Comparison of Two Analgesic Protocols for Post-tonsillectomy Pain Control in Outpatient Adults

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Abstract

Introduction and objectives: Tonsillectomy causes a moderate to severe postoperative pain, and its treatment is an unsolved problem.

The objective of this study was to compare the effectiveness of two analgesic protocols and their related complications.

Methods: Two groups of adult patients submitted to ambulatory tonsillectomy were studied. In Group 1, 52 patients received a combination of tramadol and NSAIDs postoperatively; in Group 2, 60 patients were treated with prednisone and NSAIDs. Two surgical techniques were used: cold dissection or dissection with electrocautery. Pain was recorded on days 4, 7 and 15, using a numerical scale from 0 to 10.

Results: Both groups showed similar pain at postoperative day 4. At day 7, pain was higher in Group 2 (P=0.049), while at day 15 both groups showed only some discomfort. Sickness and vomiting was more frequent in Group 1, and haemorrhage and hospitalisation in Group 2. Cold dissection patients showed lower levels of pain at days 4 and 7, independently of analgesic protocol, and had lower haemorrhage and emergency visit rates.

Conclusions: The efficacy of both protocols was similar in terms of control of pain, with the exception of day 7; however, the protocol with prednisone showed fewer secondary effects. Patients operated using cold dissection had less pain and fewer complications.

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PALABRAS CLAVE
Amigdalectomía; Tramadol; Prednisona; Dolor postoperatorio; Complicaciones postoperatorias; Enfermería

Comparación de 2 protocolos analgésicos en el control del dolor postamigdalectomía en pacientes adultos ambulatorios

Resumen
Introducción y objetivos: La amigdalectomía está incluida en los procedimientos quirúrgicos que producen dolor postoperatorio moderado-severo, y el control del mismo es un problema aun no resuelto.

El objetivo de este estudio es comparar la efectividad de 2 protocolos analgésicos y evaluar la frecuencia de complicaciones relacionadas con el tratamiento en ambos grupos.

Métodos: Se realizó un estudio en 2 grupos de pacientes adultos sometidos a amigdalectomía en régimen ambulatorio. El grupo 1 incluyó 52 pacientes a los cuales se trató con una combinación de tramadol y AINE, y el grupo 2 incluyó 60 pacientes tratados con prednisona y AINE. Se emplearon 2 técnicas quirúrgicas diferentes, la disección fría o la disección con electro bisturí. La valoración del dolor se realizó utilizando una escala numérica de 0 a 10 al 4.°, 7.° y 15.° día del postoperatorio.

Resultados: Al 4.° día ambos grupos presentan puntuación media de dolor similar. Los pacientes del grupo 2 presentaron más dolor al 7.° día (p = 0.049). Al 15.° día solo había pequeñas molestias en ambos grupos. Los vómitos y mareos fueron más frecuentes en el grupo 1, y los ingresos hospitalarios y las hemorragias lo fueron en el grupo 2. Los pacientes intervenidos con disección fría tuvieron menos dolor al 4.° y 7.° día, independientemente del protocolo analgésico, y presentaron menos hemorragias y visitas a urgencias.

Conclusión: La efectividad analgésica es similar para ambos protocolos, excepto al 7.° día, aunque con menos efectos secundarios en el protocolo con prednisona. Los pacientes intervenidos con disección fría presentaron menos dolor y complicaciones que los intervenidos con electro bisturí.

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Introduction

Tonsillectomy is one of the most common surgical procedures performed around the globe. However, in contrast to the majority of the procedures, tonsillectomy produces a wound that heals by secondary intention, which favours the appearance of pain and secondary haemorrhage. In spite of the advances in surgical and anaesthesia techniques, morbidity after tonsillectomy continues to represent an important clinical problem.

To improve treatment of postoperative pain there should be optimised analgesic protocols and identification of the types of surgery that can produce intense postoperative pain. Tonsillectomy is included in the surgical procedures that produce moderate-severe postoperative pain and its control is still an unsolved problem.

Postoperative pain limits recovery from surgical procedures in outpatient surgery, and inadequate analgesia can delay and prevent hospital discharge. Developing effective analgesic protocols for the treatment of postoperative pain is a priority.

The tramadol is a drug that is an agonist of the mu-opioid receptors and inhibitor of monoamine recapture and, in contrast the pure opioid agonists, it presents less risk of respiratory depression. This last characteristic has led to its use in the control of postoperative pain in outpatient surgery.

