

## Lithium-induced diabetes insipidus-a propos a case

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### Abstract

Lithium carbonate has displayed a major role in the treatment of bipolar affective disorders. However, the complications implied in its consumption are numerous and may be serious. One of the sequels, diabetes insipidus, though infrequent, might originate both in dehydration, and might cause this setback as well. A time may occur in the patient's life when the physician in charge will consider the imperative need to discontinue lithium therapy. This occurrence represents a complex event in an otherwise difficult malady. In this report, consideration is given, in addition, to a gradual checking of the lithium therapy.

**Keywords:** Bipolar Affective Disorder, Lithium Carbonate, Renal Insufficiency, Diabetes Insipidus, Lithium Discontinuation

### Introduction

Despite several serious complications, lithium carbonate remains an important mode of treatment in bipolar affective disorders [1]. Previously considered a "lifesaving medicine", due to a potent anti-suicidal preventive effect, it has often been abandoned [2], especially in private practices. Dropping this medication is an intricate step, which nevertheless, does not ascertain the disappearance of the complications [3]. Thus, in most instances, an arrest of the lithium, might not abolish the drug-related diabetes insipidus [4].

A query is raised, to find out if partial lithium therapy restriction may lead to an acceptable symptom reduction, as well as to curbing of the renal dysfunction.

### Case Presentation

A 69-years-old male had been treated for a bipolar affective disorder for nearly 40 years. He was administered 300 mg x 2 lithium carbonate, together with a minimal dose of antipsychotic drug, among others. The patient was then followed by a nephrologist, as soon as the volume of daily urine reached as much as 4,400 cc/d. No evidence of hypertension was displayed. Impaired fasting glucose was shown-118 mg/dL, but HB A1C was within normal limits. Nocturia, x 4-5 was reported.

The renal function was preserved: Sodium-143 mEq/L. Potassium-4.9 mEq/L. Urea -33-41 mg/dL. Creatinine-1.03-1.1 mg/dL. Calcium-9.7 mEq/L. Phosphorus-3.7 mEq/L. PTH- 61nmol/dL. Vitamin D3-103 UI/d.

Urine osmolarity-220 MOSM. Specific gravity-1.009. Serum lithium level-0.7 mEq/L.

By U/S, the kidneys size was preserved, and their parenchyma was lobulated. The prostatic weight was evaluated at 30g.

A diagnosis of lithium-induced nephrogenic diabetes insipidus was established [5,6].

A regular follow-up was instituted, but no specific diet or restrictions were proposed. Five years after the diagnosis was established, a rise in creatinine and urea was observed: 1.21 mg/dL and 48 mg/dL, respectively [6,7].

The nephrologist and the general practitioner addressed the psychiatrist in charge, demanding the immediate cessation of the lithium therapy, and its replacement by an alternate mood stabilizer [8-10]. However, the psychiatrist had previously evaluated the possible relevance of several alternative medications, in vain (with every medicine assessed, there were various, often serious side-effects, which prevented its use), responded by a blunt rebuttal.

A new psychiatrist had arrived at the scene in the meantime, who suggested a compromise, not evoked before. The patient was requested to administer the lithium carbonate in alternate doses: on paired days, he will take 450 mg/d, while on impair days, he will absorb 600 mg/d. Thus, in two days' time, a reduction of the medicine will encompass 150 mg; and over a month, the restriction

may reach: 2, 250g, which is very significant. Nevertheless, the serum level of lithium remains the most relevant, and if accessible, it will reflect a de facto restriction of the medication.

When lithium tapering for bipolar disorders obtained gradually (over 1-14 days), while a rapid distribution was done in about 30 days, a recurrence occurred later with gradual tapering (14.0 months), as compared with the urgent method (2,5 months) [11]. By evaluating the patient's course, after a rapid lithium interruption for bipolar conditions, the risk of mania is higher than with a gradual treatment arrest [12].

A cohort of 21 elderly patients, displayed variable incitement to stop lithium absorption. Most elders discontinued treatment over several weeks. Of the 21, 11 progressed to mania. The relapsing patients had been on lithium for years, much longer than those who had dropped lithium, while keeping well [13].

Of note, an evolution concerning a gradual, as contrast with an urgent mode of lithium disposal, had been validated for different neuropsychiatric drugs: dopaminergic, antipsychotic, mood stabilizing, as well as anticonvulsant medications [14].

Renal complications-frequent; (Na+++).
Hypothyroidism (Males++) iodine transport.
Hyperthyroidism (rare).
Ca+++ , PTH ++ (30% of cases); Ca low in urine.
Diabetes insipidus, often irreversible,
Follows dehydration.
Weight gain.
Diabetes mellitus is not related.

**Table 1:** Sequels of lithium therapy.

Lithium arrest may cause early affective symptoms and increased suicidal risk.
The whole maintaining therapy set up is totally distorted.
The variables affected: Memory measures; tapping speed; associative activity:
All improve when lithium is off.
Diabetes insipidus resolution is infrequent.

**Table 2:** Consequences of lithium discontinuation.

Often preceded by dehydration.
Beware of excessive correct ion of hyponatremia.
Further sequel of DI: skeletal fluorosis (with or without spinal stenosis) [16].
DI may also present with hypernatremic dehydration [3].

**Table 3:** Nephrogenic diabetes insipidus.

## Discussion

The elderly person, hereby presented, confirms the complications

known to occur following administration of lithium carbonate, especially for long periods of time [7]. The two main sequels considered, comprise deterioration of the renal function, that may lead to renal insufficiency. The second consequence is less frequent, but might lead also to renal insufficiency, following a transition. It is as eccentric as its name implies: it presents with an extreme production of urine, both daily and at night. This was indeed the means of presentation in our patient's report. For a long period, the kidney functions did not deteriorate. It is of note, that for his instructions, the elder man was not offered a special diet, and no mention was made of the amount of water he was required to drink. Besides, he never has been dehydrated, nor was he on the verge of dehydration. Indeed, this was a weird disease. Eventually, a mild degree of renal dysfunction developed.

Ideally, the patient should have abandoned any intake of lithium, but his physicians had decided otherwise. Perhaps, the pursuit of the trial, that succeeded in reducing the monthly amount of lithium absorbed, by 2,250 mg (two g and 250 mg). By the limitation of the drug, slowly but progressively, one may reach the goal: prevention of a renal function deterioration. For that purpose, it is absolutely requested to follow-up the serum level of the drug [15].

Six weeks following the medication 25%-restriction, the daily urine production diminished by 1,100.00 cc/d, while the creatinine reached 1.21 mg/dL, and the urea was 48 mg/dL During that period, the serum lithium remained stable (0.7 mEq/L). These results allow the continuation of the lithium restriction, in some security.

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## Conflicts of Interest

The authors declare 'No conflicts of interest are evident'.

The patient described hereby, approved the report of his clinical features.

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