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Successful discontinuation after 7 years of hemodialysis following Toprak's kidney care: A case report

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Abstract. *Patients with end-stage kidney disease, who require hemodialysis for more than three months, have little chance of terminating dialysis. The purpose of this case report is to show the effects of patient kidney care and nutrition on the termination of dialysis and patient follow-up. We present a 74-year-old end-stage kidney disease patient who underwent hemodialysis 3 times a week for 7 years. After the patient underwent a special kidney care and nutrition program called Toprak's Kidney Care, hemodialysis was terminated by gradually reducing the dialysis sessions over 2.5 months. During the 62-month follow-up after discontinuing dialysis, the patient required no kidney replacement therapy. The glomerular filtration rates were stable at 8-10 mL/min/1.73 m2. During the follow-up period, the patient was not hospitalized and no major adverse cardiac events occurred. To date, the patient remains in good health.*

Toprak's Kidney Care and nutritional support may be considered during the termination of HD in ESKD patients. The discontinuation of HD in ESKD patients who have adequate urine output may be considered, even after 7 years of HD. Consensus and clinical guidelines regarding the termination of chronic HD in ESKD patients are needed.

Key words: *dialysis, end-stage kidney disease, patient care, nutrition assessment.*

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Успішне припинення лікування після 7 років гемодіалізу в результаті догляду за нирками за програмою Топрака: клінічний випадок

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Резюме. *У пацієнтів з термінальною стадією хронічної хвороби нирок (ХХН), які лікуються методом гемодіалізу протягом більш ніж три місяці, мало шансів припинити діаліз. Метою цього клінічного випадку є продемонструвати вплив догляду за нирками пацієнта та харчування на можливість припинення діалізу та спостереження за пацієнтом. Ми представляємо 74-річного пацієнта з ХХН ВД, який лікувався методом гемодіалізу 3 рази на тиждень протягом 7 років. Після того, як пацієнт пройшов спеціальну програму догляду за нирками та харчування, названу доглядом за нирками Топрака, гемодіаліз було припинено шляхом поступового зменшення сеансів діалізу протягом 2,5 місяців. Протягом 62-місячного спостереження після припинення гемодіалізу швидкість клубочкової фільтрації стабілізувалась на рівні 8-10 мл/хв/1,73 м^2, пацієнт не був госпіталізований, і не відбулося жодної небажаної серцевої події. На сьогоднішній день пацієнт залишається у задовільному стані.*

Догляд за програмою Топрак та харчова підтримка можуть бути розглянуті у разі необхідності припинення лікування методом гемодіалізу у пацієнтів з адекватним діурезом, навіть через 7 років діалізної терапії. Потрібні консенсус і клінічні рекомендації щодо можливості припинення лікування гемодіалізом у пацієнтів з ХХН ВД.

Ключові слова: *гемодіаліз, хронічна хвороба нирок, догляд за пацієнтом, оцінка харчування.*

Introduction. Patients with acute kidney injury (AKI) initiating dialysis have significantly higher rates of kidney function recovery (KFR). However, KFR in chronic kidney disease (CKD) patients requiring long-term dialysis is rare [1, 2]. Normally, end-stage kidney disease (ESKD) patients who start hemodialysis (HD) continue dialysis treatment indefinitely, unless kidney transplantation is performed. Withdrawal from dialysis treatment in ESKD is dangerous [3, 4]. However, kidney function recovers in up to 8% of patients with ESKD receiving long-term dialysis, allowing discontinuation of dialysis, sometimes permanently [1-3, 5-7]. KFR is defined as the complete discontinuation of dialysis after 3 months of kidney replacement therapy [5].

Approximately 840 million people are diagnosed with CKD worldwide and around 10 million people per year require kidney replacement therapy. Unfortunately, only 2.5 million of these patients have access to kidney replacement therapy [4, 8]. Thus, the education of CKD patients is important. Patients may prevent or delay health problems secondary to CKD by consuming the right food and drinks. Dietary interventions and lifestyle changes can improve kidney function [7, 9-11]. One study showed that HD could be terminated after dietary adjustment in HD patients [9].

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Based on our 17 years of nephrology experience, we have created a care program for CKD patients called Toprak's Kidney Care [7, 11]. Herein, we present the case of an ESKD patient with an arteriovenous fistula who was removed from HD after 7 years by following Toprak's Kidney Care. After more than 5 years, the patient still does not require HD or kidney transplantation. Although this is only a single case, the results are promising; very long-term HD treatment may be terminated with careful and strict patient care. Furthermore, patients can maintain good health for many years after termination of HD. This is the third reported case in which a patient discontinued long-term HD due to Toprak's Kidney Care.

Brief Description of Toprak's Kidney Care

Definition and main principles: Toprak's Kidney Care is a newly defined kidney care model for CKD patients and their caregivers and consists of 37 components. The components of Toprak's Kidney Care include patient and caregiver education, lifestyle changes, well-ordered regular nutrition and exercise, rational use of medicine, fluid status regulation, residual kidney function preservation, and alternative applications such as walking barefoot, sweat therapy, spiritual support, jujube, black seed, and special probiotic use (Fig. 1).

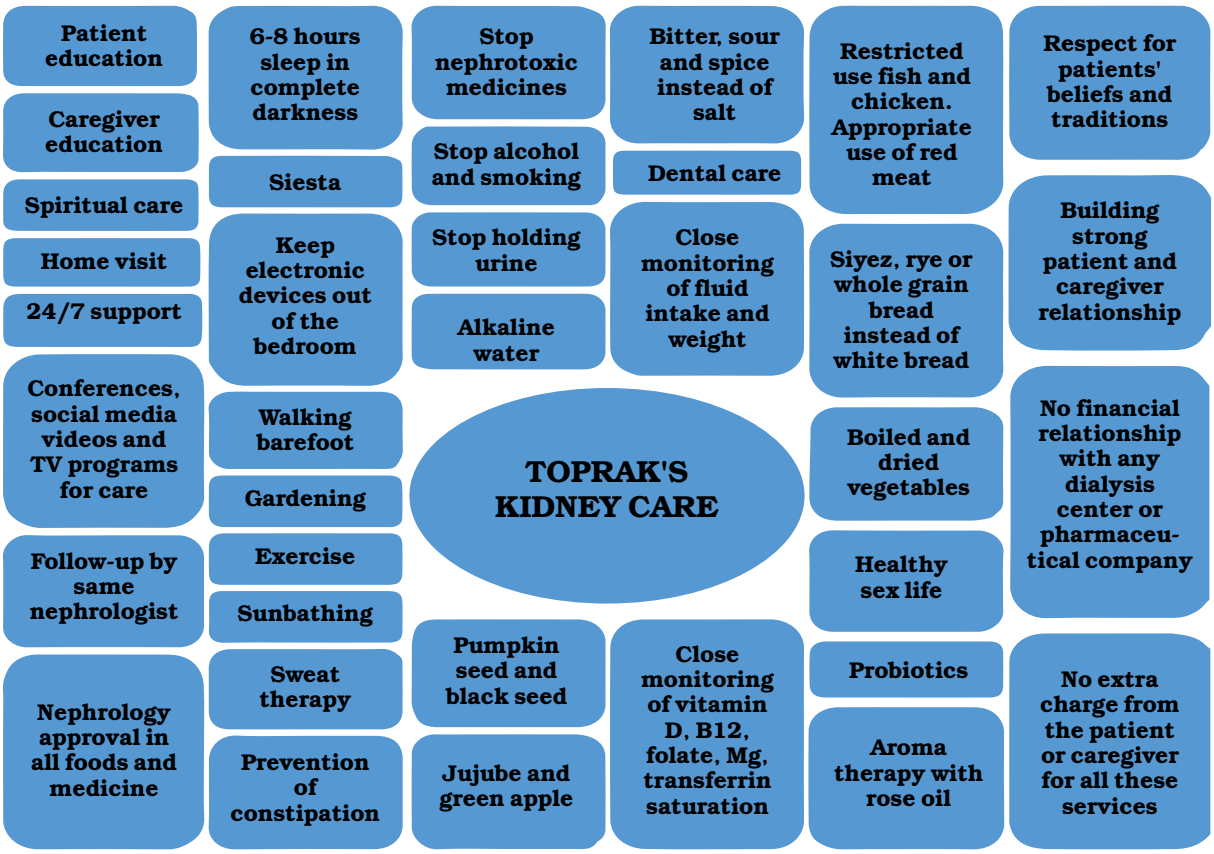

Fig. 1. Components of Toprak's Kidney Care.

We do not use any products, drugs or applications that may be harmful to CKD patients or whose content is unknown. Almost all of the components of Toprak's Kidney Care are also used in many other medical fields and diseases for many years [12-23]. Toprak's Kidney Care aims to improve the kidney functions, and social and psychological conditions of CKD patients. One of the most difficult things in the world is to change the life and of patients in a positive way. We are trying to do this with Toprak's Kidney Care.

