Do Steroids Improve Recovery in Vestibular Neuritis?

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BACKGROUND

Vestibular neuritis (VN) is one of the three most common causes of peripheral vestibulopathy, with a reported incidence of 3.5 per 100,000 population. VN is characterized by the acute onset of debilitating vertigo, nausea, vomiting, and gait instability. Despite a benign and self-limiting course, patients may suffer from residual symptoms of imbalance and dizziness for several months. The cause of VN is not fully understood, but it is thought to have a viral etiology.1,2

Typically, acute VN has been managed with a short course of corticosteroids. Proponents of corticosteroid therapy argue that this treatment accelerates recovery for patients.2–5 However, others argue that corticosteroids do not alter long-term prognosis and may carry risks for adverse events.4 This article focuses on whether corticosteroids are warranted for VN.

LITERATURE REVIEW

In 1990, Ariyasu et al. published the first clinical trial in a double-blind, placebo-controlled, crossover study that demonstrated benefit of short-term corticosteroid therapy in treating patients with acute VN.3 VN was diagnosed if acute rotary vertigo, nystagmus on electro-nystagmogram (ENG), and reduced caloric response of >25% were present. A total of 20 patients were randomly selected to take methylprednisolone or placebo; however, if no significant reduction in symptoms were experienced in the first 24 hours in either group, then participants were allowed to cross over to the other group. Treatment outcome was determined by subjective relief of vertigo, nausea, vomiting, gait instability, and ability to drive a vehicle. In the group of 10 patients initially receiving methylprednisolone, nine had significant symptom relief within the first 24 hours, with only one patient switching to the placebo arm. Conversely, of the 10 patients initially receiving the placebo, only three experienced symptom relief, whereas seven switched to the methylprednisolone arm. One month following treatment, ENG results demonstrated normal responses in all 16 patients taking methylprednisolone compared to only two out of the four patients in the placebo group.3

Since 1990, several studies have explored treatment for VN with combinations of corticosteroids, valacyclovir, and/or vestibular exercises. In 2004, Strupp et al. published a key randomized, double-blind, two-by-two factorial trial with patients presenting with acute VN. Diagnosis of VN was made by clinical symptoms, presence of spontaneous nystagmus, a positive head-thrust test, and reduced caloric response of >25%. Patients were assigned to treatment groups with methylprednisolone, valacyclovir, methylprednisolone plus valacyclovir or placebo.2 Mean peak slow-phase velocity during caloric irrigation was measured to determine unilateral vestibular loss in the first couple days of hospitalization and compared results in a 12-month follow-up. Of the 114 patients completing the study, peripheral vestibular deficits at baseline showed no significant differences amongst the groups; however, analysis of variance showed methylprednisolone alone being significantly effective in improving peripheral vestibular function (P < .001). Valacyclovir alone showed no benefits (P = .43), whereas methylprednisolone plus valacyclovir showed no additional benefit compared to methylprednisolone alone. It is important to note methylprednisolone caused one severe adverse event (gastric ulcer), and eight minor adverse events, whereas placebo and valacyclovir showed no adverse effects. One major limitation was that duration of symptoms was not assessed before the 12-month follow-up.2

In 2008, Shupak et al. published a randomized, placebo-controlled trial consisting of 30 patients presenting with acute VN to determine the effects of prednisone versus placebo on symptom relief and caloric lateralization on ENG over 1-, 3-, 6-, and 12-month follow-ups.4 Diagnosis of VN was made by clinical symptoms, presence of spontaneous nystagmus, and a reduced caloric response of >25%. The prednisone group showed earlier

