Table 1. Effect of vitamin K₁ supplementation on calcium metabolism of hemodialysis patients

<table>
<thead>
<tr>
<th></th>
<th>Normal range</th>
<th>Start of study</th>
<th>3 Months</th>
<th>6 Months</th>
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</thead>
<tbody>
<tr>
<td>Vitamin K₁ (µg/l)</td>
<td>0.15–1.55</td>
<td>2.2 ± 2.8</td>
<td>12.1 ± 15.1*</td>
<td>7.9 ± 8.2*</td>
</tr>
<tr>
<td>iPTH (pmol/l)</td>
<td>1.2–4.0</td>
<td>26.3 ± 17.5</td>
<td>29.3 ± 19.0</td>
<td>32.4 ± 20.5</td>
</tr>
<tr>
<td>bAP (µg/l)</td>
<td>6–22</td>
<td>11.4 ± 6.2</td>
<td>12.7 ± 8.7</td>
<td>11.4 ± 7.6</td>
</tr>
<tr>
<td>Calcium (mmol/l)</td>
<td>2.25–2.60</td>
<td>2.21 ± 0.17</td>
<td>2.20 ± 0.15</td>
<td>2.17 ± 0.13</td>
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<tr>
<td>Phosphate (mmol/l)</td>
<td>0.8–1.4</td>
<td>1.87 ± 0.54</td>
<td>1.90 ± 0.47</td>
<td>1.90 ± 0.49</td>
</tr>
</tbody>
</table>

*P<0.01 vs start; †P<0.05 vs start by ANOVA; bAP, bone alkaline phosphatase; values are mean ± SD; vitamin K₁ was measured as described previously [9].

In summary, the intake of 2 mg vitamin K₁ resulted in a several-fold increase in serum vitamin K₁ demonstrating good intestinal absorption of the drug. Nevertheless, there was no statistically significant effect on plasma iPTH during the study. In absolute numbers, mean iPTH rose by 23% during 6 months. Clinical experience suggests that this corresponds to progression of hyperparathyroidism in the absence of medical suppression of parathyroid function. An inverse correlation between vitamin K₁ and iPTH as reported previously [7] was not present under the conditions of this study.

Among currently available bone markers, the combined measurement of iPTH and bAP most accurately predicts bone turnover in dialysis patients [8]. According to those criteria, vitamin K₁ did not influence bone turnover in haemodialysis patients. Theoretically, aluminium overload might interfere with the interpretation of the results. None of the patients had been exposed to aluminium-containing phosphate binders. The dialysis water was treated by reverse osmosis and was virtually aluminium-free. Thus, a clinically relevant aluminium overload can be excluded.

Confounding factors cannot be formally excluded in this prospective observational study; however, several lines of evidence argue against the presence of clinically important confounding factors. The 6-month study period was certainly sufficient to induce changes in bone turnover and/or parathyroid function. In most studies with active vitamin D metabolites, a significant reduction of iPTH could be achieved within 3 months. Another argument might be that mostly hyperparathyroid ‘non-responders’ with autonomous parathyroid function had been studied. Risk factors for autonomous parathyroid function are long-standing end-stage renal failure, uncontrolled phosphate metabolism and excessively high plasma iPTH. In the current study, patients were less than 2 years on dialysis, had well controlled serum phosphate and moderate hyperparathyroidism.

Taken together, the present results argue against a clinically important effect of a 2 mg vitamin K₁ supplementation on calcium and bone metabolism in haemodialysis patients. Formal proof of that assumption can only be obtained in a controlled study.

Acknowledgements. This study was supported by RenaCare Nephromed Bartz GmbH, Hüttenberg, Germany.

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Pulmonary migration of a vascular stent

Sir,

A 57-year-old male patient was sent from another hospital to be included in the renal transplant list. He had been diagnosed of adult polycystic disease 14 years before. The renal function deteriorated and a radiocephalic arteriovenous fistula was performed in the left arm in October 1995. In October 1996 because of poor function (blood flow during haemodialysis below 200 ml/min) an arteriographic study was performed. The angiogram showed a stenosis of 2–3 cm length in the venous side of the fistula. During the procedure a transulminal angioplastia of the stenosis was performed and a Wallstent (Schneider, Switzerland) was placed in the stenotic area. The function of the fistula was restored, the blood flow reached during haemodialysis was up 300 ml/min and the patient presented no problems with the procedure.

In a routine X-ray film in March 1997, the stent was localized in the right lung (Figures 1 and 2), tenth segment. The function of the fistula was restored, the controlled study. blood flow during haemodialysis was up 300 ml/min and the patient presented no problems with the procedure.

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Can telemedicine contribute to the expansion of home haemodialysis?

Sir,

Recently in your journal Mackenzie and Mactier described past and present home haemodialysis (HD) and for the future they anticipated that: ‘home HD as universally available cost-effective mode of dialysis may be best secured by centralizing training and support facilities in one centre in each geographical region’ [1].

We agree with the authors’ anticipations and for this reason we are working on a research project called HOMER-D (home rehabilitation treatment-dialysis), which is supported by the European Union.

The ultimate goal of HOMER-D is to develop, apply and validate telematic monitoring services (TMS) for supporting end-stage renal disease patients, who need home, or satellite HD. The system’s architecture includes two main components: the central control station (CCS) to be used by nephrologists and nurses and the modified HD machine in patients’ homes, to be used by patients and their partners. The telemonitoring of patient’s HD and self-management actions, and the remote care from doctors in our system is succeeded by bi-directional communication links (Integrated Service Digital Networks—ISDN), between the CCS (UNIX workstation with multimedia PC-terminal) and modified HD machine (multimedia PC-terminal) in the patients’ home.

In this system, an on-line remote supervision of the HD machine related functions and the clinical condition of the patients, through measurements of blood pressure (BP), pulse rate, PO$_2$ (pulse oxymetry) and electrocardiogram (ECG) are managed by the CCS.

For the clinical trials by this form of HD, two HD machines, modified for the project, were installed in the renal unit and the CCS was established in another room in the hospital. In a 4 month period we performed about 100 HD sessions in two patients using this system. During the clinical

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Fig. 1. Lateral X-ray chest film showing the stent in the 10th segment of the right lung (arrows).

Fig. 2. Postero-anterior X-ray chest film showing the stent in the low pulmonary right field (arrows).

Fig. 3. Amplified view of the Figure 2 (arrows).