The philosophy. Science, empathy, trust, patience, hope, faith, respect, and love constitute the philosophy of Toprak Kidney Care. The language, race, color, gender, religion, and country of the patient are not factors that affect our love for our patients. Patient participation in Toprak's Kidney Care is free. We do not have any sponsors. Under normal circumstances, a nephrologist's 24/7 patient support, arranging conferences, preparing training videos and doing home visits are things that require financial resources and funding. We bear all the expenses necessary for these transactions ourselves. Our biggest sponsor is the intense love and prayers of our patients. A sweet smile between the patient and his nephrologist, without any conflict of interest, is much more valuable to us than a whole world of gold.

The history. The idea to create Toprak's Kidney Care first emerged in 2006. The corresponding author of this paper has been following thousands of CKD patients for years as a single nephrologist and also conducts the education of CKD patients and their caregivers. Most of these patients are stage 5 CKD patients. Working under very intense conditions for years, having patients from many countries, cultures, and different geographies and following them as a single nephrologist gave us experience in the field of nephrology, especially in CKD patient education and care. We patiently listened to thousands of questions about lifestyle and healthy eating from our patients and recorded them all. In line with the suggestions of our patients and their caregivers, we have prepared a better patient education program each time. As a result of years of effort, we combined our experience with existing nephrology guidelines and Toprak's Kidney Care emerged in 2009. Toprak's Kidney Care shows continuous development and change depending on the needs of patients and scientific developments. We started our medical publications on Toprak's Kidney Care in 2019. Currently, we have 7 different clinical studies on Toprak's Kidney Care that are ethically approved by Balikesir University Faculty of Medicine, ongoing or completed and waiting to be published. After these publications, Toprak's Kidney Care will be better understood in the field of nephrology. The topics of these studies are briefly investigating the effects of some components of Toprak's Kidney Care such as specific probiotics, ziziphus jujuba, walking barefoot, siesta, sweat therapy and spiritual care on CKD progression.

Reasons for its creation. Millions of CKD patients all over the world, especially in underdeveloped

countries, die before they can reach dialysis or kidney transplantation due to impossibilities [4, 8]. Knowing this, we dedicate all of our energies to helping people with CKD live longer and healthier without the need for dialysis or a kidney transplant or delaying this need as much as possible. We have found that in the follow-up and treatment of thousands of our patients, classical nephrology patient education and current nephrology guidelines are insufficient at some points and cannot answer the questions of the patients. Many CKD patients did not know or misunderstood exactly how they should be fed. For these reasons, we decided to create Toprak's Kidney Care, considering that a new kidney care model is needed."

Case Report

In October 2017, a 74-year-old man was admitted to our nephrology outpatient clinic from another city, hoping to recover from HD. The patient heard that if urine output was adequate, patients could be removed from HD. The patient had ESKD and underwent HD 3 days per week, 4 hours per session for 84 months in a dialysis center. The medical records revealed that the patient was diagnosed with stage 4 CKD in July 2008 and was followed up for 2 years at a university hospital nephrology division. A kidney biopsy was not performed to determine the etiology of CKD due to the small size of both kidneys. An arteriovenous fistula was placed in December 2009. HD was started in August 2010 due to pulmonary edema and a glomerular filtration rate (GFR) of 9.7 mL/min/1.73m^2. The patient was added to the cadaveric kidney transplant list. The patient has had prediabetes for 5 years, insomnia for 6 years, and drank two alcoholic beverages a week for almost 15 years.

After undergoing HD for 7 years, the patient applied to our kidney care program. The patient met the criteria for HD reduction or discontinuation according to Toprak''s Kidney Care, as shown in Table 1. In Toprak's Kidney Care, all patients at the HD pass the selection according to Table 1 and the algorithm of Fig. 2. We do not have any pre-selection conditions or criteria. The patient's willingness and motivation to cooperate is the main reason for starting participation in the program. Also in our case, the patient and her caregiver were highly motivated to participate in Toprak's Kidney Care.

Table 1

The criteria for ESKD patient selection to attempt hemodialysis reduction or discontinuation in Toprak's Kidney Care (6 major and 30 minor criteria)

Major criteria	Minor criteria		
Mandatory criteria	**Etiology of CKD**	**HD related criteria**	**Other criteria**
1. Urine output ≥ 750 mL the day before HD	1. Unknown etiology/lack of kidney biopsy	1. Initiation to HD in the intensive care unit	1. Age ≥ 50 years
2. Serum creatinine < 7 mg/dL on the day of HD	2. ESKD secondary to AKI attack	2. Duration of HD < 10 years	2. Improved appetite and flesh weight gain
3. Absence of class IV heart failure, pulmonary edema, uremic encephalopathy, resistant hypertension, uremic pericarditis, cardiac tamponade, or malnutrition	3. Interstitial nephritis, analgesic nephropathy, obstructive uropathy, membranous GN, hypertensive nephropathy, and diabetic nephropathy	3. Unplanned/emergent initiation of HD, initiation of HD by temporary vascular access, and vascular access failure	3. Absence of multivessel coronary artery disease
4. Absence of severe hyperkalemia (≥ 6.5 mEq/L), severe hyponatremia < 120 mEq/L), and severe hyperparathyroidism (PTH > 1000 pg/mL)	4. < 80% of global glomerulosclerosis in kidney biopsy	4. Lack of periodical measurements of residual kidney function	4. Serum albumin < 3 g/dL when starting HD and ≥ 3.5 g/dL in follow-up
5. Absence of severe uremic symptomsa	5. Absence of kidney amyloidosis with massive proteinuria	5. Lack of > 1-year pre-dialysis nephrology care. Lack of nephrology care after initiation to HD	5. Need of hospitalization due to comorbidities at most once a year
6. Absence of history of long-term HD after kidney transplant rejection or peritoneal dialysis failure	6. Absence of crescentic GN did not responding to medical treatment	6. GFR > 10 mL/min/1.73 m2 when starting HD	6. Low serum magnesium (< 1.8 mg/dL) and vitamin D levels (< 10 ng/mL)
	7. Long-term eculizumab treatment in HUS	7. Starting HD with one or two sessions a week	7. Blood pH > 7.2

Continuation of Table 1

Major criteria	Minor criteria		
Mandatory criteria	**Etiology of CKD**	**HD related criteria**	**Other criteria**
	8. Renovascular diseases	8. Low interdialytic weight gain (<1 kg). Need for urination in HD	8. Blood pressure <140/90 mmHg without medications
	9. Autoimmune kidney diseases treated with immunosuppressive drug	9. Incorrect dry weight. Aggressive diuretic use and high UF volumes (> 3 liters)	9. Reduction or stopping of erythropoietin, phosphorus binders, and potassium binders
	10. Highly motivated patients and caregivers to adhere to kidney care	10. Requesting a reduction in HD time and frequency due to muscle cramp and hypotension	10. Hemoglobin > 9 g/dL

a Pruritus, malnutrition, and vomiting. UF: ultrafiltration; HUS: hemolytic uremic syndrome; HD: hemodialysis; AKI: acute kidney injury; ESKD: end-stage kidney disease; GN: glomerulonephritis; GFR, glomerular filtration rate; PTH: parathormone. To remove the patient from HD or to reduce the HD session, the patient must meet 6 major and 3 minor criteria.

The patient was evaluated according to the flow chart created for the reduction or discontinuation of HD (Fig. 2).

