

# Spontaneous achilles tendon rupture in a patient with undergoing long-term haemodialysis: a case report and literature review

## Abstract

Chronic kidney disease and hemodialysis are well known risk factors for tendon rupture, although this is a rare situation. The present case was a 70-year old male who presented with a sudden onset of painful disability in the left posterior ankle. This occurred while he was climbing the stairs. A physical examination and imaging resulted in a diagnosis of Achilles tendon rupture. The patient had received regular haemodialysis for 12 years. He developed secondary hyperparathyroidism as expected sequelae of end stage renal disease. Following surgical repair, physiotherapy and management of associated risk factors, the patient regained full active mobility.

**Keywords:** hyperparathyroidism, haemodialysis, achilles, tendon, rupture

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## Introduction

Cases of simultaneous Achilles tendon rupture in patients on regular hemodialysis have been described in the literature.<sup>1-3</sup> Many risk factors in hemodialysis patients may contribute to this presentation, but secondary hyperparathyroidism plays a major role in the pathogenesis of tendon rupture.<sup>4</sup> Early treatment of ruptured tendons is mandatory as it results in better outcomes and prevents disabilities. This current report presents a case of spontaneous Achilles tendon rupture in a patient undergoing long term haemodialysis, with multiple risk factors predisposing to this condition.

## Case report

A 70 years old male patient, who was on maintenance hemodialysis (3 times per week) since 12 years, presented to us with a sudden onset of painful disability in the left posterior ankle developed while he was climbing the stairs. On examination, by inspection there was swelling around left posterior ankle joint. On palpation there was tenderness above the insertion of the Achilles tendon, also there was a gap in the Achilles tendon site. Thompson calf squeeze test was positive. Ultrasonography revealed a complete disruption of the fibrillar structure of Achilles tendon. The serum parathyroid hormone level of the patient was 410 pg/ml (normal range 15-65 pg/ml). Based on the previous findings and data, a diagnosis of Achilles tendon rupture was confirmed with associated secondary hyperparathyroidism.

A decision of surgical repair was taken. During exploration, a tear at the lower third of Achilles tendon was detected. The color of the tissue stump was dark brown; also the tendon was degenerative and weak. The tendon was repaired by non-absorbable mono-filamentous sutures. A short leg cast was postoperatively applied with foot in gravity equinus i.e. non-bearing cast. Every 3 weeks we performed a sequential change of the cast shape and foot position with re-casting in a more dorsiflexion position each time till a 90 degree position cast reached after the sixth week. The patient had been in the 90 degree position cast for another two weeks, and then cast was removed. Physiotherapy started after cast removal, and the patient almost completely regained his normal ankle function 2 months later.

Parallel to surgical repair and physiotherapy we started to manage secondary hyperparathyroidism and high parathyroid hormone level using calcium supplements, phosphate binders and vitamin D analogues according to his laboratory result trends. His serum parathyroid hormone level was 300 pg/ml after this tight control, which is accepted level regarding the recommended targets by KDIGO (Kidney Disease-Improving Global Outcomes).

## Discussion

Tendinopathy is prominent in hemodialysis patients,<sup>5</sup> but the presentation with tendon rupture is rare. Tendon rupture has been described as a complication of multiple disorders rather than chronic kidney disease and hemodialysis,<sup>6</sup> as systemic lupus erythematosus,<sup>7</sup> gout,<sup>8</sup> rheumatoid arthritis,<sup>9</sup> diabetes mellitus,<sup>10</sup> obesity<sup>11</sup> and trauma.

The most frequently affected tendons are quadriceps tendon, patellar tendon, and Achilles tendon.<sup>1,3</sup> Also a more rare reported case of rupture pectoralis major muscle was reported in a hemodialysis patient.<sup>12</sup> The first reported ruptured tendon in hemodialysis patient was in 1949, and it was a case of simultaneous bilateral rupture of the quadriceps tendon.<sup>13</sup>

Chronic kidney disease and hemodialysis sequelae are suggested to be the predisposing factors for rupture beside other concomitant factors. These predisposing factors include being on long-term hemodialysis, development of secondary hyperparathyroidism, b-2microglobulin associated amyloidosis, fluoroquinolone use, corticosteroid use, malnutrition/chronic inflammation syndrome, and chronic acidosis. Among these predisposing factors; secondary hyperparathyroidism is the most important regarding pathogenesis of tendon rupture.<sup>4,14</sup> Our patient had more than one predisposing factor of these. He was on long-term hemodialysis since 12 years, also he had developed secondary hyperparathyroidism, and his serum b-2microglobulin was 460 mg/L (normally <2 mg/L).

Diagnosis of rupture tendon in hemodialysis patient starts by clinical examination. Always there is tenderness at the injury site with limited mobility of the affected limb, and a tendon gap can

be detected. Thompson calf squeeze test is positive for cases with subcutaneous Achilles tendon rupture. Ultrasonography reveals the injury with good sensitivity (96-100%) and specificity (83-100%).<sup>15</sup> MRI may be helpful when the diagnosis remains unclear, especially in quadriceps tendon rupture.<sup>16</sup> It is important to highlight that up to 50% of quadriceps tendon rupture may be misdiagnosed. Always consider the possibility of a quadriceps tendon rupture in any patient who presents with acute knee pain, an inability to extend the leg, a palpable soft-tissue depression proximal to the superior pole of the patella, and as mentioned before MRI of both thighs may be helpful when the diagnosis remains unclear.<sup>16</sup> It is also important to highlight that simultaneous, spontaneous, bilateral ruptures may occur, especially of the quadriceps tendon.<sup>3</sup>

Tendon rupture may occur at one of two sites, rupture may occur in the tendon itself due to degenerative changes, or at the tendon insertion site i.e. enthesitis; as secondary hyperparathyroidism increases the osteoclastic cortical bone resorption at the tendon insertion site.<sup>17,18</sup> Early surgical repair and treatment of ruptured tendons with post-operative physiotherapy and controlling of predisposing factors result in better outcomes than delayed treatment.<sup>16</sup> Tendon rupture may be a preventable problem by controlling the previous mentioned risk factors as possible.

## Conclusion

Tendon ruptures are uncommon injuries in hemodialysis patients that require early surgical intervention, physiotherapy, with management of predisposing factors in order to maximize functional outcomes for the patient. The most important predisposing factor to be controlled is secondary hyperparathyroidism.

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## Conflict of interest

The author declares no conflict of interest.

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