The Royal College of Pathologists
Pathology: the science behind the cure

Patient Safety Bulletin

Multidisciplinary work reduces risk

What happened and what were the issues/implications?

The mental health pharmacy team noted a series of cases of toxic lithium levels in patients in the community that had not been followed up. In one instance, the patient had a lithium level of 1.63 mmol/L. This was not followed up for several months by the general practitioner (GP). When it was picked up, the psychiatrist was alerted. On this occasion, there was no evidence of the patient coming to harm; however, the outcome could have easily been different. As with any medication error, a trust incident form was completed to ensure appropriate lessons are learned.

Training sessions to avoid similar incidents were provided to the GP practice concerned. In the same time period, there were other occasions involving patients in the local area being admitted to hospitals owing to suspicion of lithium toxicity. This prompted a review of the current system for alerting primary care colleagues of patients with elevated lithium levels to ensure timely action and minimise the risk of harm to patients.

Lithium is a commonly prescribed treatment for bipolar affective disorder. However, treatment is complicated by lithium's narrow therapeutic index and the influence of kidney function, both of which increase the risk of toxicity. Therefore, careful attention to dosing, monitoring and titration is required. As per NICE guidelines, once the lithium level is stable it should be monitored once every three months.[1]

Chronic poisoning is the most common underlying cause of lithium toxicity. This is usually unintentional, resulting from lithium intake exceeding elimination and is most commonly due to impaired kidney function caused by volume depletion from lithium-induced nephrogenic diabetes insipidus or intercurrent illnesses. However, it may also be drug induced. Medicines that can increase the lithium level include non-steroidal anti-inflammatory drugs and drugs that can lower sodium level, i.e. diuretics. Therapeutic lithium levels can range from 0.4 to 1.0 mmol/L. Toxic effects reliably occur at levels ≥1.5 mmol/L.

Lithium toxicity can be caused by renal impairment, but lithium can also be a cause of renal failure itself. Lithium poisoning can affect multiple organs; however, the primary site of toxicity is the central nervous system. Some of the symptoms of lithium toxicity include vomiting, blurred vision, confusion, drowsiness, ataxia, coarse tremor, muscle twitching and muscle weakness. Above 2.0 mmol/L, increased disorientation and seizure usually occur, which can progress to coma and ultimately death.[2] It is important that raised lithium levels are appropriately managed in a timely manner to ensure safe care to patients.

What actions were taken?

Mental health pharmacists and clinical scientists within the local pathology network agreed a system to ensure that lithium levels ≥1.0 mmol/L were reported with an appropriate comment.

The following comments were automatically added to the laboratory results issued to the requesting clinician when the lithium level was ≥1.0 mmol/L.

Lithium level	Comments
Between ≥1.0 mmol/L and <1.5 mmol/L	If sample was collected 12 hours post dose, a lithium of this level is associated with toxicity. Urgent review required. Contact Medicines Information at your local mental health trust or your practice pharmacist for more advice or support.
≥1.5 mmol/L	If sample was collected 12 hours post dose, a lithium of this level is highly toxic. Patient should be informed of the result immediately, advised not to take their lithium and sent for urgent review with the GP, community mental health trust or via the emergency department. Contact Medicines Information at your local mental health trust or your practice pharmacist for more advice or support. (Note: lithium results ≥1.5 mmol/L should be telephoned to primary care by the lab within 24 hours.)

It was important to get the correct wording to ensure the right message was conveyed as succinctly as possible. Therefore, the wording of the advice was extensively discussed and debated by various groups (pathology, medical and pharmacy) within the NHS trusts involved. The local clinical commissioning group (CCG) was kept abreast of the work being carried out and an article on lithium monitoring was sent out in our pathology GP newsletter. It was a great example of collaborative and multidisciplinary working between several NHS trusts in the local area.

What did you learn?

Collaborative work between the different health professionals, such as pharmacists and lab-based clinical scientists, improves clinical pathways. We would now like to perform an audit to assess if the comments helped ensure appropriate action was taken by the clinicians when lithium levels are ≥1.0 mmol/L.

How was the learning shared?

The learning was shared at the local mental health interface prescribing forum among the mental health trusts and the CCGs in South West London.

References

1. NICE. *Bipolar Disorder: Assessment and Management*. Available at: www.nice.org.uk/guidance/cg185
2. Taylor D, Barnes TRE, Young AH. *The Maudsley Prescribing Guidelines in Psychiatry (13th edition)*. New Jersey, USA: Wiley, 2018.

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