

COMPARATIVE EFFECTIVENESS OF PREDNISOLONE PLUS CO-ENZYME Q10 VERSUS PREDNISOLONE ALONE IN THE TREATMENT OF BELL'S PALSY

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ABSTRACT

Objective: To determine the comparative effectiveness of prednisolone plus co-enzyme Q10 versus prednisolone alone in the treatment of Bell's palsy.

Methodology: This comparative clinical trial was carried out from March 18, 2017 to June 25, 2018. The study included 60 patients with Bell's palsy, above 18 years of age and either gender. Patients were selected by non-probability convenient sampling method. The study participants were randomized to either group I (prednisolone plus co-enzyme Q10) or group II (prednisolone alone). Effectiveness was calculated in terms of symptoms resolution and improvement in House-Brackmann (HB) grading scale in both groups. Chi square test was applied to compare the two groups.

Results: There were 28 (46.7%) males and 32 (53.3%) females. Age of the patients ranged from 19 to 72 years with mean age of 34.90 ± 14.99 years. Mean HB grade before initiation of treatment was 3.58 ± 0.86 , which improved to 2.18 ± 0.98 after treatment. In group I, mean HB grade improved to 2.23 ± 0.85 after treatment; while in group II, it improved to 2.13 ± 1.11 after treatment. Overall improvement was present in 50 (83.3%) of patients. In group I, 90% patients and in group II, 76.6% patients improved (p value 0.149).

Conclusion: Significant improvement was observed in patients with Bell's palsy in both groups. Coenzyme Q10 based treatment was slightly better in terms of effectiveness, however, the difference was statistically not significant.

Key Words: Bell's palsy, Facial palsy, Prednisolone, Co-enzyme Q10

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INTRODUCTION

Acute lower motor neuron type peripheral facial nerve palsy of unknown cause or presumed viral etiology is considered as Bell's palsy. It is responsible for about 50% of all cases of facial nerve palsy¹. Each year 20 per 100, 000 new cases are reported. It has a great impact on individual's quality of life leading to significant decrease in social and personal performance.

Bell's palsy presents with characteristic unilateral facial weakness, however, there is no predilection for involvement of either side of the face. It may be associated with complete or partial loss of eye closure on the affected side. Moreover, numbness or pain around the ear, decreased production of tears, hyperacusis and altered taste can be present in variable frequencies².

The overall prognosis of Bell's palsy is favorable as recovery may occur without treatment in approximately

60% of cases². Treatment is directed to accelerate the recovery, prevent residual facial weakness or other sequel and achieve a normal or near-normal outcome^{3,4}. However, evidence regarding choice of therapy to improve the outcome is conflicting and individualized. Inflammation and viral infection were thought to be the inciting factors which resulted in use of steroids and antivirals (alone or in combination) as the suitable pharmacological options^{5,6}. But, their success rates vary largely and whether the combination therapy of antivirals and steroids is of significant benefit remains unresolved. A number of meta-analyses have investigated the role of combination therapy with steroids plus antivirals for the treatment of Bell's palsy. Though some studies favored the superiority of combination therapy (particularly in patients with more severe facial paralysis at presentation⁷) but majority of studies questioned the additive role of antivirals⁸⁻¹².

Therefore, there is need for continued research regarding optimal choice of therapy¹³. Coenzyme Q10 (Ubiquinone) is an antioxidant and acts as a coenzyme for mitochondrial enzymes. Coenzyme Q10 deficiency may be associated with a variety of neurologic and metabolic diseases¹⁴. Coenzyme Q10, although not a primary treatment for Bell's palsy but as it is well tolerated, not related to serious adverse effects and is reasonably affordable; therefore, its oral administration may provide a significant symptomatic benefit to patients with Bell's palsy because of its antioxidant properties. It could become an attractive option in the management of Bell's palsy as add-on therapy to steroids. The objective of this study was to determine the comparative effectiveness of prednisolone plus co-enzyme Q10 versus prednisolone alone in the treatment of Bell's palsy.

