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Original Research Article

Assessment of Periodontal Disease Severity in Hashimoto's Thyroiditis (HT) Female Patients

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Abstract: Although gender based periodontal therapy is questionable the advent of chronic autoimmune induced hypothyroidism [Hashimotos thyroiditis [HT] with its grave consequences affects the periodontal therapeutic decision making in chronic HT or stroma lymphomatora is the most common autoimmune thyroid disease with 10 percent of total population resulting in thyroid failure. Hence this study emphasis the need to investigate and analyze the T3 & T4 & TSH levels in HT and Corelate with severity of periodontal disease. To obtain a standardized protocol for diagnosis and management of periodontal disease in hashimotos thyroiditis females. ***Materials and methods:*** A total of 30 female patients were randomly selected during their laboratory examination of thyroid hormone assessment. ***Statistical analysis:*** was performed using Microsoft excel 2003 and statistics 5.0. ***Result:*** The mean PI showed a weak positive correlation with T3, T4 & TSH. Out of 30 patients, with mean TSH levels of 8.82 mg/dl showed a positive correlation with clinical signs of gingivitis.

Keywords: Hashimotos thyroiditis, periodontitis, gingivitis.

INTRODUCTION

Clinicians have always faced a challenge in treating female patients. Female patients are unique as they are super imposed by transient phases of hormonal variations [periodontal therapy in female patients is well established].

Although gender based periodontal therapy is questionable the advent of chronic autoimmune induced hypothyroidism [Hashimotos thyroiditis [HT] with its grave consequences affects the periodontal therapeutic decision making in chronic HT or stroma lymphomatora is the most common autoimmune thyroid disease with 10 percent of total population resulting in thyroid failure. Genetic susceptibility, environmental factors and immune inflammatory pathways of HT and Periodontitis presents a similar pattern of disease progression [11]. Evidence suggests that the severity and prevalence of Periodontitis is greater in individuals with autoimmune disease such as rheumatoid arthritis [10].

Pubmed research in 2011and recently in 2019 have established a potential link between HT and Periodontitis.

Hence this study emphasis the need to investigate and analys the T3 & T4 & TSH levels in HT AND

1. Corelate with severity of periodontal disease.
2. To obtain a standardized protocol for diagnosis and management of periodontal disease in hashimotos thyroiditis females.

MATERIALS AND METHODS

Study design: A total of 30 female patients were randomly selected during their laboratory examination of thyroid hormone assessment. Various endocrinology centers with well equipped labs were the source for study. (Thyroid dysfunction with hypothyroidism patients were enrolled in the study). TSH levels with clinical correlations interpreted by the concerned pathologist suggestive of hypothyroidism were approved. Following the

selection of subjects, written consent was obtained from the same.

Inclusion criteria

- 30 female patients with 35 years of age
- Previously not diagnosed with diabetes mellitus
- Presence of > 10 natural teeth and who had not received any surgical/ non surgical periodontal therapy for past 6 months.

Exclusion criteria

- Previously not diagnosed with periodontal diseases

METHODS

1) TSH level assessment by electrochemiluminescence.
2) Periodontal parameters comprised of PI & PSR coding.

Measurement of periodontal parameters included plaque index (PI) Silliness & Loe; periodontal screening and recording (PSR) with code (1, 2, 3, 4 & X) that measures BOP, calculus and probing depth with CPITN was recorded[2].

All subjects received a clinical periodontal examination by a single examiner, who recorded all the variables by manual procedure. The study protocol has been approved by the local ethical committee [Ethical committee code].

Data management and statistical analysis

- The statistical analysis procedure included the random sampling design. Relevant parameters for periodontal disease examination i.e. PI & PSR code and TSH levels with hypothyroidism were assessed.
  Statistical analysis was performed using Microsoft excel 2003 and statistics 5.0
- Data are expressed as mean and standard deviation (SD) and Karl Pearson's tests were used for distribution of parameters

Statistical significance level at 0.05 was considered

RESULTS

- Table 1 and 2

1) To explore the crude association between hypothyroidism and periodontal disease measures, mean of PI & mean TSH were calculated.

The mean PI showed a weak positive correlation with T3, T4 & TSH. [PI mean= 1.241, T3=1.251mg/ml; T4=8.828mg/dl and mean TSH= 17.569 micro IU/ ml]

Non-significant association between PI & TSH levels with P value of 0.1494 represents a weak positive correlation

	AGE	PLAQUE INDEX	PSR CODE	T3(0.967 TO 1.68mg/dl)	T4(5.52 TO 10.92) mg/dl	TSH (0.465 TO 4.68) MicroIU/ml
Mean	**38**	**1.241**	**1.241**	**1.251**	**8.281**	**17.569**
SD	**31.30**	**1.29**	**7.02**	**2.00**	**20.69**	**105.75**

