The Benefit of Adding Steroids to Local Anesthetics for Chronic Non-Cancer Pain Interventions; A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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Introduction

Percutaneous injections containing steroids plus local anesthetics (LA) are commonly used for chronic non-cancer pain (CNCP) (1-3). The rationale for injecting steroids includes their anti-inflammatory and immune effects and potential lengthening of treatment effect (1-3). Clinically these are expected to translate into improved rate of success and longer duration of relief.

Objectives: To assess the chances of successful pain relief, functional improvement and adverse effects when steroids are added to LA, and further to assess whether the ‘number of injections’ and ‘steroid dose’ influence pain relief.

Materials and methods

Our protocol has been registered and published (4). Randomized Controlled Trials published in English were searched within MEDLINE, EMBASE and the Cochrane Central Registry of Controlled Trials databases, along with a review of bibliographies of relevant reviews, for trials comparing injections with ‘LA’ versus ‘LA plus steroid’ for CNCP. Trials were assessed by pairs of reviewers working independently and in duplicate for eligibility and data abstraction using Distiller (online tool for systematic review). In this report, we only include the results from studies reporting their pain outcomes as binary or categorical measure of success. We pooled outcomes across trials using random effects models and reported as relative risks (RR) with 95% confidence intervals. A priori defined analysis was conducted to assess the effect on clinical subgroups. Sensitivity analyses were conducted to assess the effect of ‘number of injections’ and ‘steroid dosing’ on treatment success using meta-regression.

IRB approval: Not applicable

Results/Case report

Results: Out of 4249 abstracts 612 full text articles were screened to select 70 studies comparing LA versus LA plus steroid. Among them 40 studies allowed for binary analysis of pain outcomes. Nearly half of the studies suffered from potential selection bias. Meta-analysis of included studies (n=3547) demonstrated increased success with LA plus steroid for pain relief. It was reported by 19 studies between 2-6 weeks: RR of 1.52 (1.12, 2.07), I² = 84.6%; and 23 studies between 2-4 months: RR of 1.14 (1.04, 1.26), I² = 71.8%; interaction test: p=0.04. Functional Improvement was only observed in studies reporting outcomes between 2-6 weeks (n= 5 studies). The included studies belonged to the following clinical subgroups based on the injected structure: epidural and intrathecal (n=22); peripheral nerve (n=5); peripheral joint (n=4); soft tissue and periarticular (n=4); facet joint or nerve (n=2); trigger point injection or intramuscular (n=2); and autonomic ganglia (n=1). Attempt to pool separately for clinical groups did not demonstrate any subgroup effect (p=0.84). We observed no differences in adverse outcomes, or successful pain relief based on the number of injections (p=0.64) or steroid doses (p=0.07). Among 24 trials using single injections no significant differences in pain outcomes were observed over time (p=0.85).

Discussion

Conclusions: Steroids added to LA increase the chances of successful pain relief for CNCP but may not increase the duration of relief. However, the ‘number of injections’ or ‘steroid dose’ does not seem to influence the success rate. Physicians should consider limiting the number of injections and steroid dose to minimize cumulative adverse effects due to steroids. Use of steroids for conditions of CNCP could be off-label.
References


Tables/images

Figure 1: Successful Pain Relief between Trials using Local Anesthetics versus Local Anesthetics and Steroid
Table 1a- Characteristics of included studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Clinical Diagnosis</th>
<th>Year</th>
<th>Study Group</th>
<th>Target Structure</th>
<th>No. of patients randomized</th>
<th>Mean Age</th>
<th>Mean VAS</th>
<th>Mean VAS</th>
<th>Mean VAS</th>
<th>Mean VAS</th>
<th>Duration of Chronic Pain in Months</th>
<th>Mean VAS</th>
<th>SD VAS</th>
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<td>Sivakumar 2016</td>
<td>Lumbosacral pain</td>
<td>2016</td>
<td>UPA</td>
<td>Epidural</td>
<td>30</td>
<td>35 (30-55)</td>
<td>9.2</td>
<td>6.5</td>
<td>4.7</td>
<td>6.8</td>
<td>12.5 (10-18)</td>
<td>3.9 (3.7-4.6)</td>
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<td>Rezig 2018</td>
<td>Lumbosacral pain</td>
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<td>UPA</td>
<td>Epidural</td>
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Table 1a- Characteristics of included studies

**Figure 2:** Effect of Single injections on the duration of pain relief and Effect of Steroid dose on pain relief
I declare that there are no conflicts of interest or support that may cause bias in my presentation.