Glucocorticoids such as dexamethasone, methylprednisolone and prednisone have anti-inflammatory properties and are used as a coadjuvant to analgesic drugs such as non-steroidal anti-inflammatory drugs (NSAIDs) and opioids because they potentiate their action and reduce undesirable effects.

That is why the objective of this study was to compare the analgesic effectiveness of the combination of tramadol and NSAID against the combination of prednisone and NSAID and evaluate the frequency of complications related to the treatment in both groups.

Material and Method

Study Type and Design

This was a descriptive, observational and prospective study, carried out in a teaching hospital with adult patients from the Ear, Nose and Throat Service that had a tonsillectomy as an outpatient during the period between October 2009 and January 2012. The patients included in the study were divided into two groups depending on the period of time in which they were operated. Group 1 consisted of the patients intervened from 22 October 2009 to 16 December 2010, composed of 52 patients to whom Protocol 1 was applied; under Protocol 1, the analgesic treatment was formed of the combination of metamizole, tramadol, metoclopramide and omeprazole for 4 days, changing after that to the administration of the combination of ibuprofen, metamizole, paracetamol and omeprazole (Appendix 1). Group 2 consisted of the patients intervened from 13 January 2011 to 20 January 2012, composed of 60 patients to whom Protocol 2 was applied; under Protocol 2, the patients received a combination of ibuprofen, prednisone, paracetamol and...
omeprazole for 4 days, and then they changed to a progressive reduction of the prednisone for 5 days more (Appendix 2).

In the preoperative nursing interview carried out with the patient and family before the operation, information was given on the procedure and postoperative care, the patient was trained in handling the numeric scale (NS) of 0–10 for assessing the postoperative pain, and the analgesic protocol and the recommended diet were given and explained.

Both groups were subject to the inclusion/exclusion criteria for indication of tonsillectomy recommended by the Spanish Society of Otorhinolaryngology and Cervicofacial Pathology\(^ \text{a} \) and to the inclusion/exclusion criteria for major outpatient Surgery.\(^ \text{b} \)

The surgical techniques used were cold dissection with ligature (Technique 1) or dissection with electrocautery (Technique 2). The anaesthetic technique used was general anaesthesia, with propofol and remifentanil in the induction anaesthesia, and remifentanil for maintenance anaesthesia; likewise, the patients received the protocol for prevention of nausea and vomiting (ondansetron 4 mg) at the beginning of surgery, 80 mg of corticoids (methylprednisolone), and paracetamol 1 g and dexketoprofen 50 mg as analgesia administrated before finalising the intervention; the anaesthetic gases used were oxygen, protoxide and sevoflurane.

Data on age, gender and surgical technique were gathered by reviewing the case histories.

A telephone record sheet was designed, which was used to record the data corresponding to pain, primary and secondary haemorrhage, fever, aphthae, anxiety, diarrhoea, constipation, infection, dizziness, nausea, vomiting, admission and readmission, on the 4th, 7th and 15th days.

### Statistical Analysis

The data were transferred to an Excel\(^ \text{c} \) sheet. The programme MedCalc\(^ \text{d} \) version 11.1.0 was used for the statistical analysis. Student’s t-test was used for the comparison of quantitative variables and Chi-squared test was used for the qualitative variables. Values of \( P<0.05 \) were considered statistically significant.

### Results

#### Patient Characteristics

**Group 1**

Tonsillectomy operations were given to 52 patients between 22 October 2009 and 16 December 2010. Two patients abandoned the treatment and were excluded, leaving a sample with 50 patients: 29 males and 21 females, with ages between 15 and 52 years. The surgery was due to recurrent tonsillitis in the majority of the cases (47) and to recurrent peritonsillar phlegmon in 3 of them.

**Group 2**

Of the 63 patients who received a tonsillectomy between 13 January 2011 and 20 January 2012, 3 patients were excluded (2 for abandoning treatment and 1 for presenting allergy to the corticoids), leaving a sample of 60 patients: 26 males and 34 females, with ages between 15 and 41 years. All the patients were intervened because of recurrent tonsillitis.

Both groups were comparables insofar as age and gender, with a statistically significant difference regarding the surgical technique. In Group 1, Surgical Technique 1 was used more, while in Group 2 both techniques were used almost equally (Table 1).

### Pain Assessment (Table 2)

On the 4th day, both groups presented a mean score of approximately 3 on the NS 0–10. There was no statistically significant difference (Table 2).

On the 7th day, in Group 2 higher scores for pain were registered, with statistically significant differences (\( P<.049 \)).

