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EC NEUROLOGY
Research Article

Frequency of Diabetes Mellitus in Patients Presenting with Bell's Palsy and Comparison of Response to Steroids among Diabetic Versus Non Diabetics

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Received: August 28, 2019; **Published:** September 24, 2019

Abstract

Objective: To find out the frequency of diabetes in patients bell's palsy and measure the response of steroid therapy among diabetics versus non diabetics patients of Bell 's palsy.

Materials and Methods: It was a longitudinal study conducted at the OPD of department of Liaquat university hospital Hyderabad/ Jamshoro from September 2017 to July 2019. Ninety two patients were screened for presence of diabetes with history, blood sugar (both FBS and RBS) and glycalated hemoglobin (hbA1c). The patients who have Hba1c ≤ 6.5% were labeled as non-diabetic and Hba1c > 6.5% were labelled diabetic.

Bell's palsy was assessed at presentation according to house-Brackman facial nerve grading system and classified accordingly. For the response of steroid, patients were follow-up at 3rd, 6th and finally 9th week.

Result: Out of 92 patients, 19 had diabetes mellitus and among those 19 patients 5 had good glycemic control. The highly significant decrease ($p < 0.05$) in mean grade at 3rd (2.50 ± 0.87), 6th (1.71 ± 0.76) and 9th (1.32 ± 0.573) week have been found when compared with pre Intervention mean grade (4.27 ± 0.92). Out of 19 DM patients, 5 showed satisfactory response of the steroid therapy, whereas out of 73 non-diabetic patients 63 showed satisfactory response and hence the relationship was statistically significant ($p < 0.05$).

Conclusion: The incidence of Bell's palsy in diabetics is slightly lower than in non-diabetics, but in non-diabetics and diabetics with good glycemic control the response to standard steroid dose was good.

Keywords: *Diabetes; Bell's Palsy; HbA1c; Steroid Response*

Introduction

Bell's palsy (BP) also known as idiopathic facial paralysis (IFP)s is the most common neurologic dysfunction of facial nerve and accounted up to 75% of the acute unilateral facial paralysis. Approximately 15 to 20 new cases of BP in 100,000 people are reported each year and 1 in 60 persons are at risk of having BP in their lifetime [1,2]. Up to 85% of the BP patient recover within 3 months spontaneously whereas 15 - 20% have experience residual deficit [3]. It is predominant in adults but can occur at any age and there is no racial or gender difference [1,2,4]. The major risk factors of BP are obesity, diabetes, hypertension, pregnancy and preeclampsia [1,2].

Exact prevalence and incidence of BP is not known in Pakistani population. This is probably because BP is usually treated by general physicians and neurosurgeons whereas only few are referred to specialists or come directly to neurologists [5]. A recent study was

conducted at the neurology clinics of AKUH, Karachi for a duration of two years included 16,371 patients with neurological disorders and estimated frequency of BP as 0.98% [6]. However, in Italy the annual incidence of BP is 53.3 cases for 100,000 [7] and in UK it is 20.2 cases per 100,000 [8].

The frequency of patients with DM is affected by Bell's palsy differs extensively i.e. 7 - 39%. Diabetes mellitus (DM) is a heterogeneous metabolic disorder characterized by the presence of hyperglycemia due to impairment of insulin secretion, defective insulin action or both [9]. Worldwide the prevalence of DM has increased from 4.7% to 8.5% from 1980 to 2014 in the individuals of age over 18 years [10-13]. More than 50% of the diabetic patients are unaware of their disease. However, in long-term, the uncontrolled DM is associated with microvascular complications affecting nerves and other organs. Hence by controlling the HbA1c level could enhance the quality of life and prevent the poor outcomes [14].

Association of diabetes and comparison of steroid response has been never studied in Pakistan though it is reported in international literature that diabetic patients are more prone to develop Bell's palsy than non-diabetic [15]. Thus, measuring blood glucose levels at the time of diagnosis of Bell's palsy may reveal undiagnosed diabetes. Furthermore, diabetics are more likely to have only partial recovery; recurrence and steroid induced poor glycemic control. Therefore, the aim of present study was to evaluate the frequency of diabetes in patients of Bell's palsy and measure the response of steroid therapy among diabetic versus non diabetic patients of Bell's palsy.

Materials and Methods

It was a longitudinal study conducted at the OPD of department of Liaquat university hospital Hyderabad/Jamshoro from September 2017 to July 2019. The sample size of 92 was estimated using Open epi sample size calculator by taking frequency of DM as 39% [16], margin of error as 10% and 95% confidence level. All the patients with bell's palsy who (presented within 3 days of onset of symptoms) of age 15 - 65 years of either gender were included in the study. Patients with chronic kidney disease, anemia, taking vitamin B12 or iron supplementation, psychiatric illness and pregnancy were excluded from the study.

