explanation appears unlikely as sevelamer is not absorbed by the gastrointestinal tract and thus is devoid of any systemic effect.

Previous studies have shown that sevelamer does not affect absorption of digoxin, warfarin, enalapril or metoprolol [2,3]. Sevelamer does affect the bioavailability of ciprofloxacin [4]. Recently Guillen-Anaya reported an interaction between sevelamer and cyclosporin A [5].

The primary amine groups of sevelamer are responsible for the phosphate binding. These amine groups become protonated at physiological pH ($pK_a = 9.5$) [6], are therefore cationic and bind negatively charged phosphate ions. This results in lower serum phosphate concentrations. Furosemide is anionic at physiological pH ($pK_a = 3.9$) [7] and can therefore bind to sevelamer at physiological pH.

We observed that sevelamer can decrease the diuretic action of furosemide when they are administered at the same time. This interaction can be avoided by taking the drugs at different times.

If this interaction occurs, the physician may erroneously conclude that the remaining diuresis has declined and may stop the diuretic therapy prematurely.

The consequences of this interaction have to be explored further in clinical practice.

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A rare case of alveolar haemorrhage due to malignant hypertension

Sir,

We describe a patient with an alveolar haemorrhage that probably arose due to malignant hypertension. A 26-year-old man noticed a cough with clear sputum 10 days before admission to the hospital. Six days before admission, he flew from Miyazaki to Osaka, and returned 4 days before admission. Two days before admission, he developed exertional dyspnoea and haemoptysis. He had at least a 3 year history of hypertension, but treatment was not administered.

Upon admission, his vital signs were as follows: blood pressure, 210/150 mmHg; pulse rate, 128 beats/min and respiratory rate, 32/min. A fundus revealed severe hypertensive changes consisting of retinal haemorrhage, soft exudates and papilloedema. Laboratory data revealed 3.1 mg/dl creatinine, 2.2 g/dl albumin, haemoglobin 13.0 g/dl, platelets $6.0 \times 10^4/\mu l$, C-reactive protein 20.0 mg/dl, haptoglobin <8 mg/dl, and the absence of antinuclear antibody, MPO-antinuclear cytoplasmic antibody (ANCA), PR3-ANCA and anti-glomerular basement membrane antibody. Plasma renin activity was 31.2 ng/ml/h and plasma aldosterone concentration was 492 pg/ml. Ultrasonic cardiograph revealed a conspicuous thickening of the left ventricular wall (LVPWTd 22 mm).

Bronchial intubation and mechanical ventilation was applied, since the patient had become drowsy during admission. Chest computed tomography examination showed a prominent bilateral dense pulmonary infiltration indicating alveolar haemorrhage. Bronchoalveolar lavage (BAL) fluid contained increased numbers of red blood cells. Hypertension was controlled at ~150/90 mmHg with a calcium antagonist, β-blocker and angiotensin II blockade. We performed a kidney biopsy and obtained 30 glomeruli. The capillary walls of almost all of them were thickened and wrinkled. Crescent formation was absent. A small artery showed 'onion peel' thickening with a narrowed lumen. An immunofluorescent study did not detect immunoglobulin or complement deposition.

The mechanism of how malignant hypertension can cause alveolar haemorrhage remains unclear, but humoral factors might be involved in the alveolar capillaries [1]. A careful review of the patient's medical history showed that the symptoms worsened after flying to Osaka. Since planes on this route travel at 8000 m, the patient would have been subjected to the equivalent of ~2000–2500 m of altitude and 0.7–0.8 atm of air pressure [2]. We supposed that this patient had mild congestive heart failure and/or airway inflammation, that could cause more hypoxia than in normal subjects. High-altitude pulmonary oedema is a life-threatening condition caused by rapid ascent to altitudes >2500 m [3]. Grissom *et al*. described a patient who developed high-altitude pulmonary oedema after rapidly ascending a mountain [4] and in whom BAL findings confirmed alveolar haemorrhage. We speculated from these reports and the present findings that flying at high altitude could trigger alveolar haemorrhage in the presence of underlying conditions such as malignant hypertension, mild congestive heart failure and airway inflammation.

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A case of leptospirosis presenting with end-stage renal failure

Sir,

Leptospirosis is a zoonosis caused by spirochetes. Information concerning leptospirosis-induced end-stage renal failure (ESRF) is very scarce [1]. This report describes a young male patient presenting with leptospirosis who continued as a chronic haemodialysis patient despite treatment for leptospirosis.

