Long Term Renal Stability with Disodium EDTA Chelation in Non-Diabetic Patient with Stage 3b CKD and a Solitary Kidney: A Seven Year Case Report

Abstract

We present the case of a 62-year-old non-diabetic woman with stage 3b chronic kidney disease (CKD) and a solitary kidney who underwent 15 sessions of chelation therapy using disodium EDTA combined with multivitamins. Over a seven-year follow-up, her renal function remained remarkably stable, with only a minimal decline in glomerular filtration rate (GFR) and improvements in blood urea nitrogen, serum urea, and creatinine levels. Although the patient was also receiving antihypertensive therapy, the sustained biochemical stabilitysuggests a potential adjunctive role for chelation therapy in slowing CKD progression. This case highlights the need for further controlled studies to evaluate the long-term renal effects of EDTA-based chelation in non-diabetic CKD patients.

Keywords: Chronic Kidney Disease, Chelation Therapy, Disodium EDTA, Solitary Kidney, Renal Function, Multivitamins.

Introduction

Chronic kidney disease (CKD) impacts around 10% of people worldwide, creating a major public health challenge due to its progressive nature and the high costs of treatment (1). In the United States, about 15% of the population is affected, with many cases going undetected until later stages (2). CKD involves a slow decline in kidney function, which can ultimately lead to end-stage renal disease (ESRD), requiring dialysis or a kidney transplant (3). While diabetes and high blood pressure are leading risk factors, some individuals develop CKD without these underlying conditions (4).

Chelation therapy using disodium EDTA has commonly been applied to manage heavy metal poisoning (5). Recent studies have examined its possible benefits for cardiovascular and kidney health, focusing on mechanisms like removing toxic metal ions, reducing oxidative stress, and enhancing endothelial function (6). This report reviews the long-term effects of EDTA-based chelation therapy in a non-diabetic stage 3b CKD patient with a single kidney.

Research Question

Does chelation therapy with disodium EDTA and multivitamins help stabilize renal function in non-diabetic patients with a solitary kidney and advanced CKD?

Objectives

- **General Objective:**
  To evaluate the long-term effect of disodium EDTA chelation therapy on renal function in a non-diabetic patient with stage 3b CKD and a solitary kidney.
- **Specific Objectives**
  - To measure changes in glomerular filtration rate (GFR) over a seven-year period.
  - To compare biochemical markers (blood urea nitrogen, serum urea, serum creatinine) before and after therapy.
  - To assess blood pressure control during follow-up.
  - To document any adverse events associated with chelation therapy.

Case Presentation

A 62-year-old woman with a history of six pregnancies (four live births and two spontaneous abortions, including one with fetal macrosomia) was diagnosed with stage 3b CKD. Her family history revealed diabetes mellitus in three siblings, one of whom passed away due to renal failure. At 32, she underwent a right nephrectomy for recurrent kidney stones, and 15 years ago, she had lithotripsy for small stones with temporary ureteral catheter placement. A CT scan in November 2017 showed the absence of the right kidney, a 1.8 cm cyst in the left kidney, minor calcium deposits, and mild dilation of the collecting system. Her initial renal function indicated a GFR of 37.53 mL/min/1.73 m² (filtration percentage: 35.43%), confirming stage 3b CKD.

She received 15 weekly infusions of 1000 mL Hartmann's solution over 3 hours, containing:

- 10 mL Disodium EDTA (150 mg/mL)
- 6 mL Cyanocobalamin (1 mg/mL)
- 5 mL Magnesium Sulfate (500 mg/mL)
- 5 mL Sodium Bicarbonate 8.4% (84 mg/mL)
- 5 mL Procaine 2%
- 3 mL Heparin (1000 units/mL)

Four months prior to therapy, she was diagnosed with hypertension and started on Losartan 50 mg and Amlodipine 5 mg daily.

Results

During the latest evaluation on August 26, 2024, the patient's blood pressure measured 130/80 mmHg, with a weight of 100 kg and a height of 1.70 m. Renal function tests indicated a GFR of 33.77 mL/min/1.73 m² (filtration percentage: 32.78%). Biochemical parameters showed improvements compared to the initial evaluation:

- Blood urea nitrogen dropped from 49.85 to 36.0 mg/dL,

- Serum urea reduced from 106.70 to 77.04 mg/dL, and
- Serum creatinine declined from 3.54 to 1.61 mg/dL.

(See Table 1 for detailed laboratory results.)

