Auris Nasus Larynx xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Auris Nasus Larynx

journal homepage: www.elsevier.com/locate/anl

High-dose corticosteroids improve the prognosis of Bell's palsy compared with low-dose corticosteroids: A propensity score analysis

Takashi Fujiwara *, Yasuharu Haku, Takuya Miyazaki, Atsuhiro Yoshida, Shin-ich Sato, Hisanobu Tamaki

Department of Otolaryngology Head and Neck Surgery, Kurashiki Central Hospital, Miwa 1-1-1, Kurashiki, Okayama 710-8602, Japan

ARTICLE INFO

Article history:
Received 10 August 2017
Accepted 13 September 2017
Available online xxx

Keywords:
Bell's palsy
Facial palsy
Prognosis
Steroids
Propensity score

ABSTRACT

Objective: The aim of this study was to evaluate the effectiveness of high-dose corticosteroid (120 mg prednisolone equivalent daily) in Bell's palsy compared with low-dose corticosteroid (60 mg PSL equivalent).

Methods: A single-center retrospective observational study was performed. We included adult Bell's palsy patients who were treated within 7 days after disease onset. We compared high- and low-dose corticosteroid for the non-recovery rate at 6 months after disease onset using inverse probability-weighted propensity score analysis (IPW-PS).

Results: A total of 368 Bell's palsy patients (281 in the high-dose and 87 in the low-dose group) were included. The non-recovery rate without IPW-PS was 13.8% in the low-dose and 8.2% in the high-dose group. After IPW-PS adjustment, the non-recovery rate was 13.1% in the low-dose and 7.8% in the high-dose group (difference = −5.28%, 95% confidence interval [CI] −12.7% to −2.1%, p = 0.040). High-dose corticosteroid decreased the non-recovery rate in severe Bell's palsy patients with a Yanagihara score of 0–10 (difference = −16.1%, 95% CI −38.5% to −6.2%, p = 0.012), but did not decrease in moderate Bell's palsy patients with a Yanagihara score of 12–18 (difference = −2.0%, 95% CI −11.0% to 7.0%, p = 0.591). Subgroup analysis revealed that the efficacy of high-dose corticosteroids was higher when patients were treated within 3 days after disease onset, but not when patients were treated at 4 days or later after disease onset.

Conclusions: Physicians would be better to treat severe Bell's palsy patients with high-dose corticosteroids when the patients are treated within 3 days after disease onset.

1. Introduction

Bell's palsy, defined as an acute facial nerve paralysis of unknown origin, is the most common cause of peripheral facial palsy. Epidemiologic studies have reported an annual incidence of 20–30 cases per 100,000 persons [1]. The prognosis of Bell's palsy is favorable, and approximately 70% of patients achieve complete recovery of facial movement without treatment [2]. In addition, approximately 90% of Bell's palsy patients achieve complete recovery of facial movement using a combination of corticosteroids and antiviral agent therapy [3,4].

The etiology of Bell's palsy remains unclear, but reactivation of latent herpes simplex type 1 infection in the geniculate ganglion is considered a major cause [5]. The reactivation of herpes simplex type 1 introduces edematous changes in the

* Corresponding author.
E-mail address: t.fujiwarabi@gmail.com (T. Fujiwara).

http://dx.doi.org/10.1016/j.anl.2017.09.008
0385-8146/

facial nerve [6], causing compression of the nerve in the facial canal. Corticosteroids are anti-inflammatory agents, reducing edema and inflammation of the facial nerve in the acute presentation of Bell's palsy. A recent Cochrane systematic review reported that systemic corticosteroid improves the prognosis of Bell's palsy [3]. However, the initial dosage of corticosteroid included in this systematic review varied from 50 to 1000 mg (prednisolone [PSL] equivalent) daily [3].

Several clinical practice guidelines recommend the use of steroids during the acute phase of Bell's palsy [7–9], but the optimal dosage of corticosteroids remains unclear. Therefore, various corticosteroid dosing regimens were recommended in the clinical practice guidelines [7–9]. An initial PSL dose of 50 or 60 mg daily is commonly used, and the American Academy of Otolaryngology-Head and Neck Surgery proposed two regimens: PSL at 50 mg daily for 10 days and PSL at 60 mg daily for 5 days with a 5-day taper [8]. The Japan Society of Facial Nerve Research also proposed PSL at 60 mg daily with a 10-day taper for moderate-to-severe Bell's palsy patients [7]. However, the Japan Society of Facial Nerve Research proposed treatment options of PSL at 120–200 mg daily with a 10-day taper for severe Bell's palsy patients.

