

Factors contributing to favorable outcome in adults with Bell's palsy: experience from a tertiary care hospital of Bangladesh

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ABSTRACT

Background: Bell's palsy (BP) is the most common cause of lower motor neuron type facial nerve palsy and is one of the most frequently encountered presentations in Neurology. Treatment with corticosteroid and antiviral drugs within 72 hours of onset of symptoms along with supportive treatment is encouraged for better outcome. Despite good prognosis, a significant portion of the patients with BP suffer from disfiguring facial appearance and other complications which remain as great concern of the patients. We aimed to evaluate the factors contributing to favorable outcome in adult with BP.

Methods: Data of patients with BP [House-Brackmann (H-B) Grading III and above], who attended and were followed up at the Department of Neurology of BIRDEM General Hospital, Dhaka, Bangladesh between January 2017 and December 2020, were reviewed from hospital records and patients' personal files. Total 56 adult patients with BP were recruited from hospital records according to eligibility criteria. During recruitment and data analysis, patients of H-B Grade III-IV were considered as lower grade and Grade V-VI were considered as higher grade. During follow up Grade I and II were considered as recovered. Comorbidities including diabetes and hypertension were addressed. Patients with BP who attended within 72 hours of onset of symptoms were prescribed steroid and antiviral drugs, whereas patients attending after 72 hours of onset of symptoms received supportive treatment only. All patients of both the groups received physical therapy for facial asymmetry and medication for eye care along with close monitoring and management of diabetes and other comorbidities. H-B Grades were assessed at onset, after 10 days, at the end of 1st and at 3rd month after facial paralysis and depending upon this Grading patients were finally divided into two groups of favorable (H-B Grade I & II) and unfavorable (H-B Grade III or more) outcome. Univariate and multivariable logistic regression analyses were performed to assess the factors for favorable prognosis.

Results: Among the total 56 patients, 45(80.4%) patients had favorable and 11 (19.6%) had unfavorable outcomes at the end of 3rd month. Multivariable logistic regression analysis revealed that younger (at or below 40 year) age group (OR= 1.33; 95% CI, 0.412-4.310, p=0.005), lower H-B Grade at presentation (Grade III – IV) (OR= 2.712; 95% CI, 1.951-3.612, p=0.044) and absence of hypertension (OR=1.14; 95% CI, 0.963-2.035, p=0.023) were significant.

Conclusion: We concluded that younger age group of patients with lower H-B grade at initial presentation and absence of hypertension all are contributing factors for favorable outcomes in adults with Bell's palsy.

Key words: Bell's palsy, diabetes mellitus, corticosteroids, House-Brackmann Grading.

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INTRODUCTION

Bell's palsy (BP) is an idiopathic acute palsy of the peripheral facial nerve supplying all muscles of the face.¹ BP is named after Sir Charles Bell (1774-1842), who described the unilateral involvement as well as the anatomy and function of the facial nerve for the first time. The annual incidence of BP is reported as 10-40/100,000 in the general population in western countries.²⁻³ Men and women are equally affected and the disease can occur at any age.⁴ The facial weakness usually occurs within a maximum of 48 hours; it can be complete or partial and is generally unilateral.⁵ The etiology and the exact pathogenic mechanism is not well known and treatment methods for complete resolution of symptoms have not yet been established. However, viral infection, vascular ischemia, autoimmune inflammatory disorders and heredity have been proposed as underlying mechanisms.⁶⁻⁸ Studies have demonstrated that the major cause of BP is the reactivation of the latent herpes simplex virus type 1 or varicella zoster virus within the geniculate ganglia.⁶ The pathogenesis by which these viruses can cause neuropathy may begin with a cytotoxic edema induced by neuronal inflammation.⁹ These hypotheses have justified the use of corticosteroid and antiviral agents, separately or together, in the treatment of BP.

