

CLINICAL CASE

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Good Dental Status Despite Long-Term Dialysis and Severe Renal Osteodystrophy – Case Report and Literature Review

Dobry stan uzębienia mimo długotrwałej dializoterapii i zaawansowanej osteodystrofii nerkowej – opis przypadku i przegląd piśmiennictwa

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Abstract

Renal osteodystrophy due to secondary hyperparathyroidism is traditionally believed to aggravate both tooth loss and course of periodontal disease in chronic kidney disease patients. This paradigm has been recently questioned by studies suggesting that alveolar bone may be spared from resorption in this clinical setting. We report on a 50-year-old male with end-stage renal failure, dialyzed for as long as 20 years, who had exceptionally well-preserved teeth, no caries, minimal periodontitis, and no appreciable alveolar bone destruction. Interestingly, the patient suffered from the most severe, uncommon and disabling form of secondary or even tertiary hyperparathyroidism, with massive destruction of skeletal bone, osteoporosis and metastatic calcifications. Possible protective mechanisms as well as importance and medical implications of oral health status in maintenance dialysis patients are briefly reviewed (**Dent. Med. Probl. 2005, 42, 3, 507–510**).

Key words: alveolar bone, dialysis, hyperparathyroidism, periodontal disease, renal failure.

Streszczenie

Osteodystrofię nerkową pod postacią wtórnej nadczynności przytarczyc uznaje się, tradycyjnie, za główną przyczynę utraty zębów i przyspieszonego rozwoju choroby przyzębia u pacjentów z przewlekłą chorobą nerek. Związek ten jest ostatnio kwestionowany; sugeruje się, że w tej sytuacji klinicznej kość wyrostka zębodołowego może być chroniona przed resorpcją. Przedstawiono przypadek 50-letniego mężczyzny ze schyłkową niewydolnością nerek, dializowanego od 20 lat. U pacjenta stwierdzono wyjątkowo dobry stan uzębienia, brak próchnicy, zaledwie śladową chorobę przyzębia oraz brak zaniku kości wyrostka zębodołowego. Jednocześnie występowała rzadko spotykana, zaawansowana i okaleczająca postać wtórnej lub trzeciorzędowej nadczynności przytarczyc, ze zniszczeniem większości kości szkieletowych, osteoporozą i masywnymi zwapnieniami przerzutowymi. Omówiono po krótko możliwe mechanizmy ochronne oraz znaczenie prawidłowego stanu zdrowia jamy ustnej pacjentów dializowanych w aspekcie postępu chorób ogólnoustrojowych (**Dent. Med. Probl. 2005, 42, 3, 507–510**).

Słowa kluczowe: wyrostek zębodołowy, dializa, nadczynność przytarczyc, choroba przyzębia, niewydolność nerek.

Chronic renal failure is a state of profound calcium/phosphorus imbalance, leading to excessive production of parathormone and generalized osteodystrophy [1]. It encompasses a spectrum of bone disorders that are initially silent but finally manifest with severe osteoporosis, massive bone

fractures and extra-osseous calcifications. Dental radiographic presentations of renal osteodystrophy include loss of lamina dura, giant cell lesions, bone demineralization, expansion of alveolar ridges and root resorption [2]. The most dramatic manifestations of renal osteodystrophy are

destructive, neoplasm-like lesions in the bone of jaws, known as brown tumors [2].

Herein, we report a case of the patient on ultra long-term dialysis, who presented with exceptionally good dental status despite severe secondary hyperparathyroidism. We also discuss recent data showing that patients undergoing long-last hemodialysis (HD) therapy due to end-stage renal failure may have no appreciable alveolar bone loss and periodontitis [3].

