

# Widespread Calcifications Delineating an Arterial Vessel Tree in a Peritoneal Dialysis Patient

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A 47-year-old male peritoneal dialysis (PD) patient presented with pain in the fingertips of both hands that had developed spontaneously over the past 2 weeks. On physical examination, livid discoloration and gangrenous areas were visible. Radial pulses on both sides were sharply palpable; however, blood pressure could only hardly be taken and when measured, was elevated. Palpation of the brachial artery revealed a strongly calcified vessel over its entire course (Osler's sign). Duplex sonography was negative for stenoses in the arteries of both arms, however, showed widespread calcifications of the vessel wall over the entire course. To improve acral perfusion, vasodilatory treatment with intravenous alprostadil was started, and antihypertensive drugs were stopped as the patient's high blood pressure was believed to be invalid. To quantify the burden of arterial calcification and to evaluate the feasibility of kidney transplantation, a whole-body low-dose computer tomography without the use of contrast media was performed revealing extensive calcifications of nearly all peripheral arteries that spared central arteries such as aorta (Figure 1 and video). In his medical records, a long-lasting history of deranged bone and mineral metabolism was evident. Twelve years ago, a total parathyroidectomy had been performed leading to a persistent hypoparathyroid state (plasma parathyroid hormone concentration: 0.7 pmol/L [reference range: 1.5-7.6]), and ever since, he has been taking

high doses of active 1,25-OH vitamin D (up to 1 µg per day) and calcium to prevent hypocalcemia (plasma calcium concentrations between 1.4 and 2.6 mmol/L) with associated tonic-clonic grand mal seizures. The serum concentrations of 25-OH vitamin D and 1,25-OH vitamin D were 98 nmol/L (50-175) and 30 pmol/L (75-200), respectively. The action of 1,25-dihydroxy vitamin D on vascular smooth muscle cells<sup>1</sup> in conjunction with an adynamic bone metabolism<sup>2</sup> and hyperphosphatemia (inorganic phosphorus concentrations between 1.4 and 2.0 mmol/L) might explain these extensive vascular calcifications.

During the subsequent years, the patient developed severe acral ischemia and necrosis of all limbs, necessitating repeated sequential amputations with repeated wound infections. As the patient lost his dexterity, he was switched to assisted automated PD. Eventually, the patient died after 6 years due to sudden cardiac death in the setting of repeated inflammatory states which are predictive of mortality in PD patients.<sup>3</sup>

**Video:** 3D reconstruction of the CT data. CT, computed tomography. (You can access the video at <https://doi.org/10.5152/turkjnephrol.2022.2286375>)

**Informed Consent:** The patient and his relatives died and the patient's consent could not be obtained. A figure exposing the case was not used in the study.





**Figure 1.** Native low-dose whole-body CT scan revealed extensive arterial calcifications that could be reconstructed and visualized as a vessel tree. A curled peritoneal dialysis catheter is also visible. Note that central arteries such as aorta are spared. CT, computed tomography.

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