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Relation between dose dialysis and quality of life of patients on peritoneal dialysis

Relation entre la dose de dialyse et la qualité de vie des patients en dialyse péritonéale.

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Résumé

Objectif : Notre travail avait pour but d'identifier les paramètres objectifs pouvant améliorer les paramètres subjectifs du bien-être des patients et de partager l'expérience de la prise en charge dans notre centre. .La dose de dialyse exprimée par le Kt/V urée et le KDQOL SF 36 ont été utilisé.

Matériel et Méthode
C'est une étude monocentrique transversale menée en octobre 2018 auprès des patients traités par dialyse péritonéale, suivis depuis au moins six mois dans le service de Néphrologie du CHU de Fès (Maroc). La qualité de vie a été évaluée en utilisant la version SF-36 (short form) de l'échelle KDQOL (Kidney Disease Quality Of Life) dans sa version arabe dialectale validée. Nous avons utilisé les résultats du KDQOL-SF36 comme variables quantitatives rapportées à l'obtention d'un Kt/V>1,7.

Résultats
17 patients adultes sous dialyse péritonéale on été inclus, 35,3% sous dialyse péritonéale automatisée (et 64,7% sous dialyse péritonéale continue ambulatoire. L'âge moyen est de 40,8±5 ans et le sex-ratio de 9H/8F.

En analyse bivariée, nous avons trouvé une relation significative entre la dose de dialyse et le support social. Ce résultat pourrait être expliqué par la meilleure observance thérapeutique chez les patients ayant un meilleur support social.

Conclusion
Il faut s'efforcer d'atteindre les objectifs d'adéquation, sans perdre de vue la qualité de vie des patients. Il faut aussi prévoir d'autres études ultérieurs qui incluent un plus grand nombre de patients et qui étudient d'autres paramètres tel l'évaluation cliniques ,la fonction rénale résiduelle et l'ultrafiltration.

Mots clés : dialyse péritonéale , KDQOL SF 36, dose de dialyse Kt/V urée, qualité de vie, support social, observance thérapeutique .

Summary

Objective
The interest of our work is to identify the objective parameters that can improve the subjective parameters of the well-being of the patients and to share the experience of the care in our center. Kt / V urea and KDQOL SF 36 scale (Kidney Disease Quality of Life short form 36)were used.

Material and methods
This is a single-center cross-sectional study conducted in October 2018 among patients treated with peritoneal dialysis, followed for at least six months in the Nephrology Department of Fez University Hospital (Morocco). The quality of life was assessed using the SF-36 (short form) version of the Kidney Disease Quality of Life (KDQOL) scale in its validated Arabic dialect version (1). We used the KDQOL-SF36 results as quantitative variables related to obtaining a Kt / V> 1.7.

Results
This study included 17 adult patients on peritoneal dialysis of which 35.3% are on automated peritoneal dialysis (APD) and 64.7% are on continuous ambulatory peritoneal dialysis (CAPD). The mean age is 40.8 ± 5 years and the sex ratio is 9H / 8F.

In bivariate analysis, we found a significant relationship between dialysis dose and social support. This result could be explained by better adherence in patients with better social support.

Conclusion
Efforts must be made to achieve the adequacy goals, without losing sight of patients' quality of life. There is also a need for further studies that include more patients and study other parameters such as clinical evaluation, residual renal function and ultrafiltration.

Keywords : peritoneal dialysis, KDQOL SF 36, dialysis dose Kt / V urea, quality of life, social support, therapeutic compliance

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INTRODUCTION

Peritoneal dialysis (PD) is one of three available renal replacement therapy for patients with end-stage renal failure. Taking the advice of PD patients is one of the simplest ways to clarify the weak points of the technique and study the possibility of correcting them. Similarly, the opinion of the caring team who supervises it is essential.

KDQOL-36 (Kidney Disease Quality of Life) is a scale of quality of life validated by several studies. It is a short-form questionnaire based on 36 questions measuring two components: mental and physical well-being, with an added focus on dialysis. A higher score favors a better quality of life (4). The Moroccan Arabic dialect version has been validated in the linguistic and contextual dimensions (1).

Kt/V urea measures dialysis dose and clearance of urea. Its result reflects the number of times the total volume of water has been purified. Urea is taken as a control for the accumulation of uremic toxins and serves as a reference substance to quantify the purification (5-8).

The overall management of PD patients should take into account not only the objective clinico-biological results but also the impact on the quality of life of the patient.