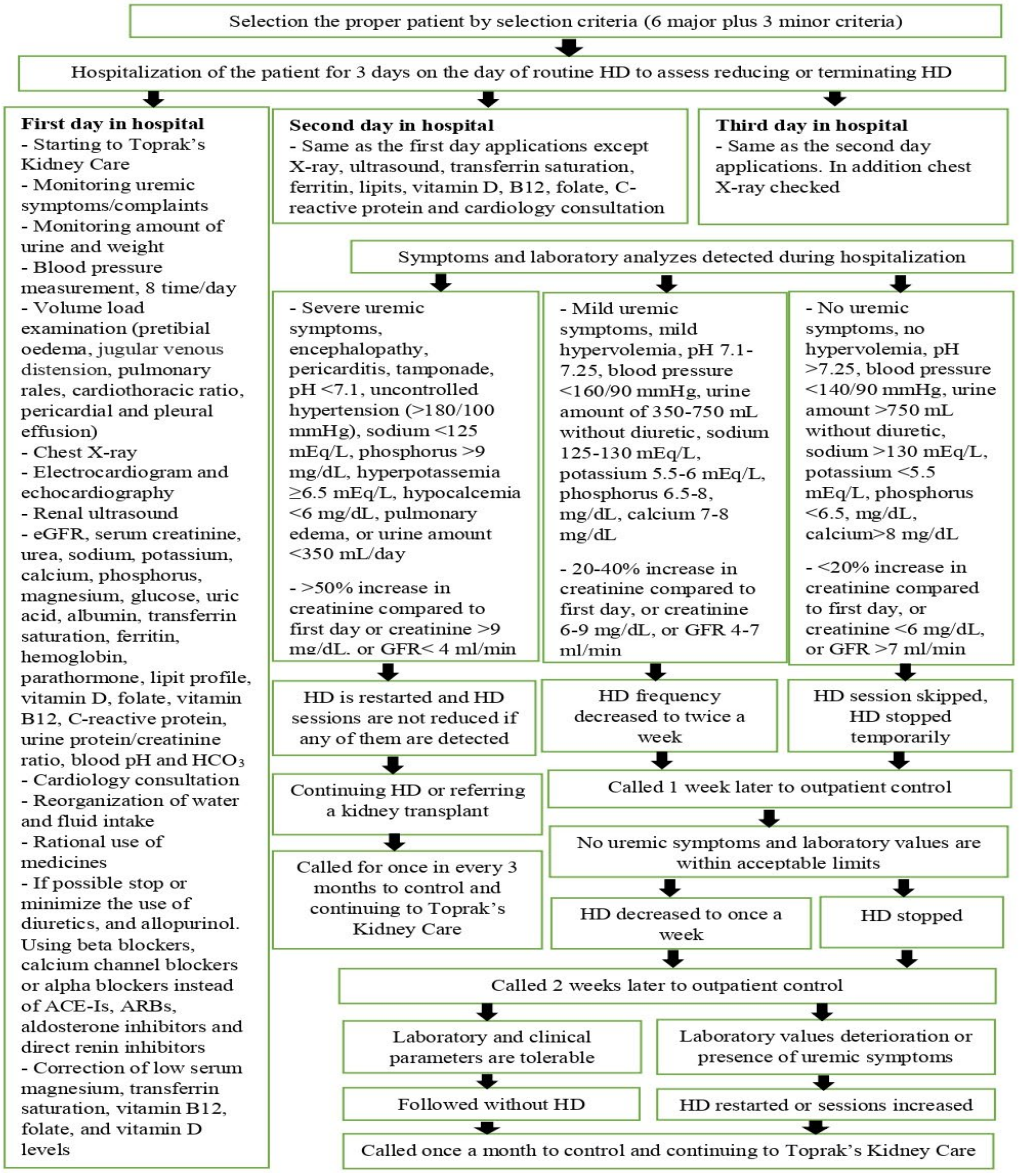

Fig. 2. Flowchart of hemodialysis reduction or hemodialysis discontinuation.

Abbreviations. HD: hemodialysis; ACE-Is: angiotensin-converting enzyme inhibitors; ARB: angiotensin receptor blockers, GFR: glomerular filtration rate.

The patient had an arteriovenous fistula with aneurysms in the right arm (Fig. 3).

Fig. 3. An arteriovenous fistula in the right arm. Aneurysms can be seen in the arterial and vein needle entry points.

The patient was evaluated the day before the patient's routine HD. The patient was stable and had a urine output of 1500 mL/day. The kidney ultrasound showed bilateral small-sized kidneys with increased echogenicity (Table 2).

Table 2

Renal, metabolic, nutritional, and fluid load parameters of the patient

	First start to HD	Start of Kidney Care	HD decrease to 2	HD decrease to 1	HD stopped	HD free 13 months	HD free 26 months	HD free 62 months
Date	12 Aug 2010	5 Oct 2017	6 Oct 2017	17 Nov 2017	18 Dec 2017	10 Jan 2019	14 Feb 2020	21 Feb 2023
HD schedule (hours/session per week)	4/3	4/3	4/2	4/1	0/0	0/0	0/0	0/0
		The day before HD	The day of HD	The day of HD	Time without HD (62 months)			
Renal Parameters								
eGFR, mL/min/1.73m2	9.7	18.09	13.41	9.83	10.81	10.82	9.94	8.6
Creatinine, mg/dL	5.6	3.2	4.1	5.3	4.9	4.8	5.16	5.7
Urea, mg/dl	174	51	73	116	138	160	163	145
Urine amount, mL/day	1500	1500	1500	1600	1800	1600	1500	2250
Blood pressure, mmHg	170/90	130/80	120/70	140/80	130/70	130/80	140/70	130/70
Urine P/C, mg/mg		1325		904	1132	1456	1047	1620
Blood pH	7.23	7.32		7.31	7.33	7.36	7.30	7.36
Blood HCO3, mEq/L	18	22		22	24	25	23	24
Parathormone, pg/mL	362	80.2		235.1	221.6	118.2	103.6	226.0
Sodium, mEq/L	132	137	136	134	133	135	135	137
Potassium, mEq/L	5.7	4.7	4.1	4.4	4.9	4.6	4.7	4.5
Calcium, mg/dL	8.1	9.2	8.4	8.9	8.6	9.0	9.1	9.5
Phosphorus, mg/dL	7.8	2.0	2.7	3.6	4.7	4.7	4.7	4.1
Magnesium, mg/dL	2.7	1.9		2.2	2.1	2.3	2.3	2.2
Kidney Ultrasound								
Linear dimension, mm	84/86	82/78						78/80
Echogenicity, grade	2/2	3/2						2/2
Parenchyma, mm	9/9	7/7						8/8
Fluid Load Parameters								
Pretibial edema	++/++	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Pleural effusion, cm	3/2	0/0		0/0	0/0	0/0		0/0
Pericardial effusion, cm		0		0	0	0		0
Cardiothoracic ratio	0.58	0.50		0.48	0.49	0.51		0.48

Continuation of Table 2

Metabolic Parameters								
BMI, kg/m^2		24.46	24.39	24.56	24.22	24.56	24.22	24.22
Weight, kg	79	70.7	70.5	71.0	70.0	71.0	70.0	70.0
Hemoglobin, mg/dL	8.9	12.6	10.9	10.6	9.8	12.0	10.8	11.6
Albumin, gr/dL	3.2	4.2		4.2	3.9	3.8		3.7
Uric acid, mg/dL	8.6	3.0		7.5	8.4	7.1	6.6	6.7
Glucose, mg/dL	121	126		104	108	109	113	114
HbA1C, %		6.2				5.4	5.5	6.1
HDL-C, mg/dL		42				49		45
LDL-C, mg/dL		85				92		131
Vitamin D, ng/mL		18					25	33.5
Standard CRP, mg/L	14	4.8		4.3	72.2	6.62	6.2	5.3

Abbreviations. HD: hemodialysis; eGFR: estimated glomerular filtration rate; calculated by CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration equation. Urine P/C: urine protein to creatinine ratio; BMI: body mass index; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol; CRP: C-reactive protein.

A program consisting of changes in medications, lifestyle, and nutritional habits was started (Tables 3 and 4).

Table 3

Clinical and lifestyle parameters and eating habits of the patient

	Start of Kidney Care	**Day 2**	**Day 12**	**Day 73**	**Month 8**	**Month 15**	**Month 28**	**Month 64**
Frequency of HD (times in a week)	3	2	1	Time without hemodialysis (62 months)				
Educational activities								
Patient/caregiver education, total hour	0	4	8	16	42	68	126	195
Spiritual support, total number	0	1	2	4	10	17	30	68
Patient-related activities								
Nephrologist approval of all drugs	-	+	+	+	+	+	+	+
24/7 support by a nephrologist	-	+	+	+	+	+	+	+
All exams by same nephrologist	-	+	+	+	+	+	+	+
Hospitalization for any reason	1	0	0	0	0	0	0	0
Major adverse cardiac events	0	0	0	0	0	0	0	0
Medications used by patient								
Sodium bicarbonate, 1500 mg/day	-	+	+	+	+	+	+	+
Multivitamin (B,C,folate), 2x/week	-	+	+	+	+	+	+	+
Darbepoetin-alfa 30-50 mcg/week	-	-	-	+	+	-	+	+
Allopurinol, 150 mg twice/week	-	-	+	+	+	+	+	+
Acetylsalicylic acid, 100 mg/day	+	+	+	+	+	+	+	+
Calcitriol 0.25 mcg/day if necessary Atorvastatin, 20 mg/day	+ -	+ -	+ -	+ -	+ -	+ -	+ -	+ +
Anti-hypertensives or anti-diabetics	-	-	-	-	-	-	-	-
Potassium or phosphate binders	-	-	-	-	-	-	-	-
Nephrotoxic agent, antibiotic, herbal	-	-	-	-	-	-	-	-
Depression/Anxiety								
Beck Depression Score (patient)	27			3	2	2	2	2
Beck Anxiety Score (patient)	28			5	2	2	2	2
Beck Depression Score (caregiver)	21			6	5	3	3	3
Beck Anxiety Score (caregiver)	23			9	4	3	3	3
Lifestyle changes								
Smoking	-	-	-	-	-	-	-	-
Alcohol intake	+	-	-	-	-	-	-	-
Exercise, minutes/day	30	30	45	60	60	60	60	60