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<th>Article</th>
<th>Study Design</th>
<th>No. of Patients</th>
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<th>Outcomes Measured</th>
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<tr>
<td>Ariyasu et al., 1990</td>
<td>RTC</td>
<td>20</td>
<td>Methylprednisolone</td>
<td>ENG, subjective symptom relief</td>
<td>Decreased vertigo within 24 hours (P = .02), ENG normal in all patients taking methylprednisolone after 1 month but not significant compared to placebo (P = .06)</td>
<td>N/A</td>
<td>N/A</td>
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<td>Strupp et al., 2004</td>
<td>RTC</td>
<td>141</td>
<td>Methylprednisolone</td>
<td>Unilateral vestibular loss with caloric irrigation</td>
<td>N/A</td>
<td>Methylprednisolone was effective in improving peripheral vestibular function compared to placebo at 12 month follow-up (P &lt; .001)</td>
<td>1/141 had a severe adverse effect (gastric ulcer), 8/141 had minor adverse effects; all in the steroid group</td>
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<td>Shupak et al., 2008</td>
<td>RTC</td>
<td>30</td>
<td>Prednisone 1 mg/kg for 5 days then tapered to 0 after 15 additional days</td>
<td>ENG, DHI, mean caloric lateralization, canal paresis, subjective symptom relief</td>
<td>Prednisone decreased ENG lateralization at 1 month (P &lt; .03) and 3 months (P &lt; .01), and showed resolution of symptoms at months 3 and 6 (P &lt; .03) compared to placebo</td>
<td>At the 12-month follow-up, there was no significant difference seen in any outcome measured between prednisone and placebo</td>
<td>N/A</td>
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<td>Solis et al., 2015</td>
<td>Retrospective</td>
<td>76</td>
<td>Methylprednisolone</td>
<td>DHI, oculomotor function, canal paresis, length of hospital stay</td>
<td>Reduced nystagmus (P = .03), canal paresis (P &lt; .001), length of hospital stay (P = .002), and lower DHI at discharge (P &lt; .001) compared to no methylprednisolone treatment</td>
<td>N/A</td>
<td>N/A</td>
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DHI = dizziness handicap inventory; ENG = electronystagmogram; N/A = not available; RTC = randomized controlled trial.
recovery of ENG lateralization at months 1 and 3, and higher rates of complete resolution of symptoms at months 3 and 6. However, no significant differences were found between the treatment and placebo groups with respect to symptoms and degree of caloric lateralization at the 12-month follow-up. This study suggests prednisone treatment may accelerate recovery in the short term but does not improve long-term functional outcomes.4

In 2011, Fishman et al. published a Cochrane meta-analysis review to assess the effect of corticosteroids on VN and its recovery in both the short term and long term.3 Four placebo-controlled (including the three aforementioned trials), randomized trials of corticosteroids for VN were identified and included in the analysis, which totaled 149 patients. All four trials compared corticosteroids to placebo, but the specific corticosteroid regimen differed between trials. The risk ratio (RR) for complete caloric recovery at 1 month after corticosteroid therapy compared to placebo was 2.81 (95% confidence interval [CI]: 1.32-6.00, P = .007). However, the RR for complete caloric recovery at 12 months between corticosteroid therapy and placebo was 1.58 (95% CI: 0.45-5.62, P = .48).

The degree of caloric recovery based on improvement in lateralization on caloric testing showed no difference at both 1 month (mean difference [MD] = 9.60%; 95% CI: -20.7-39.0, P = .53) and 12 months (MD = 6.83%; 95% CI: -27.7-41.4, P = .70). When assessing symptomatic relief at 24 hours, there was no significant difference between corticosteroids and placebo with a RR of 0.39 (95% CI: 0.04-3.57, P = .40). The authors concluded there is insufficient evidence to support the treatment of corticosteroids for VN because the trials had methodological flaws, small patient numbers, and heterogeneity between trials.1

A 2015 retrospective study by Batuecas-Caletrio et al., consisting of 76 patients diagnosed with acute VN, compared glucocorticoid treatment on admission to non-glucocorticoid treatment.5 Each patient had caloric testing and completed a dizziness handicap inventory (DHI) upon admission to the hospital and moments before discharge. Patients receiving glucocorticoids demonstrated a significantly lower canal paresis at discharge (P < .001) and a marked reduction in nystagmus intensity (P = .03) compared to the nonglucocorticoid arm. Dizziness Handicap Inventory scores were also noted to be significantly lower at discharge (P < .001) and with a shorter length of hospital stay (2.18 ± 1.5 days compared to 3.6 ± 1.7 days, P = .002) compared to the nonglucocorticoid arm. The authors did not explore long-term outcomes.5

The reviewed data present several limitations. These studies show heterogeneity with respect to how the trials were conducted in inclusion and exclusion criteria for VN, the difference in corticosteroid treatment regimens, and the clinical outcomes measured by each study (Table I). Additionally, some of these studies focus heavily on caloric irrigation and ENG to assess for vestibular recovery, with unclear correlation to symptomatic relief/improvement.

BEST PRACTICE

The management of VN with corticosteroids remains controversial. Although the risks of short-term steroids have not been well studied in the trials available, adverse events have been documented. Although four out of the five studies cited demonstrated short-term benefits, long-term benefits remain to be determined. There is insufficient evidence to warrant a general recommendation, as larger well-designed randomized clinical trials, with outcome measures that focus on symptomatology and adverse events secondary to corticosteroid use are needed.

LEVEL OF EVIDENCE

In this review, four level 1 studies (three randomized controlled trials and one systematic review) and one level 3 study were reviewed.

BIBLIOGRAPHY