Original Research Article

Ophthalmic manifestations of thyroid disease and the association of serum levels of T3, T4 and TSH with thyroid eye disease

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Abstract:

Aim: To study the ophthalmic manifestations in thyroid disease and the association of serum levels of T3, T4 and TSH with thyroid eye disease. **Material and methods:** The present study was a prospective case series study. It included 72 patients with thyroid disease with either hypo, hyper or euthyroid status visiting ophthalmology department from March to October 2019, at GMC, Bambolim, Goa. Data was entered on SPSS software and analysed by using one-way ANOVA test to study the proportions of thyroid eye disease signs in various thyroid disease types and to establish their relationship with serum levels of T3, T4 and TSH and the duration of thyroid disease. **Result:** The most common thyroid eye disease was found to be dry eye (41 patients) followed by upper lid retraction (19 patients) and proptosis (14 patients). Serum level of T3 at the time of study was found to be significantly correlated with the severity and the frequency of upper lid retraction. Serum levels of T4 at the time of diagnosis of hyperthyroid was found to be significantly related with the severity and the frequency of the proptosis. Rest all signs of thyroid eye disease (Chemosis, congestion, dry eye) and intraocular pressure were found to be not associated or related with serum levels of T3, T4 and TSH at the time of examination or at the time of diagnosis. **Conclusion:** Duration of thyroid disease was not found to be significantly related with the frequency and severity of any of the thyroid eye disease signs which were studied with the p value being more than 0.05 in each subgroup.

Keywords: Thyroid disease, Ophthalmic manifestations, Graves' disease

Introduction

Thyroid Eye Disease (TED) is a complex orbital inflammatory disease, which can be sight threatening, debilitating and disfiguring [1]. Incidence of TED is - 16/1,00,000 females and 2.9/1,00,000 males with overall prevalence of 0.25% [2]. Incidence of thyroid hence thyroid eye disease is more common in females (4:1) but severity of it is more commonly seen in males [3,4,5]. Most common clinical sign in TED is upper eyelid retraction (90%) followed by exophthalmos (60%) and eye movement restrictions (40%) [6]. Thyroid eye disease was considered as a part of the triad of Graves' disease which included orbital signs, hyperthyroidism and pretibial myxoedema [7]. Thyroid eye disease is more severe in patients with thyroid dysfunction than in those with euthyroid status [7].

Europeans are 6.4 times more likely to develop thyroid eye disease as compared to the Asians [7]. Thyroid eye disease involves 20 eyelid signs along with conjunctival chemosis, congestion, strabismus, corneal exposure, dry eye, proptosis, extra-ocular muscle movement restriction, decrease in vision, optic neuropathy in severe cases. The pathogenesis behind the development of orbitopathy in patients with the thyroid disease is not completely well understood but it seems to be an autoimmune process because the tissues contain proteins which appear similar to thyroid gland to the immune system [8,9,10]. Many studies have been carried out to study ophthalmic manifestations of thyroid disease, however there are no studies or literature found on association of serum levels of thyroid hormones with thyroid eye disease and this study attempts to seek if any significant relationship exists between these two.

Aim: To study ophthalmic manifestations in thyroid disease patients and to study the association of serum levels of thyroid hormones T3, T4 and TSH with thyroid eye disease signs.

Material and Methods

Type of study: Prospective caser series study
Duration of study: February 2019 to October 2019

Manuscript received: 8th December 2019
Reviewed: 18th December 2019
Author Corrected: 24th December 2019
Accepted for Publication: 27th December 2019

Sample size: 72 cases with thyroid disease

Ethical permission: IEC approval was obtained to carry out this study

Inclusion criteria

Patients with thyroid disease or those thyroid eye disease with euthyroid status with thyroid hormone profile at the time of diagnosis and at the time of examination visiting Ophthalmology OPD at GMC, Bambolim, Goa and who gave consent for this study are included.

