Hydrogen Peroxide Mouth Rinse: An Analgesic Post-Tonsillectomy

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Abstract

Objective: To compare the analgesic efficacy of hydrogen peroxide (H₂O₂) mouth rinse with control for post-tonsillectomy pain management.

Design: Double-blinded, prospective, randomized, controlled clinical trial.

Patients and Methods: Thirty-seven patients from 5 to 14 years old undergoing electrocautery tonsillectomy were randomized to either the H₂O₂ mouth rinse or the water rinse (control) group. For 14 days, patients recorded pain levels twice daily using a visual analogue scale. Analgesic uses, as well as any complications, were also noted by the patients.

Results: Thirty-seven patients completed the study, 21 in the treatment group and 16 in the control group. Mean postoperative days of pain were 10.3 and 8.3, respectively, and differed significantly (p = .008). Mean postoperative days of analgesic use were 9.0 and 6.7, respectively, and differed significantly (p = .005). Only one incidence of postoperative hemorrhage occurred in the study group.

Conclusion: In our study, the H₂O₂ mouth rinse does not provide a better analgesic effect than the water rinse for post-tonsillectomy pain relief.

Key words: analgesia, hydrogen peroxide, pain, tonsillectomy

Tonsillectomy is one of the most commonly performed surgeries in pediatric otolaryngology. Although this surgery is minor and very successful, two major morbidities are often associated with it: pain and bleeding.1,2 Pain, which is the major studied morbidity in this study, lasts from a few days to 2 weeks and affects oral intake, sleeping pattern, and mood, influencing the child's and the parents' quality of life. Postoperative nausea, abdominal discomfort, and constipation are other common complaints, partly owing to postoperative pain medications (acetaminophen and...
codeine) administered postoperatively until the patient starts to eat with no pain. For this pain, local anesthetics, fibrin glue, and steroids have already been tried. Hydrogen peroxide (H$_2$O$_2$) has been tried in pilot studies in different centres but has never been studied post-tonsillectomy. At present, the two commonly employed pain medications are acetaminophen and codeine.

**Materials and Methods**

The study was a prospective, randomized, double-blinded clinical trial on the potential effect of H$_2$O$_2$ mouth rinse on post-tonsillectomy morbidity. The Montreal Children’s Hospital Ethics Committee gave both scientific and ethical approval for the study. Consent forms were signed by all parents and by children above 7 years of age. Thirty-seven healthy children who underwent tonsillectomy in our department were studied. They were blindly randomized into two groups: 21 in the H$_2$O$_2$ rinse group and 16 in the control group (water). Randomization was achieved by an unlabelled bottle system. The inclusion criteria were healthy children aged 5 to 12 years undergoing elective tonsillectomy. Concomitant procedures allowed included adenoidectomy, myringotomy, and insertion of middle ear ventilation tubes. Patients were excluded if other procedures were performed. Patients with severe medical conditions such as pulmonary, cardiac, neurogenic, renal, digestive, and hematologic diseases; severe sleep apnea; coagulopathy; allergy to acetaminophen or codeine; and craniofacial or other syndromes were also excluded.

The operations were all performed by three surgeons using the same technique. Tonsils were dissected using the cautery knife, and the adenoids were removed using the liquefaction cautery ablative technique, as described by Wright and colleagues. Twenty-one patients used an H$_2$O$_2$ mouth rinse diluted to 1%, and the remaining 16 patients used a normal tap-water rinse (control group). Solutions of H$_2$O$_2$ and water were filled in identical bottles and labelled with numbers in a similar fashion. Patients were recruited right after the surgery by a third party and were given oral instructions, along with a kit containing the following:

1. An informative booklet, containing the quantity and frequency of the study drug to be administered
2. A domiciliary questionnaire (Appendix), to record pain twice daily and analgesic use, both for 14 days
3. A visual analogue scale (Figure 1)
4. An unlabelled bottle containing solution

Informed written consent was obtained from all parents. Throughout the study, both the patients and the investigators were blinded to the type of solution. An assessment of morbidity in regard to pain when swallowing, eating, or drinking, as well as a thorough record of the number of doses of analgesics administered, was noted on the questionnaire for both arms for a period of 2 weeks. The scoring of the pain was based on the visual analogue scale.