MATERIAL AND METHODS

This is a single-center cross-sectional study conducted in October 2018 among patients treated with PD in the Nephrology Department of the University Hospital Center (CHU) in Fez (Morocco). We used the following inclusion criteria: 1) all adult patients at the center having received PD for at least six months, 2) consenting patients, and 3) patients over 16 years of age. Patients with peritonitis or hospitalized during the last three months were excluded. All the patients of our center benefit from a free-of-charge care provided by the CHU Hassan II of Fez.

Medical data were collected from the medical records. The quality of life was evaluated by an epidemiologist and a physician external to the PD unit to address the problem of high rates of illiteracy of our patients. The dialectal Arabic version of the KDQOL scale is validated by a Moroccan study of 80 patients. The questionnaire was initially translated into Moroccan by two independent translators, then two more translations against the English version were done. The difficulties of comprehension were evaluated on a group of ten patients and the modifications concerning misunderstandings were realized (1). The quality of life was measured by KDQOL in two stages: a doctor external to the PD unit administered the questionnaire with the patients to address the problem of illiteracy, and an epidemiologist collected the results and calculated the score of each dimension. A higher score favors a better quality of life in this dimension.

The KDQOL-36 has two cores (8).

The first is a generic core that studies the mental and physical components in eight dimensions:

1) physical functioning with ten questions, 2) physical health with four questions, 3) pain with two questions, 4) general perception of health with five questions, 5) emotional well-being with five questions, 6) emotional health with three questions, 7) social relationships with two questions, and 8) energy/fatigue with four questions.

The second is a specific core that studies eleven dimensions:

1) the symptoms of illness in twelve questions, 2) the burden of kidney disease in four questions, 3) the effect of kidney disease in eight questions, 4) the professional status in two questions, 5) cognitive functions in three questions, 6) the quality of social interaction with three questions, 7) sexual function in two questions, 8) sleep in four questions, 9) social support in five questions, 10) encouraging treatment staff in two questions, and 11) patient satisfaction with a question.

The nephrologists and the general practitioner assigned to the PD unit collected the clinico-biological data.

The dialysis dose was calculated from dialysate drained over 24 hours, 24-hour urine collections, and blood samples. Urea clearance was expressed as the dialysis dose (Kt/V) using bio-impedancemetry (Fresenius™ BCM System) to measure body water volume.

Kt/V was calculated by the following formulas:

total Kt/V = Kt/Vr + Kt/Vp

Kt/Vr (residual) = ((urinary volume of 24h × urea urea / plasma urea) × 7) / V

Kt/Vp (peritoneal) = ((24h dialysate volume × urea in dialysate / plasma urea) × 7) / V

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V: the volume of water distribution measured by bio-impedancemetry (Fresenius™ BCM System).

We used the KDQOL-36 results as quantitative variables related to obtaining a Kt/V > 1.7 (7,8).

Modified Subjective Global Evaluation (m-SGA) is a tool composed of seven variables: weight change, food consumption, gastrointestinal symptoms, functional capacity, comorbidity, subcutaneous fat and signs of muscle wasting. A score ranging from 1 (normal) to 5 (very severe) has been assigned to each component. The sum of the seven components of this malnutrition score may be 7 (normal), between 7 and 21 (low undernutrition), between 21 and 35 (moderate malnutrition), and 35 (severe malnutrition) (9,10).

To describe the variables, we calculated the frequency for the qualitative variables and the median and interquartile range for quantitative variables. Then we proceeded with bivariate analysis. The association was significant if $p < 0.05$.

RESULTS

This study included 17 adult patients undergoing PD of which 35.3% were on automated peritoneal dialysis (APD) and 64.7% were on continuous ambulatory peritoneal dialysis (CAPD). The mean age was 40.0 [30.0; 54.0] years. The sex ratio was 9M:8F.

We took into account socio-demographic components, educational level, employment status and marital status. Similarly, 47.1% of patients were illiterate, 58.8% were unemployed, 52.9% were married, and 50% of patients had low socio-economic status.

Patient physical activity was subjectively evaluated: 10 patients (58%) had moderate physical activity, 5 patients had low physical activity and only 2 were very active.

According to the modified assessment overall score (m-SGA), 14 patients (82%) were mildly malnourished and two patients (11%) were moderately malnourished; no patients were severely malnourished. The average body mass index (BMI) calculated from the dry weight was 21.8 [20.5; 24.2] kg/m2. According to WHO's interpretation of BMI, 2 patients were underweight, 11 patients had a normal body size and 2 patients were overweight. The average muscle mass of our patients was 28.6 [24.0; 38.6] kg and the average fat mass was 24.3 [19.1; 36.5] kg. The average albumin level was 34.0 [32.0; 36.0] g/L. The average body surface area of our patients was 1.69 m^2 [1.60, 1.78].