Exclusion criteria

Patients without thyroid hormone profile or those who didn't give consent are not included in this study. Patients with thyroid disease and with age less than 10-year-old were excluded from the study

Sampling method: Conventional

The patients included in the study their demographic data was recorded along with the serum levels of T3, T4, TSH at the time of diagnosis and examination. All the patients detailed ocular examination was carried out with the help of torch light, and slit lamp for anterior segment evaluation, direct ophthalmoscopy for posterior segment evaluation, indirect ophthalmoscopy whenever necessary. Proptosis was measured with the help of Hurtles exophthalmometer and graded as mild-moderate (less than 3 mm) and severe (more than 3 mm). Simple ruler scale was used for evaluation of upper lid retraction and it was graded as mild-moderate (less than 2 mm) and severe (more than 2 mm). Schirmers test was used for the evaluation of dry eye disease and was considered negative if more than 10 mm of wetness of the Schirmers strip over 5 minutes.

The present study also observed the presence of conjunctival chemosis, congestion, diplopia, restriction to extra ocular movements and intraocular pressure was measured by using Goldman's applanation tonometry technique.

Data analysis: Then data was entered on SPSS software and analysed by using chi square test and one way annova test was used to establish the significance of serum levels of T3, T4, TSH at the time of study and Pre T3, Pre T4 and Pre TSH at the time of diagnosis of thyroid disease with the severity and the frequency of thyroid eye disease signs.

Results

Out of 72 cases which were studied, 36 patients were found to be of hypothyroid status, 34 patients were having hyperthyroidism and 2 patients had euthyroid status, out of the 72 patients, females were seen to be more commonly affected than men (Table 1).

Table 1: Distribution of thyroid and gender in the present study population.

Type of Thyroid	Number of Cases
Hypothyroid	36 (50%)
Hyperthyroidism	34 (47.44%)
Euthyroid	2 (2.78%)
Gender	Number of Cases
Males	25 (18%)
Females	54 (75%)

Most common age group affected with thyroid disease was 41-50 years (Table 2)

Table-2: Age range.

In years		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10-20	7	9.7	9.7	9.7
	21-30	2	2.8	2.8	12.5
	31-40	22	30.6	30.6	43.1
	41-50	25	34.7	34.7	77.8
	51-60	11	15.3	15.3	93.1
	61-70	4	5.6	5.6	98.6
	81-90	1	1.4	1.4	100.0
	Total	72	100.0	100.0	

Upper lid retraction was seen in 19 patients out of which 14 patients belonged to hyperthyroid group, 4 patients had hypothyroid status and 1 patient had euthyroid status. One way Annova test was applied to see whether the upper lid retraction was associated with serum levels of thyroid hormones or not, and it was found that only serum levels of T3 at the time of present examination was related with upper lid retraction and its severity with a p value of 0.009. Higher the level more the severity of upper lid retraction was seen. Rest thyroid hormone levels didn't show any significant relationship with the frequency and severity of the upper lid retraction with p value more than 0.05 (Table 3).

Table 3 showed significance values after comparing serum levels of T3, T4, TSH levels at the time of examination with upper lid retraction. It showed only serum level of T3 at the time of examination of this study is related to upper lid retraction significantly with the p value of 0.009. Table 3 also represented the relationship between serum levels of T3, T4, TSH and the upper lid retraction in case of hypothyroid cases. This table represented the significance values above 0.05 for each type of serum level of thyroid hormones in case of hypothyroidism, showing there is no significant relationship between these two variables. Table 3 also depicted the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism and the upper lid retraction. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect upper lid retraction.

Table 3: Comparison of serum levels of T3, T4 and TSH levels at the time of examination with upper lid retraction along with cases of hypothyroid and hyperthyroidism.

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	57.233	5	11.447	3.908	.009
	Within Groups	79.086	27	2.929		
	Total	136.319	32			
T4	Between Groups	354.414	5	70.883	2.427	.061
	Within Groups	788.470	27	29.203		
	Total	1142.884	32			
TSH	Between Groups	107.544	5	21.509	.539	.745
	Within Groups	1077.259	27	39.898		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	.114	2	.057	.521	.598
	Within Groups	3.614	33	.110		
	Total	3.728	35			
T4	Between Groups	3.611	2	1.805	.211	.811
	Within Groups	281.938	33	8.544		
	Total	285.548	35			
TSH	Between Groups	221.243	2	110.621	.270	.765
	Within Groups	13517.661	33	409.626		
	Total	13738.904	35			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	171.467	4	42.867	.105	.980
	Within Groups	9372.702	23	407.509		
	Total	9544.169	27			
pre_T4	Between Groups	307.727	4	76.932	2.116	.111
	Within Groups	836.062	23	36.351		
	Total	1143.789	27			
pre_TSH	Between Groups	13.986	4	3.497	.237	.915
	Within Groups	339.797	23	14.774		
	Total	353.783	27			

Table 4 depicted the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hypothyroidism and the upper lid retraction. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect upper lid retraction.

