NATRUM MURIATICUM 1M VS. THYROIDINUM 3X: A STUDY IN HYPOTHYROID RAT MODELS

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Abstract : A common endocrine condition known as hypothyroidism is typified by an underactive thyroid gland. The therapeutic effectiveness of Natrum Muriaticum 1M and Thyroidinum 3X in treating hypothyroidism in albino rat models is compared in this study. A number of physiological problems, such as metabolic slowdown, weight gain, fatigue, and hormonal abnormalities, are caused by hypothyroidism. Propylthiouracil (PTU) was employed to trigger the condition, and thyroid dysfunction was successfully induced in all groups. The animals were divided into four groups for treatment: a negative control group, a group treated with Natrum Muriaticum 1M, a constitutional homoeopathic remedy traditionally used for glandular dysfunction and hormonal disturbances; another group treated with Thyroidinum 3X, a powerful organ remedy made from the thyroid gland itself and commonly used in homoeopathic therapeutics for thyroid-related disorders; and the final group received standard treatment with levothyroxine. All of the rats' TSH levels were measured both before and after the intervention, and the findings were then compared. Thyroidinum 3X showed the largest reduction in TSH among the treatments, with Natrum Muriaticum 1M coming in second, indicating a marginally better impact. In comparison to conventional treatment, these results demonstrate the potential benefits of both homoeopathic remedies in modifying thyroid axis dysfunction. For the advancement of homoeopathy in the treatment of hypothyroidism, more research including larger samples and additional hormonal indicators like T3 and T4 is necessary in the near future to confirm and elucidate these first findings.

Index Terms **- Albino rats, Homoeopathy, Hypothyroidism, Natrum Muriaticum, Thyroidinum, Thyroid stimulating hormone.**

1.INTRODUCTION

Hypothyroidism is caused by any anatomical or functional abnormality that prevents proper thyroid hormone production.[1] According to some estimates, over 4% of individuals have subclinical hypothyroidism and 0.3% of people have overt hypothyroidism, making hypothyroidism a fairly prevalent condition. The prevalence of hypothyroidism increases with age and is more than ten times more common in women than in men.[5] Clinical features include fatigue, sadness, weight gain, and intolerance to cold; if not addressed, more severe symptoms like myxoedema may manifest. Levothyroxine replacement treatment is the cornerstone of traditional management, although it often overlooks the distinctive and constitutional aspects of sickness presentation. In addition to the conventional technique, we may use homeopathy to treat hypothyroidism, which may offer a more compassionate, all-encompassing strategy with fewer potential side effects. Homoeopathy uses extremely diluted substances to promote the body's natural healing mechanisms.[2]

In homoeopathy, patients with hypothyroidism are frequently treated with Thyroidinum, a sarcode derived from the thyroid gland, and Natrum Muriaticum, a polycrest therapy meant for endocrine and mental issues, based on patient constitution and symptom similarities.[6] The use of whole organisms or portions of organisms (organs, cells or subcellular structure) is common for basic research. The rat is the creature most frequently used and examined in fundamental homoeopathic research.[3] In this study, in rat models of hypothyroidism, the effectiveness of Natrum Muriaticum 1M and Thyroidinum 3X is compared. The TSH test's improved sensitivity and specificity have greatly enhanced laboratory thyroid function testing. Since TSH levels vary dynamically in response to changes in T4 and T3, it is advisable to begin thyroid testing by determining whether TSH is elevated, normal, or suppressed. As a result, the metric we employed in this study to compare the rat groups was TSH measurement.[4]

2.NEED OF THE STUDY

Despite advancements in endocrine therapy, treating hypothyroidism is still challenging. For persistent symptoms like fatigue, mood changes, and weight gain, a significant number of patients continue to receive regular thyroxine therapy even with biochemically normalized TSH levels. Comprehensive well-being is not implied by biochemical healing. This suggests a potential flaw in the current medical strategies. These days, complementary therapies like homoeopathy, which offers a holistic approach and treatments without negative side effects, are growing in popularity. Thyroidinum 3X and Natrum muriaticum 1M are two common homoeopathic treatments for thyroid dysfunction used in clinical practice. On the other hand, their relative effectiveness in controlled experimental settings has not been thoroughly studied. Establishing a scientific foundation for their practice is crucial to bridging the gap between empirical homoeopathic practice and evidence-based validation. This study aims to assess how these two therapies for PTU-induced hypothyroidism affect the TSH levels in albino rats. It advances our understanding of their relative efficacy. Furthermore, the study creates a benchmark for preclinical credibility in the integrated health sciences framework for upcoming studies using homoeopathic medications in animal models, which is important yet currently rare.

