Comparison of Dexamethasone and Bupivacaine on Reducing the Intensity of Pain Caused by Tonsillectomy

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ABSTRACT

Pain after tonsillectomy has been considered in various studies due to its importance and various drugs and substances have been studied to prevent and reduce pain. Bupivacaine and dexamethasone are also among the drugs that have been introduced as suitable substitutes for opioids in reducing postoperative pain after tonsillectomy. Therefore, the present study was performed to evaluate the experiences of using these two drugs in reducing the pain intensity caused by tonsillectomy. This descriptive cross-sectional study was conducted in 2019 with the participation of 120 children under the age of 15 who were candidates for tonsillectomy. Two methods were used to control the patients. One group was injected with bupivacaine at the surgical site and the other group was injected with dexamethasone. Pain intensity after surgery was compared between the two groups. Comparison of pain intensity between the study group rejected the study for the first 12 hours after the study and found that the pain intensity during the first 4 hours was significantly lower in the bupivacaine group than in the dexamethasone group; On the other hand, in the hours of 5 to 12 hours, the comparison of pain intensity between the two groups showed that there was no statistically significant difference; It should be noted that in both groups, the severity of pain was controllable as pain, so there was no need to prescribe another drug to control pain. The different results obtained in various researches in this field indicate that the method of injection of drugs (topical, intravenous, intramuscular) or the dose of drugs used, as well as the average age of the study groups (in children and Adults) as well as different methods of measuring pain are among the factors that can affect the results.

Keywords: Dexamethasone, Bupivacaine, Pain, Tonsillectomy

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Introduction

Pain is an unpleasant sensation experienced by a person with tissue damage and is a defense mechanism for the body that causes the person to react (1). The severity of pain is closely related to the amount of tissue damage and the release of various substances, especially bradykinin, in the damaged tissue stimulates chemical pain receptors (2, 3). Acute pain and pain after surgery is experienced by millions of people around the world every day, which despite all the progress that has been made in its treatment, is still one of the major problems and its progress is unacceptably unstable. The face is slow (4). The severity of pain after surgery depends on various factors such as the location and extent of the incision, the method of incision, the type of analgesia prescribed before and after surgery, the duration of surgery, and so on (5). The severity of pain experienced in children after surgery is lower than in adults. Tonsillectomy is one of the most common surgeries and in most cases the first surgery that a child undergoes (6). Although this operation is technically easy, but it can have serious complications such as laryngospasm, laryngitis, bleeding and so on. The mortality rate after tonsillectomy varies from about one in 10,000 cases, and the mortality rate in the United States is reported to be 1 in 16,000 cases, often due to bleeding and respiratory problems (7). Effective pain relief after tonsillectomy is very important and necessary (8). The most common way to control pain after surgery is to use narcotics, which in addition to causing side effects such as apnea, are also abused, and another method that seems to have less side effects than narcotics is the use of It is a local sensor. Local anesthetics relieve pain in the area of the nerves that are affected (9). Pain after tonsillectomy has been considered in various studies due to its importance and various drugs and substances have been studied to prevent and reduce pain. Bupivacaine and dexamethasone are also among the drugs that have been introduced as suitable substitutes for opioids in reducing postoperative pain after tonsillectomy. Therefore, the present study was performed to evaluate the experiences of using these two drugs in reducing the pain intensity caused by tonsillectomy.

Materials and Methods

Study design: This is a cross-sectional descriptive study that was conducted during 2019 (beginning to end of the year) with the participation of 120 children under the age of 15
candidates for tonsillectomy. Participants in this study entered the study based on the inclusion / exclusion criteria and by available sampling method.

**Inclusion / Exclusion Criteria**

Inclusion criteria included age less than 12 years, parental consent to participate in the present study and a candidate for tonsillectomy surgery. Exclusion criteria included: history of respiratory diseases, history of previous bleeding, history of coagulation disorders, history of cancer and receiving chemotherapy drugs, patients with laryngospasm, patients with severe vomiting after surgery and patients with allergies to drugs used in this study.

**Methods**

For all patients, 10 mg / kg Ringer serum was administered after entering the operating room. Induction of anesthesia was with the help of midazolam, fentanyl, propofol, lidocaine and atracurium. Maintenance of anesthesia was with the help of nitrous oxide, oxygen and isoflurane gases. At the end of the surgery, the effects of atracurium were eliminated with the combination of atropine + neostagin. At the end of the surgery, 2 ml of bupivacaine was injected at the surgical site for 45 participants and 2 ml of dexamethasone was injected at the surgical site for the other group. Pain intensity was measured using a visual pain scale in the first 12 hours after surgery between the two groups and finally a comparison was made.

**Ethical considerations**

This research was conducted after approval by the ethics committee of Tabriz University of Medical Sciences. Parents of all participants completed informed consent. The objectives of the study were explained to all participants and no fees were charged to participants in the study. In case of any complication, that complication was treated immediately by the medical team.