Table 4: Comparison of serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hypothyroidism and the upper lid retraction.

		Sum of Squares	df	Mean Square	F	Sig.
pre_T3	Between Groups	.325	2	.162	.061	.941
	Within Groups	77.525	29	2.673		
	Total	77.849	31			
pre_T4	Between Groups	.207	2	.103	.009	.991
	Within Groups	348.096	29	12.003		
	Total	348.302	31			
pre_TSH	Between Groups	2126.377	2	1063.189	.621	.544
	Within Groups	49622.444	29	1711.119		
	Total	51748.821	31			

14 patients out of 72 patients which were studied had proptosis and out of which 9 patients belonged to hyperthyroid group and 5 had hypothyroid status.

Except serum levels of T4 (p value 0.024) in hyperthyroid group of patients at the time of diagnosis of the thyroid disease rest all subgroups of thyroid hormone levels were not significantly related with frequency or severity of the proptosis with the following p values as shown in Table 5.

It also depicted the relationship between serum levels of T3, T4 and TSH values at the time of examination of the disease in case of hyperthyroidism and the proptosis. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect proptosis.

The relationship between serum levels of T3, T4 and TSH values at the time of examination for this study in case of hypothyroidism and the proptosis is also depicted. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect proptosis.

Table 5 also depicted the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism and proptosis. Serum level of T4 was found to be significantly related to the proptosis with p value of 0.024. In rest all cases p value is more than 0.05 so, it can be concluded that T3 and TSH hormone levels don't affect proptosis.

Table 5 also highlighted the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hypothyroidism and the proptosis. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect proptosis.

Only 3 patients in the present study had chemosis and congestion all of which belonged to hyperthyroid status with no significant relationship with serum levels of thyroid hormone levels. P values of different subgroups of thyroid hormones are given in Table 6. It also depicted the relationship between serum levels of T3, T4 and TSH values at the time of examination of the disease in case of hyperthyroidism and the chemosis. In all cases p value is more than 0.05 So, it can be concluded that these hormone levels don't affect chemosis. Table 6 also depicted the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism and chemosis. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect the chemosis. The relationship between serum levels of T3, T4 and TSH values at the time of examination of this study in case of hyperthyroidism and the congestion was also highlighted. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect congestion.

Table 5: Relationship between serum levels of T3, T4 and TSH values at the time of examination and diagnosis of the disease in case of hyperthyroidism and hypothyroidism and the proptosis.

		Sum of Squares	df	Mean Square	F	Sig.
T3	Between Groups	6.217	2	3.109	.717	.496
	Within Groups	130.101	30	4.337		
	Total	136.319	32			
T4	Between Groups	111.130	2	55.565	1.616	.216
	Within Groups	1031.754	30	34.392		
	Total	1142.884	32			
TSH	Between Groups	72.091	2	36.046	.972	.390
	Within Groups	1112.712	30	37.090		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	.102	1	.102	.961	.334
	Within Groups	3.625	34	.107		
	Total	3.728	35			
T4	Between Groups	2.998	1	2.998	.361	.552
	Within Groups	282.551	34	8.310		
	Total	285.548	35			
TSH	Between Groups	177.068	1	177.068	.444	.510
	Within Groups	13561.836	34	398.878		
	Total	13738.904	35			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	38.403	2	19.201	.050	.951
	Within Groups	9505.766	25	380.231		
	Total	9544.169	27			
pre_T4	Between Groups	293.755	2	146.877	4.320	.024
	Within Groups	850.034	25	34.001		
	Total	1143.789	27			
pre_TSH	Between Groups	7.329	2	3.664	.264	.770
	Within Groups	346.455	25	13.858		
	Total	353.783	27			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	.676	1	.676	.263	.612
	Within Groups	77.174	30	2.572		
	Total	77.849	31			
pre_T4	Between Groups	13.034	1	13.034	1.166	.289
	Within Groups	335.268	30	11.176		
	Total	348.302	31			
pre_TSH	Between Groups	2636.213	1	2636.213	1.610	.214
	Within Groups	49112.608	30	1637.087		
	Total	51748.821	31			

The relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism and the congestion was also presented. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect the congestion.