Generally, the prognosis of BP is good, with 71% patients regain normal function with or without medical therapy, often within 3 weeks and within next 3 to 5 months improves further^{10,11} but up to 30% cases are left with potentially disfiguring facial weakness, involuntary movements and/or persistent lacrimation requiring further interventions.¹²⁻¹⁴ Therefore, the resolution of BP and risk of paralysis are of great concern to patients. Previous studies¹⁵⁻¹⁷ reported several factors associated with prognosis based on a clinical evaluation of accompanying symptoms, underlying medical diseases (hypertension, dyslipidemia and diabetes), age and the degree of degeneration of the facial nerve as determined using an electrophysiological test.

Though early diagnosis and treatment for patients with BP may accelerate recovery and prevent possible complications, it is very important to identify the factors associated with the favorable outcome of this commonly presented neurological diagnosis. This study aimed to evaluate the factors that contribute to a favorable prognosis to adult patients with BP.

METHODS

Study design and participants

This study is based on the data that was collected from the Department of Neurology, BIRDEM General Hospital, Dhaka, Bangladesh from January 2017 to December 2020. During this period, 56 adult patients of BP with H-B Grading III or above and who met the eligibility criteria were recruited in the study.

Patients' baseline characteristics were assessed from hospital records before recruiting in the study, including age and sex, presence or absence of comorbidities including diabetes and hypertension and the findings of the neurological examination and assessment of facial function by using H-B Grading system. Adult patients having BP with H-B Grade III and above were included in the study and during recruitment and data analysis patients of H-B Grade III-IV was consider as lower grade and Grade V-VI were considered as higher grade. Grade I, II at presentation, bilateral facial palsy, unclear timing of onset and patients who attended to the hospital more than seven days from the onset of the symptoms were excluded. All patients were prescribed an eye ointment to prevent eye damage along with supportive management including physical therapy. Patients who presented within 72 hours of onset of symptoms were given treatment with oral corticosteroid and an antiviral drug and patients who presented after 72 hours of onset of facial paralysis were only on supportive management. The corticosteroid treatment consisted of oral prednisolone in divided doses of 1 mg/kg up to 60 mg for 5 days and then tapered over next 5 days along with the antiviral agents valacyclovir (1000 mg daily for 5-7 days) or acyclovir (400 mg five times daily for 10 days). Physical therapy consisted of facial massage and facial expression practice.

Assessment of outcome and follow-up

The degree of functional improvement was assessed based on the H-B Grade at every follow-up visit (at day 10, 1 month and 3 months). At the 3-month follow-up visit, we re-evaluated the H-B Grade in all patients and defined a favorable outcome as an H-B Grade of I or II and an H-B grade III or higher as an unfavorable outcome.

Statistical analysis

Clinical data were presented as mean (SD), with the difference in rates of favorable and unfavorable outcome

and 95% confidence interval (CI). To evaluate the association between baseline variables, treatment and outcome of BP, univariate and multivariable logistic regression analyses were performed and associations were reported as odds ratio (OR) with 95% CI. A p value less than 0.05 was considered as statistically significant.

RESULTS

Total 56 patients with BP were enrolled, 45 (80.4%) patients had favorable and 11 (19.6%) had unfavorable outcomes at the end of 3rd month. There were female predominance (87.1%) in favorable outcome group. Patients of younger (<40 years) age (94.7%) and of lower H-B Grade (III-IV) (83.3%) had satisfactory clinical

outcome. Fifty (89.3%) patients had diabetes, 25 (44.7%) had hypertension, 35 (62.5%) patients were treated with corticosteroid and antiviral agents and 21 (37.50%) patients were on supportive care alone (Table I).

On univariate analysis, female gender, age younger than 40 years, lower initial H-B Grade (III-IV), absence of hypertension and treatment with oral steroid and antiviral drugs appeared as significant (Table II). On multivariable logistic regression analysis, favorable outcome was observed with female gender, younger age group, lower initial H-B Grade, absence of hypertension and treatment with steroid and antiviral drugs (Table III).