**Statistical analysis**

The collected data were entered into SPSS software (version 21). Mean and standard deviation or frequency and percentage were used to display descriptive information. To compare the severity
of pain between the two groups at different hours, t-test was used. P value less than 0.05 was considered significant.

**Results**

The mean age of study participants in the bupivacaine group was 10.41 ± 1.61 years and in the dexamethasone group was 10.81 ± 1.13 years; Comparison of age of participants showed that there was no statistically significant difference between the two groups participating in the study (P = 0.598). The gender of the participants in both studies was equal; There were 21 girls in each group and 39 boys. Gender comparison of study participants showed no statistically significant difference between the two groups (P = 0.999). Comparison of pain intensity between d. The study group rejected the study for the first 12 hours after the study and found that the pain intensity during the first 4 hours was significantly lower in the bupivacaine group than in the dexamethasone group; On the other hand, in the hours of 5 to 12 hours, the comparison of pain intensity between the two groups showed that there was no statistically significant difference; It should be noted that in both groups, the severity of pain was controllable as pain, so there was no need to prescribe another drug to control pain. A comparison of pain intensity during the first 12 hours after surgery is presented in Table 1.

**Table 1:** Comparison of pain intensity during the first 12 hours after surgery in the study groups

<table>
<thead>
<tr>
<th>Pain Time After Surgery</th>
<th>Groups ( N = 120)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bupivacaine (N=60)</td>
<td>Dexamethasone (N=60)</td>
</tr>
<tr>
<td>first hour</td>
<td>3.01±0.49</td>
<td>3.95±0.79</td>
</tr>
<tr>
<td>second hour</td>
<td>2.95±0.85</td>
<td>3.85±0.65</td>
</tr>
<tr>
<td>third hour</td>
<td>3.33±0.45</td>
<td>4.15±0.96</td>
</tr>
<tr>
<td>fourth hour</td>
<td>3.14±0.74</td>
<td>4.21±0.88</td>
</tr>
<tr>
<td>fifth hour</td>
<td>2.90±0.91</td>
<td>2.99±0.96</td>
</tr>
<tr>
<td>sixth hour</td>
<td>2.81±0.89</td>
<td>2.90±0.67</td>
</tr>
<tr>
<td>Seventh hour</td>
<td>2.66±0.69</td>
<td>2.72±0.66</td>
</tr>
<tr>
<td>Eighth hour</td>
<td>2.54±0.63</td>
<td>2.63±0.59</td>
</tr>
<tr>
<td>Ninth hour</td>
<td>2.41±0.58</td>
<td>2.49±0.52</td>
</tr>
</tbody>
</table>
Discussion

Bupivacaine works by inhibiting the production and conduction of nerve impulses. The mechanism of action of bupivacaine is probably to increase the electrical stimulation threshold of the nerve by slowing down the nerve conduction rate and decreasing the rate of action of the action potential. The onset of action of bupivacaine is rapid and produces prolonged anesthesia. The duration of anesthesia induced by bupivacaine is significantly longer than other local anesthetics used. The drug retains its analgesic effects for some time after anesthesia, which reduces the need for analgesic compounds. Lower plasma concentrations of bupivacaine show higher protein binding. Depending on how the drug is prescribed, bupivacaine is distributed in different tissues of the body. In this study, it was observed that the effects of bupivacaine lasted up to 5 hours and were able to control the pain caused by surgery, which is consistent with the results of similar studies in this field. Pain after tonsillectomy has been considered in various studies due to its importance and various drugs and substances have been studied to prevent and reduce pain. Dexamethasone is a long-acting glucocorticoid with few mineralocorticoid effects. It is a suitable substitute for narcotics in reducing pain after tonsillectomy. Dexamethasone is one of the drugs that has been introduced as a suitable substitute for narcotics in reducing pain after tonsillectomy. At high concentrations, topical corticosteroids have a direct effect on the membrane. Corticosteroids reduce cellular and fibrin exudate and tissue infiltration. Other effects of this drug include inhibiting the formation of collagen and connective tissue, delaying the regeneration of epithelial cells, reducing the formation of new blood vessels after inflammation, and reducing the permeability of swollen capillaries. Dexamethasone ampoules are also injected intramuscularly after injection of antibiotics to relieve allergies to the compounds penicillin, penicillin 633 and the whole group of antibiotics. It can lower serum prolactin and thyrotropin-
releasing hormone. This problem is more likely to occur when an dexamethasone injection is injected into a joint.

**Conclusion**

The different results obtained in various studies in this field indicate that the method of injection of drugs (topical, intravenous, intramuscular) or the dose of drugs used, as well as the average age of the groups studied (in children and adults) as well as different methods of measuring pain are among the factors that can affect the results and it is suggested that these studies be continued with the same conditions on different study groups so that researchers can achieve more definite results and also the severity. The pain should be measured from the beginning of the ward and every 3 hours or at closer times to further determine the analgesic effect of the drugs.

**References**


**How to Cite This Article**

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