

Original Research

A Prospective observational study on ischemic stroke and impact of thyroid profile

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ABSTRACT:

Background: The present study was conducted for assessing patients with ischemic stroke and impact of thyroid profile on it. **Materials & methods:** A total of 50 patients with ischemic stroke were enrolled. Complete demographic and clinical details of all the patients was obtained. Radiographic findings were evaluated. Blood samples were obtained from all the patients and serum thyroid profile was evaluated. Outcome of patients was assessed on follow-up correlation of thyroid profile with outcome was also evaluated. All the results were recorded and analysed using SPSS software. **Results:** Mean TSH, fT3 and fT4 levels at baseline were found to be 3.8 mIU/L, 6.1 pmol/L and 20.3 pmol/L respectively. Significant correlation was observed while correlating thyroid profile alteration with outcome of ischemic stroke. **Conclusion:** This is significant to pursue vigorously in larger studies, as strategies to replace thyroid levels could be developed for therapeutic trials for managing patients with ischemic stroke.

Key words: Ischemic stroke, Thyroid

Received: 17 June, 2022

Accepted: 22 July, 2022

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This article may be cited as: Bhandal NS. A Prospective observational study on ischemic stroke and impact of thyroid profile. J Adv Med Dent Scie Res 2022;10(8):92-94.

INTRODUCTION

Stroke is common in patient groups and therefore results in morbidity and fatality. There are three types of strokes: ischemic, hemorrhagic, and subarachnoid.¹ The categories of cardioembolism, small-vessel occlusion, large-artery atherosclerosis, and stroke of unknown aetiology are divided into subcategories under the Trial Org 10172 in Acute Stroke Treatment classification system for ischemic strokes. A thrombotic or embolic episode that reduces blood supply to the brain is the aetiology of an ischemic stroke. When a thrombotic episode occurs, the blood vessel that supplies blood to the brain becomes dysfunctional, frequently as a result of atherosclerotic disease, arterial dissection, fibromuscular dysplasia, or an inflammatory disorder.^{2,3}

Other elements, such as endocrine hormones and inflammatory cytokines have not consistently produced a predictable outcome in recent predictive analyses. T3 and T4, which make up the majority of thyroid hormones, play a crucial part in the growth, differentiation and development of brain tissue. The thyroid gland produces and emits thyroid hormones, primarily T4, in response to TSH stimulation. Deiodinase converts a part of T4 into T3 during blood

circulation. T3 exhibits 3-5 times more activity than T4 does.⁴⁻⁶ Thus, the current investigation was carried out to evaluate ischemic stroke patients and the effect of thyroid profile on it.

MATERIALS & METHODS

The present study was conducted for assessing patients with ischemic stroke and impact of thyroid profile on it. A total of 50 patients with ischemic stroke were enrolled. Complete demographic and clinical details of all the patients was obtained. Radiographic findings were evaluated. Blood samples were obtained from all the patients and serum thyroid profile was evaluated. Outcome of patients was assessed on follow-up correlation of thyroid profile with outcome was also evaluated. All the results were recorded and analysed using SPSS software.

RESULTS

Out of 50 patients, majority of them belonged to the age group of more than 60 years. Mean age of the patients was 68.4 years. 62 percent of the patients were males. Majority of the patients were of urban residence. Mean TSH, fT3 and fT4 levels at baseline were found to be 3.8 mIU/L, 6.1 pmol/L and 20.3

pmol/L respectively. Significant correlation was observed while correlating thyroid profile alteration with outcome of ischemic stroke.