PSL at 120–200 mg daily with a 10-day taper is an optional treatment for Bell's palsy in Japan, but a randomized controlled trial or well-designed comparative study is not yet available. Additionally, the adverse effects of corticosteroids increase in a dose-dependent manner and it is important to identify subgroups of patients who may benefit from high-dose corticosteroids. In this study, we evaluated the effectiveness of high-dose corticosteroid (120 mg PSL equivalent) compared with low-dose corticosteroid (60 mg PSL equivalent), and identified patients who may benefit from high-dose corticosteroids based on a propensity score analysis.

2. Methods

2.1. Study design and setting

We conducted a retrospective observational study at Kurashiki Central Hospital from October 2009 to September 2016. The institutional review board of Kurashiki Central Hospital approved this study. We included Bell's palsy patients aged 18 years or older who first visited the hospital during the study period. Patients were identified using the following International Statistical Classification of Diseases and Related Health Problems 10 (ICD-10) codes: B022, G510, G519, S045, and T812.

We included patients who were diagnosed with Bell's palsy and prescribed corticosteroid within 1 week after disease onset. Patients whose facial palsy was caused by Hunt syndrome or other causes (e.g., trauma, iatrogenic, or parotid tumors) were excluded, as were patients who were prescribed a step-up dose of corticosteroid (e.g., initially prescribed 1.0 mg/kg/day prednisolone and later prescribed 2.0 mg/kg/day prednisolone after a few days because of worsening facial palsy). Patients who visited our hospital for a second opinion and were followed by another hospital; who died due to other diseases within 6 months after facial palsy; who were on bad terms with Kurashiki Central Hospital because of violence or failure to pay medical bills; who had slight facial palsy (Grade 1–2 on House–Brackmann facial grading system, Yanagihara facial nerve grading system score of 32–40 [10,11]); who had sequelae, such as facial spasm, synkinesis, or contracture before disease onset; or who could not be followed for more than 6 months or until complete recovery were excluded. The aim of our study was to compare high-dose corticosteroid (120 mg PSL equivalent) with low-dose corticosteroid (60 mg PSL equivalent); thus, we excluded Bell's palsy patients who were treated with an initial PSL dose of 30 mg daily or less.

2.2. Treatment of Bell's palsy in our hospital

During the study period, Bell's palsy was treated using the following strategy: 30 mg (0.5 mg/kg) PSL equivalent daily for 3 days with a 6-day taper, 60 mg (1.0 mg/kg) PSL equivalent for 3 days with a 6-day taper, or 120 mg (2.0 mg/kg) PSL equivalent for 3 days with a 6-day taper. Corticosteroids were administered orally at an initial dose of 0.5 or 1.0 mg/kg, and intravenously at an initial dose of 2.0 mg/kg. In most cases, one of these three steroid regimens was used, but physicians modified the dose of steroids for individual patients. Whether the Bell's palsy patients were prescribed antiviral agents was not standardized for protocol at our hospital. The physicians advised patients to massage their faces, but did not prescribe rehabilitation by a speech-language therapist.

2.3. Outcome measures

The primary outcome was non-recovery at 6 months after onset. Recovery was defined as an improvement in the Yanagihara facial nerve grading system score to 36 or more without sequelae, according to the facial paralysis guidelines of the Japan Society of Facial Nerve Research.

Data on patient age, gender, date of Bell's palsy onset, side of palsy, symptoms of zoster sine herpete (ZSH) (auricular redness, intense pain, or taste disturbance), concurrent medical diseases (diabetes mellitus or hypertension), Yanagihara facial nerve grading system score (at first hospital visit and the worst score), and time from the onset to the start of treatment were collected. The initial dose and the use of antiviral drugs were also determined. Different corticosteroid agents were used and the dosage of corticosteroid was converted to the PSL equivalent based on anti-inflammatory potency (e.g., prednisolone:betamethasone = 4:25). The dose of PSL was divided into low and high doses. When the initial dose of PSL equivalent was less than 100 mg daily, it was defined as a low dose; initial doses of 100 mg PSL equivalent daily or more were defined as high doses. For subgroup analysis, Yanagihara facial nerve grading system score were converted to House–Brackmann facial nerve grading system, as reported previously [11].

In our hospital, Bell's palsy patients are treated in an outpatient setting. During the acute phase of Bell's palsy, patients on low-dose corticosteroids visit the hospital once a week, while those on high-dose corticosteroids visit every day.

Please cite this article in press as: Fujiwara T, et al. High-dose corticosteroids improve the prognosis of Bell's palsy compared with low-dose corticosteroids: A propensity score analysis. Auris Nasus Larynx (2017), http://dx.doi.org/10.1016/j.anl.2017.09.008