The Biochemistry Chronicles

News bulletin of AMBI West Bengal Chapter
March, 2022 ; Issue 03

MYSTERY CREATES WONDER AND WONDER IS THE BASIS OF MAN'S DESIRE TO UNDERSTAND
-NEIL ARMSTRONG

The Mystery of Laboratory Reports

Flabbergasting Serum T_3, T_4 and TSH Reports

The Mysterious Case

A 24 yrs, graduate and unmarried female undergoing computer course presented with swelling in the neck to our hospital OPD. While seeking appointment at the Biochemistry department for T_3, T_4 and TSH investigations on 27th Mar. 1997, on examination a movable Grade-IIb (WHO classification) nodular goitre involving two lobes with somewhat firm in consistency was found and there was neither any relevant symptom nor any sign apart from the goitre. Investigations were scheduled on 10th May, 1997 [RIA (BRIT, Bhaba Atomic Research Centre)].

T_3 (ng/ml) [0.7-2]	**T_4** (ug/dl) [5.5- 13.5]	**TSH (**uIU/ml) [0.3-4.5]
1.2	**2**	**>100**

The above findings were diagnostic of primary hypothyroidism. The patient was advised tablet thyroxine - 50 ug / day once daily for three weeks followed by 100ug/day once daily for next six weeks in the morning on empty stomach and then report for biochemical evaluation.

The patient came one year later to our department for the above investigations. It was learnt that **she discontinued her medication, resorted to alternative medical therapy and then, she went to Christian Medical College, Vellore where a diagnosis of Hashimoto's Thyroiditis** was made as per the following reports:

T_3(ng/ml)	**T_4**(ug/dl)	**TSH** (uIU/ml)
4	**19**	**<0.07**

She was advised to take Neomarcazole – 5 mg thrice daily.
Despite stringent calibration including quality controls, the credibility of our laboratory was at stake against the above reports and accordingly, its consequences but there was no mistake committed by us in any way.

The Mystery unfolds…….

The case was thought that the disease perhaps started with goitrous hypothyroidism but later evolved to hyperthyroidism. In a review article, it was found "change in antibody production from blocking to stimulating thyrotropin receptor antibodies in Hashimoto's thyroiditis".[1] "Up to 20% of patients with autoimmune hypothyroidism have antibodies against the TSH-R, which, in contrast to TSI, do not stimulate the receptor but prevent the binding of TSH. These TSH-R-blocking antibodies, therefore, cause hypothyroidism and, especially in Asian patients, thyroid atrophy. Their transplacental passage may induce transient neonatal hypothyroidism. Rarely, patients have a mixture of TSI and TSH-R-blocking antibodies, and thyroid function can oscillate between hyperthyroidism and hypothyroidism as one or the other antibody becomes dominant. Predicting the course of disease in such individuals is difficult, and they require close monitoring of thyroid function. Bioassays can be used to document that TSH-R-blocking antibodies reduce the cyclic AMP–inducing effect of TSH on cultured TSH-R-expressing cells, but these assays are difficult to perform. Assays that measure the binding of antibodies to the receptor by competition with radiolabelled TSH [TSH-binding inhibiting immunoglobulins (TBII)] do not distinguish between TSI- and TSH-R-blocking antibodies, but a positive result in a patient with spontaneous hypothyroidism is strong evidence for the presence of blocking antibodies. The use of these assays does not generally alter clinical management, although it may be useful to confirm the cause of transient neonatal hypothyroidism". [2, 3]

Continuous researches can explain the current hitherto unexplained observations in future but these are likely to raise some more difficult issues for cost-effective routine applications in laboratory/medicare services and new questions for conceptual clarity.

References

1. Toft AD. Thyroxine therapy. N. Eng. J. of Med. Jul 21, 1994, 174-78
2. Jameson JL and Weetman AP. Disorders of the Thyroid Gland, In : Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL , Jameson JL, editors. Harrison's Principles of Internal Medicine, 16th ed, 2005, Mcgraw- Hill, p2110
3. Jameson JL, Mandel SJ and Weetman AP. Hypothyroidism. In : Jameson JL, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo, editors, Harrison's principles of internal medicine Eds. J 20th ed,2018, Mcgraw- Hill, p2700

The Unexpected Creatinine Level

The Case

On 13th May, 2012, a serum sample of 35-year-old male received from the male surgical ward revealed a serum urea level–19 mg/dl but **a creatinine level–3.5 mg/dl, analyzed by Olympus AU 640 autoanalyzer by Kinetic Jaffe uncompensated method (Olympus,OSR 6178). The serum was clear, nonicteric, nonlipemic and nonhemolytic.**

The Mystery thickens

The sample was recentrifuged and analyzed using its 1:1 and 1:2 dilutions also concurrently. The estimated values from dilutions were corroborating with previously analysed values. From the case sheet, the following salient points were noted –

i. the patient was admitted four days back for cellulitis
ii. there was no history of diabetes, hypertension or renal failure as per medical booklet records
iii. serum urea and creatinine level were normal on the day of admission
iv. among others, cefpirome injection - 1 gm i.v. twice daily was advised for five days and this was the only drug being continued.
v. After examination, no cellulitis was found.

