

Movement Disorders And Diabetes, A Study From South India

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Citation

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Abstract

Purpose: Movement disorders like chorea, hemichorea-hemiballismus, choreoathetosis has been documented earlier with diabetes mellitus. We in our study have analyzed clinical and radiological characteristics of movement disorders occurring in association with diabetes. **Methods:** Patients admitted with movement disorders were screened for the presence of Diabetes. Patients with history of diabetes or new onset diabetes were analyzed for their clinical presentation and radiological characteristics, and the recovery of movement disorders with treatment of diabetes. **Results:** A total of eleven patients who presented with involuntary movements were found to have diabetes. Of these, five patients presented with hemiballismus-hemichorea, three with hemichorea, and two patients with choreoathetosis and one with generalized chorea-ballismus. The age of the patients ranged between 45–73 years. In three patients, it was the presenting symptom of diabetes without any previous history of diabetes. The glycemic status as assessed by HbA1C was very poor, with values more than 10 % in all the 11 patients. In nine patients, the Brain CT showed hyperdensity in the region of putamen. In all the patients, the involuntary movements resolved completely or decreased with treatment of diabetes. **Conclusion:** Movement disorders are associated with diabetes. The early recognition of the clinical and radiological features of these movement disorders is necessary, as prompt control of the glycemic status will result in rapid recovery of these involuntary movements and will have good prognosis.

INTRODUCTION

There are various movement disorders namely chorea, choreoathetosis, hemiballismus-hemichorea. Chorea is a spontaneous, brief, semi-purposive, jerky, irregular muscle contractions, non repetitive or rhythmic, but flows from one muscle to the next. Ballismus is a wild, violent, flinging, random, and proximal involuntary movement. Athetosis is a slow, writhing, continuous, distal (mainly the fingers), worm-like movements. Stroke is a common cause of these movement disorders. Other causes being metabolic, trauma, drugs, toxins, infections and immunological diseases. Among the metabolic disorders, India has a high prevalence of diabetes mellitus¹¹. Movement disorders has been documented earlier with diabetes mellitus.¹⁻⁶. It can also be the presenting feature of diabetes^{2,3,4}. We in our study have analyzed the association of diabetes with involuntary movements.

MATERIALS AND METHODS

The study was carried out in patients, who were admitted with involuntary movements and diabetes in the department of medicine, Chennai Medical college Hospital and Research

Centre, Tiruchirappalli, Southern India, from June 2011 to April 2012. Of the eleven patients included, there were four male and seven females. The age of the patients ranged between 45–73 years. The onset, progression, duration of the involuntary movement were noted. The characteristics of the involuntary movement were also noted and classified accordingly as chorea, choreoathetosis, hemichorea-hemiballismus, and generalized chorea-ballismus. History of head injury, visual disturbances, altered sensorium, drowsiness, headache, fits, fever, incontinence to urine and stools, alcoholism, smoking were noted. Previous history of diabetes, similar illnesses in family members, history of heart disease, history of seizures, drug history were recorded. A proper clinical and neurological examination was done. A detailed laboratory and radiological examination including the blood sugar, HbA1C, chest radiograph, electrocardiogram, Brain CT of all the patients were done. All the patients were treated with human insulin and neuroleptics, if needed. The improvement of involuntary movements with treatment of hyperglycemia was noted.

Figure 1

Table 1: Characteristics of the patients with Movement Disorders

No	Age/ Sex	Duration of diabetes in years	Type of movement disorder	Movement disorder duration- in days	Hb A1 C %	Blood sugar at presentation	Resolution with treatment- in days	Brain hyperdensity in contralateral putamen/caudate nucleus	CT
1	64/F	8	HCHB	2	10.3	408	1	Yes	
2	45/M	unknown	HC	2	10.8	360	2	Yes	
3	55/F	6	HCHB	2	11.2	367	2	Yes	
4	73/F	3	HC	5	12.8	422	9	Yes	
5	57/M	7	HCHB	2	10.7	256	1	Yes	
6	48/F	unknown	HC	1	11.1	254	9	Yes	
7	65/M	10	HCHB	3	12.4	324	2	Yes	
8	53/F	unknown	HCA	1	10.3	267	3	No	
9	61/F	6	HCHB	2	13.2	365	12	Yes	
10	63/F	9	HCA	3	11.8	290	7	Yes	
11	62/F	15	Generalised CB	2	14.2	310	9	No	

