimental point of view, a recent study by our group evaluated the heart rate, in vivo (ECG) and isolated ex vivo preparation (Langendorf preparation), of rats with epilepsy [14]. The results showed differences in the mean heart rate in vivo, but surprisingly, no differences in the heart rate could be observed in the isolated ex vivo situation, suggesting a central nervous system modulation on the heart, which could result in cardiac death in epilepsy [14].

In accordance with this reasoning, we postulated the following question: is there a possible relation between epilepsy, renal dysfunction and cardiovascular abnormalities? Cardiac disease is the major cause of death in patients with end-stage renal disease (ESRD), accounting for ~43% of all deaths [15,16]. In dialysis patients, ~20% of cardiac deaths are attributed to acute myocardial infarction, a catastrophic clinical event in this group of patients [15,17]. In parallel, an estimated incidence of seizure of ~10% in patients with chronic renal failure has been reported [18]. In addition, Plum and Posner [19] also noted that convulsions occurred in one-third of patients with ESRD and was frequently a preterminal event. The seizures in this series were usually generalized tonic–clonic type; however, the mechanism of reduced seizure threshold in renal failure is still unknown. Haemodialysis-associated seizure (HAS) is a common complication of haemodialysis [20]. HAS occurs in 7–50% of children with ESRD, and their seizures are usually reported as generalized tonic–clonic seizures [21]. Risk factors for HAS include young age, prior history of seizures, malignant hypertension, microvascular diseases, uraemic encephalopathy and cardiomyopathy. Moreover, induced brain-water disequilibrium, hypocalcaemia, uraemic toxins, the use of acetate in the dialysate, intracranial haemorrhage due to systemic heparinization, treatment with recombinant erythropoietin, homodynamic and metabolic defects, and drugs such as penicillin and theophylline are also considered responsible for HAS [21,22,23]. If all these data are taken together, information on the management of seizures in renal failure should be disseminated among professionals treating systemic diseases. In the mean time, there is an urgent need for a large-scale, prospective, international, community-based study of cardiovascular abnormalities in patients with epilepsy receiving renal replacement therapy with dialysis to explore more closely the risk factors so that preventive strategies can be planned.

Finally, we express our congratulations to Professor Herzog for the stimulating review [1] and we are totally in agreement with his conclusion that with regard to kidney
disease in cardiology, it should be apparent that a true convergence of clinical cardiology and nephrology has to exist; however, we also believe that neurology could be added in this context.

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Reply

Sir,

I thank Drs Scorza, Arida and Cavalheiro for their kind comments and interesting letter. Their letter underscores the importance of cerebrovascular disease in ESRD patients, an area (in my opinion) that has not yet garnered the attention it deserves in relation to its clinical importance. In particular, I would highlight the issue of dementia and cognitive decline as a topic of critical interest for clinicians and patients.

Our correspondents’ point on the convergence of neurology, cardiology and nephrology is well taken, as the underlying mechanisms of microvascular disease are likely to overlap in the brain, heart and kidney.

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Cardiovascular Special Studies

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Radio-opaque appearance of lanthanum carbonate in a patient with chronic renal failure

Sir,

We have read an interesting case report concerning an X-ray finding in a patient taking lanthanum carbonate [1]. David et al. explain the opacification on radiographs by intestinal calcium phosphate accumulation. However, such strong opacification with a CT density of 3000 HU (Hounsfield value) has not been found in patients taking other types of phosphate binders including those containing calcium (CT density of bone 600 HU). In our opinion, there might be another explanation of this finding. Below, we describe a case of radio-opaque appearance of lanthanum in a patient taking this phosphate binder.

A 77-year-old man was admitted to a hospital for renal failure caused by complete obstructive ureterolithiasis in the solitary kidney. Haemodialysis was indicated due to elevated renal parameters (urea 28.0 mmol/l, serum creatinine 1079 µmol/l, phosphorus 2.45 mmol/l). Treatment with lanthanum carbonate was started in order