Table I Demographic, clinical and treatment variables associated with favorable and unfavorable outcomes in patients with Bell's palsy (N = 56)

Variables	All patients, No. (%) (N = 56)	Favorable outcome No. (%) (n = 45)	Unfavorable outcome, No. (%) (n = 11)	p value
Gender				
Female	31 (55.36)	27 (87.10)	4 (12.90)	0.013*
Male	25 (44.64)	18 (72.10)	7 (28.00)	
Age (years)			Mean ±SD	
<40	33.47±6.51	29.17±4.23	32.22±5.31	0.037*
>40	56.54±9.37	51.78±8.87	54.26±9.11	
Initial H-B Grade				
III–IV	48 (86.79)	40 (83.33)	8 (16.67)	0.001*
V - VI	8 (13.21)	5 (62.50)	3 (37.50)	
Hypertension				
No	31 (55.36)	22 (70.97)	9 (29.03)	<0.0001*
Yes	25 (44.64)	23 (92.00)	2 (8.00)	
Diabetes				
No	6 (10.71)	5 (83.33)	1 (16.67)	0.005*
Yes	50 (89.29)	40 (80.00)	10 (20.00)	
Treatment				
Combination of oral steroid and antiviral drug	35 (62.50)	32 (91.43)	3 (8.57)	0.041*
Only supportive care	21 (37.50)	13 (61.90)	8 (38.10)	

Table II Univariate logistic regression analysis for favorable outcome for Bell's palsy

Variable	Odds ratio (OR)	95% Confidence interval (95% CI)	p value
Female gender	0.801	0.279-2.003	0.0411*
Age ≤40 years	1.21	0.322-4.678	0.003*
Initial H-B Grade III - IV	1.93	1.037-3.764	0.004*
Absence of hypertension	1.17	0.891-2.897	0.013*
Absence of diabetes mellitus	1.66	0.721-2.375	0.066
Treatment with oral steroid and antiviral drug	0.71	0.121-1.567	0.022*

Table III Multivariable logistic regression analysis for favorable outcome for Bell's palsy

Variable	Odds ratio (OR)	95% Confidence interval (95% CI)	p value
Female gender	0.762	0.242-2.398	0.0321*
Age ≤40 years	1.333	0.412-4.310	0.005*
Initial H-B Grade III- IV	2.712	1.951-3.612	0.044*
Absence of hypertension	1.143	0.963-2.035	0.023*
Absence of diabetes mellitus	1.147	0.942-2.113	0.072
Treatment with oral steroid and antiviral drug	0.512	0.175-1.266	0.003*

DISCUSSION

Several factors were evaluated, including age, sex, initial H-B Grade, hypertension and diabetes and treatment given. Several previous studies reported on factors associated with better prognosis in patients with BP. Margarida Ferreira et al¹⁰ reported that male sex was one of the early predictors of poor prognosis of BP. But Mohamed E. Flifel¹¹ showed that age, sex, hypertension, diabetes and dyslipidemia did not correlate with the degree of recovery in BP. In our study, female sex was associated with good prognosis initially but later on in univariate and multivariate regression analysis it was not appear to be significant factor for favorable outcome.

Peitersen¹² reported that age at the time of complete or incomplete paralysis was associated with treatment outcome for BP and children younger than 14 years had better outcome than older patients. Takemoto et al¹⁸ reported little correlation between age and treatment outcome. Mantsopoulos et al¹⁹ showed that age was not a significant prognostic factor for BP. The association between age and outcome of BP may seem to be controversial; in our study age less than 40 years was associated with favorable outcome.

H-B Grading system is the most frequently used grading system to assess the degree of facial function in BP and

was used in current study. In several studies²⁰⁻²², H-B Grade I was set as the threshold for a favorable outcome, H-B Grade of II or lower is believed to indicate favorable outcomes in the context of normal function in daily life.^{20,23} In our study, the results were consistent with this study; patients with BP had favorable outcomes when the initial H-B Grade was IV or lower.