Note: HCHB: hemichorea- hemiballismus, HC: hemichorea, HCA: hemichoreoathetosis, CB: chorea-ballismus

Figure 2

Figure 1: Type of Movement Disorders and Number of patients

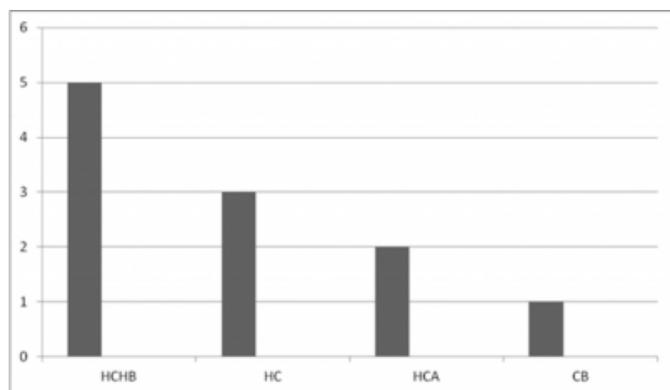


Figure 3

Figure 2

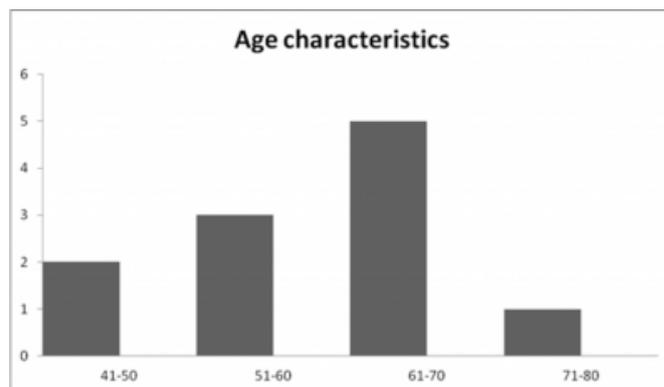


Figure 4

Figure 3

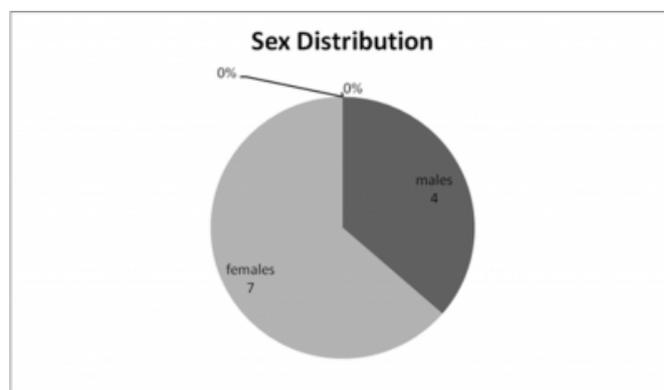
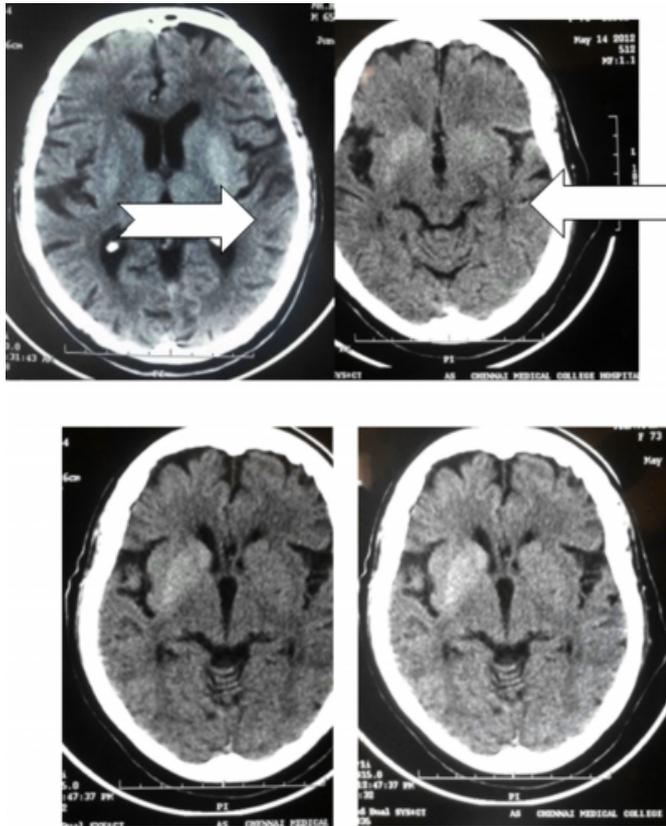


