Recent-Onset Bell Palsy Complicated by Diabetes

Comparison of Steroid and Lipoprostaglandin E₁ Therapy

Tomoya Koriyama, MD; Shigeru Inafuku, MD; Kiyoko Kimata, MD; Tatsuyuki Banno, MD; Hiromichi Ishigami, MD

Objective: To compare megadose steroid therapy (n=17; group S) and lipoprostaglandin E₁ (lipo-PGE₁) therapy (n=14; group L) in patients with recent-onset Bell palsy complicated by diabetes.

Design: A nonrandomized controlled trial was performed. The 2 groups were almost identical in age, sex distribution, and laterality, and there was no difference in the average palsy scores in the 2 groups either at the time of the first visit or when the palsy was at its worst.

Results: There was no statistically significant difference in the cumulative rates of improvement in the 2 groups 4 weeks, 2 months, or 6 months after the first visit, revealing no difference in the therapeutic effects of the 2 agents. During the therapy, fasting blood glucose concentrations were increased in all patients in group S, whereas they were not increased in group L. Complicated diabetes was aggravated in group S, while it was not aggravated in group L.

Conclusions: Lipo-PGE₁ therapy may have improved vascular flow in the facial nerves and accelerated recovery, resulting in a rate of improvement comparable with that obtained through megadose steroid therapy. Lipo-PGE₁ is a useful treatment method for patients with Bell palsy complicated by diabetes.


MEGADOSE steroid therapy is highly effective against Bell palsy. However, steroids may affect saccharometabolism, increasing blood glucose concentrations and leading to a diagnosis of diabetes or to diabetic complications. Lipoprostaglandin E₁ (lipo-PGE₁) improves the circulation to the facial nerves without affecting blood glucose levels and is now receiving considerable attention as a new therapeutic drug for the treatment of Bell palsy. This study was conducted to compare the effects and complications associated with these 2 forms of treatment for patients with both diabetes and Bell palsy. We report the results of a comparison between megadose steroid and lipo-PGE₁ therapies for recent-onset Bell palsy complicated by diabetes, including a literature review of previous work in this area.

RESULTS

The cumulative rate of improvement was 47% in the megadose steroid therapy group (group S) and 43% in the lipo-PGE₁ group (group L) 4 weeks after the first visit; after 2 months, these figures were 65% and 71%, respectively, and after 6 months, they were 76% and 79%, respectively. There was no statistically significant difference, indicating no difference in the therapeutic effects of megadose steroids and lipo-PGE₁ (Figure).

Of the entire series of patients, 14 (8 in group S and 6 in group L) had diabetic complications at the time of the first visit, such as palsy in the lower limbs, perception disorder, or hot flashes. Of these 14 patients, 3 patients in group S (but none in group L) complained of aggravation of their signs and symptoms during the 4 weeks after the first visit. A funduscopic examination was performed for all 31 patients within 4 days of the first visit, and simple diabetic retinopathy was observed in 10 patients (5 in each group). In group S, a second funduscopic examination 2 months later revealed mildly aggravated diabetic retinopathy in 1 patient.

Changes in fasting blood glucose concentrations were monitored during the treatment. In group S, the peak fasting blood glucose levels were observed at 2 to 11 days (5 days on average) after the start of steroid therapy. The mean peak level
SUBJECTS AND METHODS

SUBJECTS
The subjects were 31 patients with diabetes seen within 7 days of the onset of Bell palsy who visited Nagoya Memorial Hospital, Nagoya, Japan, between April 1991 and May 2000, and who were available for follow-up for a minimum of 6 months. Among these patients, 17 aged 42 to 78 (mean, 61.2) years received megadose steroid therapy (group S) and 14 aged 49 to 80 (mean, 64.5) years were given therapy with lipo-PGE1, (group L). There was no statistical difference between the groups with respect to sex distribution, affected side, period between the onset of as having diabetes and the start of treatment, mean palsy scores at the first visit, or mean maximum palsy scores (Table). All patients were either already diagnosed as having diabetes or diagnosed in our Department of Internal Medicine after findings of high blood or urinary glucose levels at their first visit. All patients had type 2 diabetes mellitus. Of the 31 patients participating in this study, 12 were undergoing previous treatment for diabetes (7 in group S and 5 in group L). The first 3 patients in this study were assigned to group S, and the remaining patients were allocated sequentially between the 2 groups.

TREATMENT METHODS AND ASSESSMENT OF CURE
The patients in group S were treated with decreasing doses of hydrocortisone sodium succinate by intravenous drip: a dose of 500 mg/d for 3 days, 300 mg/d for 2 days, and 100 mg/d for 2 days. The patients in group L were treated with intravenously infused lipo-PGE1 in a dose of 10 µg/d for 10 days. In both groups, adenosine triphosphate and B vitamins thiamine hydrochloride, pyridoxine hydrochloride, and cyanocobalamin were concomitantly drip infused intravenously. In both groups, fasting blood glucose concentrations were determined every day, and the physician controlled the blood glucose through either insulin or oral diabetic drugs and diet therapy.