However, on the 15th day, the pain was significantly more frequent in Group 1, with presence in 18% of the patients (9 cases), as against Group 2, where it was registered in 3% of the patients (2 cases). However, the level was very low in both groups; it was impossible to refer to true pain, but rather discomfort.

### Frequency of Complications (Table 3)

Although there were complications in both groups of treatment (without significant differences), hospital admissions,
primary and secondary haemorrhages, aphtha and anxiety were a bit less frequent in Group 1. As for diarrhoea, vomiting and dizziness, there were differences favourable to Group 2. The need for complementary treatment (ibuprofen 600 mg or paracetamol 1 g c/8 h) was more frequent in Group 2, with significant differences (Table 3).

Relation of Surgical Technique With Pain and Complications (Table 4)

The patients operated on using Technique 1 (cold dissection) presented less pain on the 4th and the 7th day than those operated on using Technique 2 (electrocautery), although the differences were not statistically significant. Likewise, the patients operated on using Surgical Technique 2 presented a greater incidence of haemorrhages and visits to emergency service, which were significant in the case of the visits ($P=.01$) (Table 4).

Relation of Pain With Analgesic Protocol and Surgical Technique (Table 5)

When postoperative pain is compared based on analgesic protocol and surgical technique, it can be seen that the patients who received the Analgesic Protocol 2 presented higher pain scores on the 7th day, independently of the surgical technique used. In addition, Surgical Technique 2 (with electrocautery) was slightly more painful than that

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### Table 2

<table>
<thead>
<tr>
<th>NS 0–10</th>
<th>Group 1: Tramadol</th>
<th>Group 2: Prednisone</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th day</td>
<td>2.92 $\pm$ 2.07</td>
<td>2.86 $\pm$ 2.11</td>
<td>.89</td>
</tr>
<tr>
<td>7th day</td>
<td>1.84 $\pm$ 1.88</td>
<td>2.63 $\pm$ 2.29</td>
<td>.049</td>
</tr>
<tr>
<td>15th day</td>
<td>0.44 $\pm$ 1.28</td>
<td>0.05 $\pm$ 0.28</td>
<td>.04</td>
</tr>
</tbody>
</table>

NS: numerical scale.

### Table 3

<table>
<thead>
<tr>
<th>Group</th>
<th>Tramadol: 50 cases (%)</th>
<th>Prednisone: 60 cases (%)</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>0</td>
<td>2 (3.3)</td>
<td>.55</td>
</tr>
<tr>
<td>Readmissions</td>
<td>4 (8)</td>
<td>4 (6.6)</td>
<td>.17</td>
</tr>
<tr>
<td>Primary haemorrhage</td>
<td>0</td>
<td>1 (1.6)</td>
<td>.92</td>
</tr>
<tr>
<td>Secondary haemorrhage</td>
<td>3 (6)</td>
<td>6 (10)</td>
<td>.67</td>
</tr>
<tr>
<td>Aphthae</td>
<td>1 (2)</td>
<td>2 (3.3)</td>
<td>.67</td>
</tr>
<tr>
<td>Fever</td>
<td>1 (2)</td>
<td>0</td>
<td>.9</td>
</tr>
<tr>
<td>Anxiety</td>
<td>2 (4)</td>
<td>3 (5)</td>
<td>.81</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>4 (8)</td>
<td>0</td>
<td>.08</td>
</tr>
<tr>
<td>Infection</td>
<td>2 (4)</td>
<td>1 (1.6)</td>
<td>.46</td>
</tr>
<tr>
<td>Constipation</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Vomiting</td>
<td>7 (14)</td>
<td>2 (3.3)</td>
<td>.09</td>
</tr>
<tr>
<td>Constipation</td>
<td>4 (8)</td>
<td>0</td>
<td>.08</td>
</tr>
<tr>
<td>Visit to emergency services</td>
<td>8 (16)</td>
<td>6 (10)</td>
<td>.51</td>
</tr>
<tr>
<td>Complementary treatment</td>
<td>12 (24)</td>
<td>38 (63.3)</td>
<td>.0001</td>
</tr>
</tbody>
</table>