The discarded cefpirome injection vial was recovered from the dustbin and brought to the laboratory. 2 ml of distilled water was added to about less than one drop of remaining reddish coloured solution in the vial and the mixed sample was subjected to creatinine estimation together with its dilutions (1:1, 1:4 & 1:9 in distilled water) which revealed a level 21 mg/dl.

It was learnt that in the morning, 1 gm of cefpirome injection was administered and within two to three minutes after giving i.v. injection, blood for testing was drawn from the other arm and sent to the Biochemistry department.

The report was delivered as such with a note against creatinine level – (?) interference by cefpirome inj.

Ultimately a clue was available

The package insert of cefpirome (same brand, Cefor I.V., 1 gm) obtained forthwith was read thoroughly there itself and it was found under Interactions - “Cefpirome may produce falsely raised serum creatinine value in the picrate assay. For this reason, the use of an enzymatic method is recommended".

The truth reveals

Since the degree of mismatch between serum urea and creatinine levels could not be realized by the best of wisdom even in the setting of severe dietary protein restriction by a diagnosed chronic renal failure patient or post dialysis, there was a craze for delving into the cause. The non-stop efforts were successful. No routine analytical method is absolutely perfect. Without compromising the quality, selection of a well-established method is usually chosen mainly for cost-effectiveness for offering "free services” to the beneficiaries.

The solution of Mystery

A so-called "problematic" sample, being seminal is a goldmine for increasing one's professional experiences. Hence, without neglecting or discarding or seeking fresh sample and giving any chance to loosely comment as "wrong report" by the medical caregivers, one must look into the possible “contamination issue” in that particular sample inquisitively to known the hitherto unknown.

(N.B. – The manuscripts of above two cases were received with sequential real-life events but represented in different ways by the Editorial Office to make those abridged and fit in the webpage, however, with the consent of the author)

“THE MYSTERY OF LIFE IS A REALITY TO EXPERIENCE”

Feedback on THE BIOCHEMISTRY CHRONICLES

Let me express my personal views on the recently launched "The Biochemistry Chronicle" by AMBI, WB Chapter. At the onset I congratulate the team for such an excellent idea.

Since inception within a space of 2 months there are 2 Issues of the Chronicle which is commendable provided a fixed interval period between issues are maintained.

The first issue of the chronicle presented itself in a style and manner befitting with a "new arrival" flavour with post scripts on all pages, having relevant meaning, to be deciphered as a task to the reader. Contents on the two pages deal with current activities of the state chapter and latest information on members notable achievements.

In the following issue the contents are worth recapitulating with an insight on works of a great scientist along with a technology that ushered us into the basics to today's genetics.

I wish the chronicle a successful continued publication.

Dr. Subimal Chaudhuri

DTM&H, MD (Bio); Ex Professor of Biochemistry & Principal, ANMMC,Gaya & PMCH,Dhanbad

Dean, Faculty of Medicine, Magadh University, Gaya & Vinoba Bhave University, Hazaribagh.

Designated ADME, Govt. of Jharkand.

AMBICON 2022

29th Annual Conference of AMBI, AMBICON 2022 has been arranged in Bengaluru at Moongate Resort, from 21st to 23rd July, 2022.

There will also be a programme of 3 days Pre-Conference Hands on Workshop on Advanced techniques from 18th to 20th July 2022. Delegates have the choice of attending a workshop among the10 different ones.

Details of the program is available on https://online.flippingbook.com/view/667395785/4/

Welcoming all to see more footsteps in National Conference from the state of West Bengal.

Content Contributor:-
Dr. Biswajit Saha,
MD (AIIMS), PhD (BU), PDF (SGPGIMS), PGCC (NIHFW), PGDFM (Vellore)
Director, Durgapur Steel Plant Hospital,
Durgapur -713205, West Bengal, India,
Email: biswajitsahadsp@gmail.com

Concept:-
Dr. Soma Gupta,
MD, PhD Biochemistry
Professor and Head,
Department of Biochemistry, NRS Medical College, Kolkata