

## **Lithium Dosage Adjustment Based on Body Weight of Manics**

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### ***Abstract***

In order to facilitate use of lithium salts in the management of manics who could not come for frequent monitoring of serum lithium levels, a method was designed to adjust the dosage so as to give safe but therapeutically effective levels based on body weight.

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In the management and prophylaxis of manic depressive psychosis (MDP), the use of lithium salts has been fairly well established [1]. It is generally considered that serum lithium levels between 0.5 - 1.5 mEq/L are therapeutically effective. Levels below 0.5 are of little therapeutic value but levels above 1.5 could occasionally lead to side effects which, if not recognized, lead to toxicity. Thus there is a need for monitoring serum lithium levels periodically. However some patients find it difficult to come for blood examination often due to their being in distant places. An attempt was made to find out whether a safe dose could be prescribed whereby optimal therapeutic levels of lithium could be achieved in serum, thus avoiding periodic evaluation. The present paper reports designing of a method to achieve the same.

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### **Material and Methods**

Manic depressive cases coming for consultation at this centre formed the material. Patients of both sexes in the age group 20-55 years and who fulfilled the diagnostic criteria of Feighner et al [2] were investigated. In all these cases lithium salts were prescribe Blood samples obtained (before the morning dose was taken) 10-12 hours after the last dose was processed for monitoring serum lithium by the flame photometric technique [3].

The study consisted of two phases. The first phase was to assess the levels of lithium in serum over a period of time in MDPs. For this 400 patients were selected in whom serial followup of serum lithium levels were made. Based on data obtained in the first phase, studies were made to work out the dosage needed to obtain an optimal therapeutic range based on the weight of the patients.

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## Results and Discussion

During the first phase of the study it was observed that majority of the patients who were on dosage regimen of 900 to 1500 mg/day of lithium carbonate showed optimal levels of serum lithium between 0.5-1.5 mEq/L [3]. It was noticed that the dosage required to get an optimal therapeutic range differed from group of individuals and a subjective impression was that there is some correlation between weight of the patient and dosage required. This led us to examine systematically the body weight-dosage relationship in MDP cases which formed the second phase of this study.

The dosage administered to the patients was based on the relationship between body weight and dosage noted in the first phase of the study, so as to obtain an optimal therapeutic range of 1 mEq/L. This is possible because there is a direct proportionality between the dosage and the standard serum lithium level. The number of estimation (of serum lithium) in these patients varied from 4-12. The percentage of the mean lithium level was calculated in each case and plotted against the body weight in kg. It was noted that there was a significant negative correlation ( $r = 0.6365$   $p < 0.001$ ) between body weight and the daily dose of lithium carbonate per kg body weight required to give a serum lithium level of 1 mEq/L. Thus it was possible to arrive at a formula for the calculation of dosage required.  $Y = 38.39 + (-0.256) X$  where X is the body weight in kg and Y is mg of lithium carbonate/kg/day. Thus if the body weight is 56 kg, the amount of lithium carbonate required per day to get serum lithium level of 1.0 mEq/L is equal to 24 mg per kg body weight i.e., 1350 mg of lithium carbonate per day.

It was further noted that the daily dosage requirement was not different ( $p > 0.05$ ) for the two sexes. It was also observed that till the fifth decade, the daily dose was more or less constant. After this, there was a sharp fall possibly reflecting the decreased renal function.

This study hence suggests that the daily dose of lithium carbonate can be calculated from the body weight and age of patient. The dose required to give serum lithium of 1 mEq/L is quite safe and no side effects were noted.

During the present study, by using the criteria of adjusting the dose on body weight it was noted that patients coming from distant places could be safely prescribed the dosage which needed no frequent laboratory monitoring. It is to be noted that in places where specialists help is available not always there is facility for estimating serum lithium and in such cases the present mode of arriving at the dosage would be worthwhile.

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