### Table 4

<table>
<thead>
<tr>
<th>Surgical technique</th>
<th>Cold dissection: 64 cases (%)</th>
<th>Electrocautery: 46 cases (%)</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain on 4th day (mean±SD)</td>
<td>2.7±1.8</td>
<td>3.1±2.3</td>
<td>.32</td>
</tr>
<tr>
<td>Pain on 7th day (mean±SD)</td>
<td>2.1±2</td>
<td>2.5±2.2</td>
<td>.35</td>
</tr>
<tr>
<td>Pain on 15th day (mean±SD)</td>
<td>0.2±0.62</td>
<td>0.09±0.29</td>
<td>.27</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>4 (6)</td>
<td>6 (13)</td>
<td>.38</td>
</tr>
<tr>
<td>Admission</td>
<td>2 (3)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Readmission</td>
<td>4 (6)</td>
<td>3 (7)</td>
<td>.73</td>
</tr>
<tr>
<td>Visit to emergency services</td>
<td>3 (5)</td>
<td>10 (22)</td>
<td>.01</td>
</tr>
</tbody>
</table>

SD: standard deviation.
Table 5  Mean Pain Scores Based on Surgical Technique and Analgesic Protocol.

<table>
<thead>
<tr>
<th>Surgical technique</th>
<th>4th day</th>
<th>7th day</th>
<th>15th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (cold dissection)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol 1</td>
<td>2.90</td>
<td>1.79</td>
<td>0.49</td>
</tr>
<tr>
<td>Protocol 2</td>
<td>2.44</td>
<td>2.60</td>
<td>0.08</td>
</tr>
<tr>
<td>P value</td>
<td>.34</td>
<td>.33</td>
<td>.17</td>
</tr>
<tr>
<td>2 (electrocautery)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol 1</td>
<td>3.00</td>
<td>2.00</td>
<td>0.27</td>
</tr>
<tr>
<td>Protocol 2</td>
<td>3.17</td>
<td>2.66</td>
<td>0.03</td>
</tr>
<tr>
<td>P value</td>
<td>.83</td>
<td>.40</td>
<td>.01</td>
</tr>
</tbody>
</table>

with Technique 1, independently of the analgesic protocol used. This indicates that the differences in the pain scores between the two analgesic protocols are not attributable to the different distribution of the surgical techniques used in them (Table 5).

Discussion

An optimal analgesic protocol is one that provides adequate control of postoperative pain with the minimum adverse effects. This study presents two analgesic protocols, with their advantages and disadvantages.

The patients treated with the combination of tramadol and NSAID presented a higher incidence of nausea, vomiting and dizziness, side effects associated with weak opioids. In addition, although adherence to treatment was very high, analgesic treatment in the middle of the night can be a disadvantage. In contrast, in the patients treated with prednisone and NSAID, the side effects were notably reduced and analgesic treatment is easier to fulfil. However, this analgesic protocol has currently been shown to be insufficient and needs to be reviewed.

Studies performed to examine the effect of dexamethasone on the risk of postoperative bleeding after tonsillectomy indicate that the episodes of postoperative bleeding are not associated to its use.\textsuperscript{6,7} Our results show a 2nd haemorrhagic rate slightly higher in the group treated with prednisone, although the differences are not statistically significant. This might be due to the fact that this group has a greater proportion of patients that were intervened with electrocautery, a technique associated with a higher incidence of haemorrhage.

A systematic revision and meta-analysis\textsuperscript{10} carried out to assess the risk of postoperative bleeding and reoperation with the use of systemic steroids in the patients submitted to tonsillectomy revealed that, although systemic steroids do not appear to increase the events of haemorrhage following tonsillectomy, its use is associated with a high incidence of reoperations for episodes of bleeding, which may be related to the increase in the severity of the haemorrhagic events. In the series of patients that we present, Group 2 (treated with systemic steroids) did not register any cases of surgical reoperation.

In a study with 60 patients in two groups,\textsuperscript{11} the group treated with anti-inflammatories and dexamethasone for 4 days presented less pain and odynophagia than the control group. As occurred in our Group 2 (treated with a combination of NSAID and prednisone, we obtained lower pain scores on the 4th day of the postoperative period than in Group 1 (treated with tramadol and NSAID). However, an important number of patients in Group 2 presented an increase in pain on the 7th day, which might be related to the decrease in the dosage of prednisone. None of the patients required analgesic reinforcement during the night and they presented a lower incidence of nausea, vomiting and dizziness than the patients in Group 1.

According to the results of our work, other authors conclude that there is evidence that the pain can be greater in patients who receive tonsillectomies using the dissection technique of electrocautery.\textsuperscript{12}

The postoperative morbidity after tonsillectomy seems to depend on the system inflammatory response to the surgery. A less aggressive surgical technique produces a weaker inflammatory response and lower postoperative morbidity.\textsuperscript{13} In our study, the patients who were operated with cold dissection technique presented lower rates of haemorrhage, readmission and visits to emergency services.