Hypertension may increase the risk of BP among patients aged older than 40 years.²⁴ It has long been reported that hemorrhages into the facial canal are responsible for facial paralysis with severe hypertension.^{25,26} Previous studies have shown that the incidence of BP is higher in patients with uncontrolled hypertension owing to poor compliance with medication. In 3 adult case studies with known hypertension, facial palsy occurred during the exacerbation of the hypertension owing to nonadherence of medication.²⁷⁻²⁹ Very recently George Psillas et al³⁰ also found that patients with BP and concomitant hypertension have a poorer prognosis compared to patients without hypertension. In the present study, patients without hypertension was associated with a good outcome after the development of facial palsy.

Diabetes has been reported to contribute to a poor outcome in patients with BP. Takemoto et al¹⁸ found that diabetes was significantly associated with unfavorable outcome. Peitersen¹² showed that vascular insufficiency and diabetic polyneuropathy were associated with poorer outcomes. George Psillas et al³⁰ also found that uncontrolled diabetes was significantly correlated with unsatisfactory facial recovery in case of BP. In the present study, absence of diabetes was significantly associated with favorable outcome but on univariate and multivariate analysis, it was not found as a significant one probably because of lower numbers of non-diabetic patients.

The American Academy of Neurology Treatment Guidelines for BP suggest that treatment with oral corticosteroids within 72 hours of symptom onset is highly likely to be effective in patients with new-onset BP with or without the use of concurrent antiviral therapy.³¹ Although there is a consensus that early use of prednisolone is effective, prescription of antiviral agents remains controversial. The treatment effect of prednisolone suggests that inflammation by neural edema of the facial nerve is part of the pathogenesis in BP.³² The use of additional antiviral treatment is based on the hypothesis that a simple herpes virus infection could cause inflammation of the facial nerve. Antiviral agents cannot destroy viruses that have already replicated; these drugs inhibit viral replication by interfering with the viral DNA polymerase.

Numerous studies^{21,33,34} have shown the efficacy of combination treatment with oral steroid and antiviral drugs. Engström et al²¹ aimed to compare the efficacy of prednisolone and valacyclovir for resolution of facial paralysis. They concluded that treatment with prednisolone alone reduced the time to resolution of symptoms, whereas valacyclovir did not, indicating that prednisolone alone is sufficient to treat patients with BP. In contrast, Hato et al³³ reported that combination antiviral therapy was more effective in treating BP, excluding zoster sine herpete, than the conventional prednisolone therapy and described the importance of an early treatment with valacyclovir and prednisolone. This result is in accordance with those of a previous study by Adour and colleagues³⁴ who showed that treatment with acyclovir-prednisone is superior to that with prednisone alone in treating patients with BP.

In the present study, as we collected data from records and we included patients treated with either combination therapy with steroid and antiviral drugs or patients received supportive care only, we only tried to find out the factors that help for favorable outcome. In our study, the proportion of patients who received the combination therapy with oral steroid and antiviral drugs showed statistically significant differences than the other group. But both the univariate and multivariate logistic analysis did not show significant improvement with the combination therapy in comparison to the supportive care group which is in line with previous studies.

Limitations of the study

This study has some limitations. First, we could not perform the electrophysiological studies which may provide important information regarding assessment of the degree of facial dysfunction and prognosis of BP. Second, we used the H-B Grading system to assess the severity of palsy but we did not evaluate synkinesis, a risk factor for poor prognosis and a major complication of BP. To overcome these limitations, further research is needed.

Conclusion

The rate of favorable outcome in patients with BP was 80.4%. Multiple clinical factors were associated with favorable prognosis in patients with BP, including younger age, lower initial H-B Grade and absence of hypertension.

Authors' contribution: DA and RSBR planned the study and were involved in drafting and manuscript writing. SHH analyzed the data. The manuscript was critically revised and guided by MSH, MRI and RH. All authors read and approved the final manuscript for submission.

Conflicts of interest: Nothing to declare.

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