

Original Research Article

Rheumatological Manifestations in Chronic Hemodialysis Patients at the National Hospital of Zinder

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Abstract: Introduction: Hemodialysis can be used restoratively for patients with end-stage chronic renal failure [1, 2]. However, patients with chronic kidney disease (CKD) can develop rheumatological complications that cannot be or only poorly controlled by hemodialysis. Indeed, rheumatological manifestations that develop in hemodialysis patients can be multiple and varied, and can occur early and then worsen depending on the duration of dialysis therapy [3,4]. Other complications, some not yet fully elucidated, can also adversely affect quality of life. Rheumatological abnormalities can result in clinical polymorphisms within bones and joints, but also entheses, muscles and tendons. Pathophysiologically, these manifestations can be associated with various abnormalities: e.g., calcium-phosphate metabolism disorders, immunological disturbances with increased susceptibility to infections, induced auto-inflammatory pathologies, microcrystalline arthritis, β_2 microglobulin amyloidosis, etc...Despite scientific progress, there is a paucity of detailed knowledge on the many mechanisms involved and, in particular, on their multiple interactions. Overall, these conditions can lead to a significant deterioration in quality of life, and increased morbidity and mortality. Worldwide, rheumatological manifestations are found in hemodialysis patients with a frequency of between 47 and 72% in the West and in North Africa [5,6,7]. Although they have been the subject of several studies, few data are available from sub-Saharan Africa. Thus, we conducted a study in the Nephrology Department of the National Hospital of Zinder (Niger) to determine the epidemiological profiles and diagnostic characteristics of end-stage kidney disease (ESKD) patients receiving hemodialysis.

Keywords: Kidney failure, health workers, practice, knowledge, Zinder.

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PATIENTS AND METHODS

This cross-sectional study was conducted over a 12-month period (March 2021-February 2022). In our dialysis center at Zinder National Hospital 72 patients were treated by chronic hemodialysis. Of these, sixteen (22.22 %) hemodialysis patients were included. The inclusion criteria specified any hemodialysis patient presenting with symptoms relating to the musculoskeletal system (joints, bones, entheses, tendons, muscles). Patients with no symptoms involving the musculoskeletal system and subjects not on chronic dialysis were excluded. Data were collected on age, gender, pathological history (including early menopause), corticosteroid therapy, presence of a non-traumatic fracture, chronic kidney disease etiologies,

duration on hemodialysis, associated diseases, Physical or psychological deficiency, functional and physical osteoarticular factors, entheses, musculotendinous symptoms, and paraclinical data (biological, radiological, etc.).

The data were entered into Excel software. After validation, statistical analyses were carried out using SPSS software, version 24. The chi-squared test and Student's t-test were used to compare the means of the various parameters, along with Pearson's correlation test. All comparisons were made at the 5% level ($p = 0.05$).

RESULTS

Of the 72 chronic hemodialysis patients, 16 were enrolled that presented with rheumatological manifestations, i.e., 22.22%.

The female gender ratio was 1.28. Among our 16 patients, 4 had an age between 35-50 years, while 11 of them had an age between 51 and 70 years, only one of the patients had an age over 70 years. The average age was 52 ± 17 years.

The etiologies of end-stage kidney disease were dominated by vascular nephropathy with seven (7) patients, followed by glomerular nephropathy four (4) cases out of 16. The average duration of hemodialysis therapy was 3 years 5 months. Seven patients had received hemodialysis for 4 years or more. Twelve (12) of the 16 patients received only two hemodialysis sessions per week; the other four patients received 3 sessions per week. None of the patients had benefited from a kidney transplant.

Osteoarticular involvement was present in 12 patients; it affected more than 2 out of 3 patients, regardless of gender. Degenerative pathology such as osteoarthritis and tendinosis affected eight (8) of the 16 patients. Seven patients had developed renal osteodystrophy, of which there were two cases of secondary hyperparathyroidism (osteitis fibrosa). There was one case of osteomalacia and five cumulative cases of osteopenia and osteoporosis (assessed by ultrasonic bone densitometry). β_2 microglobulin amyloidosis was represented by inflammatory arthralgia in three patients, tendinopathy in five patients, and spondyloarthritis of the cervical and lumbar spine in two patients. There were two cases of microcrystalline arthritis (gout). There was one case of infectious monoarthritis caused by *Staphylococcus aureus* in the knee. In addition, muscular disorders were present in five (5) of the 16 patients.