Table 6: Relationship between serum levels of T3, T4 and TSH values at the time of examination and diagnosis of the disease in case of hyperthyroidism and the chemosis along with congestion.

		Sum of Squares	df	Mean Square	F	Sig.
T3	Between Groups	1.414	2	.707	.157	.855
	Within Groups	134.904	30	4.497		
	Total	136.319	32			
T4	Between Groups	114.811	2	57.405	1.675	.204
	Within Groups	1028.073	30	34.269		
	Total	1142.884	32			
TSH	Between Groups	56.370	2	28.185	.749	.481
	Within Groups	1128.433	30	37.614		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	25.406	1	25.406	.069	.794
	Within Groups	9518.763	26	366.106		
	Total	9544.169	27			
pre_T4	Between Groups	78.210	1	78.210	1.908	.179
	Within Groups	1065.579	26	40.984		
	Total	1143.789	27			
pre_TSH	Between Groups	.972	1	.972	.072	.791
	Within Groups	352.811	26	13.570		
	Total	353.783	27			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	1.414	2	.707	.157	.855
	Within Groups	134.904	30	4.497		
	Total	136.319	32			
T4	Between Groups	114.811	2	57.405	1.675	.204
	Within Groups	1028.073	30	34.269		
	Total	1142.884	32			
TSH	Between Groups	56.370	2	28.185	.749	.481
	Within Groups	1128.433	30	37.614		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	25.406	1	25.406	.069	.794
	Within Groups	9518.763	26	366.106		
	Total	9544.169	27			
pre_T4	Between Groups	78.210	1	78.210	1.908	.179
	Within Groups	1065.579	26	40.984		
	Total	1143.789	27			
pre_TSH	Between Groups	.972	1	.972	.072	.791
	Within Groups	352.811	26	13.570		
	Total	353.783	27			

Intraocular pressure measured by applanation tonometry was not related to serum levels of thyroid hormones as tested by one-way Annova test. In all the subgroups the p value was more than 0.05 as given in Table 7. It depicted the relationship between serum levels of T3, T4 and TSH values at the time of examination of the study in case of hyperthyroidism and the IOP. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect IOP. The relationship between serum levels of T3, T4 and TSH values at the time of examination of this study in case of hypothyroidism and the IOP was also highlighted. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect IOP. The relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism

and IOP. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect IOP. the relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hypothyroidism and the IOP. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect the IOP.

Table 7: Serum levels of T3, T4 and TSH values at the time of examination and diagnosis of the study in case of hyperthyroidism and hypothyroidism and the IOP.

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	46.833	8	5.854	1.570	.186
	Within Groups	89.486	24	3.729		
	Total	136.319	32			
T4	Between Groups	295.923	8	36.990	1.048	.430
	Within Groups	846.960	24	35.290		
	Total	1142.884	32			
TSH	Between Groups	132.402	8	16.550	.377	.922
	Within Groups	1052.401	24	43.850		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	.468	4	.117	1.114	.368
	Within Groups	3.260	31	.105		
	Total	3.728	35			
T4	Between Groups	62.241	4	15.560	2.160	.097
	Within Groups	223.307	31	7.203		
	Total	285.548	35			
TSH	Between Groups	852.158	4	213.039	.512	.727
	Within Groups	12886.746	31	415.701		
	Total	13738.904	35			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	792.010	8	99.001	.215	.984
	Within Groups	8752.159	19	460.640		
	Total	9544.169	27			
pre_T4	Between Groups	400.259	8	50.032	1.279	.311
	Within Groups	743.530	19	39.133		
	Total	1143.789	27			
pre_TSH	Between Groups	66.890	8	8.361	.554	.802
	Within Groups	286.893	19	15.100		
	Total	353.783	27			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	2.819	4	.705	.254	.905
	Within Groups	75.031	27	2.779		
	Total	77.849	31			
pre_T4	Between Groups	62.213	4	15.553	1.468	.239
	Within Groups	286.089	27	10.596		
	Total	348.302	31			
pre_TSH	Between Groups	7523.069	4	1880.767	1.148	.355
	Within Groups	44225.752	27	1637.991		
	Total	51748.821	31			

