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Original Research Article

Prospective study of thyroid dysfunction in patients of Cerebro Vascular Accidents

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Abstract: Cerebrovascular accidents (CVAs) are the leading cause of morbidity and mortality in Indian population**.** The objective is to study thyroid dysfunction in patients of CVA. Seventy five (Case group) patients of CVA were compared with 25 normal patients (control group, no CVA)in the Department of Medicine, JA Hospital, Gwalior between March 2015 to September 2016. Detailed history, thyroid profile, blood pressure and fasting blood sugar were done. Stroke pattern was analyzed using brain CT/MRI for each patient. Most common age group among Cases and Control was 61-80 years (44%) and 41-60 years (42%) respectively. Males outnumbered in Cases (60%) whereas in Control group females (84) were more. Maximum patients were smokers (57.33%) and hypertensive (62.66%) in Case group. Out of 75 CVA patients, Infarction was the most common stroke type(60.25%). Among smokers, infarction (55%) was more common compared to hemorrhage (51%). Among Cases, 46.66% were diabetic. Thyroid dysfunction was reported in 28% cases. Among thyroid dysfunction, hypothyroidism was more in Cases (21.33%).Out of 14 patients who expired, 50% had thyroid dysfunction. Thyroid dysfunction is one of risk factor for the occurrence of CVA leading to increased mortality.
Keywords: Thyroid dysfunction, stroke pattern, cerebrovascular accidents, smokers, CVA

INTRODUCTION

Cerebrovascular accidents (CVAs) or strokes are the leading cause of morbidity and mortality in Indian population. CVA is a kind of acute stress which has damaging effects on different neurophysiological pathways [1].

Hypertension, atherosclerosis, diabetes mellitus (DM) and thyroid dysfunction (TD) has been described as the risk factor for the occurrence of CVA[2].Data is lacking at what extent each of these risk factor is related with CVA.

Thyroid hormones can influence cellular metabolic activity and neural development. Thyroid hormone in circulation appears to modulate the outcome of ischemic reperfusion injury[3].

Literature review reveled lack of common consensus regarding the exact role of thyroid hormone in CVA patients. Hence present study was performed to study thyroid dysfunction in CVA patients.

MATERIALS AND METHODS

A hospital based cross sectional prospective case control study was done including 75 patients diagnosed with cerebro-vascular accident (CVA) admitted in the Department of Medicine, G R Medical College & JA Hospital, Gwalior between April 2015 to August 2016. Comparison was done with 25 age and sex matched control patients (non CVA). Two groups were formed as Case (n=75) and Control (n=25).

A Written informed consent from all the patients and Ethical Committee approval was obtained before starting the study.

After taking detailed history from each patient, clinical diagnosis and laboratory investigation including thyroid profile, blood pressure and fasting blood sugar were done in all the patients.

Patients having age between 20-85 years of either sex with clinical finding (brain CT/MRI) of CVA were included in the present study. Patients with liver disease, TIA neurological symptoms recovered within 24 hours, secondary to cerebral tumor, trauma or previous coagulation disorder, not giving informed consent, preexisting thyroid disorder and patient on thyroxin therapy and pregnancy or postpartum hypothyroidism were excluded from the study.

All the data were analyzed using IBM SPSS-ver.20 software. Analysis was performed using chi-square test and independent sample student t test. P values <0.05 was considered to be significant.

RESULTS

Out of 75 CVA patients, infarction was the most common stroke pattern [45 (60%)] followed by hemorrhage [30 (40%)]. Out of 55 smokers in Case group, 36 (55%) were of infarcts and 19 (51%) were of hemorrhage, whereas among non smokers (n=20), 12 (60%) were of infarcts and 8 (40%) were of hemorrhage (p=0.0001).

In infarct cases, stage I hypertension was most common (57.6%) while stage II was commonly associated with hemorrhage (64%) (p=0.21). Forty six percent of CVA patients were diabetic as compared to only 20% of controls (P=0.03).

