Advantage of Application of Topical Hyaluronic Acid in Reducing Post Tonsillectomy Pain; Cross Sectional Comparative Study

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Abstract

Introduction: Tonsillectomy is common surgical operation performed in otolaryngology department. Various techniques could be used that include traditional cold dissection, powered instrumentation like electro cautery, harmonic scalpel, laser, and radiofrequency technique. As with any surgery, there are some risks can occur with tonsillectomy, these include bleeding, pain at the site of surgery and/or referred otalgia, and infection. The aim of our study was to assess the postoperative use of topical hyaluronic acid with regards to safety, pain relief.

Method: The research was considered a cross-sectional research made on 60 patients needing tonsillectomy from a period began from January to September 2018. The patients had been separated into two groups both from 30 patients, one group (group A) treated by using high molecular weight(HMW) Hyaluronic acid spray on tonsillar beds after operations , and the second group(group B) dealt as control. Early complications were registered in questionnaires and then the data were evaluated for each group.

Results: The use of high molecular weight (HMW) Hyaluronic acid spray on tonsillar beds after surgery has reduces the pain significantly after 3 – 7 days (p-value = 0.0001) while has no implication on pain reduction within12 - 24 hours p-value (0.17 and 0.3) respectively .

Conclusion: The use of (HMW) hyaluronic acid spray can be used safely in post tonsillectomy patients. Hyaluronic acid spray can minimize post tonsillectomy pain.

Keywords: High molecular weight (HMW) hyaluronic acid (H.A.), tonsillectomy, pain

Introduction

The history of surgical removal of tonsils has been returned back to three thousand years ago1, nowadays, Tonsillectomy is usual operation almost lead to open wound, so, connected with important postoperative pain that may last as long as 2 to 3 weeks period 2–5. This pain constitutes the major morbidity factor leading to poor nutrition, dysphagia, dehydration and delaying time for returning to work or school6,7. Many factors contributes to the post-tonsillectomy pain as mucosal damage, irritation of vagal , glossopharyngeal nerves ,tissue inflammation , retained debris and spasm of the muscles of the pharynx  5,8,9.

Nonsteroidal anti-inflammatory drugs, codeine and paracetamol are frequently used to minimize the pain occurs following tonsillectomy 10,11. Opioids are associated with respiratory depression ,nausea, vomiting, depression of cough reflex and sedation5,10,12. So, more safe opioid and non-opioid analgesia are used as pain killer to alleviate pain and discomfort after removal of the tonsils. Ibuprofen now suggested by American Academy of Otolaryngology— Head and Neck Surgery for pain relief following tonsillectomy 4,8,13.

Optimal pain relief after tonsillectomy is challenging .Many researchers use different options for pain reduction whether systemic or topical like bupivacaine 14,15, dexamethasone , lignocaine15 , sucralfate 16, etc. Hyaluronic acid is high molecular weights, hydrophilic glycosaminoglycan that is a naturally component of connective tissue particularly seen in the synovial fluid of joint and inside the extracellular matrix of skin 17–19. It provides a role in wound healing where
its secretion in proliferative phase stimulates fibroblast migration and proliferation 20,21. Finally it shows a suppressive effect on inflammatory mediators, tissue reactions to trauma so could be applied safely as an anti-inflammatory factor 21,22. Hyaluronic acid is a lubricant material with ability to stimulate growth so widely used to be the normally non-immunogenic, biocompatible and anti-inflammatory dressing biomaterial 22. Hyaluronic acid is reported to decrease pain, inflammation with stimulation of wound healing in pressure ulcers 19. It has a role in management of osteoarthritis and tendon problems 17, in burns, and chronic wounds 23,24 as well as in healing of vocal fold wounds 25.

Materials and Method

A cross-sectional study carried out on 60 patients requiring tonsillectomy throughout the period began from January to September 2018. The study certified by hospital ethical committee with written informed consent was taken. The indications of surgery are recurrent attacks of acute tonsillitis, chronic tonsillitis and/or large obstructive tonsil with sleep apnea syndrome. Patients with quinsy, associated adenoiditis or adenoid hypertrophy, tonsillectomy for biopsy were excluded. Our study population was arising from those attended to Al-Sadiq teaching general hospital in Hilla city, Babylon, Iraq. The tonsillectomies have been done under general anesthesia, with placement of oral endotracheal intubation. The tonsils were removed by cold steel dissection method and hemostasis by ligatures, packs or cautery. The study sample were divided into 2 groups each from 30 patients, first group (group A) dealt with postoperative use of high molecular weight (HMW) Hyaluronic acid spray (0.01% topical spray) on tonsillar beds three to five times per day starting 3 hours postoperatively and the second group (group B) considered as a control. Pain assessment was done 12 hours, 24 hours, 3 days and 7 days post tonsillectomy using visual analogue scale from 0-10 (0 represents no pain at all, 10 represents the severe incapacitating pain). Data collected were comprised of age, gender, all data collected for both groups were analyzed by SPSS 22 used Mann-Whitney test for calculate P-value and another statistical analysis.