Continuation of Table 3

Sleeping, hours/day	5	5	6	8	8	8	8	8
Siesta, 30 minute/after lunch	-	-	+	+	+	+	+	+
Sweat therapy, 30 minutes twice/week	-	-	+	+	+	+	+	+
Sunbathing, 20 minutes/day at noon	-	-	+	+	+	+	+	+
Walking barefoot, 30 minutes/day	-	-	+	+	+	+	+	+
Cell phone in room where patient sleeps	+	+	-	-	-	-	-	-
Use of Probiotics								
Homemade yogurt, 35 g/day	+	+	+	+	+	+	+	+
Apple or jujube vinegar, 3 mL/day	-	-	+	+	+	+	+	+
Special sauerkrauta, 30 g/day	-	-	-	-	+	+	+	+
Kefir, 100 mL twice/week	-	-	+	+	+	+	+	+
Other important nutritional habits								
Daily water, mL	1000	1500	1500	1750	1750	1750	1750	1750
High salt intake, > 4g/day Protein intake, gr/kg/day Calorie intake, kcal/kg, day	+ 1.2 35	- 1.2 35	- 1.0 30	- 0.8 30	- 0.8 30	- 0.8 30	- 0.8 30	- 0.8 30
Jujube tea, 300 cc/day	-	-	+	+	+	+	+	+
Unsalted, pumpkin seeds, 10 g/day	-	-	+	+	+	+	+	+
Boiled and poured vegetablesb	+	+	+	+	+	+	+	+
Raw greens	+	-	-	-	-	-	-	-
Black seed oil, 2 g/every other day	-	-	+	+	+	+	+	+
Unsalted, siyez bread, 56 g/day	-	-	+	+	+	+	+	+

Abbreviations. *BAI: Beck Anxiety Inventory (8-15: mild, 16-25: moderate, 26-63: severe); BDI: Beck Depression Inventory (10–18: mild, 19–29: moderate, 30–63: severe).*

aBoiled and poured white cabbage, apple cider, vinegar, olive oil, sliced lemon, and water are used to prepare. After 1 week of fermentation, 30 g of sauerkraut was consumed every day.

b1 serving/day any of the following: spinach, leek, zucchini, artichoke, broccoli, cabbage, celery, or okra.

Table 4

Rationales for interventions to reduce or discontinue hemodialysis by Toprak's Kidney Care

Interventions and applications of Toprak's Kidney Care	Clinical practice	Rationales and standpoint
Selection of the suitable ESKD patient on HD	6 major plus 3 minor criteria listed in Table 1	0.3% to 8% of ESKD patients receiving long-term HD, stopping HD [1, 3, 5-7]
Changing the patient diet and lifestyle according to the nephrology guidelines and our experience	KDOQI Clinical Practice Guideline and Toprak's Kidney Care are strictly applied. The corresponding author is trained in nutrition. Surveys are used to check compliance with recommendations	Dietary interventions and lifestyle changes can facilitate the termination or reduction of HD. We prepared 18 educational videos and 132 conferences for patients and caregivers. Nephrotoxic drug use or excessive salt intake was < 1% in our patients [7, 9-11, 24]
Providing 24/7 medical support to patients and caregivers by nephrologists using a mobile phone and social network	The mobile phone number of the nephrologist is given to patients. If the patient or caregiver needs support, they can connect directly to the nephrologist	Health systems have adopted eHealth to improve kidney care [25]. We could not find a publication investigating the effects of direct access to a nephrologist 24/7 on the discontinuation of HD
Hospitalization of AKI patients with CKD in the nephrology division. Follow-up visits, examinations, consultations, management of comorbidities, and treatment of patients by the same nephrologist	Substantial experience in HD discontinuation over 14 years and following > 7000 CKD patients without starting HD, even with a GFR < 3 mL/min/1.73 m^2 (Unpublished information. The information of these patients can be accessed by "e-nabiz" patient data bank system of the Ministry of Health of the Republic of Turkey. Clinical studies on these patients are still ongoing).	Management of cardiovascular risk factors reduces CKD progression [4, 8]. Avoiding nephrotoxic agents and maintaining fluid balance can be more successful under nephrology supervision. We have not found any publication on the role of follow-up of CKD patients by the same nephrologist on termination or reduction of HD
Toprak's Kidney Care is easy to apply and affordable	Toprak's Kidney Care has been successfully applied by 98% of patients [7, 11, 24]	HD is costly [26]. Terminating or reducing HD is beneficial for both patients and the national economy

Continuation of Table 4

Interventions and applications of Toprak's Kidney Care	Clinical practice	Rationales and standpoint
Patient home visits	Home visits show us what patients need in their home environments for healthy kidneys	We have not found a publication investigating the effect of home visits to CKD patients by a nephrologist on reducing/terminating HD
No financial relationship with any patient, dialysis industry, or pharmaceutical company	Patients or caregivers do not pay any fees for this care. We freely reduce or terminate HD	We could not find a publication investigating the relationship of nephrologist affiliation with the dialysis industry and HD termination
Keeping serum magnesium levels between 2.0-3.0 mg/dL, vitamin B12 300-500 pg/mL, folate 5-10 ng/mL, vitamin D 20-30 ng/mL, and transferrin saturation ≥20%	If needed, we use oral magnesium oxide, intramuscular B12, oral folate, oral calcitriol, and intravenous ferric carboxymaltose to keep the vitamin and minerals in the normal range	Hypomagnesemia, vitamin D, B12, and folate deficiencies are risk factors for CKD progression, diabetes, and hypertension [10, 27-29]. Administering erythropoietin without correcting B12, folate, and transferrin saturation does not correct anemia. Vitamin B12 should be ≥ 300 pg/mL, folate ≥ 5 ng/mL, and transferrin saturation ≥20%".
Discontinuation of ACEIs, ARBs, aldosterone antagonists, thiazide, NSAIDs, and nephrotoxic antibiotics. Restricting the use of furosemide, allopurinol, and potassium binding agents in patients with GFR < 15 ml/min/1.73 m2 who can discontinue HD	The use of potassium lowering agents is 0.2% and only 2% are using > 300 mg/ week allopurinol. We use lacidipine, lercanidipine, carvedilol, nebivolol, or doxazosin instead of RAAS antagonists in stage 5 CKD patients. Proteinuria, hypervolemia, hyperkalemia, and hyperuricemia are improved with diet and lifestyle changes	Thiazide diuretics have metabolic side effects [30]. Reduction of uric acid delays CKD progression. However, allopurinol has great side effects [31]. Potassium lowering agents may cause constipation and constipation increase uremic toxins in the bowel. The benefits of RAAS antagonists in stage 5 CKD are questionable [32]. Lercanidipine, lacidipine, carvedilol, and nebivolol are nephroprotective, cardioprotective, release NO, decrease proteinuria, and retain residual kidney function [33]
Sunbathing with siesta and maintaining serum 25(OH)D level >20 ng/mL	Exposing the face, hands, and arms to sunlight and sleeping at the same time for 10-15 minutes, 3 times a week between 11.00 am-3.00 pm	Low vitamin D levels and poor sleep are associated with CKD progression. Siesta and sunbathing increase vitamin D, melatonin, and kidney blood flow, and improve sleep quality [18, 29, 34]
Removing all blue light-emitting devices from the bedroom and sleeping 6-8 hr/day	Avoiding computers, smartphones, and TV during sleep time and turning off all lights	Blue light from screen devices suppresses melatonin production and reduced melatonin is associated with kidney damage [34]
Walking barefoot	3 times a week for 30 minutes on ground, sand, or grass. Not recommended for pregnant or diabetic patients with open wounds	When the earth connection is restored through grounding, electrons flood throughout the body, reducing oxidative stress and improving kidney blood flow [16]. There are clinical studies showing that walking barefoot has beneficial effects in humans [35]. However, there are not enough clinical studies on the subject in CKD patients. Based on our own experience and unpublished long-term clinical follow-up results from our patients, we recommend walking barefoot in CKD patients
Sweat therapy	30 minutes/2 times/ week. Mid-tempo walk in open air/home with sauna tracksuits followed by a shower	Skin can act as a third kidney. Sweat therapy removes water, potassium, sodium, urea, and toxins. Sweating improves kidney function in patients with CKD [17]
Aromatherapy and acupressure massage for kidney points	There are kidney acupressure points in the hands and feet. Kidney reflexology points are massaged with rose oil for 5 minutes every day before sleep	Foot massage and aromatherapy may improve kidneys by reducing proteinuria and hypertension. Rose oil has the highest vibrational frequency (320 MHz) and may deliver vibration to kidneys by massage [21, 22]
Spiritual care	The corresponding author is spiritual care certified. Depression/anxiety improved > 80% in patients	CKD patients who had spiritual care were more likely to give a positive assessment of their care [19]
Prevention of constipation	Use of laxatives is < 5%. We solve this problem by walking barefoot, exercise, alkaline water, spices, honey, olive oil, probiotics, reflexology, magnesium, and keeping TSH < 5 mIU/L	Constipation is an important risk factor for progression to ESKD and an indicator of gut dysbiosis. In constipation, harmful bacteria and uremic toxins increase in the intestines. If we cannot prevent constipation, we cannot reduce or stop HD [14, 23]. Constipation and decreased GFR levels are common in patients with hypothyroidism. CKD is associated with a higher prevalence of primary hypothyroidism. Higher TSH levels led to higher prevalence of CKD [36]. For these reasons, we try to keep the TSH < 5 mIU/L in CKD patients."