**Results**

One hundred twenty-two children scheduled for outpatient tonsillectomy were approached for recruitment in the study protocol. Twenty-one parents refused adherence to the study. Of the 101 patients enrolled, only 37 completed the study and were included in the data analysis. The remaining constitute a group that was either incompliant, did not bring back a properly filled questionnaire, or did not show up to their scheduled appointment. There were 11 males and 10 females in the experimental group and 7 and 9 in the control group. This made a total of 21 patients in the study group and 16 in the control group. The average age was 7.5 years for the experimental group and 8 years for the control group. The patients’ daily postoperative
pain as rated by the children using the visual analogue scale is shown in Figure 1. Only children scoring 0 were considered not to have the symptom. Mean postoperative days of pain were 10.3 for the experimental group and 8.3 for the control group, which were significantly different ($p = .008$) using Mann-Whitney analysis. The patients’ daily postoperative analgesic use is shown in Figure 3. Mean postoperative days of analgesic use were 9.0 in the experimental group and 6.7 in the control group, which were also significantly different ($p = .005$) using the $t$-test. No significant side effects associated with the use of H$_2$O$_2$ mouth rinse were observed. Only one case of bleeding was reported on postoperative day 6 in the experimental group and did not need admission, a difference that did not reach statistical significance. All patients were discharged home on the same day of the surgery, and none required readmission.

**Discussion**

Despite the use of various types of analgesics, the recovery period after a tonsillectomy can be quite painful. Not only does this surgery cause distress, it also causes difficulty with eating, which delays postoperative recovery. Following surgical trauma, the tonsillar area becomes a substantial site of pain for the patients. It is also hypothesized that the morbidity (pain and bleeding) post-tonsillectomy is due to an increase in the colonization of bacteria on the tonsillar bed and its subsequent inflammation. Thus, controlling pain by decreasing colonization could improve quality of life in the first 2 weeks after surgery and decrease postoperative tonsil bleeding. The ideal postoperative pain medication should provide adequate analgesia while minimizing side effects.

For many years, H$_2$O$_2$ has been known to act as an antiseptic for skin and mucous membranes by cleaning and disinfecting the epithelium. By decreasing colonization of bacteria, H$_2$O$_2$ promotes local hygiene. H$_2$O$_2$ is also known to improve coagulation and decrease the incidence of bleeding. H$_2$O$_2$ has already been used in dentistry as an antibacterial and has not demonstrated major side effects. It is thought to decrease colonization of bacteria and infection, thereby decreasing the severity and duration of pain. It has further shown enhanced wound healing following gingival surgery. Yet there have been no studies on the clinical application of H$_2$O$_2$ mouth rinse post-tonsillectomy.

In the setting of pediatric tonsillectomy, we did not find an analgesic benefit with the use of H$_2$O$_2$ mouth rinse. We found that the pain scores were significantly lower in the control group. In this study, after a preliminary analysis of the results, we chose to stop the recruitment of further patients because we realized that the H$_2$O$_2$ was not providing our patients with analgesic benefits. The study was initially intended to be carried out in a double-blinded fashion to minimize patient or investigator bias. Although both solutions were identical in colour and were dispensed in unlabelled bottles, several parents commented that their children could recognize that the experimental solution did not taste or smell like water. This might have affected the blinding of the study. To make it perfectly blinded, we would have needed two solutions that have a similar taste and smell. Furthermore, some of the children, disliking that taste, opted for the discontinuation of the study, accounting for our low compliance rate. Moreover, the bad taste of H$_2$O$_2$ could also explain the high pain scoring in the experimental group because it may have been a source of discomfort. Furthermore, using a visual analogue scale in children does not always assess a pure pain component but sometimes an overall state of well-being. Finally, this study is not large enough to assess if our mouth rinse has an effect on postoperative bleeding or readmission rates. However, hemorrhage and readmission rates were not primary outcomes measured in this study.

**Conclusion**

We have not been able to reduce the levels of pain in our post-tonsillectomy patients by rinsing the mouth with an H$_2$O$_2$ solution. An approach that would reduce post-tonsillectomy morbidity remains an important aim in the future.

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**References**


### Appendix

**POST-OPERATIVE DAY 1** (the day following the day of the surgery)

- **IN THE MORNING** *(same time every day)*

  When the child wakes up, circle the number corresponding to one of the 6 faces referring to the *pain felt by the child at this time, before doing the rinse*:

  0  2  4  6  8  10

- **DURING THE DAY**

  **Medication taken** *(please check the corresponding box(es))*

<table>
<thead>
<tr>
<th>Medication</th>
<th>Morning</th>
<th>Noon</th>
<th>Afternoon</th>
<th>Before sleep</th>
<th>During night</th>
<th>Later during night</th>
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<tbody>
<tr>
<td>Tylenol</td>
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<tr>
<td>Codeine</td>
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<td>Others:</td>
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</table>

- **IN THE EVENING** *(same time every day)*

  Mark by using the same chart, before sleeping, a global *intensity of pain felt during the day* with each of these activities:

  **Pain when swallowing** :

  0  2  4  6  8  10

  **Pain when drinking** :

  0  2  4  6  8  10

  **Pain when eating soft foods** :

  0  2  4  6  8  10

  **Pain when eating ordinary foods** :

  0  2  4  6  8  10

- **Doctor Visit** *(please circle)* :

  Yes  No

  If yes, Why and When:

  ___________________________________________________________

  Any treatments:

  ___________________________________________________________

  Any further comments:

  ___________________________________________________________