Spontaneous bilateral rupture of quadriceps tendon: first case in short daily haemodialysis

Lilian Pires Freitas Carmo¹, Rodrigo Azevedo Oliveira¹, Hugo Abensur¹, Manuel Carlos Martins Castro² and Rosilene Motta Elias¹

¹Division of Nephrology and ²Hospital das Clinicas, University of Sao Paulo School of Medicine, São Paulo, SP, Brazil

Correspondence and offprint requests to: Rosilene Motta Elias; E-mail: rosilenemotta@hotmail.com

Abstract
Spontaneous bilateral rupture of quadriceps tendon in patients with chronic renal failure is a rare event. All patients reported until now had been on conventional haemodialysis three times a week. We report the first case of a patient on short daily haemodialysis (SDH) with hyperparathyroidism who refused surgical treatment. The serum alkaline phosphatase level had been increasing continuously until the day of tendon rupture. This report alerts about this diagnosis and also emphasizes the continuous increase in the serum alkaline phosphatase level prior to the tendon rupture. Even among well-dialysed patients, on SDH, spontaneous tendon rupture can occur.

Keywords: alkaline phosphatase; daily haemodialysis; hyperparathyroidism; quadriceps tendon rupture

Introduction
Spontaneous bilateral rupture of quadriceps tendon in patients with chronic renal failure is a rare event [1]. All patients reported to date have been on conventional haemodialysis three times a week. We report a case of a young male patient with end-stage renal disease on short daily haemodialysis six times a week who developed spontaneous bilateral rupture of quadriceps tendon.

Case report
A 37-year-old man was admitted to the emergency room after presenting with acute severe knee pain with inability to support his weight, causing falls whilst walking. He could not bear weight on his feet and was unable to walk. He denied any history of trauma or previous fracture. On examination, both knee joints were tender and swollen with a restricted range of movement. The diagnosis of bilateral simultaneous rupture of quadriceps tendons was confirmed by knee radiographs that showed inferior patellar displace-

ment. The underlying cause of renal failure was glomerulonephritis. The patient had never taken quinolones. He had received conventional haemodialysis three times per week for 1 year, and then he switched to short daily haemodialysis six times per week in the last 5 years. In this period, he presented a weight gain of 5 kg. The calcium content of the dialysate was adjusted to 1.75 mmol/L, which provided a positive balance of calcium. The calcium levels observed during all periods under short daily haemodialysis were strictly regular (minimal 9.6 mg/dL). Since the beginning of the conventional renal replacement therapy, a severe hyperparathyroidism was diagnosed. The clinical treatment was initiated; however, it was not enough to control the disease. Surgical treatment was indicated, but the patient refused. His essential laboratorial exams are presented in Table 1. Serum alkaline phosphatase level had been increasing continuously until the day of tendon rupture (Figure 1). The tendons were surgically repaired and cast immobilization was maintained for 3 weeks. The patient is still in a rehabilitation programme and has agreed to undergo a parathyroidectomy.

Discussion
Non-traumatic rupture of large tendon is a rare occurrence in individuals receiving long-term haemodialysis. The mechanism of spontaneous tendon rupture in uraemic patients with secondary hyperparathyroidism seems to be related to high parathyroid hormone level that results in osteolytic bone resorption at the tendon insertion site. Early surgical repair, control of secondary hyperparathyroidism, early use of vitamin D analogues and total parathyroidectomy can treat and prevent tendon rupture or re-rupture with satisfactory results [2]. In a published review, from 65 cases, 24 cases involved patients with renal disease. Males were more often affected than females, by a ratio of almost 2:1. The mean age of injury was 36 years. The majority of patients (63%) had signs of secondary hyperparathyroidism. The average length of renal disease was 13 years, while the average length on
Table 1. Laboratory results

<table>
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<tbody>
<tr>
<td>Haemoglobin (g/dL)</td>
<td>13.1</td>
<td>10.9</td>
<td>11.0</td>
<td>10.9</td>
<td>10.3</td>
</tr>
<tr>
<td>Haematocrit (%)</td>
<td>42.4</td>
<td>36.3</td>
<td>34.3</td>
<td>34.6</td>
<td>32.1</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>17.9</td>
<td>15.5</td>
<td>13.7</td>
<td>13.9</td>
<td>13.9</td>
</tr>
<tr>
<td>Intact PTH (ng/L)</td>
<td>906</td>
<td>2108</td>
<td>2438</td>
<td>2312</td>
<td>3582</td>
</tr>
<tr>
<td>Phosphate (mg/dL)</td>
<td>6.8</td>
<td>6.70</td>
<td>7.20</td>
<td>7.80</td>
<td>5.40</td>
</tr>
<tr>
<td>Calcium (mg/dL)</td>
<td>11.30</td>
<td>11.30</td>
<td>10.60</td>
<td>9.60</td>
<td>10.5</td>
</tr>
<tr>
<td>Bicarbonate (mEq/L)</td>
<td>20.60</td>
<td>18.50</td>
<td>25.90</td>
<td>22.70</td>
<td>26.70</td>
</tr>
</tbody>
</table>

PTH: parathyroid hormone.

Fig. 1. Serum alkaline phosphatase versus evolution during the months preceding tendon rupture.

dialysis was 6.5 years [3]. So, our patient represents exactly these risk conditions, since he is a young man with hyperparathyroidism, on haemodialysis for over 5 years.

The inadequacy of conventional haemodialysis in removing phosphate mandates the use of phosphate binders in virtually all haemodialysis patients. Despite their proven efficacy, these medications fail to control phosphorus in 70% of haemodialysis patients. It has been demonstrated in our service that short daily haemodialysis is a safe and an efficient alternative therapy. However, the expense of phosphate binders has increased by 40% [4]. Despite the use of phosphate binders (sevelamer 2400 mg three times a day), our patient presented an uncontrolled hyperparathyroidism, which could precede for years the tendon rupture.

The conversion from conventional to daily haemodialysis can improve nutritional status, associated with protein intake increase [5]. Probably, the increase in the body weight resulting from the higher protein intake may help to explain the hyperphosphataemia in this patient. It is possible that the increase of weight observed in our patient (5 kg in the last 5 years) may have contributed to the tendon rupture, since the knee is exposed to a greater impact daily.

To our knowledge, this is a first description of spontaneous bilateral rupture of quadriceps tendon in a patient on short daily haemodialysis. The importance of this case report is to alert nephrologists about this rare diagnosis, and it is also worth emphasizing the continuous increase in the serum alkaline phosphatase level prior to the tendon rupture. Furthermore, its importance clarifies that even among well-dialysed patients, specifically in short daily dialysis, spontaneous tendon rupture can occur.

Conflict of interest statement. None declared.

References


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