The severity of the palsy and the treatment results were evaluated using the 40-point method advocated by the Japan Society of Facial Nerve Research (patients having a score of ≥9 points were also included). The patients whose palsy recovered to 36 points or more without moderate or worse residual morbid synergic movement by 6 months after the first visit were judged to have been cured. The 2 groups were compared for rates of improvement and the course of diabetic complications.

was 267 mg/dL (14.8 mmol/L) in the 5 patients with concentrations of less than 160 mg/dL (8.9 mmol/L) at the time of the first visit; 321 mg/dL (17.8 mmol/L) in the 7 patients with initial values of 160 to 200 mg/dL (8.9 to 11.1 mmol/L); and 391 mg/dL (21.7 mmol/L) in the 5 patients with initial values of 200 mg/dL or higher (≥11.1 mmol/L) (mean, 291 mg/dL [16.1 mmol/L]). In group

L, during the administration of lipo-PGE1 therapy or within 1 week of its completion, none of the patients showed fasting blood glucose concentrations higher than those at the time of the first visit.

COMMENT

The symptoms of Bell palsy are attributed to a microcirculation disorder caused by neuritis and compression in the facial neural tubes secondary to edema, and pharmacotherapy using steroids, microcirculation-improving agents, or vitamin preparations is common. Especially, megadosing with steroids has been recommended since it was first advocated by Stennert in 1982. However, administration of steroids is likely to result in the aggravation of diabetes or lead to the development or aggravation of complications in patients with diabetes.

It has been well known that steroids affect saccharometabolism by increasing blood glucose concentrations. Administration of steroids suppresses uptake of glucose by the liver and suppresses synthesis of neutral fat and protein while accelerating their decomposition. This results in increased levels of free fatty and amino acids, much of which are used for the synthesis of glucose, thereby increasing blood glucose levels. Thus, it

Comparison of cumulative and final rates of improvement.

<table>
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<tr>
<th>Characteristic</th>
<th>Steroid Group</th>
<th>Lipoprostaglandin E1 Group</th>
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<tbody>
<tr>
<td>No. of patients</td>
<td>17 (8 men, 9 women)</td>
<td>14 (7 men, 7 women)</td>
</tr>
<tr>
<td>Average age (range), y</td>
<td>61.2 (42-78)</td>
<td>64.5 (49-80)</td>
</tr>
<tr>
<td>Mean ± SD palsy score at the first visit</td>
<td>12.7 ± 4.5</td>
<td>11.6 ± 4.9</td>
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<td>Mean ± SD palsy score when palsy was at its worst</td>
<td>9.8 ± 4.6</td>
<td>9.2 ± 5.0</td>
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<tr>
<td>No. of days between onset and start of treatment</td>
<td>3.8</td>
<td>3.9</td>
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</table>
Lipo-PGE₁ is a preparation in which PGE₁ is sealed in minute fat particles. The targeting effects of its drug delivery system on focal blood vessels are now the focus of attention. It has peripheral vasodilator action, inhibits platelet aggregation, improves red blood cell deformability, and inhibits the generation of reactive oxygen species, the result being an increase in peripheral blood flow. Lipo-PGE₁ is used for the treatment of arterial occlusive disorders such as Burger-Grütz disease and diabetic peripheral circulatory disturbances and for the relief of sudden deafness. Its effects and usefulness are established.

The morbidity rate for patients with both Bell palsy and diabetes is reported to be 4.2% to 6.6%, which is higher than the rate of 1.7% to 5.4% in the general population. This effect is explained by the diabetic peripheral circulatory disorder that develops in the feeding vessels to the facial nerves, often causing the microcirculatory insufficiency and edema that are responsible for the signs and symptoms of Bell palsy.

The rate of improvement of Bell palsy complicated by diabetes is said to be poor, and diabetes and hyperglycemia are assumed to be adverse factors in the prognosis of Bell palsy. Asaki et al reported that the rate of improvement in patients with both diabetes and Bell palsy who received decreasing doses of methylprednisolone sodium at a maximum dose of 500 mg was 76%. Abiko et al reported that the rate of improvement in patients who received megadose steroid therapy was 80%. Both these results are consistent with those obtained in group S in our series. The rate of improvement in patients who did not receive megadose steroid therapy is reported to be 47%. The feeding vessels for the facial nerves outside the temporal bone arise from the external carotid arterial system, including the superficial cranial bone artery and the facial artery. In the temporal bone, blood is supplied by the internal carotid or vertebral artery in addition to the external carotid arterial system. Although no report has been available on the direct evaluation of the pharmacologic effects of lipo-PGE₁ on the feeding vessels of the facial nerves, it has been reported from a number of animal experiments that administration of PGE₁ improves vascular flow in the inner ear, where the facial nerves in the internal acoustic meatus receive blood from the labyrinthine artery. Thus, it may be supposed that administration of lipo-PGE₁ increases vascular flow to the facial nerves in the interior of the temporal bone. We assume that the rate of improvement in Bell palsy, which was identical to that in group S, was obtained because administration of lipo-PGE₁ improved vascular flow to the facial nerves, suppressing the progression of the nerve disorder and accelerating recovery of the injured site. Steroid therapy for patients with Bell palsy complicated by diabetes is said to result in significant changes in blood glucose concentrations. With these changes, diabetic complications are likely to develop or be aggravated. Group S also had perception disorders in the lower limbs or diabetic retinopathy, whereas in group L there were no such cases. The changes in blood glucose levels were smaller, and blood glucose was easier to control.

In conclusion, lipo-PGE₁ therapy has therapeutic effects comparable with those of megadose steroid therapy without development or aggravation of diabetic complications. Treatment with lipo-PGE₁ was useful for patients with Bell palsy complicated by diabetes.

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REFERENCES