Continuation of Table 4

Interventions and applications of Toprak's Kidney Care	Clinical practice	Rationales and standpoint
Smoking, alcohol, and soft drinks consumption	By training, smoking ceased in 98% of patients, and alcohol and nonalcoholic beverages in 99%	Smoking, alcohol, and soft drinks are associated with progression to ESKD [37, 38]
Protein intake of 0.8-1.0 g/kg/day (60% animal-based and 40% plant-based), and energy intake of 30 kcal/kg/day. Reducing the use of chicken and banning fish. Consuming pumpkin seed and black seed oil	Beef, lamb or mutton (5 g/kg/wk), chicken (1,5 g/kg/2 week). White rice (2g/kg/wk), siyez wheat (2g/kg/wk). 3 egg whites/day, 2 egg yolks/wk. Yogurt (35 g/day), kefir (200 mL/wk), milk or ayran (150 mL/wk). Potatoes (150 g/wk), green olives (35 g/day), olive oil (30 g/day), and black seed oil (1g/day). Curd, cottage, or tongue cheese (30 g/day), cultivated/red pine mushrooms (100 g/week). Mixed unroasted almonds, walnuts, peanuts, hazelnuts, and cashews (150 g/wk), and pumpkin seeds (10 g/day). Rye, whole wheat, grain, or siyez bread (60 g/day), whole grain pasta (200 g/day)	Moderate protein restriction improves hyperkalemia, hyperphosphatemia, and delays CKD progression [10]. Recent studies question the restriction of plant-derived potassium and phosphorus. Phytate is a phosphorus found in legumes, nuts, seeds, and grains that passes through the digestive tract unabsorbed. Plant-based proteins have fewer uremic toxins and may slow CKD progression [39, 40]. Black seed oil protects the kidneys [13]. Pumpkin is a good source of vitamins, omega-3, fiber, magnesium, zinc, and iron [15]. Nuts are rich in fiber and useful against constipation. Dietary intake of poultry, fish, eggs, or dairy products may delay the progression of CKD. However, microplastics, heavy metals, and phosphorus are found in fish. We use red meat, chicken, and plant-based proteins in patients
Intermittent fasting	Fasting for 14 hours without water restriction and eating for 10 hours for patients with BM ≥ 25 kg/m2 and diabetics who do not use intensive insulin	Intermittent fasting improves obesity, diabetes mellitus, and hypertension, and may decrease CKD progression. In patients with polycystic kidney disease, intermittent fasting reduces cyst growth [40]
Consuming probiotics	3 mL apple or jujube vinegar, 30 g sauerkraut with lemon and olive oil, 35 g yogurt/day, 150 mL ayran, and 200 mL kefir per week	In CKD, uremic toxins increase in the intestines and promote aerobic bacteria growth. Probiotics improve the intestines and slow the progression of CKD [14]
Consuming ziziphus jujuba and other fruits and vegetables	Jujube (dried 28 g/day or raw 20 g/day). Green apples (150 g in diabetics, 300 g/day in non-diabetics), lemon (25 g/day), watermelon (150 g/wk), and green olives (30 g/day). Boiled spinach, leek, zucchini, artichoke, broccoli, cabbage, celery, purslane, and okra (2 gr/kg/day, of them). 150 g roasted pepper, 200 g eggplant, 100 g tomato, 100 g onion, 10 g garlic, 100 g cucumber per week	When taken in moderate amounts, fruits and vegetables do not cause hyperkalemia or hyperphosphatemia and provide many vitamins, minerals, and antioxidants that CKD patients need [40]. Jujube prevents hypertension, diabetes, and hyperlipidemia and restores kidneys in CKD patients. Jujube meets a significant portion of the daily vitamin and mineral needs [12]. Anticoagulant users should not consume jujube
Consumption of bee products	1,5 g/kg/day of flower honey in non-diabetics. Banning propolis, royal jelly, and pollen	Honey protects kidneys against oxidative stress and infection in rats [42]. Propolis, royal jelly, and pollen may cause nephropathy in humans. Acute kidney injury, acute interstitial nephritis, hyperkalemia and hyponatremia have been reported after the use of these products [43]
Cooking kidney-friendly foods at home	We teach patients how to make foods at home. > 98% of patients stay away from ready-made foods and cook their meals	We could not find a publication investigating the effects of preparing and eating kidney-friendly meals at home on kidney function and HD discontinuation
Drinking alkaline water	Water consumption with pH is 7.5-8.5	Reducing acid load by alkaline water may slow GFR decline and decrease metabolic acidosis in CKD [44]
Banning white bread consumption	Patients consumed oopsie, siyez, rye, or whole grain bread, lavash, pita, or phyllo dough instead of white bread. Cessation of white bread consumption may have a role in HD discontinuation	Dieticians recommend white bread to CKD patients because of low phosphorus and potassium levels. However, white bread is high in chemicals, which are harmful to the kidneys [20]. Phosphorus and potassium levels can be controlled by proper diet
Avoiding excessive salt restriction (<2 g/day). Using bitter, spice, vinegar, and lemon instead of salt	2 g/day rock salt for patients with hypertension/proteinuria and 5 g/day for patients with salt-wasting nephropathy and hypotension. In a day, 3 mL apple/jujube vinegar, 25 g lemon, 2 g chili or isot pepper, and 4 g black pepper or 6 g sumac may be used instead of salt	Lowering salt intake reducing hypertension and proteinuria. However, excessive salt restriction may cause hyponatremia and is a risk for CKD progression [45]. Anticoagulant users should not consume cinnamon, ginger, turmeric, and cloves. Black seed and fennel should not be used in pregnancy and breastfeeding [43]

Continuation of Table 4

Interventions and applications of Toprak's Kidney Care	Clinical practice	Rationales and standpoint
Determination of the correct fluid volume and dry weight	Some HD patients appear to have very low dry weight. We reexamined the dry weights and volume status in all patients who might discontinue or reduce HD	Inaccurate measurement of ideal dry weight, unnecessary ultrafiltration, unnecessary diuretics, and fluid restriction may reduce kidney perfusion. After correcting, urine quamtity can increase and the possibility of HD reduction and discontinuing increases [7, 11, 24, 46]
Obesity and malnutrition	We do not follow strict diet. In patients who have no appetite or BMI < 18,5 kg/m^2, the possibility of stopping HD is very low. Most of our patients have a BMI > 20 kg/m	Both obesity and malnutrition are associated with progression to ESKD. Malnutrition is more dangerous than obesity [47]. Restrictive eating may lead to malnutrition, inflammation, and atherosclerosis. Being slightly overweight gives much better results in CKD

Abbreviations. ESKD: end-stage kidney disease; CKD: chronic kidney disease; AKI: acute kidney injury; RAAS: renin-angiotensin-aldosterone system; ACEI: angiotensin-converting enzyme; ARB: angiotensin receptor blocker; BMI: body mass index; NO: nitric oxide; KDOQI: Kidney Disease Outcomes Quality Initiative; TSH: thyroid-stimulating hormone; NSAIDs: non-steroidal anti-inflammatory drugs.