Telephonic follow-up of patient evolution during the postoperative period of the tonsillectomy is a nursing intervention that is simple, safe and appreciated by the patients and their relatives, as it benefits the treatment of pain and warns of complications.\textsuperscript{14} Telephonic follow-up on the 4th, the 7th and 15th days responds to the need to reinforce the preoperative information received by the patient and the family. The follow-up dates were made to coincide with key stages in the evolution of the post-tonsillectomy inflammatory process. The maximum inflammation of the wound was produced between the 3rd and 5th days of the postoperative period and the separation of the fibrin clot occurred around the 7th day after the operation.\textsuperscript{15} Likewise, the appearance of haemorrhagic processes at 14 days of the postoperative period in some patients made patient follow-up during 2 weeks appropriate.

In both groups, the days of treatment (9 days) were shown to be insufficient and it was necessary to prescribe complementary analgesics. This situation was more significant in Group 2. This finding reveals the need to adjust the analgesic protocol to the patients’ needs. In a recent publication that analysed 614 patients who had received a tonsillectomy,\textsuperscript{16} the authors recommended in their conclusions strengthening preoperative information given and continuing the prescription of analgesics for at least 2 weeks in patients older than 16 years.

Conclusion

Analgesic effectiveness is similar for both analgesic protocols, although the patients who received the prednisone protocol presented fewer side effects. The patients on whom the technique of cold dissection was used presented slightly lower pain scores than those on whom electrocautery was used, independently of the analgesic protocol.

Conflict of Interests

The authors have no conflicts of interest to declare.
**Appendix 1.**

Protocol 1 (tramadol)

1st and 2nd days
- At 24:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
  - 1 sachet of paracetamol 1 g
- At 08:00 the patient will take
  - 1 capsule of omeprazole 20 mg
  - 1 tablet of ibuprofen 600 mg
- At 12:00 the patient will take
  - 1 or 2 capsule(s) of metamizole
- At 16:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
- At 20:00 the patient will take
  - 1 or 2 capsule(s) of metamizole

3rd, 4th, 5th and 6th days
- At 24:00 the patient will take
  - 1 or 2 capsule(s) of metamizole
  - 1 capsule of omeprazole 20 mg
  - 1 tablet of tramadol 50 mg
- At 04:00 the patient will take
  - 1 or 2 capsule(s) of metamizole
- At 08:00 the patient will take
  - 1 tablet of metoclopramide 20 min before taking
  - 1 tablet of tramadol 50 mg
- At 12:00 the patient will take
  - 1 or 2 capsule(s) of metamizole
  - 1 capsule of omeprazole 20 mg
- At 16:00 the patient will take
  - 1 tablet of metoclopramide 20 min before taking
  - 1 tablet of tramadol 50 mg
- At 20:00 the patient will take
  - 1 or 2 capsule(s) of metamizole

7th, 8th and 9th days
- At 24:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
  - 1 sachet of paracetamol 1 g
- At 08:00 a.m. the patient will take
  - 1 capsule of omeprazole 20 mg
  - 1 tablet of ibuprofen 600 mg
- At 12:00 the patient will take
  - 1 or 2 capsule(s) of metamizole
- At 16:00 h the patient will take
  - 1 tablet of ibuprofen 600 mg
- At 20:00 the patient will take
  - 1 or 2 capsule(s) of metamizole

Protocol 2 (prednisone)

First day
- At 22:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
- At 08:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
  - 1 capsule of omeprazole 20 mg
  - 1 tablet of prednisone 30 mg
- At 12:00 the patient will take
  - 1 sachet of paracetamol 1 g

At 16:00 the patient will take
- 1 tablet of ibuprofen 600 mg
- At 20:00 the patient will take
  - 1 sachet of paracetamol 1 g
  - 1 tablet of prednisone 30 mg
- At 24:00 the patient will take
  - 1 tablet of ibuprofen 600 mg

3 days
- At 08:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
  - 1 capsule of omeprazole 20 mg
  - 1 tablet of prednisone 30 mg
- At 12:00 the patient will take
  - 1 sachet of paracetamol 1 g
- At 16:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
- At 20:00 the patient will take
  - 1 sachet of paracetamol 1 g
- At 24:00 the patient will take
  - 1 tablet of ibuprofen 600 mg

2 days
- At 08:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
  - 1 capsule of omeprazole 20 mg
  - 1/2 tablet of prednisone 30 mg
- At 16:00 the patient will take
  - 1 tablet of ibuprofen 600 mg
- At 24:00 the patient will take
  - 1 tablet of ibuprofen 600 mg

**References**