An Unexpected Imaging Finding in a CKD Patient on Lithium Therapy

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Case Description
A 65-year-old woman, treated with lithium for 18 years for bipolar disorder, presented with CKD (serum creatinine level ranging between 1.6 and 2.0 mg/dl) and polyuria. There was no hematuria, aseptic leukocyturia or proteinuria, nor biologic signs of nephrogenic diabetes insipidus. Substitution of sodium valproate and olanzapine for lithium did not improve kidney function.

As part of the evaluation, an ultrasonography of the kidneys showed various cystic formations, including one with wall thickening (Figure 1). Magnetic resonance imaging (T2 sequence) demonstrates multiple, nonsuspect, disseminated, 1–2 mm diameter microcysts throughout the cortex and the medulla of both kidneys (Figure 2), highly suggestive of lithium nephropathy (1).

Lithium is a cation, not bound to proteins, not metabolized, and is eliminated completely by the kidneys. It is filtered by the glomeruli and then largely reabsorbed at the proximal level (2). Lithium is the standard treatment for bipolar mood disorders and requires regular kidney-function monitoring because of its narrow therapeutic index.

Chronic tubulointerstitial nephropathy with formation of small cysts within the renal cortex and medulla and nephrogenic diabetes insipidus (NDI) are the main nephrologic manifestations of lithium therapy. NDI is often, but not always, reversible when the drug is withdrawn. By contrast, the course of kidney disease after lithium withdrawal is unpredictable, but progressive kidney failure often occurs (3).

Figure 1. | Ultrasonography of the kidneys, demonstrating multiple cysts.

Figure 2. | MRI of the kidneys in a patient on lithium therapy. (A) Coronal and (B) axial T2 half-Fourier-acquired single-shot turbo spin echo magnetic resonance imaging demonstrates microcysts of 1–2 mm diameter within the cortex and medulla of both kidneys.

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Risk factors for nephrotoxicity are both duration of lithium exposure and cumulative dose. The underlying pathophysiologic mechanism of renal toxicity remains ill defined (4). Magnetic resonance imaging is the most sensitive test to delineate the formation of small cysts.

Teaching Points

- NDI and tubulointerstitial nephritis are the main kidney manifestations that may complicate lithium therapy.
- The discovery of a progressive CKD with the presence of small cysts within the renal cortex and medulla in a patient treated with lithium are highly suggestive of lithium nephropathy.

Disclosures

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Author Contributions

B. Anthonissen wrote the original draft of the manuscript; and E. Danse and E. Goffin edited and reviewed the manuscript.

References


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