



Recurrent Urinary Tract Infections and Lithium Therapy: A Case Report on Treatment Considerations

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Abstract

Lithium is a medication often used in multiple psychiatric conditions. Lithium salts have a limited therapeutic window, necessitating caution in prescribing and requiring adequate monitoring of serum lithium levels. Several factors can impact lithium concentration, including changes in diet and fluid intake, illness, and adherence to treatment. The half-life of lithium is approximately 24 hours and is longer in cases of renal impairment. Lithium should be initiated in secondary healthcare settings. After initiation, patients are managed under a shared care protocol to monitor lithium levels and kidney function.

Primary healthcare doctors serve as gatekeepers for these patients; high suspicion and sufficient knowledge about the signs and symptoms of lithium toxicity are mandatory to avoid toxicity and to ensure early involvement of secondary care assessment. This case highlights the importance of regular monitoring of medications like lithium and for family physicians to be mindful of any conditions that may impact lithium levels, such as recurrent urinary tract infections, which affect the kidneys. It also emphasizes the need to consider other treatment options that are not influenced by renal function.

Keywords: *bipolar disorder, lithium toxicity, monitoring lithium, recurrent Urinary tract infection, consideration of other treatment.*

Introduction

Lithium has been the top choice when it comes to mood stabilizers, and it is approved for the management of bipolar disorder. It is commonly prescribed for the treatment of acute manic and mixed episodes, as well as for long-term maintenance therapy⁽¹⁾. Furthermore, lithium is

frequently used off-label for conditions such as major depressive disorder as an adjunct treatment and bipolar disorder without a history of mania. However, its utilization is often limited due to concerns regarding potential side effects, drug interactions, and the need for regular monitoring⁽²⁾.

Due to its narrow therapeutic index, lithium serum levels normally range from approximately 0.6 to 1.2 mEq/L, with levels exceeding 1.5 mEq/L considered toxic. Lithium toxicity can lead to multiple complications, including interstitial nephritis, arrhythmias, hypotension, pseudotumor cerebri, and seizures⁽³⁾. It is important to note that there is no specific antidote for lithium toxicity. The primary approach to managing lithium toxicity involves hydration and discontinuation of the medication. Hydration with normal saline can aid in lithium excretion⁽⁴⁾. Close monitoring is crucial during the treatment period. Plasma lithium levels should be monitored five days after treatment initiation, dosage changes, or the addition or removal of another potentially interacting drug. Weekly monitoring is recommended until the patient's mental state and lithium serum levels are stable, followed by monitoring at least every three months⁽⁵⁾.

Dicu-Andrescu et al. concluded that nearly half of women and 5% of men will have at least one episode of urinary tract infection (UTI) in their lifetime. Certain antibiotic therapies and UTIs negatively affect kidney function⁽⁶⁾. This makes our case report particularly important, as it highlights the connection between recurrent UTIs, antibiotic therapy for UTIs, a drop in renal function, and the use of lithium. Considering the consequences of lithium toxicity, alternative treatments for bipolar disorder should be considered.

Based on the information provided about lithium toxicity, the impact of UTIs and renal function on lithium levels, our case report will propose different approaches for managing similar cases in the future to avoid potential hospital admissions and adverse outcomes.

Case Presentation

A 57-year-old female presented to the primary care clinic with her husband, reporting concerns over the past three days, including fever, dysuria, increased urinary urgency and frequency, and worsening flank pain. The patient has a history of

recurrent urinary tract infections. Her husband noted that she had been more lethargic for the past two days and observed a new onset of tremor.

Her past medical history includes bipolar mood disorder, for which she has been on Lithium for over three years, dyslipidaemia, hypertension, and asthma. She has no history of drug use, consumes alcohol socially, and has no known drug allergies. Her current medications are Lithium Carbonate 400 mg twice a day, Atorvastatin 40 mg once a day, Amlodipine 5 mg once a day, Omeprazole 20 mg once a day, Losartan 10 mg once a day, Breo Ellipta inhaler, and salbutamol 2 puffs when needed.

On physical exam, she was alert with a Glasgow Coma Scale of 15/15, blood pressure of 102/60 mmHg, oxygen saturation of 95%, temperature of 38.2°C, heart rate of 92 (regular), and respiratory rate of 16 per minute. Her cardiovascular and respiratory exams were within normal limits. The neurological exam was within normal limits except for a mild tremor. The abdominal exam showed suprapubic and flank tenderness but was otherwise normal. A urine dipstick showed positive leukocytes and nitrites. The last blood test, conducted over a year ago, was within normal limits.

The patient was sent to the hospital for inpatient assessment with a differential diagnosis that included delirium due to pyelonephritis, stroke, and lithium toxicity. Blood and urine tests at the hospital confirmed lithium toxicity due to acute kidney injury (AKI), with the following results: sodium 132 umol/L, potassium 4.2 umol/L, creatinine 169 umol/L, eGFR 30 ml/min, CRP 88, and lithium level 2.8 mEq/L.

Treatment involved the administration of fluids to reinstate glomerular filtration rate (GFR), normalize urinary output, and improve lithium clearance. She was also started on intravenous (IV) antibiotics (Ceftriaxone) for pyelonephritis, and propranolol was tried for the tremor. She was discharged from the hospital four days later after her eGFR normalized and lithium levels returned to normal. She was discharged on quetiapine 200

mg OD instead of lithium, with a planned follow-up with psychiatry to reassess the potential for

restarting lithium. At the time of discharge, the patient had returned to her baseline condition.