Results

In our study we take 60 patients all undergone tonsillectomy, 30 patients were used H.A. after tonsillectomy as a (case) and 30 patients not used H.A. as a (control). 38(63.33%) of patients were female and 22(36.67%) were male as in figure 1.

![Figure 1: gender distribution](image)

Table 1 shows that the two groups (case and control) are similar regarding the age (p value > 0.05)

<table>
<thead>
<tr>
<th>Table 1: Mean age of the study sample</th>
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<tbody>
<tr>
<td>Age (years)</td>
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<td>---------------------------------------</td>
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Z: Man-Whitney test; P-value <0.05 =significant.

Gender Chi square = 0.3 with P-value= 0.79 no difference between gender in case and control sample.

Figure 2 shows gender distribution according to the type of sample.

Table 2 shows that there is no difference in pain score at 12 hours and 24 hours postoperatively after using H.A. between the case and control group (p - value 0.17 and 0.3) respectively. However the use of H.A. spray post tonsillectomy in case group results in significant decrease in pain after 3 days and 7 days postoperatively (p value <0.05).

Table 2: Pain assessment by visual analogue scale post operatively
<table>
<thead>
<tr>
<th>Time</th>
<th>Case Mean ±SD</th>
<th>Control Mean ±SD</th>
<th>Z-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 12 hours</td>
<td>7.20±1</td>
<td>7.60±1.1</td>
<td>1.37</td>
<td>0.17</td>
</tr>
<tr>
<td>After 24 hours</td>
<td>7.13±1</td>
<td>7.40±1.2</td>
<td>1.078</td>
<td>0.3</td>
</tr>
<tr>
<td>After 3 days</td>
<td>4.60±1.2</td>
<td>6.60±1.7</td>
<td>4.491</td>
<td>0.0001**</td>
</tr>
<tr>
<td>After 7 days</td>
<td>2.47±1.3</td>
<td>4.07±1.34</td>
<td>4.071</td>
<td>0.0001**</td>
</tr>
</tbody>
</table>

Z: Man-Whitney test; P- value <0.05 =significant.

**Discussion**

Pain management after tonsillectomy is a crucial factor in decreasing postoperative morbidity and complications like poor oral intake, dehydration, dysphagia and disturbed sleep 10,11,26. The pain and inflammatory reactions following oral surgery may reach its maximum level two days postoperatively and decrease through 7-10 days 27.

Hyaluronic acid is a linear polysaccharide found in many tissues especially connective tissues where its responsible for tissue elasticity, control of hydration of connective tissues and synovial fluid elastoviscosity. It is an important factor in the process of wound healing 28,29. In our study it was found that postoperative pain following tonsillectomy was dramatically reduced by using topical (HMW) Hyaluronic acid spray especially after 3 days. This may be explained by the fact that this substance has a role in repairing tissue and cover the exposed wound of tonsillectomy as well as its minimize the risk of post tonsillectomy infection. These effects were clearly described to induce healing for pressure ulcers and to increase the rate of healing in diabetic foot30. Hyaluronic acid also has anti-inflammatory effects; decreasing leukocyte infiltration and enhance the angiogenesis31. H.A. is effective in management of osteoarthritis pain17 and pain of temporomandibular joint disorder18, where it used for intra articular
Researchers from Turkey studied the effect of applying hyaluronic acid gel during tonsillectomy and found that the pain decrease significantly postoperatively with rapid wound healing. In our study the maximum benefit from applying the H.A. spray was between 3-7 days (p value <0.05) while no significant pain reduction was observed within 24 hours postoperatively. This may indicates that immediate effect of H.A. need time to act as anti-inflammatory, coating material and stimulatory for wound healing.

Several studies test the effect of hyaluronic acid following teeth extraction especially third molar teeth and found significant pain reduction with decrease in analgesics need 32,33. Little researches studied the effect of hyaluronic acid following tonsillectomy so researchers should be encouraged to explore its effects, adverse effects with a larger study samples.

Conclusion

The use of topical (HMW) Hyaluronic acid spray is recommended post tonsillectomy to decrease post tonsillectomy pain and decrease the need for analgesia. Its shows maximum effect after 3 days postoperatively which may help to speed recovery, decrease morbidity and ensure early return to school and work.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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References

14. Kountakis SE. Effectiveness of perioperative