3.RESEARCH METHODOLOGY

3.1 SELECTION OF SAMPLES

Healthy Albino rats (male or female) weighing 150 – 250g.

3.2 STUDY SETTING

12 Albino rats were taken for the study. After inducing hypothyroidism, the rats were divided into 4 groups of 3 rats each.

3.3 STUDY DESIGN

This is an experimental study done on propylthiouracil induced hypothyroidism in albino rats.

3.4 ANIMAL ALLOTEMENT

GROUP 1: Disease control group.

GROUP 2: Thyroidinum 3X group.

GROUP 3: Natrum Muriaticum 1 M group.

GROUP 4: Levothyroxine group.

3.5 METHODOLOGY:

- Albino rats weighing 150 – 250g were maintained under light dark cycle (14/10) hours, at a temperature of 25±2 Cº throughout the study. All the rats were supplied with basal diet with water, and were maintained under laboratory conditions.[9]
- Blood samples were collected in empty stomach and was tested for TSH, before inducing hypothyroidism.
- Propylthiouracil was given orally, 15mg/Kg body weight for 17 days.[7]
- Blood samples were collected in empty stomach and was tested for TSH to determine whether hypothyroidism was induced after 17 days.
- After inducing hypothyroidism,

  GROUP 1: Disease control group, rats were induced with hypothyroidism and then they were left without giving any medicine.

  GROUP 2: Rats were induced with hypothyroidism and then given Thyroidinum 3X, 1 tablet dissolved in 10 ml of distilled water and then 1 ml from that was given twice a day orally.[10]

  GROUP 3: Rats were induced with hypothyroidism and then given Natrum Muriaticum 1 M, 10 drops of dilution mixed in 10 ml of distilled water and then from that 1 ml was given twice a day orally.[10]

  GROUP 4: Rats were induced with hypothyroidism and given Levothyroxine as 2 µg/100 g per day in 1 ml of vehicle.[8]

- After 15 days, blood samples were collected and was tested for TSH to determine the action of the given medicines.

3.6 OUTCOME ASSESSMENT

Blood samples were collected from the rats and assessed for TSH levels. The levels of TSH before and after the medicine, helps us to know about the action of the medicine in hypothyroid induced rats.

4.OBSERVATION AND RESULTS

Propylthiouracil was used to induce hypothyroidism in each of the four groups of rats. They were then administered the intervention medications in accordance with the group allocation. When comparing the TSH blood results, it can be seen that all of the groups—aside from Group 1, the disease control group—had lower TSH readings following the intervention. Following medication, there is a slight decrease in TSH in Group 4 and a notable decrease in TSH in Groups 2 and 3. Therefore, our drugs helped reduce the TSH value in these hypothyroid-induced rats following intervention.

Table 1 – TSH levels in rats

GROUPS	RATS	BEFORE INDUCING	AFTER INDUCING	AFTER MEDICINE
GROUP 1 NO MEDICINE	**A**	0.5	5.2	5
	B	0.9	7.005	7
	C	3.4	5.034	4.9
GROUP 2 THYROIDINUM 3X	**A**	0.5	6.2	2.7
	B	2.5	5.09	1.95
	C	1.1	8.2	3.12
GROUP 3 NAT MUR 1 M	**A**	2.43	7.01	3.04
	B	0.5	5.06	1.08
	C	2.61	7.261	2.31
GROUP 4 LEVOTHYROXINE	**A**	2.18	6.218	4.82
	B	0.5	6.7	6.06
	C	2.3	6.023	3.25