METHODOLOGY

This comparative clinical trial was carried out in the Medical OPD of Lady Reading Hospital, Peshawar and private clinics. The study included 60 patients from March 18, 2017 to June 25, 2018. All patients with Bell's palsy above 18 years of age and of either gender were included in the study. Exclusion criteria were facial weakness due to stroke, Guillain Barre Syndrome, multiple sclerosis, sarcoidosis and compressive or surgical causes of facial palsy as well as those who were unwilling to give informed consent. Moreover, Bell's palsy patients with >72 hours of presentation were also excluded from the study. These were excluded on the basis of their medical records, focused history, examination and relevant investigations where appropriate.

Although no head to head trials or studies comparing prednisolone alone with prednisolone plus co-enzyme Q10 were identified. Therefore, sample size was based on the comparative study of prednisolone alone with prednisolone plus acyclovir. WHO sample size software was used. Keeping confidence level at 95%, power of study as 90% and efficacy of prednisolone alone as 65.2% while prednisolone plus acyclovir as 90%¹⁵. The calculated sample size was 46. However, to cover for contingency factor, lost to follow-up or drop outs etc. a sample of 60 was included. Patients were selected by non-probability convenient sampling method. The study participants were randomized by lottery/draw method to either group I (prednisolone plus co-enzyme Q10) or group II (prednisolone alone). Each group had 30 participants.

Sudden onset unilateral facial weakness of no identifiable cause was considered as operational diagnosis of Bell's palsy. Its severity and associated clinical features were assessed according to the House-Brackmann (HB) grading scale¹⁶. This is a scoring system having six categories on the basis of degree of facial-nerve function. Initial presentation of patients with Bell's palsy (baseline

assessment) and their outcome/recovery on follow-up visits were recorded. Effectiveness was calculated in terms of symptoms resolution and improvement in HB grading scale in both groups.

Ethical approval was obtained from the Institutional Review Board (IRB) of the hospital. The purpose of research was explained to the patients and confidentiality was assured. An informed consent written in Urdu language was taken from the patients. Patients meeting the inclusion criteria were clinically assessed. A structured questionnaire was used covering demographics as well as clinical details (age, gender, address, marital status, occupation, socioeconomic status and duration of illness). They were thoroughly asked about pertinent presenting features (facial weakness, eye closure, deviation of mouth, drooling of saliva and collection of food on the affected side). Focused neurological examination was performed and facial weakness was graded according to the HB grading scale.

Contrast-enhanced neuro-imaging (CT scan and/or MRI brain) were performed for the diagnosis and assessment of secondary causes or exclusion of other differentials. Relevant investigations including complete blood count, erythrocyte sedimentation rate (ESR), blood glucose level, serum calcium level, lipid profile and chest x-ray were done. We compared prednisolone plus Coenzyme Q10 regimen (Group I) with prednisolone alone (group II). In both groups, treatment was initiated within 72 hours of facial palsy. Oral prednisolone was given for a period of 10 days (full dose as 1mg/kg in initial 05 days and then in tapered dose over the next 5 days) to both groups. Group I received Coenzyme Q10 orally 100 mg daily for one month. All patients were reviewed after one month.

The collected data were entered into a predesigned proforma. Computer software, SPSS version 21, was used for data analysis. For numerical variables (age and HB grading scale), mean \pm SD was calculated; while for categorical variables (gender, clinical presentation and effectiveness) frequencies and percentages were calculated. Improvement was compared between the 02 groups using chi square test. Statistical significance was considered at p value 0.05. All results were presented as tables.

RESULTS

Among 60 patients with Bell's palsy, there were 28 (46.7%) males and 32 (53.3%) females. Male to female ratio was 1:1.14. In the present study, age of the patients ranged from 19 to 72 years with mean age of 34.90 ± 14.99 years. Younger age group (<40 years) was more commonly affected (66.6%). Gender and age distribution of patients with Bell's palsy are shown in Table 1.