41 patients out of total of 72 patients had the dry eye disease as diagnosed with the help of a Schirmers test. 21 patients belonged to hyperthyroid group 18 patients belonged to hypothyroid group and rest 3 were having euthyroid status. Dry eye disease in thyroid patients was not found to be related with serum levels of T3, T4 and TSH (Table 8). It depicted the relationship between serum levels of T3, T4 and TSH values at the time of examination for the study in case of hyperthyroidism and the dry eye disease. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect dry eye disease.

Table 8 also showed the relationship between serum levels of T3, T4 and TSH values at the time of examination of this study in case of hypothyroidism and the dry eye disease. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect dry eye disease. The relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hyperthyroidism and the dry eye disease. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect dry eye disease. The relationship between serum levels of T3, T4 and TSH values at the time of diagnosis of the disease in case of hypothyroidism and the dry eye disease. In all cases p value is more than 0.05 so, it can be concluded that these hormone levels don't affect dry eye disease.

Table 8: Serum levels of T3, T4 and TSH values at the time of examination and diagnosis of the study in case of hyperthyroidism and hypothyroidism and the dry eye disease.

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	21.604	3	7.201	1.821	.165
	Within Groups	114.714	29	3.956		
	Total	136.319	32			
T4	Between Groups	74.641	3	24.880	.675	.574
	Within Groups	1068.243	29	36.836		
	Total	1142.884	32			
TSH	Between Groups	22.362	3	7.454	.186	.905
	Within Groups	1162.442	29	40.084		
	Total	1184.803	32			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
T3	Between Groups	.178	2	.089	.827	.446
	Within Groups	3.550	33	.108		
	Total	3.728	35			
T4	Between Groups	41.405	2	20.703	2.798	.075
	Within Groups	244.143	33	7.398		
	Total	285.548	35			
TSH	Between Groups	8824.664	2	4412.332	29.630	.000
	Within Groups	4914.239	33	148.916		
	Total	13738.904	35			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	684.075	3	228.025	.618	.610
	Within Groups	8860.094	24	369.171		
	Total	9544.169	27			
pre_T4	Between Groups	83.380	3	27.793	.629	.603
	Within Groups	1060.409	24	44.184		
	Total	1143.789	27			
pre_TSH	Between Groups	40.938	3	13.646	1.047	.390
	Within Groups	312.846	24	13.035		
	Total	353.783	27			
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
pre_T3	Between Groups	3.080	1	3.080	1.236	.275
	Within Groups	74.769	30	2.492		
	Total	77.849	31			
pre_T4	Between Groups	16.613	1	16.613	1.503	.230
	Within Groups	331.689	30	11.056		
	Total	348.302	31			
pre_TSH	Between Groups	161.054	1	161.054	.094	.762
	Within Groups	51587.767	30	1719.592		
	Total	51748.821	31			

Duration of thyroid disease was not found to be significantly related with the frequency and severity of any of the thyroid eye disease signs which were studied with the p value being more than 0.05 in each subgroup. Not a single patient in the present study had diplopia or strabismus. Three patients had limitation to extra ocular movement all of which belonged to hyperthyroid group. One patient in the present study with hyperthyroid status had undergone orbital decompression in both the eyes due to thyroid orbitopathy and her right eye was eviscerated due to endophthalmitis secondary to severe chronic exposure keratopathy, corneal perforation leading to evisceration of the right eye.