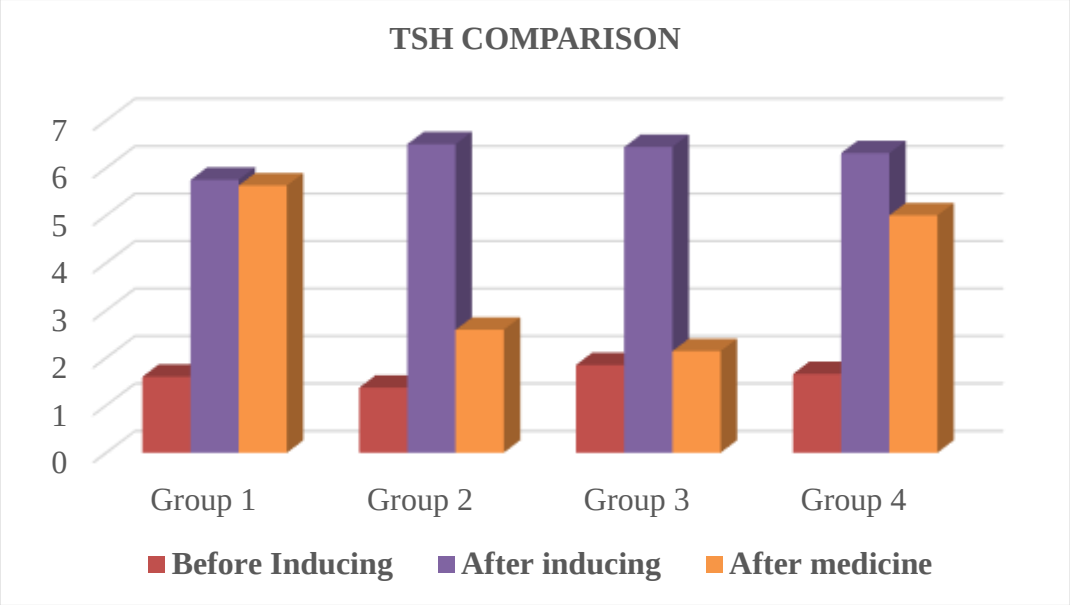

Figure 1 – TSH Graphical comparison between all the groups

5.STATISTICAL ANALYSIS

DESCRIPTIVE STATISTICS OF AFTER MEDICINE SCORES

We can comprehend each group's central tendency and variability with the aid of statistical analysis. The mean score for the after-medicine variable is 5.63 for Group 1, 2.59 for Group 2, 2.14 for Group 3, and 4.71 for Group 4. Group 1 has the greatest mean value among these values, while Group 3 has the lowest. Additionally, the standard deviations for Groups 1, 2, 3, and 4 are 1.18, 0.59, 0.99, and 1.41, respectively. Within each group, the standard deviations indicate a modest degree of heterogeneity. With a standard deviation of 1.77, the overall mean score for all groups is 3.77. Here, the confidence interval is 95%, meaning that there is 95% assurance that the true mean will fall within this range.

ANOVA – ANALYSIS OF VARIANCE

ANOVA assists us in determining whether the means of the four groups differ statistically. The p-value for post-medication is 0.012. This suggests that at least one group has a mean that differs noticeably from the rest. This important finding suggests that the four groups' means differ from one another. And additional analysis is needed to determine which group is different. The outcome reveals that the p-value is 0.012 and the F statistic value is 7.115.

TUKEY'S HSD POST HOC TEST

A post hoc statistical test known as Tukey's HSD, or Honestly Significant Difference test, is used after a one-way ANOVA to determine which particular group means differ significantly from one another. This shows the notable differences between each pair of groups by comparing them. The Tukey HSD post hoc test reveals significant pairwise differences between many groups following medication. Group 1 had higher scores than both Group 2 and Group 3, and Groups 2 and 3 are statistically significant ($p = 0.036$ and $p = 0.018$, respectively). Furthermore, Group 4 has some slight variations from the other groups, especially Group 3, but Groups 2 and 3 do not differ considerably from one another. However, the differences between Group 4 and other groups were not statistically significant at the 0.05 level.

6.DISCUSSION

In this study, two homoeopathic medicines were tested for their ability to treat hypothyroidism in albino rats. After PTU hypothyroidized the rats, they were administered medications such as Thyroidinum 3X and Natrum Muriaticum 1M in opposition to the standard medication levothyroxine. This experimental model mimics acquired hypothyroidism by preventing thyroid hormone synthesis and thyroglobulin iodination by reducing thyroid peroxidase activity. The impaired negative feedback of the HPT axis causes a compensatory rise in serum TSH. The long-term increase in TSH in the disease control group served as a trustworthy baseline for assessing the impact of several medications that we have employed for treatment. Levothyroxine had the least impact on TSH levels, whereas our Thyroidinum 3X and Natrum Muriaticum 1M had the biggest effects. This suggests the degree to which these medications interact with the endocrine system in addition to their efficacy.

Thyroidinum 3X, derived from dehydrated sheep thyroid gland, is an organ-specific remedy for conditions like goitre, myxoedema, and poor metabolism, according to traditional Materia medica. Because it is a 3X trituration, it might function at the physiological level by sending tiny glandular cues that can initiate a bio-modulatory response. It may function by increasing TSH receptor sensitivity, promoting tissue-level thyroid structural repair, or increasing thyroxine secretion. From a modern pharmacodynamic standpoint, it may interact with latent biological signalling pathways, maybe through mechanisms based on nanoparticles, to strengthen endogenous feedback loops and reawaken dormant metabolic processes. Natrum Muriaticum 1M shown a moderate improvement in hypothyroidism while not being a direct organ cure. It is particularly effective for people with fluid imbalance, emotional repression, and chronic depression. Sodium chloride is believed to regulate osmotic gradients and neuroendocrine balances in homeopathy, which may indirectly adjust pituitary signalling. It may have had an effect by reestablishing TSH equilibrium through hypothalamic-pituitary regulation without directly activating the thyroid gland. Surprisingly, the group that received levothyroxine in our study had the least reduction in TSH, despite the fact that it is the standard treatment in allopathic endocrinology. Levothyroxine may not have had the full therapeutic effect in rodents over the 15-day therapy period.