Case

The patient was a non-smoking male aged 50, who had been maintained on dialysis (initially intermittent HD and afterwards automated peritoneal dialysis) for as long as 20 years. Regarding the treatment vintage, he may be one of the longest-dialyzed patients in the world. Interestingly, the patient presented with particularly well-preserved teeth and periodontium, despite severe secondary or even tertiary hyperparathyroidism, and advanced osteoporosis. On intraoral examination, dry mouth, uremic odour, thick yellowish saliva with pH of 8.2, no decay, 4 missing teeth and 5 filled teeth were found; the DMFT = 9. The periodontal parameters were as follows: plaque index (PI, Silness and Loe) = 2.4; gingival index (GI, Loe and Silness) = 1.2; no gingival pockets with probing depth above 2 mm; and clinical attachment level (CAL) of 0 mm in six teeth, 1–2 mm in

two teeth, 3–4 mm in 14 teeth, and no teeth with CAL above 5 mm. The plaque and gingival index were higher than those of a mean of 1.76 and 0.97, respectively, reported by Frankenthal and collaborators in chronic HD patients [3]. This could be due to the fact that the patient was extremely disabled (Fig. 1), including the hands with massive periarticular calcifications, which made proper toothbrushing unfeasible for years. Considering this hygienic aspect, it is even more interesting that his probing depth and loss of periodontal attachment were remarkably less than those of 2.9 mm and 4.4 mm found in a younger group of HD patients [3]. The patient's alveolar bone was almost intact, with no evidence of recession and destruction. This remained in striking contrast to the decreased systemic bone mineral density on dual absorptiometry X-ray examination, which was 55% of normal for femoral bone and 64% for vertebral bone – both the values were much below the fracture threshold. The patient also had cervical vertebral bone fractures, and spectacular extra-skeletal calcifications involving numerous organs and tissues (Fig. 1). Such metastatic calcifications are representative of the most severe form of secondary hyperparathyroidism encountered in dialysis patients. Serum parathormone levels recorded during 5 years prior to the dental examination were all above 500 pg/ml, despite prior aggressive intravenous calcitriol therapy and ethanol injections into the enlarged parathyroid glands. The patient had refused surgical parathyroidectomy as



Fig. 1. Disabling renal osteodystrophy and good dental status in 50-year-old patient dialyzed for 20 years

Ryc. 1. Okaleczająca osteodystrofia nerkowa i dobry stan uzębienia u 50-letniego pacjenta dializowanego od 20 lat

an ultimate treatment. He died of infectious complications after 248 months on renal replacement therapy.

Discussion

The present case of severely disabled long-term HD patient with exceptionally good dental status despite the lack of elementary oral hygiene and advanced skeletal bone loss and destruction, may provide indirect support to the recent hypothesis that secondary hyperparathyroidism does not necessarily predispose to excessive tooth loss and periodontitis [3, 4]. Namely, the Ramfjord index teeth in chronic HD patients were found to be comparable with those in age-, gender-, and smoking status-matched healthy subjects [3]. The radiographic signs of alveolar bone loss in these HD patients were not different from the controls either. This study suggests that alveolar bone may be curiously protected from resorption in the course of secondary hyperparathyroidism accompanying chronic renal failure [3]. Interestingly, the hypothesis has gained further support from the experiments showing that intermittent subcutaneous injections of parathormone were protective against periodontitis-associated bone loss in rodents [4].

The findings of Frankenthal et al. [3] are, however, in distinction to the studies showing increased poor dental status, tooth mobility, fractures, erosion, attrition, recession, gingivitis and a high plaque index in dialysis patients [5–14]. The only protective mechanism against caries in these patients, reported in the literature so far, could be increased salivary urea content contributing to alkaline pH and elevated buffering capacity of the saliva [8–10]. This may inhibit growth of cariogenic microorganisms and neutralize acid formed in the plaque. In our exceptional patient, some individual and so far unrecognized genetically-determined conditions could also be protective against periodontal disease and teeth loss.

Periodontitis emerges as an important cause of systemic diseases such as atherosclerosis and cardiovascular disease, diabetes mellitus, respiratory disorders, and osteoporosis [15] – problems that plague the growing population of chronic dialysis patients [16]. Unfortunately, to-date studies of their oral health status are scarce and anecdotal, and have been performed in patients of different age, cultural and social background as well as of various ethnic origins [3, 5–14]. Thus, several clinically-important issues, including effects of secondary hyperparathyroidism on the periodontium in chronic renal failure patients, deserve further investigations.

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