Discussion

The present study had 72 patients out of which 36 patients were hypothyroid, 34 were hyperthyroid and 2 were having euthyroid status. 54 out of 72 patients were females and 18 were males. Like in other studies, the present study also supports that thyroid eye disease is more commonly seen in women than in men [2,7].

Most common age group affected in the current study is 41-50 years. As per the available literature thyroid eye disease has the bimodal peak incidence in 5th and sixth decade in both men and women this is also proven in the current study [7]. In a study carried out in Accra the mean age group affected was 45.22 years in the current study it is 43.07 years while in a study carried out at Nepal it was 42.39 years [13,14].

The most common thyroid eye disease was found to be dry eye (41 patients) followed by upper lid retraction (19 patients) and proptosis (14 patients) in the current study. Upper eyelid retraction being the second most frequent sign here in the current study is the most frequent sign of TED in other studies/literature found [11,12]. Upper lid retraction is more common in hyperthyroid cases followed by hypothyroid and Euthyroid cases which is also seen in the current study [8].

Serum level of T3 at the time of study was found to be significantly correlated with the severity and the frequency of upper lid retraction with the p value of 0.009. Serum levels of T4 at the time of diagnosis of hyperthyroid was found to be significantly related with the severity and the frequency of the proptosis with the p value of 0.024.

Rest all signs of thyroid eye disease (Chemosis, congestion, dry eye) and intraocular pressure were found to be not associated or related with serum levels of T3, T4 and TSH at the time of examination or at the time of diagnosis.

Duration of thyroid disease was not found to be significantly related with the frequency and severity of any of the thyroid eye disease signs which were studied with the p value being more than 0.05 in each subgroup.

However, there are no studies or literature found on association of serum levels of thyroid hormones with thyroid eye disease so the results of the present study couldn't be compared with any other similar study.

Limitations of the present study

1. Limited sample size: Due to the limited duration and unavailability of the records of thyroid profile at the time of diagnosis the sample size is less but this study serves as the pilot study for the future study with a bigger sample size.

2. This study doesn't include the management of the patients for their thyroid disease so the effect of it on the manifestations of thyroid eye disease couldn't be studied

Conclusion

1. Out of 72 cases which were studied, 36 patients were found to be of hypothyroid status, 34 patients were having hyperthyroidism and 2 patients had euthyroid status.
2. Females were seen to be more commonly affected than men (54 VS 18)
3. Most common age group affected with TED was 41-50 years with the mean age of 43.07
4. The most common thyroid eye disease was found to be dry eye (41 patients) followed by upper lid retraction (19 patients) and proptosis (14 patients).
5. Serum level of T3 at the time of study was found to be significantly correlated with the severity and the frequency of upper lid retraction.
6. Serum levels of T4 at the time of diagnosis of hyperthyroid was found to be significantly related with the severity and the frequency of the proptosis.
7. Rest all signs of thyroid eye disease (Chemosis, congestion, dry eye) and intraocular pressure were found to be not associated or related with serum levels of T3, T4 and TSH at the time of examination or at the time of diagnosis.
8. Duration of thyroid disease was not found to be significantly related with the frequency and severity of any of the thyroid eye disease signs which were studied with the p value being more than 0.05 in each subgroup.
9. One patient in the present study with hyperthyroid status had undergone orbital decompression in both the eyes due to thyroid orbitopathy and her right eye was eviscerated due to endophthalmitis secondary to severe chronic exposure keratopathy, corneal perforation leading to evisceration of the right eye. So, from this observation, it can be concluded that TED can be sight threatening, disfiguring and needs the prompt appropriate treatment

What the study adds to the existing knowledge?

This kind of study has never been done and this study helps to find the relationship between serum levels of T3,T4 and TSH at the time of diagnosis of thyroid disease and at the time of current examination for the study also the duration of the thyroid disease with thyroid eye disease manifestation. Which in turn can give us idea about managing the particular hormonal levels which are significantly related to the manifestation of particular thyroid eye disease type. So, there is further scope to carry out a new study which will study the management of the serum levels of these thyroid hormones with different modes of treatment and thyroid eye disease.

Author's contribution

Dr. Priyanka Choudhari: Conduct of study
Dr. Ugam Usgaonkar: Guidance.
Dr. Dipti Shrivastav: Guidance.

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