Ten patients (58.8%) were hypertensive and only one patient (5.88%) was diabetic (Table 1). More than half of the patients (64%) had a residual diuresis greater than 500 ml per day. Residual diuresis was 1,000 [300; 1,000] ml/day. Residual renal function was 2.35 [0.50; 5.00] ml/min /1.73 m2.

Table I. Clinico-biological characteristics of PD patients

Parameters	Results
Hypertension (%)	58.8
Hemoglobin (mean in g/dl)	9.10 [7.70;10.4]
CRP (mean in mg/l)	3.00 [2.00;5.00]
Vitamine D (mean in ng/ml)	20.0 [16.0;25.0]
Albuminéemia (mean in g/l)	33.0 [32.0;36.0]
Diabetes (%)	5.88
BMI (mean in Kg/m^2)	21.8 [20.5;24.2]

The number of patients who received intravenous iron supplementation was 11 (64.7%), while 13 patients (76.5%) received subcutaneous injection of erythropoietin. Only two patients had anemia less than 7 g/dl. The first had a treatment-resistant HTA that contraindicated erythropoietin uptake and the second was poorly observant to treatment.

The phosphocalcic balance of our patients was disrupted. The mean parathyroid hormone level was 1,200 [750, 1,500] ng/l, vitamin D was 20.0 [16.0, 25.0] ng/ml, serum calcium was 90.0 [82.0, 95.0] mg/l, and phosphoremia was 63.0 [51.0; 77.0] mg/l. Only one patient had parathyroidectomy and one patient was under calcimimetic. The rest of the patients were on calcium, vitamin D and phosphorus chelator supplementation but did not take them regularly for lack of means. Only one patient had a double fracture of the right lower limb.

Of the 17 patients followed, 58.8% had a hypopermeable peritoneum and 41.2% hyperpermeable.

The dialysis dose (Kt/v mean urea) was 1.80 [1.30; 2.40]. Eleven patients (64%) reached the target of Kt/V urea> 1.7. Mean creatinine clearance was 48.0 [33.0; 69.0] L/week/1.73m^2. The mean average ultrafiltration volume was 520 [500; 720] ml per day. The volume of ultrafiltered water measured by the impedance meter was 3.80 [1.50; 4.40] liters (Table 2).

Therapeutic compliance is one of the pillars of achieving the targets of adequate dialysis. Only 11 patients

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(64.7%) practiced good compliance according to their doctor. Compliance consisted of following the water and dietary regimen as well as the drugs prescription and prescription of dialysis exchanges. Of all the patients in our study, only one patient was taking antidepressants prescribed by a psychiatrist.

The calculation of the sub-scores of the KDQOL-36

Table II. Characteristics of PD and kidney disease

Parameters	Results
Seniority on PD (months)	31.2
Hypopermeable (%)	58.8
Hyperpermeable (%)	41.2
Type of PD : CAPD /APD (%)	64,7 / 35,3
Diuresis (mean in ml)	1000 [300;1000]
Residual renal function : (Average clearance ml/min/1,73 m²)	2.35 [0.50;5.00]
Volume of water overload (average in L)	3.80 [1.50;4.40]
Sum of ultrafiltered volume and diuresis>1L/J (%)	64
Average dialysis dose (Kt/V)	1.80 [1.30;2.40]

shows that the lowest score of our patients is that of

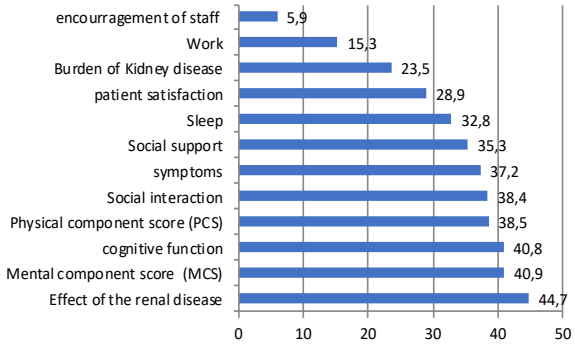

Figure 1. Average subscales of KDQOL SF 36

the staff's encouragement to the patient. The best mean of the KDQOL-36 sub-scores was that of the effect of the disease. The majority of patients refrained from answering questions about sexual function. In the bivariate analysis, we found a significant relationship between dialysis dose and social support (Table 3).