Between	R value	P value
Age and Plaque I*ndex*	0.2015(Weak positive correlation)	0.2946(NS)
Plaque I*ndex and T3*	0.154(Weak positive correlation)	0.4252(NS)
Plaque I*ndex and T4*	0.187(Weak positive correlation)	0.3314(NS)
Plaque I*ndex and TSH*	0.2746(Weak positive correlation)	0.1494(NS)
PSR CODE *and T3*	-0.0667(Weak negative correlation)	0.7310(NS)
PSR CODE *and T4*	-0.3667(Weak negative correlation)	0.0504(NS)
PSR CODE *and TSH*	0.8997(strong positive correlation)	<0.00001(S)

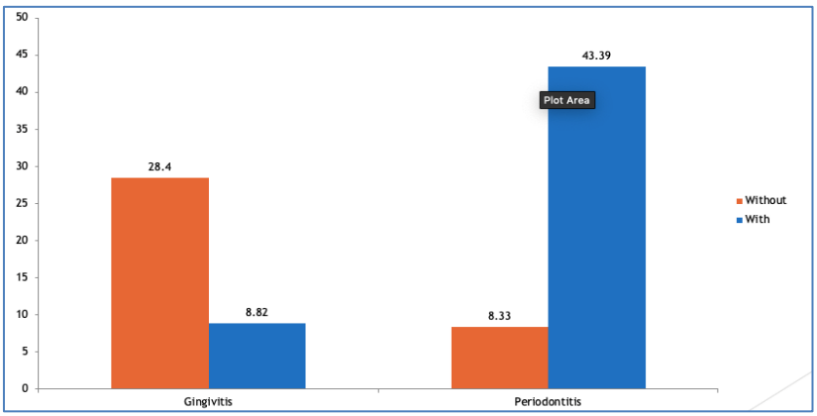
Table 1 and 2

- Table 3 represents the standard deviation (SD) by Karl Pearson's method TSH levels and PSR coding (code 1,2,3,4 & X).

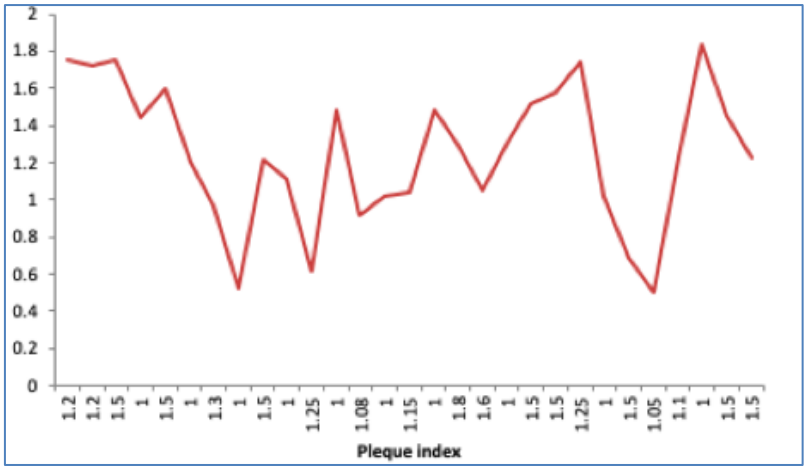
Out of 30 patients, with mean TSH levels of 8.82 mg/dl showed a positive correlation with clinical signs of gingivitis as per PSR code of 2&3.

06 with mean TSH levels of 43.39microIU/dl showed a positive correlation with clinical signs of periodontitis.

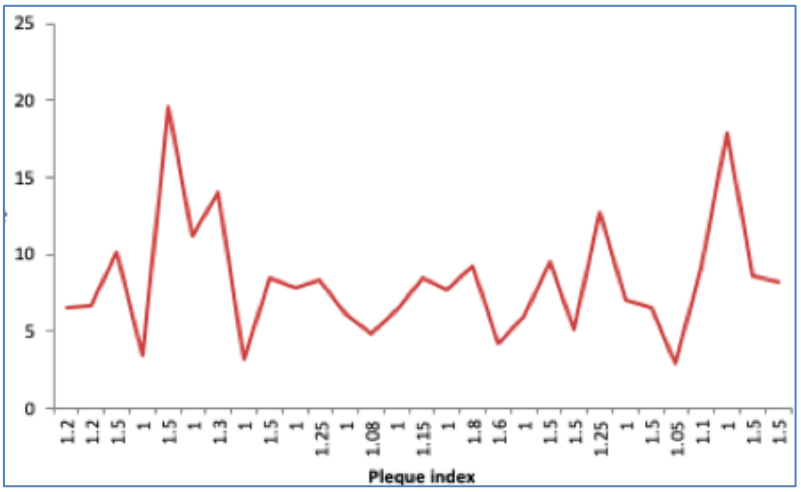
'P' value of <0.00001 represented a significant association of TSH levels with code 3 & code 4.