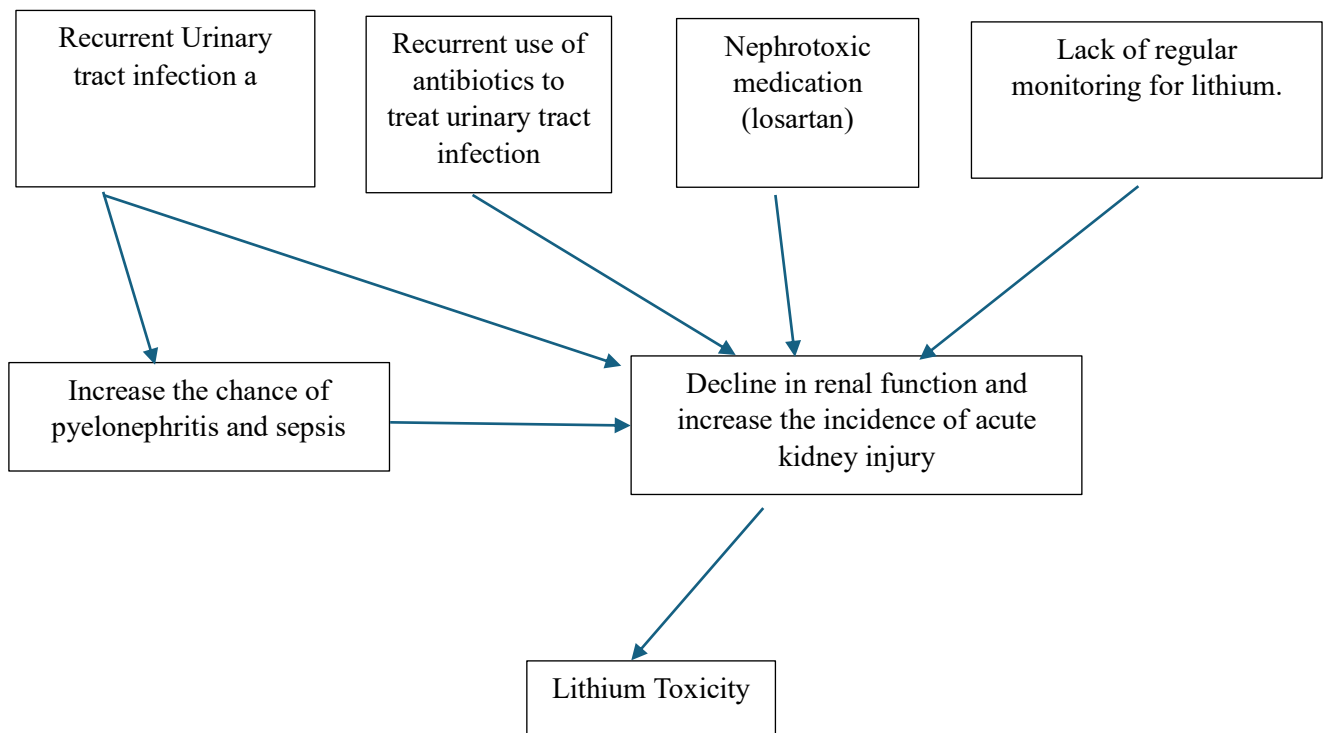


Figure 1: Further Explanation on the Diagram

Discussion and Conclusion

There are a few important lessons to learn from this case. Family physicians encounter a limited number of patients on lithium therapy, which is usually initiated by secondary care. Lithium has a narrow therapeutic index, and patients on this medication often have mental health issues. These patients may sometimes have an impaired understanding of their illness, making regular training and checks on their understanding of lithium therapy essential. Involving caregivers, like the patient's husband in this case, can be helpful in improving outcomes and reducing comorbidity.

In this case, the patient did not have a blood test for more than 12 months, despite guidelines recommending blood tests every 3 months after stabilization. It is unclear whether this was due to the patient's misunderstanding of the lithium

monitoring process or a lapse in the practice's recall system. Blood tests for medications like lithium should be a shared responsibility between the patient and the healthcare provider, as long as the patient does not have impaired decision-making abilities due to mental health issues or other comorbidities, such as dementia.

Having free and urgent access to healthcare for such patients can help prevent hospital admissions. For example, if the patient had started antibiotics early for her UTI, she might not have needed to visit the hospital. Additionally, urgent blood tests and earlier involvement of the psychiatric team could have improved her care. Empowering patients and their caregivers to perform their own urine tests in such cases could help prevent prolonged urinary tract infections and progression to pyelonephritis. Providing training for this can improve the situation and reduce poor

prognosis if the UTI is treated early. This approach is particularly beneficial for patients who have difficulty accessing health services or feel anxious about visiting the doctor or emergency department.

Another important consideration is whether medications like lithium should be used in similar patients or if switching to other mood stabilizers would be more appropriate. This decision depends on the patient's age, other comorbidities, mental health conditions, and personal preferences⁽⁷⁾.

In future cases, if I encounter a patient with a risk of recurrent UTIs and pyelonephritis, I would suggest changing their medication to a safer alternative, provided this change does not negatively affect their stable bipolar symptoms. Patients may be hesitant to switch medications due to potential side effects, so careful consideration and discussion are necessary.

Additionally, stopping or changing medications like losartan, which is nephrotoxic, can help prevent further deterioration of renal function. It is important for primary care providers to counsel patients about the risks associated with their medications and the symptoms that may suggest toxicity. Compliance with monitoring guidelines is essential to ensure that patients maintain their medications within therapeutic levels and avoid potential toxicity.

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