

To Study the Deteriorating Effects of Lithium Carbonate on Thyroid Gland - A Study in Albino Rats

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ABSTRACT

Background: The human thyroid gland is located in the front of neck. It consists of two lobes. The two lobes are joined with each other by isthmus. The mood stabilizer Lithium Carbonate has deleterious effects on the thyroid gland.

Aim: To observe and report the data of the harmful effect of Lithium on the weight changes of thyroid gland.

Methods: Sixteen rats were selected for this experimental study. The rodents were divided into two groups. Group A comprised of eight animals which were given laboratory diet, Group B contained eight albinos who were given Tablet Lithium Carbonate in powder form at a dose of 60 mg/day for four weeks. After completion of the study time animals were sacrificed and thyroid gland weight were recorded and compared in both groups.

Results: The results in both groups were recorded and compared. It was reported that Group B animals had a highly significantly decreased thyroid weight after four weeks Lithium ingestion than Group A control group.

Conclusion: The results of our study concluded that Lithium Carbonate damages thyroid glandular tissue and causes its weight to decline.

Key words: Thyroid gland, Isthmus, deteriorating

INTRODUCTION

The thyroid gland is an endocrine gland¹ situated in the anterior lower neck². It consists of two lobes³ joined by an isthmus⁴. The gland extends from fifth cervical to first thoracic vertebrae⁵ and it is encapsulated and weighs almost 15-30 grams in an adult human.⁶The weight of thyroid in adult rat is almost 1.5 grams⁷.

Thyroid histology consists of follicular and parafollicular cells. The follicular cells secrete tri-iodothyronine and tetraiodothyronine which increases basal metabolic rate and somatic growth. The parafollicular cells are present in between the Follicular cells and these cells secrete calcitonin which regulates body calcium concentration⁸.

The focal antipsychotic drug Lithium Carbonate causes adverse effects on brain⁹, heart¹⁰ and Kidneys¹¹. It acts as an oxidant agent¹² and releases Superoxide radical which causes apoptosis and deterioration of the above tissues.

Medicinal literature is deficient of the harmful effects of lithium carbonate on Thyroid gland and for the same reason we carried out this research which enlightens the decrement of the weight of thyroid gland after chronic Lithium intake.

The objective of the study was to observe and report the data of the harmful effect of Lithium on the weight changes of thyroid gland.

METHODS

Our research was carried out at the Animal house of Basic Medical Sciences Institute Jinnah Postgraduate Medical Centre Karachi from fifteen June to fifteen July 2013 after permission from IRB. For our study sixteen adult albino rats weighing 145-165 grams animals were chosen and were acclimatized for a week. The animals were divided into two groups. Group A which contained eight albinos and Group B which comprised of eight rodents.

Group A animals served as Control Group which were fed Lab diet and Group B animals was the treated group and they were given Lithium carbonate (Adamjee pharmaceuticals) at a dose of 60 mg /kg in powder form in flour pellets for four weeks.¹³At completion of four weeks the animals were sacrificed and the thyroid gland was removed and weighed on electronic weighing balance in Group A and in Group B animals.

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Statistical analysis: Statistical Analysis was conducted by using SPSS version -16. Statistical differences between means and experimental data was carried out by student's 't' test. The statistical differences between means and experimental data were carried out. The differences in thyroid gland weights at four weeks was regarded as highly significant if the P value was equal to or less than .001.

RESULTS

Mean values of the weight of thyroid gland in Group A (Control) and Group B (Lithium Carbonate) treated groups are in Table 1.

Thyroid gland weight in (mg) in different groups of albino rats

Groups/Treatment received	Subgroups	4 th week
A-Control	A	5.95±0.67 mg
B-Lithium Carbonate	B	2.97±0.88mg

P value (ZvsB): P<.001

At the end of four weeks values of thyroid gland weight were highly significantly increased (P value, < .001) in Control Group A 5.95±0.67 mg than in Lithium treated Group B. The values of thyroid gland weight were highly significantly decreased (p < .001) in treated group B 2.97±.88 mg as compared to Group A (control) group. Mean values of thyroid gland weight was highly significantly decreased p< .001 in Group B albinos as compared to Group A

DISCUSSION

The great discovery of classical¹⁴ antipsychotic drug Lithium was almost seventy years ago and it is still used as a single therapeutic drug as well in combination¹⁵ but it causes disintegration of thyroid tissue, these harmful effects of Lithium were reported by Lazarus¹⁶ in 1998. He in his research reported of decreased thyroid hormone secretion and destruction of the microanatomy of thyroid gland. The same damaging effects of Lithium were documented by us. We in our research found that Lithium intake causes decreased weight of the thyroid gland; this may be due to the fact that Lithium therapy causes increased apoptotic cells and vacuolated follicular cell cytoplasm¹⁷ resulting in decreased in thyroid weight. The same results of decrement of thyroid weight were found by Dhawan¹⁸ et al 1988 and our findings are in accordance with their results. The above observations may be due to the fact that lithium causes cell death¹⁹ resulting in decreased organ weight.

CONCLUSION

Our research is a documented proof for psychiatrists to take caution in prescribing Lithium Carbonate to the masses as it has adverse effects on Thyroid gland function.

Conflict of interest: Nil

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