DISCUSSION

Our study found a significant relationship between dialysis dose and social support. This result could be explained by the fact that better social support would

Table 3. Association between dialysis dose Kt / V urea and sub scores of KDQOL SF36

Components of KDQOL SF 36 scale	Score	p
Symptoms	37.9 [27.5;46.2]	0.614
Effect of the renal disease	59.4 [21.9;68.8]	0.128
Burden of Kidney disease	25.0 [0.00;37.5]	0.303
Work	50.0 [50.0;50.0]	0.900
Cognitive function	53.3 [26.7;60.0]	0.840
Social interaction	40.0 [33.3;46.7]	0.647
Sleep	37.5 [27.5;42.5]	0.960
Social support	33.3 [33.3;50.0]	0.029
Encouraging staff towards patients	5.00 [0.00;12.5]	1.000
Satisfaction	33.3 [16.7;33.3]	1.000
Physical component	37.5 [32.8;43.0]	0.625
Mental component	40.8 [35.9;46.5]	0.254

cause the patient to be observant and not omit the prescribed peritoneal exchanges. Indeed, two studies have shown that patients' disrespect of the peritoneal exchange prescription is correlated with a poor quality of life and more frequent uremic complications requiring the use of hemodialysis sessions (3,4). They concluded that home visits by medical staff as well as the involvement of another person in the circle were a good way to encourage the patient to be more observant (3,4).

Previous studies have found no significant relationship between creatinine clearance and quality of life. A lower Kt/V was independently associated with a lower score for sleep and physical function (11). Repetition of the KDQOL-36 survey in patients two years later showed a decline in quality of life over time (11). The authors relied on this conclusion to state that dialysis should be a transitional substitute and that each dialysis patient should have a kidney transplant (11).

The ADEMEX study of 965 patients had a similar hypothesis to ours. Achieving a target creatinine clearance ≥ 60 L/week/1.73m² would lead to an improvement in the quality of life of PD patients (12). The relationship between target creatinine clearance and quality of life in PD patients was studied at baseline, in 6 months and then in 12 and 24 months. The 6th-month assessment found a significant association with the burden of kidney disease, the effects of kidney disease, sexual function, and symptom-related dimensions.

www.bdd.rdplf.org Volume 2, n° 4, Décembre 2019
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Evaluations at 12th and 24th months did not find a significant association. The stalling bias of study patients due to renal transplantation, hemodialysis transfers and deaths was noted. Despite the adjustment to account for this bias, peritoneal clearance of creatinine did not affect patients' quality of life (12).

In addition, the ADEMEX study emphasized the significant predictive value for the survival of patients on continuous PD, as well as the occurrence of hospitalizations and their duration (12).

It is interesting to compare the quality of life scores studied in the large PD patient population of the ADEMEX study and the hemodialysis of the Dialysis Outcomes and Practice Patterns Study (DOPPS) with the scores of our study (Figure 1) (12,13). We note that our patients have mental component and physical component scores similar to those of the ADEMEX and DOPPS studies. On the other hand, the KDQOL-36 scale-specific and PDK-specific scores of our patients are significantly lower.

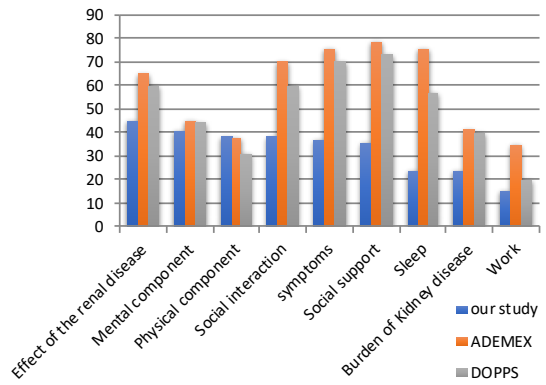

Figure 2Comparison of the results of the KDQOL SF 36 sub-scores in our series with the results of ADEMEX and DOPPS

CONCLUSION

Previous studies and ours point to a reduction in the importance given to peritoneal clearance and a greater emphasis on clinical evaluation, residual renal function and optimization of ultrafiltration without exposing the peritoneum to a high glucose load. The question of the relationship between quality of life and other parameters such as morbidity and mortality, residual renal function and peritoneal ultrafiltration needs to be studied. We also need to extend our study to a larger population of PD patients nationally.

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DISCLOSURE

The authors have no conflict of interest to declare.

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