Biological data

Calcemia

The average calcemia was 91.84 mg/l with extremes ranging from 76 mg/l and 124 mg/l. Ten (10) patients out of 16 had normal serum calcium, five (5) patients had hypocalcemia, and only 1 had hypercalcemia among the 16 patients.

Phosphataemia

The average phosphate level was 37.6 mg/l with extremes of 26 mg/l and 78 mg/l. twelve patients had normal phosphatemia, 4 of the 16 patients had hypophosphatemia, and 2 patients had hyperphosphatemia.

PTH

Eleven (11) patients out of the sixteen (16) had a PTH level assay. Among these, the average PTH was

624 ng/ml with a maximum of 1236 ng/ml, 18 times normal. All eleven (11) patients had an elevated PTH level at 2 times normal and more according to KDIGO 2009 recommendations.

DISCUSSION

Hemodialysis is a life-saving supportive treatment for end-stage chronic renal failure; it is accompanied in its duration and its frequency of multiple complications, in particular rheumatological. Indeed, the overall frequency of rheumatological manifestations was 22.22% in our series. The female sex is predominant, with a sex ratio of 1.28, this is reported in the literature [8, 9]. The impact of menopause on the bone status of women and other abnormalities related to chronic renal failure and hemodialysis, remain to be discussed. The average age was 52 ± 17 years, according to data from the literature, the frequency of rheumatological manifestations increases with age [9, 10].

The average duration of hemodialysis in our series was 45 months; the frequency of rheumatological involvement would increase with the duration of hemodialysis, seven (7) of our patients had a duration of hemodialysis ≥ 4 years; this confirms the data in the literature [9-11]. Osteoarticular manifestations during chronic hemodialysis in our sample concerned 14 patients out of 16, higher than the frequency reported in series in the literature, which is 47 to 72% [3, 10]. Our finding concurs with published data that show that the occurrence of amyloid spondylitis was almost constant after 10 years of hemodialysis [12]. Although six of our patients suffered from degenerative arthropathy, it was difficult to link this condition to hemodialysis because the degenerative arthropathy could exist before the start of hemodialysis treatment. Moreover, in elderly patients, the appearance of osteoarthritis could simply be related to aging [13].

Renal osteodystrophy, represented by bone remodeling disorders and linked to hyperparathyroidism, affected 8 of our patients, although its occurrence increases with age (six of eight (8) patients aged > 51 years), a result in agreement with published data [14-16].

Muscular involvement: marked by sarcopenia and myalgia was found in five patients in our series. Several factors may be associated: it could have been the consequence of acidosis, corticosteroid therapy, an episode of oxidative stress, or a metabolic imbalance related to hemodialysis [17, 18]. A case of infectious monoarthritis in the knee, caused by *Staphylococci*, was reported by Yamamoto *et al*. [19].

Tendinopathies were present in five (5) patients, secondary to amyloid deposits, which weakened the tendon and predisposed it to rupture from the slightest trauma, in particular β_2 microglobulinemia.

CONCLUSION

The rheumatological manifestations of chronic hemodialysis are varied: they had an overall frequency of 22.22% in our study, which is a similar rate to that reported in the literature. Apart from a possible association with hemodialysis, lesions from classic osteodystrophy can be a result of damage linked to

several factors, some of which remain to be clarified. Hence, the need for information and data to be shared between national dialysis centers, to integrate multidisciplinary skills and to better master these adverse factors to attempt to avoid serious complications that can reduce functionality or even the vital prognosis of a patient.

Table-1: Main rheumatological manifestations in 16 patients on chronic hemodialysis

Rheumatological damage		No. of cases
Osteo-articular		
	Arthroses	6
	Microcrystalline arthritis	2
	Infectious arthritis	1
	Other inflammatory arthralgia	3
	Spondyloarthritis	2
Bone		
	Fibrous osteitis	1
	Osteoporosis	2
	Osteopenia	4
	Osteomalacia	1
Tendons		
	Tendinosis	2
	Tendinitis	3
Muscles		
	Diffuse myalgia	3
	Sarcopenia	2

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