Allopurinol for hyperuricemia, bicarbonate for mild metabolic acidosis, multiple vitamins to support B12, B6, B1, and folic acid levels, and erythropoietin for anemia were administered. High salt and alcohol intake were terminated. The patient was drinking 750-1000 mL of water and 500 mL of other liquids a day. We allowed an intake of 1.5 liters of water and 500 mL of other liquids per day because there was no hypervolemia. The patient and the patient's caregiver attended our education conference. The patient did not undergo HD on the second day due to the clinical and laboratory findings. The patient felt much better on the second day. The urine output was adequate, the blood pressure was in the normal range, and no hypervolemia was detected. The serum creatinine levels increased from 3.1 mg/dL to 4.2 mg/dL. The electrolyte levels were in the normal range. We reduced the weekly HD to two on the second day. After 42 days, we reduced HD to once a week. After 73 days, we found no uremic symptoms such as nausea, vomiting, fatigue, weight loss, pruritus, or changes in mental status, severe acidosis, uncontrolled hypertension, hyponatremia, hyperphosphatemia, hyperkalemia, or fluid overload. Urine output was sufficient. GFR levels stabilized at an average of 8-10 ml/min/1.73 m^2 (Table 2). There was no indication for HD. Depression and anxiety improved. Based on these findings, HD was terminated. Thus, the 88-month HD of the patient ended.

At the time of this report, the patient has been followed for 62 months and remains HD-free. At each outpatient clinic appointment, patient compliance with our recommendations for eating, drinking, lifestyle, and medication was reviewed with a standard questionnaire. Our patient largely complied with the exact serving sizes we suggested during the follow-up period. During the 62-month follow-up, the patient was not hospitalized, and no major adverse cardiac events occurred. The patient continues to come for examination every 3 months.

Discussion. In elderly HD patients, the remaining life expectancy is approximately 3 years [4]. If the patient described above had not applied to us, he would most likely be on HD for the remainder of his life or had an unnecessary kidney transplant. The discontinuation of HD for this patient may have been facilitated by restricting the high salt diet, reducing daily protein intake, increasing exercise, increasing fluid intake, and providing alternative treatments to the patient; these changes in diet and exercise resulted in increased kidney perfusion, decreased oxidative stress, and decreased proteinuria (see Table 4).

Our patient had HD-dependent ESKD according to medical records, laboratory analyses, and kidney ultrasound findings. The patient received pre-dialysis care for 2 years in a nephrology clinic and ESKD was diagnosed. In addition, an AV fistula was created during the pre-dialysis care and the patient was on the cadaveric kidney transplant list. According to the patient's medical record, a kidney biopsy was not performed and the cause of ESKD was unknown. We could not find a kidney biopsy. Therefore, we cannot say anything clearly about the relationship between the termination of HD and the histological type of kidney damage. Has our patient been mistakenly diagnosed with ESKD and undergone unnecessary HD for over 7 years? Such a possibility is impossible for a nephrologist. The initiation of HD was corrected for a patient with pulmonary edema and a GFR value of 9.7 mL/min/1.73 m^2. The IDEAL study which was published in August 2010 showed that with careful clinical management, HD may be delayed until either the GFR <7.0 ml/min or more traditional clinical indicators for the initiation of HD are present. Our patient was started on HD in August 2010, when deferral HD was not in practice as the results of the IDEAL study were just published [48]. However, we could not determine if the initiation of the HD program was too early for the present case. Many patients with CKD develop AKI, are diagnosed with ESKD, and become HD-dependent [2, 4, 7]. If this situation is not noticed and the patient continues HD, kidney function will further decrease with HD and the patient will be sentenced to HD for

life. In our patient, daily fluid intake was restricted and fluid was removed by ultrafiltration in each HD session. Unnecessary ultrafiltration and fluid restriction in the HD period can lead to prerenal azotemia, which further disrupts kidney perfusion [5, 7]. Our patient had preserved diuresis and no hypervolemia. After increasing the patient's oral fluid intake and terminating ultrafiltration and HD, a slight increase in urine quantity was observed in our patient. A 1500 ml urine output per day is very unusual for a patient on HD for 7 years. However, although rare, residual kidney function may be preserved for years in some patients. Renin-angiotensin-aldosterone system blockade, incremental HD, use of biocompatible membranes and ultrapure dialysate, blood pressure control, diuretic usage, diet, and HD modality influence the preservation of residual kidney function in HD patients [49].

We follow current guidelines in the care of CKD patients [10]. Based on our 17 years of nephrology experience, we have also added alternative therapies, resulting in the emergence of Toprak's Kidney Care (Fig. 1) [7, 11]. Nephrologists are currently not adequately informed about complementary and alternative medicine consumption by their patients. Because many products are at risk of either accumulating or causing interactions with medication. There are very few publications in the medical literature on alternative methods that can be applied to patients with ESKD or advanced CKD [50-53].

Toprak's Kidney Care is a newly defined care model for CKD patients, which may facilitate the termination of HD in some patients [7, 11, 24]. The care model includes nutritional care of the patient, and spiritual care of patients and their caregivers; depression and anxiety in both the patient and the caregiver are treated without medication. Jujube fruits may prevent kidney damage and control dyslipidemia and diabetes [12]. Therefore, jujube tea, jujube fruit, or jujube vinegar is included in Toprak's Kidney Care for CKD patients, as in the presented case. Black seed oil may improve kidney function in patients with CKD [13]. Regular consumption of probiotics may slow the progression of CKD [14]. Pumpkin seeds are a good source of vitamins and minerals needed in ESKD patients [15]. Therefore, black seed oil, probiotics, and pumpkin seeds were included in the treatment program for the present case.

Walking barefoot, which may improve kidney blood flow, is also a part of our care program [16]. Sweat treatment facilitates the excretion of potassium, sodium, urea, toxins, and excess fluids, especially in CKD patients, and was included in our treatment program [17]. Vitamin D supplementation may benefit CKD patients [10]. Vitamin D can be synthesized by the human body through the action of sunlight. Our patient had vitamin D deficiency despite taking vitamin D supplements; thus vitamin D levels were increased by sunbathing, correct nutrition, and vitamin D supplements. Shorter sleep duration and poor sleep are associated with an increased risk of CKD development [18]. The components of our care program such as siesta, walking barefoot, sweat therapy, sunbathing, spiritual care, and probiotics, may all have positive effects on sleep quality and quality of life [14, 16-19]. Our patient's insomnia decreased after beginning therapy; his sleep duration increased from 5 to 8 hours. Few studies in the literature support these alternative therapies; thus, we cannot recommend them for all CKD patients. Our ongoing large-scale studies will clarify the benefits of alternative therapies such as the use of specific probiotics, the use of ziziphus jujuba, barefoot walking, intermittent fasting, siesta, sweat therapy, and spiritual care. The duration of exercise was increased and dietary habits changed in our patient. High salt intake was terminated and replaced with kidney-friendly spices, like bitter and lemon. Alcohol intake was also terminated. Our patient had prediabetes. White bread contains high amounts of gluten and has a high glycemic index [20]. Therefore, white bread was eliminated from the patient's diet and was replaced with siyez, rye, or whole grain bread. The high phosphorus and potassium levels were adjusted via diet changes and were in the normal range during the 62 months follow-up period (Table 2).

Under normal conditions, long-term HD in ESKD patients is only terminated by kidney transplantation [8]. However, KFR occurs in approximately 8% of patients with ESKD receiving long-term HD [1-3, 5-7]. HD duration before withdrawal from HD was less than one year in most cases and only 45% survived of patients survived for one year after HD was discontinued [1, 3, 5, 6]. In one study, the median time to KFR and HD discontinuation was 8.3 months [54]. In a Swedish study, the longest period before the cessation of HD was 5.7 years [6]. Very few cases describe discontinuation of HD secondary to KFR in ESKD patients after 7 years. Letachowicz et al. reported that 97 months was the longest period of HD before cessation of HD due KFR [5]. Our case is one of the longest dialysis periods before withdrawal from HD reported in the literature. Although complete KFR was not detected, our patient has been living without HD for over 5 years. KFR rates are low in patients with permanent vascular access for HD of more than one year [1, 3, 5, 6]; therefore, the successful discontinuation of dialysis was unexpected in our patient, who had an arteriovenous fistula.

Very limited data is available on the cessation of HD in ESKD patients due to patient care or lifestyle changes. One study showed that a low protein diet led to the cessation of HD in three CKD patients [9]. We recently reported that a 71-year-old patient with ESKD was removed from HD due to Toprak's Kidney Care after 6 months of HD; the patient did not need HD for the following 9 years [11]. In another case, we reported that a 77-year-old man who had undergone HD 3 times weekly for 75 months, after which HD sessions were gradually decreased and terminated within 21 months while undergoing Toprak's Kidney Care. The patient went without HD for 10 months. Then, HD was started

once weekly for 46 months. Following this period, he underwent HD 3 times weekly [24]. Thus, this is the third case report demonstrating that long-term HD can be terminated using Toprak's Kidney Care. Of note, we did not terminate HD because of a progressive decrease in urea and creatinine levels or an inability to tolerate HD. However, in most of the reported KFR cases, a progressive decrease in serum urea and creatinine or an inability to tolerate HD was observed [1-3, 5, 6, 9]. Despite low GFR levels, our kidney care program was implemented and HD sessions were gradually decreased over 2.5 months before the complete discontinuation of HD. After discontinuation of HD, the GFR values were stabilized at approximately 8-10 mL/min/1.73 m^2, the daily amount of urine was preserved and slightly increased over time, HD was not needed, and the patient continued to lead a healthy life.