It is possible that homeopathic remedies serve as biological feedback loop regulators rather than hormone substitutes based on the documented response pattern, such as Thyroidinum > Natrum Muriaticum > Levothyroxine. In situations with early or subclinical hypothyroidism, where overusing synthetic hormones offers long-term hazards, the ability to restore self-regulatory endocrine systems rather than just raising hormone levels may offer a safer and more adaptable approach. Our study has limitations, including a small sample size, measures of T3 and T4 levels, thyroid gland histopathology, a prolonged time period, and metabolic markers. Despite these drawbacks, our research provides experimental support for the use of Thyroidinum 3X and Natrum Muriaticum 1M in the treatment of thyroid dysfunction. They demonstrated the potential of homeopathic treatment by outperforming Levothyroxine in this short-term model in terms of TSH normalization. To overcome the shortcomings of current research, more extensive randomized blinded studies with longer duration and extended outcome measures—such as T3 or T4 levels, histology, and metabolic indicators including weight, climate, and activity levels—are required.

7.CONCLUSION

This experimental investigation evaluated and compared the therapeutic efficacy of Thyroidinum 3X, Natrum Muriaticum 1M, and conventional Levothyroxine in treating hypothyroidism caused by PTU in albino rats. The results demonstrated that although all three treatments reduced elevated TSH levels, their effects differed considerably. The consistently high TSH levels in the untreated disease control group supported the successful development of hypothyroidism and the model's sensitivity to treatment modulation. Among the therapy groups, Thyroidinum 3X had the biggest reduction in TSH, nearly returning it to baseline, suggesting a direct organotrophic impact on the thyroid gland. This outcome is in line with the traditional homeopathic use of Thyroidinum, especially at low triturated potencies, which are believed to function physiologically and either improve intrinsic thyroid hormone secretion or receptor sensitivity.

Additionally, Natrum Muriaticum 1M significantly decreased TSH. Natrum Muriaticum, a deep-acting constitutional medicine, may have influenced the HPT axis through neuroendocrine regulation or the correction of internal energy imbalances due to its systemic relevance in homeopathic prescribing. The group treated with levothyroxine, the most popular allopathic medication for hypothyroidism, had the least reduction in TSH. PTU interference, species-specific pharmacokinetics, or insufficient treatment time to reach steady-state levels could all contribute to this poor response. These findings have important implications. They suggest that homeopathic treatments, particularly Thyroidinum 3X, may have therapeutic benefits by activating the endocrine system's self-regulatory activities. The study found that, especially in cases of early or subclinical thyroid disease, homeopathic medicines are pertinent and could be helpful supplements or replacements for synthetic hormone replacement. These results also offer a solid basis for integrative approaches that seek to reduce iatrogenic risks and enhance patient-specific outcomes.

The results' robustness and generalizability are restricted by the study's short treatment duration (15 days), small sample size ($n = 3$ per group), and exclusive reliance on TSH as a quantitative endpoint. Our knowledge of thyroidal repair and systemic improvement is further limited by the lack of free T3/T4 levels, histological analysis, and functional outcome indicators. Additionally, the pharmacodynamics of homeopathic medications and levothyroxine in rodent physiology are currently poorly understood and necessitate species-specific dose validation. Therefore, the conclusions should be interpreted cautiously due to these limitations.

In summary, this study provides promising preliminary evidence for the treatment of intentionally induced hypothyroidism using Natrum Muriaticum 1M and Thyroidinum 3X. The remarkable effectiveness of Thyroidinum demonstrates how homeopathic organ therapies may aid in the restoration of endocrine equilibrium. These results suggest to conduct larger cohorts, extended follow-ups, comprehensive biomarkers, and mechanistic studies involving gene expression, receptor profiling, and histology. To prove the effectiveness of our homoeopathic medicines, more meticulously planned research trials will be needed.

8.ETHICAL STATEMENT

This study was carried out in strict compliance with ethical guidelines and principles to safeguard the welfare and well-being of the animals involved. Ethical approval was obtained from the Institutional Animal Ethics Committee of Cape Bio Lab & Research Center under approval number **CBLRC/IAEC/01/02-2024**, following a comprehensive review and evaluation of the study methodology.

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