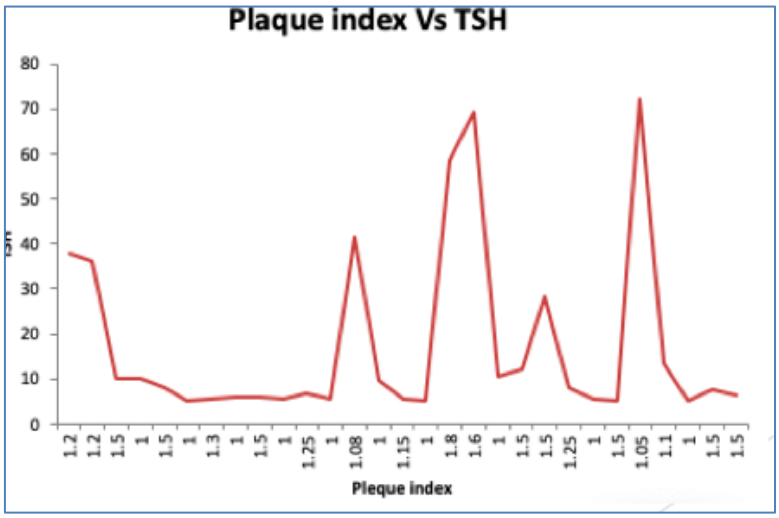
Graph -1 = means of TSH with gingivitis and periodontitis



Graph-2 = PI vs T3



Graph-3 = PI vs T4



Graph-4= PI vs TSH.

DISCUSSION

Hashimoto's thyroiditis is more common over the age of 30 years in female patients with 10% showing an overt signs and grave consequences of hypothyroidism. A Key evidence by Scardina and Messina suggested that mitochondrial changes in gingival tissue with reduced caliber and increased tortusity contributing to altered nonspecific defense mechanisms[6]. In a case report of ours with periodontitis in Hashimoto's thyroiditis patients showed a poor response to periodontal therapy. Further with the evidence base-two hypothetical

models described to establish a casual positive relationship between periodontitis and Hashimoto's thyroiditis.

To summarize the relationship further we have considered the assessment of TSH and correlate with periodontal disease progression. TSH is the most common diagnostic test to detect Hashimoto's thyroiditis. The electrochemiluminescence method proved to be the sensitive screening test. PI and PSR using CPITN probe assessed the chemical presentation of periodontal disease patterns. Increasing levels of TSH was positively associated with progressing severity i.e. from gingivitis to periodontitis.

Out of 30 female patients, 20 patients with PSR code of 2 and 3 presented clinical case of gingivitis and o6 patients with PSR code of 4 presented with periodontitis. TSH level correlating with disease gingivitis to periodontitis varied from 8.82mg/dl to 43.34mg/dl respectively. This different degree of periodontal disease observed in Hashimoto's thyroiditis (accordance with study by E Kerinov et al be mitochondrial breathing altered glycolysis and terminal oxidation can effect metabolic and structural changes in periodontal tissues. This indicates the autoimmune thyroiditis can induce cytokine-mediated apoptosis of thyroid epithelial cells thus infiltrating T-lymphocytes leading to thyrocyte cell death. Hashimoto's thyroiditis itself with increased antithyroid antibodies directed against thyroid antigens specific T-lymphocytes leads to chronic inflammation. Destruction of those cells results in decreased production of T4, T3 and increased TSH.

Although the mean PI (1.241) and P value of 0.1494 measured a weak correlation with TSH, it might have been the initiator of amplified inflammatory cascades. Decreased mitochondrial breathing, altered glycolysis and terminal oxidation within the PMN is suggestive of metabolic and structural changes in periodontal tissue in patient with Hashimoto's thyroiditis with some limitations of controlling the confounding factors .Our study was relevant in deterring of the associated conditions like PCOD and infertility in Hashimoto's thyroiditis females.

Lack of radiographic evaluation of bone loss patterns and correlations with decreased T3 and T4 identifies a gap in comprehensive assessment. However with the study, we speculated that the female individuals with Hashimoto's thyroiditis may be more apparent with severe periodontitis.

The objective of obtaining a standardized protocol for diagnosis and management of Hashimoto's thyroiditis is we make recommendations as follows:

Systemic phase in female patients

- Medical referral
- Medical inter-consultation ---i) Gynecologist
  ii) Endocrinologist
- Systemic administration
- Maintenance of systemic phase

Periodontal treatment plan

- Initial phase
- Educating patients about disease process, contributing factors.
- Teaching the patient about oral hygiene, evaluation and reinforcement of plaque control methods.
- Surgical phase
- Maintenance phase – success depends largely on patient compliance both through adherence to medical appointments and dental appointments.

Diagnosis

Evaluation of systemic conditions (discard diabetes mellitus, blood dyscresiasis and other complications. consider the age of the patient)

- Enquire about family history of periodontal disease
- Stomatological examination and UCLA periodontal chart assessment.

CONCLUSION

Based on our experience and the data collected from the various endocrinological centers proved that the prevalence of periodontal disease is associated with Hashimoto's thyroiditis.

Severe periodontitis in female patients should be investigated for T3, T4, TSH (Thyroid dysfunction). Further we believed that assessment of periodontal status in female patients demonstrating reduced T3, T4 and increased TSH may indicate the undiagnosed thyroid dysfunction. Thorough evaluation of hypothyroidism by endocrinologist and periodontist helps to mutually improve the patient outcome.

Future perspective: with limitations in controlling confounding factors of immunological components; it's difficult to measure the strength of this study. However, our findings have applicability in clinical practice .we further need high quality studies consisting of retrospective cross-sectional study to establish either of the disease in pathogenesis of other.

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