Stopping dialysis is extremely risky in ESKD patients [4, 7, 8]. If any complications develop after stopping HD or reducing the HD sessions, we could be accused of endangering the patient's life. In this case, we ended the HD by taking all these risks. Guidelines for termination or reduction in HD sessions should be formulated to reduce the risks to both patients and the medical staff. If we want to achieve successful results with Toprak Kidney Care, first of all, the nephrologist following the patient, the patient, patient caregivers, dialysis center employees, nurses and all doctors who deal with the patient's accompanying diseases should work in coordination and cooperation.

The main limitation of this study is that it is a single case report; we cannot conclude that all HD patients can discontinue HD with Toprak's Kidney Care. This is an important and rare presentation and the treatment approaches we used may not be beneficial to every patient. We cannot yet determine which component(s) of Toprak's Kidney Care facilitated the discontinuation of HD in this patient. To answer this question, randomized controlled studies with more patients are needed. The histology underlying the kidney disease in this patient was unknown. However, the lack of ESKD etiology does not decrease the value of the case. Importantly, HD was successfully terminated in this patient with ESKD; the patient did not require HD for over 5 years after termination, even though the patient was on HD for 7 years. We should have to calculate creatinine clearance values in 24-hour urine and residual renal clearance of urea to assess residual kidney function and assess the need for ongoing HD.

Conclusions. Toprak's Kidney Care and nutritional support may be considered during the termination of HD in ESKD patients. The discontinuation of HD in ESKD patients who have adequate urine output may be considered, even after 7 years of HD. Consensus and clinical guidelines regarding the termination of chronic HD in ESKD patients are needed.

Conflicts of Interest. The authors declare that they have no conflicts of interest.

Data Availability. The data used to support the findings of this study are included in the article. The data supporting the findings of this study are also publicly available in the electronic health system (E-nabiz) of the patient.

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Ethical Approval. The study was conducted ethically following the World Medical Association Declaration of Helsinki.

Consent. The patient has given their written informed consent to publish their case (including publication of images). Approval was also obtained from the patient and his caregiver for the termination of hemodialysis treatment.

Author Contributions. Data collection and writing OT, and EAB; the conception and design of the study, or acquisition of data, or analysis and interpretation of data OT, EAB, and DEA; concept and critical review OT; final approval of the version to be submitted OT, EAB, and DEA. All authors have read and agreed to the submitted version of the manuscript.

References

1. *Mohan S, Huff E, Wish J, Lilly M, Chen SC, McClellan WM*; Fistula First Breakthrough Initiative Data Committee, 2013. Recovery of renal function among ESRD patients in the US medicare program. PLoS One. 2013;8:e83447. doi: 10.1371/journal.pone.0083447.
2. *Chen Z, Lee BJ, McCulloch CE, Burrows NR, Heung M, Hsu RK.* The relation between dialysis-requiring acute kidney injury and recovery from end-stage renal disease: a national study. BMC Nephrol. 2019;20:342. doi: 10.1186/s12882-019-1483-y.
3. *Agraharkar M, Nair V, Patlovany M.* Recovery of renal function in dialysis patients. BMC Nephrol. 2003;4:9. doi: 10.1186/1471-2369-4-9.
4. *Seckinger J, Dschietzig W, Leimenstoll G, Rob PM, Kuhlmann MK, Pommer W, et al.* Morbidity, mortality and quality of life in the ageing haemodialysis population: results from the ELDERLY study. Clin Kidney J. 2016;9:839-848. doi:10.1093/ckj/sfw087.
5. *Letachowicz K, Madziarska K, Letachowicz W, Krajewska M, Penar J, Kusztal M.* The possibility of renal function recovery in chronic hemodialysis patients should not be overlooked: Single center experience. Hemodial Int. 2016;20:12-14. doi:10.1111/hdi.12383.
6. *Fehrman-Ekholm I, Bergenhag AC, Heimburger O, Schön S.* Recovery of renal function after one-year of dialysis treatment: case report and registry data. Int J Nephrol. 2010;817836. doi: 10.4061/2010/817836.

7. *Toprak O, Kirik A.* Is renal function recovery and discontinuation of long term hemodialysis possible in patients with presumed end stage kidney disease? The role of Toprak's Kidney Care. J Urol Ren Dis. 2020;05:1191. doi:10.29011/2575-7903.001191.
8. *Bikbov B, Purcell CA, Levey AS, Smith M, Abdoli A, Abebe M.* Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2020;395:709-733. doi:10.1016/S0140-6736(20)30045-3.
9. *Piccoli GB, Guzzo G, Vigotti FN, Capizzi I, Clari R, Scognamiglio S.* Tailoring dialysis and resuming low-protein diets may favor chronic dialysis discontinuation: report on three cases. Hemodial Int. 2014;18:590-595. doi:10.1111/hdi.12168.
10. *Ikizler TA, Burrowes JD, Byham-Gray LD, Campbell KL, Carrero JJ, Chan W.* KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update. Am J Kidney Dis. 2020;76:S1-S107. doi:10.1053/j.ajkd.2020.05.006.
11. *Toprak O, Bozyel EA, Alp B.* Discontinuing Hemodialysis with Patient Care and a Successful 9-Year Follow-up in a Patient Presumed to have End-Stage Kidney Disease Scheduled to Lifelong Hemodialysis: A Case Report. Clinics and Practice. 2021;11:131-142. doi: 10.3390/clinpract11010019.
12. *Sobhani Z, Nikoofal-Sahlabadi S, Amiri MS, Ramezani M, Emami SA, Sahebkar A.* Therapeutic Effects of Ziziphus jujuba Mill. Fruit in Traditional and Modern Medicine: A Review. Med Chem. 2020;16:1069-1088. doi:10.2174/1573406415666191031143553.
13. *Alam MA, Nasiruddin M, Haque SF, Khan RA.* Evaluation of safety and efficacy profile of Nigella sativa oil as an add-on therapy, in addition to alpha-keto analogue of essential amino acids in patients with chronic kidney disease. Saudi J Kidney Dis Transpl. 2020;31:21-31. doi: 10.4103/1319-2442.279943.
14. *Nelson K, Wysocki J.* Benefits of Probiotic Consumption on Chronic Kidney Disease. J Ren Nutr. 2020;30:e35-e36. doi:10.1053/j.jrn.2019.05.001.
15. *Dotto JM, Chacha JS.* The potential of pumpkin seeds as a functional food ingredient: A review. Scientific African. 2020;10:575. doi:10.1016/j.sciaf.2020.e00575.
16. *Menigoz W, Latz TT, Ely RA, Kamei C, Melvin G, Sinatra D.* Integrative and lifestyle medicine strategies should include Earthing (grounding): Review of research evidence and clinical observations. Explore (NY). 2020;16:152-160. doi: 10.1016/j.explore.2019.10.005.
17. *Hanafusa N, Lodebo BT, Shah A, Kopple JD.* Is There a Role for Diaphoresis Therapy for Advanced Chronic Kidney Disease Patients? J Ren Nutr. 2017;27:295-302. doi: 10.1053/j.jrn.2017.04.008.
18. *Bo Y, Yeoh EK, Guo C, Zhang Z, Tam T, Chan TC, et al.* Sleep and the Risk of Chronic Kidney Disease: A Cohort Study. J Clin Sleep Med. 2019;15:393-400. doi: 10.5664/jcsm.7660.
19. *Pham TV, Beasley CM, Gagliardi JP, Koenig HG, Stanifer JW.* Spirituality, Coping, and Resilience Among Rural Residents Living with Chronic Kidney Disease. J Relig Health. 2020;59:2951-2968. doi: 10.1007/s10943-019-00892-w.
20. *Askari G, Heidari-Beni M, Broujeni MB, Ebneshahidi A, Amini M, Ghisvand R, et al.* Effect of whole wheat bread and white bread consumption on pre-diabetes patient. Pak J Med Sci. 2013;29 Suppl:275-279. doi:10.12669/pjms.291(Suppl).3516.
21. *Mohamadinasab S, Ravari A, Mirzaei T, Sayadi A.* The Effect of Aromatherapy with Essential Rose Oils on Blood Pressure in Hypertensive Patients. J Med Plants. 2019;18:202-214. doi:10.29252/jmp.4.72.202.
22. *Samarehfekri A, Dehghan M, Arab M, Ebadzadeh MR.* Effect of Foot Reflexology on Pain, Fatigue, and Quality of Sleep after Kidney Transplantation Surgery: A Parallel Randomized Controlled Trial. Evid Based Complement Alternat Med. 2020;2020:5095071. doi: 10.1155/2020/5095071.
23. *Lu CY, Chen YC, Lu YW, Muo CH, Chang RE.* Association of Constipation with risk of end-stage renal disease in patients with chronic kidney disease. BMC Nephrol. 2019;20:304. doi: 10.1186/s12882-019-1481-0.
24. *Toprak O, Bozyel EA, Alp B, Kirik A.* Discontinuation of Hemodialysis After 8 Years in Favor of Toprak's Kidney Care in a Patient with End-Stage Kidney Disease. Am J Case Rep. 2021;22:e930857. doi: 10.12659/AJCR.930857.
25. *Wang Cs, Ku E.* eHealth in kidney care. Nat Rev Nephrol. 2020;16:368-370. doi: 10.1038/s41581-020-0271-z.
26. *Zhang H, Zhang C, Zhu S, Ye H, Zhang D.* Direct medical costs of end-stage kidney disease and renal replacement therapy: a cohort study in Guangzhou City, southern China. BMC Health Serv Res. 2020;20:122. doi: 10.1186/s12913-020-4960-x.
27. *Capelli I, Cianciolo G, Gasperoni L, Zappulo F, Tondolo F, Cappuccilli M, et al.* Folic Acid and Vitamin B12 Administration in CKD, Why Not? Nutrients. 2019;11:383. doi: 10.3390/nu11020383.