Table 1: Profile of patients with ischemic stroke

Variable	Number	Percentage
Males	31	62
Females	19	38
Mean age (years)	68.4	
Rural residence	16	32
Urban residence	34	64

Table 2: Thyroid Profile of patients with ischemic stroke

Thyroid profile	Mean	SD
TSH (mIU/L)	3.8	1.1
fT3 (pmol/L)	6.1	1.9
fT4 (pmol/L)	20.3	2.3

Table 3: Correlation of thyroid profile alteration with outcome of ischemic stroke

Thyroid profile	Death (n=7)	Survived (n=43)	p- value
TSH (mIU/L)	4.3	3.1	0.01*
fT3 (pmol/L)	7.4	5.8	0.00*
fT4 (pmol/L)	26.8	18.7	0.00*

*: Significant

DISCUSSION

Stroke is characterised by blood vessel obstruction. Brain clots prevent blood from flowing properly, obstructing arteries and triggering blood vessels to burst, which causes bleeding. The abrupt destruction of brain cells as a result of lack of oxygen occurs when the arteries feeding to the brain are ruptured during the episode.^{7,8} Also, a stroke can result in dementia and depression. Hemorrhagic stroke is brought on by bleeding or blood vessel leaks, whereas ischemic stroke is brought on by insufficient blood and oxygen delivery to the brain. Nearly eighty five percent of patients lose their lives as a result of ischemic occlusions, with intracerebral haemorrhage accounting for the remaining fifteen percent. In the brain, ischemic occlusion causes thrombotic and embolic situations. Thyroid hormones and functional outcomes after stroke have a complicated link.^{9,10}

According to recent research, decreased T3 readings within hours of an acute ischemic stroke are linked to worse functional prognoses, increased stroke intensity, and fatality. Additionally, T3 levels are reduced, yet TSH is normal in severely ill hospitalised patients with non-thyroidal illness syndrome i.e. NTIS syndrome. In comparison to non-NTIS patients, NTIS patients have worse short-term prognoses and greater one-year fatality rates.¹¹ Thus, the current investigation was carried out to evaluate ischemic stroke patients and the effect of thyroid profile on it.

Fifty patients were treated, and the bulk of them were over sixty years old. The patients were 68.4 years old on average. Men made up sixty two percent of the patients. Most of the patients lived in cities. At baseline, mean values of TSH, fT3, and fT4 were discovered to be 3.8 mIU/L, 6.1 pmol/L, and 20.3

pmol/L, respectively. The relationship between the baseline thyroid function profile and the prognosis following an AIS was discovered by Dhital R et al.¹² We discovered that subclinical hypothyroidism was linked with superior modified Rankin scale scores at one and three months compared to the euthyroid cases after analysing twelve trials involving five thousand two hundred and eighteen participants. Those who had greater initial levels of thyrotropin-releasing hormone and fT3 or T3 also fared better at discharge and three months later. In AIS among clinically euthyroid individuals, raised early TSH may be associated with better functional outcomes, while reduced initial T3/fT3 may be associated with poor prognosis.

While comparing the result of an ischemic stroke with the altered thyroid profile, a strong association was found. In a different investigation, TSH, free T3, and free T4 serum concentrations were assessed in patients with radiologically diagnosed acute ischemic stroke 24±6 hours after the beginning of symptoms by Lena M. O'Keefe et al.¹³ The modified Rankin scale and modified Barthel Index were used as indicators of disability to assess stroke outcomes at discharge, three and twelve months after the stroke. Following multivariate evaluation, none of the outcomes maintained even though we discovered that reduced amounts of free T3 were linked to a poor prognosis at hospital discharge, as well as at three and twelve months after a stroke.

Thyroid hormones are therefore probably linked to other variables, including sex, age, and stroke cause, that affect the prognosis of strokes. Their research revealed that reduced free T3 levels were linked to worse outcomes at hospital discharge as well as three and twelve months after a stroke. The mechanisms

controlling TH production, free fraction unattached to thyroxine binding globulins, transmembrane transporters, and the activity of iodothyronine deiodinases tightly govern the availability of T3 to the developing and adult brain. Depending upon the developmental stage and in the adult brain, these regulatory processes may take on a different form. T3 is crucial for neurological processes, and even little changes to these pathways might exert an impact on healthy brain growth and function.¹⁴

CONCLUSION

This is significant to pursue vigorously in larger studies, as strategies to replace thyroid levels could be developed for therapeutic trials for managing patients with ischemic stroke.

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