Approval from ethical review committee was sought before the conduct of study. Informed consent was taken from all the eligible patients. The patients were screened for presence of diabetes with history, blood sugar (both FBS and RBS) and glycalated hemoglobin (hbA1c). The patients who have Hba1c ≤ 6.5% were labeled as non-diabetic and Hba1c > 6.5% were labelled diabetic. Bell's palsy was assessed at presentation according to House-Brackman (H-B) facial nerve grading system [17] and classified accordingly (Table 1). Diabetic and non-diabetic patients with BP received steroids treatment. The response of steroid treatment were assessed by follow-up of the patients at 3rd, 6th and 9th week and H-B grade was evaluated. Finally, at 9th week the H-B grade 1 was considered as satisfactory response.

Grade I - Normal	Normal facial function in all areas
Grade II - Slight Dysfunction	Gross: slight weakness noticeable on close inspection; may have very slight synkinesis At rest: normal symmetry and tone Motion: forehead - moderate to good function; eye - complete closure with minimum effort; mouth - slight asymmetry.
Grade III - Moderate Dysfunction	Gross: obvious but not disfiguring difference between two sides; noticeable but not severe synkinesis, contracture, and/or hemi-facial spasm. At rest: normal symmetry and tone Motion: forehead - slight to moderate movement; eye - complete closure with effort; mouth - slightly weak with maximum effort.
Grade IV - Moderate Severe Dysfunction	Gross: obvious weakness and/or disfiguring asymmetry At rest: normal symmetry and tone Motion: forehead - none; eye - incomplete closure; mouth - asymmetric with maximum effort.
Grade V - Severe Dysfunction	Gross: only barely perceptible motion At rest: asymmetry Motion: forehead - none; eye - incomplete closure; mouth - slight movement
Grade VI - Total Paralysis	No movement

Table 1: *House-Brackmann facial nerve grading system.*

Data was entered and analyzed using SPSS version 23. Mean and SD were reported for quantitative variables whereas frequency and percentage were reported for qualitative variables. The pre and post intervention mean H-B grades were compared using paired t test. Comparison between satisfactory response and DM was done using chi-square test. P-value ≤ 0.05 was taken as statistically significant.

Results

The mean age of the study sample was calculated as 37.59 ± 12.40 years, 33 patients were < 30 years old, 23 were in between 31 - 40 years old, 21 were in between 41 - 50 years old, and 15 were > 50 years old. Male were dominant with 81.5% presence and female were 18.5%. Out of 92 patients of BP, 12 were hypertensive and 9 were smokers (Table 2).

Quantitative variables	Mean	SD
Age (years)	37.59	12.403
Qualitative variables	**n**	**%**
Age groups		
< 30 years	33	35.9
31 - 40 years	23	25.0
41 - 50 years	21	22.8
> 51 years	15	16.3
Gender		
Male	75	81.5
Female	17	18.5
Hypertension		
Yes	12	13.0
No	80	87.0
Smoker		
Yes	9	9.8
No	83	90.2

Table 2: *Descriptive statistics of study sample (n = 92).*

Out of 92 patients, 19 had diabetes mellitus and among those 19 patients 5 had good glycemic control (Figure 1).

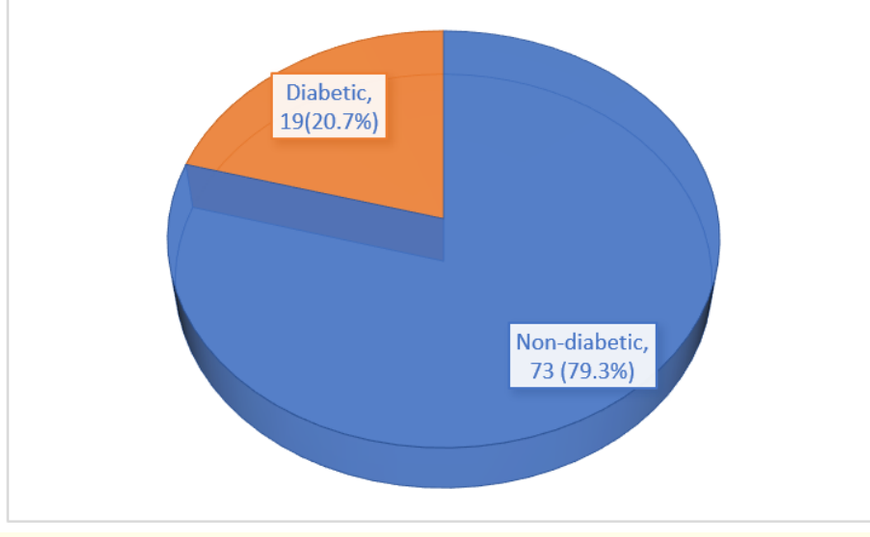

Figure 1: *Frequency distribution of diabetes.*

Pre intervention there were 7, 5, 40, 36 and 4 subjects were in Grade 2, 3, 4, 5 and 6 respectively and post intervention at week 9 it is reduced to 68 subjects in Grade 1, 19 subjects in Grade 2 and 5 subjects in grade 3. The highly significant decrease ($p < 0.05$) in mean grade at 3rd (2.50 ± 0.87), 6th (1.71 ± 0.76) and 9th (1.32 ± 0.573) week have been found when compared with pre intervention mean grade (4.27 ± 0.92) (Figure 2).