Table 1: Gender and age distribution of patients with Bell's palsy

| Variables | | Drug Regimen | | Total |
|-------------|--------|----------------|-----------------|------------|
| | | Group I (n=30) | Group II (n=30) | |
| Gender | Male | 13 (43.3%) | 15 (50%) | 28 (46.7%) |
| | Female | 17 (56.7%) | 15 (50%) | 32 (53.3%) |
| | Total | 30 (100%) | 30(100%) | 60 (100%) |
| Age (years) | <30 | 19(63.3%) | 15(50%) | 34 (56.7%) |
| | 30-39 | 1(3.3%) | 9(30%) | 10 (16.7%) |
| | 40-49 | 2(6.7%) | 3(10%) | 05 (8.3%) |
| | 50-59 | 4(13.3%) | 3(10%) | 07 (11.7%) |
| | >60 | 4 (13.3%) | 0(0%) | 04 (6.7%) |
| | Total | 30 (100%) | 30 (100%) | 60 (100%) |

Table 2: Comparison of effectiveness in both groups of Bell's palsy patients

| Effectiveness | Drug Regimen | | P value |
|---------------|----------------|-----------------|---------|
| | Group I (n=30) | Group II (n=30) | |
| Yes | 27 (90%) | 23 (76.7%) | 0.149 |
| No | 3 (10%) | 7 (23.3%) | |
| Total | 30 (100%) | 30 (100%) | |

Mean HB grade before initiation of treatment was 3.58 ± 0.86 , which improved to 2.18 ± 0.98 after treatment. In group I, mean HB grade improved to 2.23 ± 0.85 after treatment; while in group II, it improved to 2.13 ± 1.11 after treatment. Overall Improvement was present in 50 (83.3%) of patients. In group I, 90% patients and in group II, 76.6% patients improved (p value 0.149), as shown in Table 2.

DISCUSSION

In the present study, mean age of the patients was 34.90 ± 14.99 years and younger age group (<40 years) was more commonly affected (66.6%). There were almost equal number of males and females (46.7% vs. 53.3%). Our results are in accordance with study by Rowlands et al who reported that men and women are equally affected and the median age as 40 years¹⁷.

In the present study, mean HB grade before initiation of treatment was 3.58 ± 0.86 , which improved to 2.18 ± 0.98 after treatment. Sullivan et al⁵ reported mean HB grade of 3.6, while it was 4.3 in the study by Hato et al¹⁸. The higher the grade, the prognosis is less favorable. In our patients, in group I the mean HB grade improved to 2.23 ± 0.85 after treatment; while in group II, it improved to 2.13 ± 1.11 after treatment with no statistically significant difference.

Overall improvement was present in 83.3% of our patients. In group I, 90% patients and in group II, 76.6% patients improved. It shows that coenzyme Q10 based treatment was slightly better in terms of effectiveness, however, the difference was statistically not significant (p value 0.149). The observation of facial nerve enhancement on magnetic resonance imaging in patients with Bell's palsy suggested the possible role of inflam-

mation. Consequently, steroids were recommended as treatment of Bell's palsy and have been significantly associated with improved outcomes compared with placebo⁵. Although coenzyme Q10 was recognized for a number of years for its principal role in mitochondrial bioenergetics; the later studies extensively investigated its antioxidant role¹⁴.

In an experimental animal models study by Young et al¹⁹ it was shown that coenzyme Q10 may have protective role against neuronal damage produced by toxic injury, atherosclerosis and ischemia. Similarly, Yildirim et al²⁰ carried out an experimental study on 16 rats to demonstrate the possible positive effect of coenzyme Q10 on facial nerve regeneration. It was reported that after 1 month of treatment, the coenzyme Q10 group showed more improvement than the placebo group ($p = 0.05$). Significant differences (vascular congestion, macrovacuolization and myelin thickness) were observed between the coenzyme Q10 and control groups ($p < 0.05$). It was concluded that coenzyme Q10 for the treatment of acute facial paralysis is promising based on both physiologic as well as pathologic evaluation

CONCLUSION

Significant improvement was observed in patients with Bell's palsy in both groups. Coenzyme Q10 based treatment was slightly better in terms of effectiveness, however, the difference was statistically not significant. Based on its beneficial effects, it may be an attractive option in the treatment of Bell's palsy. It is suggested that Coenzyme Q10 merits evaluation in large scale randomized controlled trials to confirm its efficacy and role as a clinically effective therapeutic modality in patients with Bell's palsy.

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CONTRIBUTORS

ZA conceived the idea, planned the study and drafted the manuscript. MARA, RM, MA, SKUR and AS helped acquisition of data, did statistical analysis and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.