tacrolimus and prednisolone. Four months post-transplant, a sudden rise in bHCG to 199 iU/l was noted. A CT scan of the chest, abdomen and pelvis was reported as normal, and he had a normal ultrasound scan and biopsy of his remaining testicle. However, a positron emission tomography (PET) scan revealed an intense focus of uptake in the left supraclavicular fossa (Figure 1). A high resolution CT and fine needle aspiration of a tiny lesion in this area showed recurrent seminoma. He was given chemotherapy with etoposide, bleomycin and carboplatin in three cycles, followed by local radiotherapy. Two years later he is well with serum creatinine of \( \sim 100 \mu \text{mol/l} \), with no evidence of tumour recurrence.

Germ cell tumours are the most common cancers in young men and are highly amenable to treatment, with cure rates of \( \sim 90\% \). Testicular neoplasms are 20–50% more prevalent amongst immunosuppressed patients when compared with controls. Low levels of bHCG are seen in only 10–25% of seminomas. After orchidectomy and radiotherapy a 1–2% relapse rate is quoted. Testicular neoplasms are more prevalent among organ transplant recipients. There is a lower recurrence rate in renal compared with cardiac allograft recipients [1], suggesting that tumour surveillance is impaired proportionally to the degree of immunosuppression. This patient had a very unusual presentation for his seminomatous recurrence, with the rise in bHCG, which could be explained simply by an increase in tumour load. The focus of recurrence was at a distant site from the primary cancer, so it is possible that there were further seeded metastases that were not picked up by the imaging but that contributed to the tumour marker concentration at the time of recurrence. The small proportion of producing bHCG seminomas may behave clinically as non-seminomatous germ cell tumours (NSGCT). The threshold value many clinicians use to suggest NSGCT is a bHCG level of 200 iU/l [2].

The dramatic rise in bHCG prompted careful diagnostic surveillance scans, which failed to detect recurrence at this stage. It was only with PET scanning that we localized the metastatic area. A higher sensitivity (70 vs 40%) and specificity (100 vs 78%) has been reported for PET vs CT scanning, with \( \sim 100\% \) specificity and positive predictive values for metastases >5 mm with PET. However, it is not reliable in differentiating between fibrosis and residual tumour mass [3].

There is a paucity of data on the effects of radiotherapy on the peritoneum, but what is available suggests it can cause an increase in permeability of the peritoneum to water causing a loss in ultrafiltration or haemoperitoneum [4]. This did not occur in our patient and his PD prescription remained unchanged throughout his treatment.

Cisplatin is the most effective agent against seminomas and metastatic disease, and there are reports of successful treatment of renal transplant recipients with this drug [5]. However, due to the well documented nephrotoxicity of cisplatin, we chose to use carboplatin, and this caused no problems with graft function. The sequelae of chemotherapy on a transplanted kidney is not necessarily seen immediately and cases of renal deterioration up to 6 years post chemotherapy have been reported, but after time it becomes difficult to identify whether the chemotherapy agent is the culprit. We also considered renoprotection using sodium thiosulphate and N-acetylcysteine [6], but were worried about reducing the anti-tumour properties of the drugs.

In summary this patient with a germ cell tumour had no PD problems after standard radiotherapy, but had an unusual presentation of recurrence. PET scanning is strongly suggested if recurrence is suspected. Transplantation did not interfere with modified standard chemotherapy, with a good outcome from tumour and transplant.

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Severe theophylline intoxication: a delay in charcoal haemoperfusion solved by oral activated charcoal

Sir,

During the 1980s, clinicians worldwide were more frequently confronted with patients experiencing the effects of a theophylline intoxication than nowadays. However, while theophylline is still on the market, intoxications of theophylline can occur...
in chronic users as well as in acute overdoses [1]. The haemodynamic and neurological side effects in particular can result in significant morbidity and mortality [2]. Haemoperfusion with a charcoal filter is an established and efficient technique for removal of theophylline [3]. However, oral activated charcoal can also be very effective in lowering serum levels of theophylline, as we experienced while treating a patient with an overdose.

Case. A 22-year-old female was brought to the Emergency Department 6 h after ingestion of 20 g of sustained-release theophylline in a suicide attempt. She had not used theophylline before. The patient complained of nausea and experienced palpitations. Further medical history was insignificant. Laboratory investigation revealed a hypokalaemia (2.4 mmol/l) and a theophylline serum level of 105 mg/l.

After admission to the intensive care unit, she was sedated, intubated and mechanically ventilated in order to administer charcoal by gastric tube as severe nausea and vomiting were unresponsive to anti-emetics. The charcoal was given in three doses, in a total dose of 150 g. To accelerate enteral passage, magnesium sulfate was given by nasogastric tube until charcoal was seen in the stool 2 h later. One hour after admission, the patient experienced severe hypotension and possible epileptic activity, treated withcolloids, inotropes and pentobarbital, respectively.

Due to technical difficulties, there was a significant delay of 6.5 h in the start of haemoperfusion since the first measured theophylline serum level. During this time, the patient received oral activated charcoal and the serum theophylline level dropped from 105 to 48 mg/l. Additional clearance by haemoperfusion induced a drop to 24 mg/l; at that time, haemoperfusion was stopped. The following day, sedatives were stopped and the endotracheal tube removed; she made a full recovery.

Discussion. Oral activated charcoal is a well-established therapy for treatment of theophylline intoxication [4]. The effects of ingested charcoal are multiple: in addition to decreasing gut absorption, the ingested charcoal results in transluminal drug clearance from the systemic circulation [4,5]. The only contra-indications for the use of oral activated charcoal are ileus and co-ingestion of caustics. Magnesium sulfate was given because cathartics can reduce the risk of bowel obstruction [5]. Cathartics also decrease the transit time of charcoal, thereby preventing reabsorption of theophylline. Intractable vomiting is one of the major reasons for failure of oral activated charcoal therapy. Besides respiratory failure, intractable vomiting can in itself be an indication for sedation and ventilatory support. In this case, oral activated charcoal was a very effective way to remove theophylline, resulting in a >50% reduction in the theophylline serum level.

Conflict of interest statement. None declared.