Introduction
Lithium compounds are commonly used in the treatment and prophylaxis of mood disorders, multiple sclerosis, stroke insults, neurotoxicity associated to human immunodeficiency virus and Huntington disease. Although the clinical benefit of lithium salt has known over the long term, it is related to the risk of development of numerous adverse effects such as hyperparathyroidism and hypercalcemia. The exact pathogenic mechanism for abnormality or impairment in parathyroid during lithium therapy is however unknown. Lithium-associated hyperparathyroidism is often asymptomatic. The manifestations are resulted of the detrimental effects of chronic excessive secretion of parathyroid hormone following hypercalcemia to human body tissues. The calcium, parathyroid hormone and 1,25-hydroxycholecalciferol concentrations in blood should be monitored periodically during lithium treatment. Sometimes the cessation of lithium administration does not lead to normocalcemia, thus parathyroidectomy may indicate. Psychiatrists should be noted in screening for hyperparathyroidism and hypercalcemia in their older patients taking lithium, both prior to starting administration and at least annually thereafter.

Keywords: Lithium therapy, Parathormone, Intoxication, Calcium, Parathyroid hormone, Neurotoxicity

Materials and Methods
While, lithium is one of the most widely drugs in psychiatry and according to its side effects, we aimed to conduct an updated mini-review on chronic administration of lithium.

For this mini-review, we used a diversity of sources by searching through PubMed/Medline, Scopus, EMBASE, EBSCO and directory of open access journals (DOAJ). The search was conducted, using combination of the following key words and or their equivalents; lithium therapy, parathyroid glands, calcium, parathyroid hormone, neurotoxicity.

Pathophysiology
Lithium may alter calcium homeostasis by several mech-
Lithium induce hypercalcemia

• Implication for health policy/practice/research/medical education

Lithium-associated hyperparathyroidism is often asymptomatic. The manifestations are resulted of the detrimental effects of chronic excessive secretion of parathyroid hormone following hypercalcemia to human body tissues. The calcium, parathyroid hormone and 1,25-hydroxycholecalciferol concentrations in blood should be monitored periodically during lithium treatment. Sometimes the cessation of lithium administration does not lead to normocalcemia, thus parathyroidectomy may indicate. Psychiatrists should be noted in screening for hyperparathyroidism and hypercalcemia in their older patients taking lithium, both prior to starting administration and at least annually thereafter.

Clinical manifestations

Lithium-associated hyperparathyroidism could present either as symptomatic form or as asymptomatic form. Also it is rarely formed as an acute hypercalcemic crisis. However, it may be represented with normocalcemia on the first stage of the disease. In symptomatic forms, manifestations are resulted of the injurious effects of chronic excessive secretion of parathyroid hormone following hypercalcemia to human body tissues. They are parallel to the extent of serum levels of parathyroid hormone and calcium (8). Vitamin D insufficiency is common and has the potential to affect clinical presentation toward deterioration. However, hyperparathyroidism often remains undetected and having no objective manifestations of the disease. They may have vague neurocognitive symptoms or altered quality of life such as pain, fatigue, depression and constipation (5-8).

Lithium-associated hyperparathyroidism is a disorder that affects multi-organ systems. It may occur more frequently in older patients. Its symptoms include lethargy, drowsiness, weakness, nausea, vomiting, diarrhea, impaired consciousness, ataxia, seizures, cardiac arrhythmias, renal insufficiency and acute renal failure (4,8,16).

Managements

In spite of the fact that, several psychiatric consensus guidelines reference to the management of lithium intoxication, only one guideline recommends routine calcium and parathyroid hormone screening in lithium-treated patients (9). In chronic lithium users, the bone mineral decreased, in association with elevation of serum levels of immunoreactive parathyroid hormone, calcium and magnesium during the treatment with lithium. Psychiatrists should note in screening for hyperparathyroidism and hypercalcemia in their older patients taking lithium, both prior to starting administration and at least annually thereafter (3). If clinical symptoms are reported, specific follow-up including the monitoring of calcium, parathyroid hormone and 1, 25-hydroxycholecalciferol concentrations every year or more frequently is recommended. Moreover during the treatment, the bone mineral may de-
crease and the serum levels of magnesium may increase, thus, it is better to monitor the bone mineral and the ser-
um levels of magnesium too. Psychiatrists should be con-
sidered with intention to improve psychiatric well-being
and provide multi-organ protection. The balance of risks
should be considered before lithium withdrawn (5).
In this regards, a study suggests that patients with pre-ex-
sting parathyroid disorders may be susceptible to the
development of lithium associated hyperparathyroidism.

Often cessation of lithium treatment normalizes parathy-
roid function, but the hypercalcemia may not occasion-
ally resolve the problem. Thus, parathyroidectomy may
be necessary only in some cases. Concordant sestamibi
scintigraphy and ultrasound imaging are the sensitivity
and specificity for identifying single-gland versus multi-
glandular involvement (17). Lithium-induced hyperpara-
thyroidism presents with a spectrum of disorder ranging
from single-gland to four gland disease characterized by
asymmetrical hyperplasia. Bilateral exploration may be
best way to achieve a resolution of it. If localization offers
single gland disease, minimally-invasive parathyroidecto-
my plus intraoperative parathyroid hormone monitoring
may be successfully performed. Surgery provided a safe
and effective management option with a long-term cure
rate of well over 80% (17).

Conclusion
Lithium-associated hyperparathyroidism is often asympto-
tomic. The manifestations are resulted of the detrimental
effects of chronic excessive secretion of parathyroid hormone following hypercalcemia to human body tissues.
The calcium, parathyroid hormone and 1,25-hydroxycho-
lecalfcalciferol concentrations in blood should be monitored
periodically during lithium treatment. Sometimes the ces-
sation of lithium administration does not lead to normo-
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and hypercalcemia in their older patients taking lithium,
both prior to starting administration and at least annually
thereafter.

Authors’ contribution
MH and MH wrote the manuscript equally.

Conflicts of interest
The authors declared no competing interests.

Ethical considerations
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