Table 1: Showing comparison of different parameters among both the groups

Parameters		Control (n=25)	Cases (n=75)	P value
Age	20-40	8 (32)	15 (20)	NS
	41-60	11 (44)	27 (36)	NS
	61-80	6 (24)	33 (44)	NS
Gender	Male	4 (16)	45 (60)	NS
	Female	21 (84)	30 (40)	NS
Smoking	Smoker	2 (8)	43 (57.33)	0.001
	Non smoker	23 (92)	32 (42.66)	0.001
HTN	Normotensive	16 (64)	27 (36)	0.002
	Hypertensive	9 (36)	47 (62.66)	0.001
	Hypotensive	0 (0)	1 (1.34)	NS

Data is expressed as no of patients (percentage), NS; not significant, HTN; hypertension p value of <0.05 is considered as significant

Table 2: Distribution of Cases according to thyroid profile

Thyroid Profile	Control (n=25)	Case (n=75)	P value
Euthyroid	21 (84)	54 (72)	
Hypothyroidism	3 (12)	16 (21.33%)	0.003
Hyperthyroidism	1 (4)	5 (6.67)	

Data is expressed as no of patients (percentage), p value of <0.05 is considered as significant

Out of 75 CVA patients, 21 (28%) had shown thyroid dysfunction while only 4 (16%) of controls had thyroid abnormality (p=0.003). Hypothyroidism being the commonest pattern observed both in Cases (21.33%) and Controls (12%).Out of 75 stroke patients, 14 (18.66%) has expired.

Table 3: Comparing outcome with Thyroid dysfunction, hypertension and diabetes mellitus

Outcome	Thyroid dysfunction (n=21)	HTN (n=47)	DM (n=35)	CVA type	
				Infract (n=45)	Hemorrhage (n=30)
Expired (n=14)	7 (50)	9 (64.28)	7 (50)	9 (64.28)	5 (35.72)
Survived (n=61)	14 (22.95)	38 (62.29)	28 (45.90)	36 (59.01)	25 (40.98)

Data is expressed as no of patients (percentage), CVA; cerebrovascular accident, DM; diabetes mellitus, HTN; hypertension

DISCUSSION

CVA or stroke is one of the serious neurological diseases and makes a major cause of mortality and disability globally. Thyroid disorders can affect different risk factors of CVA and several authors have reported a high prevalence of thyroid dysfunction among CVA patients[4].

Cappola and Laden son established a relationship between hypothyroidism and atherosclerosis which if not treated can progress to stroke[5].

A study on 75 CVA patients from Meerut reported an overall incidence of thyroid dysfunction as 25.33% and incidence of hyperthyroidism and hypothyroidism was 8% and 17.33% respectively[2. The overall incidence revealed by present study was 28%, of that hypothyroidism was 21.33% and hyperthyroidism was 6.67% which is almost similar to what is reported by Pande et al[2].

Khalil et al studied 351 stroke patients and reported that 14.5% had thyroid disorder, 6.15% had hyperthyroidism whereas 8.45 patients had hypothyroidism which is in accordance to the present study data[6].

A report from Taiwan on 28548 patients with and without hyperthyroidism reveled that after 5 years of follow of 0.7% had ischemic stroke which finally conclude that hyperthyroidism as one of the risk factor for stroke, which again confirms the results revealed by present study where 6.5% CVA patients had hyperthyroidism [7]. A case study of 52-year-old woman with acute ischemic stroke from Taiwan reported that after thyroid replacement therapy her condition was greatly improved which confirm that hypothyroidism to be the established risk factor for CVA[8].

Pande et al studied thyroid profile of 185 patients presenting within 48 hrs of an acute hemorrhagic stroke reported high mortality rates among patients with low FT3 and free thyroxine (FT4) level which is in accordance to present study data where half of the patients who expired had thyroid dysfunction[9].

Present study had few limitations including small sample size; a large randomized clinical trial is needed to strengthen the present study findings.

CONCLUSION

Based on the data it can be concluded that thyroid disorders can be seen as one of the important risk factor for CVA. If thyroid disorders are taken care properly, it can decrease the chances of CVA.

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