Table 1. Laboratory Results

LaboratoryParameter	November 16, 2017 (Baseline)	August 26, 2024 (Follow-up)	Reference Range
Hematologicbiometry:			
Erythrocytes	4.06	4.33	(4.0–5.0)
Hemoglobin	12.6	13.8	(12–16)
Hematocrit	38.0%	39.0%	(36–48)
Bloodchemistry:			
Glucose	105.30	83.0	(79–109)
Glycosylated Hb	5.40	5.70	(>6.50)
Urea nitrogen	49.85	36.0	(7–18)
Serum urea	106.70	77.04	(15.0–40.0)
Serumcreatinine	3.54	1.61	(0.57–1.11)
Uricacid	8.18	8.0	(2.50–7.0)
Totalcholesterol	146	173	(<200)
Triglycerides	166	149	(150–199)
General urine test:			
Density	1.015	1.010	(1.010–1.025)
Proteins	Traces	0.0	(Negative)
Glucose	0	0	(Negative)
Hemoglobin	Pos +++	Negative	(Negative)
Erythrocytes	>100	0	0-2PF
Creatinineclearance:			
Urinarycreatinine	37.5	57.72	(10–300)
Totalvolume (ml)	3200	1580	

LaboratoryParameter	November 16, 2017 (Baseline)	August 26, 2024 (Follow-up)	Reference Range
Serumcreatinine	1.95	1.61	(0.57–1.11)
Bodysurfacearea	1.96 m²	2.02 m²	
Filtrationrate	37.53 mL/min	33.77 mL/min	(97–133)
Functionpercentage	35.43%	32.78%	

Discussion

This case report highlights a unique clinical scenario involving a non-diabetic patient with stage 3b chronic kidney disease (CKD) and a solitary kidney who underwent chelation therapy with disodium EDTA and multivitamins. Over a seven-year follow-up, the patient demonstrated remarkable renal stability, with only a modest decline in glomerular filtration rate (GFR) and improvements in key biochemical markers. These observations prompt important questions about the potential role of chelation therapy as an adjunctive strategy in CKD management.

Chelation therapy with disodium EDTA has traditionally been used for heavy metal detoxification (5). However, emerging evidence suggests that its mechanisms—such as the removal of toxic metal ions, reduction of oxidative stress, and enhancement of endothelial function—may have broader implications in chronic diseases, including cardiovascular and renal pathologies. The Trial to Assess Chelation Therapy (TACT) demonstrated cardiovascular benefits in patients with diabetes and prior myocardial infarction, indirectly supporting the hypothesis that EDTA may improve vascular health and microcirculation, both essential for renal preservation (7).

In 2014, Yang SK and colleagues (8) conducted a review of randomized controlled trials to assess the benefits of calcium disodium EDTA chelation therapy for CKD. Their meta-analysis suggested that this therapy might slow disease progression in individuals with detectable lead levels, as evidenced by improvements in estimated glomerular filtration rate (eGFR) and creatinine clearance rate (Ccr).

In this case, the combination of disodium EDTA and multivitamins was associated with sustained stabilization of renal function over a 7-year period. Given her stage 3b CKD, familyhistory of diabetes, and prior nephrectomy, the patient was at high risk. While some stabilization might be attributed to antihypertensive therapy, the timing and biochemical improvements after chelation hint at a potential synergistic effect.

It's important to recognize the limitations of this report. Being a single case, it can't establish causality, and the lack of a control group prevents drawing definitive conclusions.

Additionally, the long-term safety of EDTA in CKD patients remains unclear, particularly concerning calcium depletion and potential nephrotoxicity. However, the absence of adverse events in this patient over seven years is noteworthy. This case highlights the need for more research into the renal effects of chelation therapy, especially in non-diabetic CKD populations with few treatment options. Randomized controlled trials are crucial to confirm these findings and determine the best dosing, duration, and patient selection.

Conclusion

This case report presents a rare scenario of a non-diabetic patient with stage 3b chronic kidney disease (CKD) and a solitary kidney undergoing chelation therapy with disodium EDTA and multivitamins. Over a seven-year follow-up, the patient demonstrated remarkable renal stability, with only a minor decrease in glomerular filtration rate (GFR) and notable improvements in key biochemical markers. These findings raise intriguing questions about the potential of chelation therapy as an adjunctive option in CKD management.

References

1. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease Kidney Int. 2024; 105: S1-S197
2. Centers for Disease Control and Prevention. Chronic Kidney Disease. Surveillance System website. https://nccd.cdc.gov/CKD. Accessed 2/19/2021.
3. Maringhini, S., et al (2024). Chronic Kidney Disease Progression-A Challenge. Biomedicines, 12(10), 2203. https://doi.org/10.3390/biomedicines12102203
4. Erfanpoor, S., et al. (2020). Diabetes, Hypertension, and Incidence of Chronic Kidney Disease: Is There any Multiplicative or Additive Interaction? International journal of endocrinology and metabolism, 19(1), e101061. https://doi.org/10.5812/ijem.101061
5. Andersen, O. (1999). Principles and recent developments in chelation treatment of metal intoxication. Chemical Reviews, 99(9), 2683-2710.
6. Lamas, G. A., et al (2016). Heavy Metals, Cardiovascular Disease, and the Unexpected Benefits of Chelation Therapy. Journal of the American College of Cardiology, 67(20), 2411–2418. https://doi.org/10.1016/j.jacc.2016.02.066
7. Lamas G. A. (2015). Cardiology Patient Page. Chelation therapy: a new look at an old treatment for heart disease, particularly in diabetics. Circulation, 131(21), e505–e506. https://doi.org/10.1161/CIRCULATIONAHA.114.01077
8. Yang, S. K., et al. (2014). Is lead chelation therapy effective for chronic kidney disease? A meta-analysis. Nephrology (Carlton, Vic.), 19(1), 56–59. https://doi.org/10.1111/nep.12162

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