28. *Azem R, Daou R, Bassil E, Anvari EM, Taliercio JJ, Arrigain S, et al.* Serum magnesium, mortality and disease progression in chronic kidney disease. BMC Nephrol. 2020;21:49. doi: 10.1186/s12882-020-1713-3.

29. *Franca Gois PH, Wolley M, Ranganathan D, Seguro AC.* Vitamin D Deficiency in Chronic Kidney Disease: Recent Evidence and Controversies. Int J Environ Res Public Health. 2018;15:1773. doi: 10.3390/ijerph15081773.

30. *Agarwal R, Sinha AD.* Thiazide diuretics in advanced chronic kidney disease. J Am Soc Hypertens. 2012;6:299-308. doi: 10.1016/j.jash.2012.07.004.

31. *Thurston MM, Phillips BB, Bourg CA.* Safety and efficacy of allopurinol in chronic kidney disease. Ann Pharmacother. 2013;47:1507-1516. doi: 10.1177/1060028013504740.

32. *Ahmed A, Jorna T, Bhandari S.* Should We STOP Angiotensin Converting Enzyme Inhibitors/Angiotensin Receptor Blockers in Advanced Kidney Disease? Nephron. 2016;133:147-158. doi: 10.1159/000447068.

33. *Sinha AD, Agarwal R.* Clinical Pharmacology of Antihypertensive Therapy for the Treatment of Hypertension in CKD. Clin J Am Soc Nephrol. 2019;14:757-764. doi: 10.2215/CJN.04330418.

34. *Hrenak J, Paulis L, Repova K, Aziriova S, Nagtegaal EJ, Reiter RJ, et al.* Melatonin and renal protection: novel perspectives from animal experiments and human studies (review). Curr Pharm Des. 2015;21:936-949. doi: 10.2174/1381612820666140929092929.

35. *Oschman JL, Chevalier G, Brown R.* The effects of grounding (earthing) on inflammation, the immune response, wound healing, and prevention and treatment of chronic inflammatory and autoimmune diseases. J Inflamm Res. 2015 ;8:83-96. doi: 10.2147/JIR.S69656.

36. *Basu G, Mohapatra A.* Interactions between thyroid disorders and kidney disease. Indian J Endocrinol Metab. 2012;16:204-213. doi: 10.4103/2230-8210.93737.

37. *Lee S, Kang S, Joo YS, Lee C, Nam KH, Yun HR, et al.* Smoking, Smoking Cessation, and Progression of Chronic Kidney Disease: Results From KNOW-CKD Study. Nicotine Tob Res. 2021;23:92-98. doi: 10.1093/ntr/ntaa071.

38. *Joo YS, Koh H, Nam KH, Lee S, Kim J, Lee C, et al.* Alcohol Consumption and Progression of Chronic Kidney Disease: Results From the Korean Cohort Study for Outcome in Patients with Chronic Kidney Disease. Mayo Clin Proc. 2020;95:293-305. doi: 10.1016/j.mayocp.2019.06.014.

39. *Lew QJ, Jafar TH, Koh HW, Jin A, Chow KY, Yuan JM, et al.* Red Meat Intake and Risk of ESRD. J Am Soc Nephrol. 2017;28:304-312. doi: 10.1681/ASN.2016030248.

40. Cases A, Cigarrán-Guldrís S, Mas S, Gonzalez-Parra E. Vegetable-Based Diets for Chronic Kidney Disease? It Is Time to Reconsider. Nutrients. 2019;11:1263. doi: 10.3390/nu11061263.

41. *Torres JA, Kruger SL, Broderick C, Amarlkhagva T, Agrawal S, Dodam JR, et al.* Ketosis Ameliorates Renal Cyst Growth in Polycystic Kidney Disease. Cell Metab. 2019;30:1007-1023.e5. doi: 10.1016/j.cmet.2019.09.012.

42. *Erejuwa OO, Aja DOJ, Uwaezuoke NI, Nwadike KI, Ezeokpo BC, Akpan JL, et al.* Effects of honey supplementation on renal dysfunction and metabolic acidosis in rats with high-fat diet-induced chronic kidney disease. J Basic Clin Physiol Pharmacol. 2021;32:1. doi: 10.1515/jbcpp-2019-0151.

43. *Nauffal M, Gabardi S.* Nephrotoxicity of Natural Products. Blood Purif. 2016;41:123-129. doi: 10.1159/000441268.

44. *Passey C.* Reducing the Dietary Acid Load: How a More Alkaline Diet Benefits Patients With Chronic Kidney Disease. J Ren Nutr. 2017;27:151-160. doi: 10.1053/j.jrn.2016.11.006.

45. *Nagasawa Y.* Positive and Negative Aspects of Sodium Intake in Dialysis and Non-Dialysis CKD Patients. Nutrients. 2021;13:951. doi: 10.3390/nu13030951.

46. *Bragg-Gresham JL, Fissell RB, Mason NA, Bailie GR, Gillespie BW, Wizemann V, et al.* Diuretic use, residual renal function, and mortality among hemodialysis patients in the Dialysis Outcomes and Practice Pattern Study (DOPPS). Am J Kidney Dis. 2007;49:426-431. doi: 10.1053/j.ajkd.2006.12.012.

47. *Rhee CM, Ahmadi SF, Kalantar-Zadeh K.* The dual roles of obesity in chronic kidney disease: a review of the current literature. Curr Opin Nephrol Hypertens. 2016;25:208-216. doi: 10.1097/MNH.0000000000000212.

48. *Cooper BA, Branley P, Bulfone L, Collins JF, Craig JC, Fraenkel MB, et al.*; IDEAL study. A randomized, controlled trial of early versus late initiation of dialysis. N Engl J Med. 2010;363:609-619. doi: 10.1056/NEJMoa1000552.

49. *Li T, Wilcox CS, Lipkowitz MS, Gordon-Cappitelli J, Dragoi S.* Rationale and Strategies for Preserving Residual Kidney Function in Dialysis Patients. Am J Nephrol. 2019;50:411-421. doi: 10.1159/000503805.

50. *Nowack R, Ballé C, Birnkammer F, Koch W, Sessler R, Birck R.* Complementary and alternative medications consumed by renal patients in southern Germany. J Ren Nutr. 2009;19:211-219. doi: 10.1053/j.jrn.2008.08.008.

51. *AlAnizy L, AlMatham K, Al Basheer A, AlFayyad I.* Complementary and Alternative Medicine Practice Among Saudi Patients with Chronic Kidney Disease: A Cross-Sectional Study. Int J Nephrol Renovasc Dis. 2020;13:11-18. doi: 10.2147/IJNRD.S240705.

52. *Osman NA, Hassanein SM, Leil MM, NasrAllah MM.* Complementary and Alternative Medicine Use Among Patients With Chronic Kidney Disease and Kidney Transplant Recipients. J Ren Nutr. 2015;25:466-471. doi: 10.1053/j.jrn.2015.04.009.

53. *Mohammadi S, Asghari G, Emami-Naini A, Mansourian M, Badri S.* Herbal Supplement Use and Herb-drug Interactions among Patients with Kidney Disease. J Res Pharm Pract. 2020;9:61-67. doi: 10.4103/jrpp.JRPP_20_30.

54. *Chu JK, Folkert VW.* Renal function recovery in chronic dialysis patients. Semin Dial. 2010;23:606-613. doi: 10.1111/j.1525-139X.2010.00769.x.