A 21-year-old, previously healthy man, a farmer by profession, was brought to the Emergency Room on March 20, 2004 by relatives due to high fever, headache, nausea and vomiting, and constant sleepiness. At admission, he was lethargic and clinically dehydrated. At physical examination, conjunctival congestion and petechia in the soft palate region were observed. Pupils were symmetric and reactive. No meningism was noted. Axillary temperature was 37.8°C, blood pressure was 130/90 mmHg and heart rate was 88 beats/min. Initial laboratory evaluation showed leukocyte levels of 4200/mm^3 with a fraction of 86% polymorphonuclear cells, haemoglobin at 9.2 g/dl, thrombocytes at 62 000/mm^3, serum urea at 474 mg/dl, creatinine at 17.8 mg/dl, albumin at 3.5 g/dl, uric acid at 10.2 mg/dl, serum sodium at 127 mmol/l, potassium at 8.8 mmol/l, calcium at 8.9 mg/dl, phosphorus at 6.1 mg/dl and proteinuria of 1750 mg/day. Liver function tests, and the levels of serum glucose, lactate dehydrogenase and creatine kinase were normal. Arterial blood gases were pH 7.25, HCO_3^- 8.5 mmol/l, pO_2 114 mmHg and pCO_2 22 mmHg. Urinalysis showed microscopic haematuria, and leukocyturia. The daily urine volume was 3000–5000 ml. Blood and urine cultures were sterile. Serum antibodies for brucella, salmonella, toxoplasmosis, cytomegalovirus, Epstein–Barr virus and hantavirus were negative. At bone marrow biopsy, megakaryocytes were reduced. Haemodialysis treatment was immediately initiated. In addition, empirical antibiotic therapy was started using cefoperazone/sulbactam.

His relatives stated that he lived in the south of Turkey, which has a temperate climate, and that 20 days previously he had worked without gloves in an irrigation channel containing river water.

Leptospirosis was investigated 10 days after the patient's admission due to high fever, haematological and renal abnormalities. No leptospira were seen in the blood under dark field microscopy. *Leptospira icterohaemorrhagiae* and *Leptospira australis* were positive by macrotube agglutination (Danke-Seien) test. Leptospira immunoglobulin M (Ig M) was positive by enzyme-linked immunosorbent assay (ELISA). Blood samples were screened for anti-leptospiral IgM antibodies using a *Leptospira*

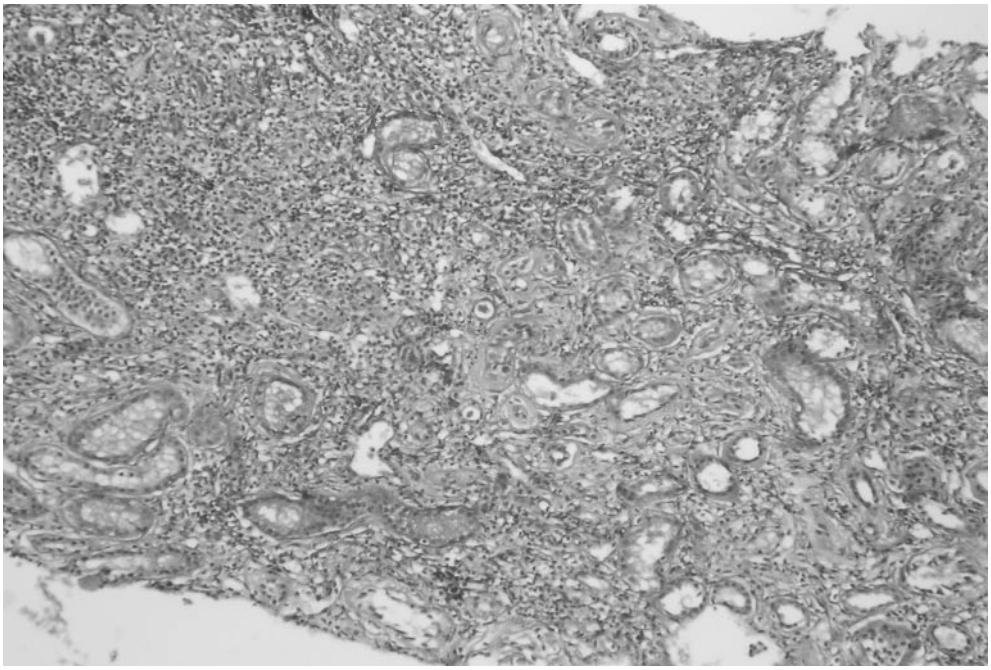

Fig. 1. Interstitial mononuclear cell infiltration and mild fibrosis in the first kidney biopsy specimen [Trichrome staining (Gomori), ×10].