Figure 5

Figure 4: Brain CT Images showing hyperdensity in contralateral putamen/caudate nucleus



RESULTS

A total of eleven patients who presented with movement disorders were found to have diabetes. Of these, five patients presented with hemichorea-hemiballismus, three with hemichorea, one with generalized chorea-ballismus and two patients had hemichoreoathetosis (table 1) (figure 1). The duration of these movement disorders varied from one to five days (table 1) and was of sudden onset in all patients. There were four male and seven female patients (figure 3). There were two patients in age group of 41-50 years, three in 51-60 years, five in 61-70 and one in 71-80 years (figure 2). Among these eleven patients, eight patients had a past history of diabetes for a duration of three to fifteen years. These eight patients were on treatment with oral antihyperglycemic agents with irregular follow up with the treating physician. In the remaining three patients, it was the presenting symptom of diabetes without any previous history of diabetes. In all the patients the examination of the cardiovascular system and respiratory System were normal. Memory, orientation, cranial nerves, power and reflexes, sensory system were normal in all the eleven patients. The blood sugar levels on presentation were more than 250 mg/dl

in all the cases. The glycemic control as assessed by HbA1C was very poor with values more than 10 % in all the eleven patients (table 1). Serum fasting lipid profile, blood urea, serum creatinine, serum sodium, serum potassium, electrocardiogram were all analyzed. The serum low dense cholesterol was above normal in eight patients. The renal parameters and the serum electrolytes were normal in all the patients. Serum and urine ketones were negative in all the patients. Brain CT(figure 4) was done in all the patients. In nine patients, there was hyperdensity in the region of putamen/caudate contralateral to the side of clinical presentation of involuntary movements. In the remaining two patients, the Brain CT did not show any significant abnormality. All the patients were treated with regular human insulin to attain the glycemic control. In six patients, the involuntary movements resolved completely in one to five days with control of glycemic status. These five patients did not receive any other specific medications. In the remaining five, the involuntary movements decreased with treatment of diabetes. These five patients also received haloperidol for the control of the involuntary movements. The involuntary movements resolved almost completely in all eleven patients on day 1-12.

DISCUSSION

Movement disorders have been documented earlier with diabetes mellitus.¹⁻⁸ These involuntary movements can be due¹ to hereditary reasons, drugs, metabolic causes- hyperglycemia, thyroid/parathyroid disorders, infections, immunological and perinatal hypoxia. Metabolic cause is one of easily treatable and completely reversible cause of involuntary movements. Among the metabolic disorders, India has a high prevalence of diabetes mellitus¹¹. Stroke and diabetes mellitus remain as the major causes of movement disorders¹². Majority of the patients reported with movement disorders caused by non-ketotic hyperglycemia were Asians, due to possible genetic predisposition^{7,9,13}. It can also be a presenting symptom of diabetes^{2,3,4,10}. Proposed hypothesis⁵ for hyperglycemia as a cause of these movement disorders in diabetes are a) hyperglycemia induces mild ischemia in the putamen via hypoperfusion and b)it induces anaerobic metabolism which leads on to GABA depletion .It mostly occurs in females of 50- 80 years of age. Brain CT shows hyperdensity of putamen/ caudate nucleus, resolves eventually with resolution of symptoms. The cause of hyperdensity is due to protein hydration inside the cytoplasm of swollen gemistocytes. As reported in earlier studies, in our study also the involuntary movements occurred mostly

in elderly female patients, who had a long term poor control of diabetes and resolved well¹⁰ with prompt treatment of diabetes.

CONCLUSION

Movement disorders namely chorea, hemiballismus-hemichorea, and choreoathetosis can be induced by hyperglycemia. Early recognition of hyperglycemia induced movement disorders is important, as hyperglycemia is a easily treatable disorder and these carries a good prognosis. It should also be noted that movement disorders can be one of the presenting feature of diabetes mellitus. Hence screening all patients who present with involuntary movements for hyperglycemia, even in patients without a previous history of diabetes is important, especially in India, where diabetes is highly prevalent. We also stress the importance of Brain CT in confirming the diagnosis of hyperglycemia associated movement disorders.

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