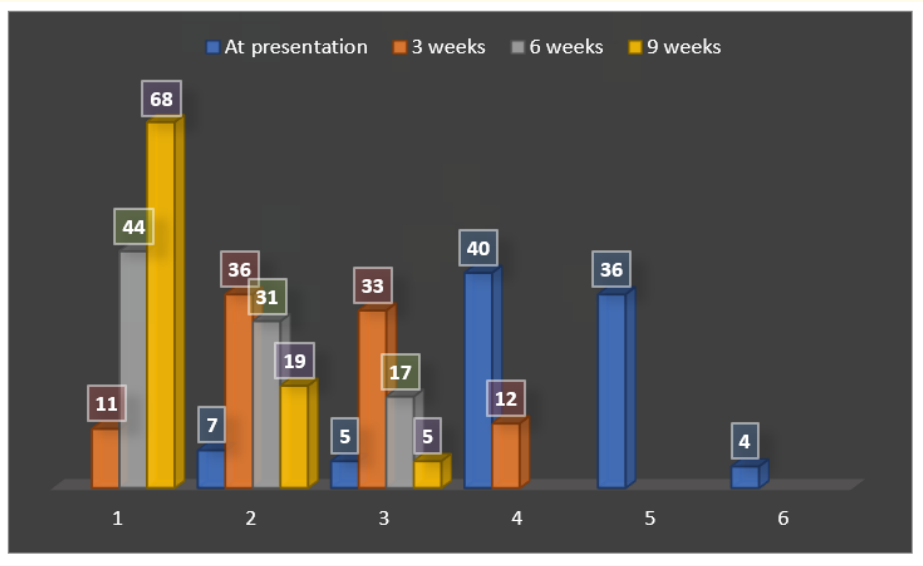

Figure 2: *H-B grading pre and post intervention.*

Out of 19 DM patients, 5 showed satisfactory response of the steroid therapy, whereas out of 73 non-diabetic patients 63 showed satisfactory response and hence the relationship was statistically significant ($p < 0.05$) (Table 3).

Diabetic	Response		Total	P-value
	Unsatisfactory	Satisfactory		
Yes	14	5	19	0.001
No	10	63	73	
Total	24	68	92	

Table 3: *Comparison of steroid therapy response between diabetic and non-diabetic patients.*

Discussion

Voluminous amount of individuals with Bell's palsy get better without seeking proper treatment. For several years it is common practice to diagnose and treat the facial palsy as viral or post viral phenomenon. No doubt that is admissible and evidence based nonetheless local studies are needed to know the associations and variability of treatment response with concomitant disease.

The present study findings revealed that out of 19 DM patients, 5 showed satisfactory response of the steroid therapy, whereas out of 73 non-diabetic patients 63 showed satisfactory response and hence the relationship was statistically significant ($p < 0.05$). On the

contrary a study investigated relation between Bell's palsy severity and abnormal glycated haemoglobin. Nevertheless, the results were found similar between diabetic and non diabetic groups post 6 months followup [18]. Eliçora SŞ., *et al*. in his study evaluated the healing time in patients with diabetes mellitus. The findings doesnot concur with the present study. The results showed that diabetes mellitus does not affect Bell's Palsy in anyway and the healing time in diabetics and non-diabetics were quite similar [19].

In another study, the results were in disagreement with the current study showing high success of treatment in diabetic patients with the management of a higher dose steroid administration [20]. In addition, a recent study conducted by Bayram A., *et al*. in the year 2010 compared effect of steroid therapy among three groups. The groups consisted of diabetic patioents with Bell's Palsy who receive corticisteroids, other group had similar population. However, they refuse to take steroid therapy and the third group had non-diabetic patients with BP undergoing steroid therapy. The study had unique results that the recovery of facial functions might be acceptable without steroid therapy providingthat the sugar and blood pressure levels are maintained [21]. Özer G., *et al*. investigated effect of insulin resistance on the facial paralysis in patients with Bell's palsy. He concluded that patients having facial nerve paralysis had higher blood sugar and limited insulin levels. Therefore, insulin resistence should be made important part of treatment planning [22,23].

The results of the present study are in agreement with the study conducted by Kanazawa A., *et al*. The results showed poor response among diabetic patients as compare to non-diabetic patients having Bell's palsy. The patients also showed poor recovery in diabetics patients [24]. However, the results showed disparity in study conducted by Özgirgin ON., *et al.* The reterospective data revealed that diabetes mellitus was not a poor predictive indicator in idiopathic facial nerve paralysis [25].

Within the limitations of this study, large sample size studies are recommended for more accurate results.

Conclusion

The incidence of Bell's palsy in diabetics is slightly lower than in non-diabetics, but in non-diabetics and diabetics with good glycemic control the response to standard steroid dose was good.

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Volume 11 Issue 10 October 2019