External Dacryocystorhinostomy:
Local versus General Anesthesia
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Abstract

Purpose: To evaluate efficacy, complications, and patient satisfaction using local anesthesia (LA), in comparison to with general anesthesia (GA) in external dacryocystorhinostomy (DCR).

Methods: In this prospective study, 149 patients with complete nasolacrimal duct (NLD) obstruction who were candidates for external DCR were randomized in 2 groups: GA; 73 patients, and LA; 76 patients. Intraoperative bleeding, duration of surgery, postoperative complications and patient’s satisfaction were recorded.

Results: Mean intraoperative bleeding was 50.5±42.6 cc in the LA group and 62.6±59.9 cc in the GA group (P=0.157). In terms of operation time, postoperative complications, and patient’s satisfaction no significant differences were noted between the 2 groups. Our success rate was 100% at the third month follow up visit.

Conclusion: LA in DCR is safe, comfortable, and high level of patient acceptance. Intraoperative bleeding is less with LA than GA although it was not statistically significant in our study.

Keywords: Local Anesthesia, General Anesthesia, External Dacryocystorhinostomy

Introduction

External dacryocystorhinostomy (DCR) remains the gold standard for the treatment of epiphora caused by nasolacrimal duct (NLD) obstruction which is traditionally performed under general anesthesia (GA). It retains a reputed association with significant intraoperative blood loss, especially among general ophthalmologists.

In recent years, there has been a progressive move by lacrimal surgeons toward DCR performed under local anesthesia (LA) and intravenous sedation as an outpatient procedure.¹⁴ Although minimizing blood loss is helpful in DCR under GA, the value increases with transition to LA. The decision to admit patients overnight can then be based on factors such as distance from hospital to home, the convenience of postoperative review and the risk of postoperative hemorrhage.

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Received: November 23, 2008
Accepted: July 27, 2009

Authors declare any financial support or relationships that may pose conflict of interest.

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This study compares the results, complications, and patient’s satisfaction of LA and GA intra and postoperatively in patients undergoing external DCR.

Methods

Patients
In a prospective study between December 2005 to December 2007, 149 patients who underwent external DCR in Farabi Eye Hospital, Tehran, Iran, included in the study. Patients were randomly assigned in one of the two groups, LA or GA. All patients underwent external DCR under GA or LA with intravenous sedation by one surgeon and one anesthetist. Exclusion criteria were previous lacrimal surgery, previous mid-face trauma, unsuitability for LA or GA, and the use of anticoagulant.

This study performed following the tenets of Declaration of Helsinki, and after approval by the Institutional Review Board of Tehran University Eye Research Center. Before randomization, the type of anesthesia, the characteristics, and benefits of each operation were explained for the patients. If they were agreed with the study course, and after taking informed consent, the patients were randomly assigned to each of the study groups. Preoperative work-up included obtaining hematological work-up (hemoglobin, hematocrite) and coagulating status (prothrombine time and partial thromboplastin time). Intraoperatively blood loss and duration of surgery, and postoperatively nausea, vomiting and pain were checked. The pain level on the first day after surgery was assessed by using a “visual pain scale” (VPS) with values ranging from 0 to 3 (0=no pain; 1=mild, 2=moderate, and 3=severe pain). Each patient was asked to summarize the pain experienced after surgery. Patient’s satisfaction was evaluated with values ranging from zero to 100.

Surgical procedure
In the LA group all patients received intravenous sedation with 2 mg midazolam and 3 cc sufentanly (0.005 mg/cc) for sedation. Topical anesthetic drop (tetracaine) was instilled in both conjunctival sacs of each patient. The local anesthetic solution consisted of 2% lidocaine without epinephrine. Injections included 2 cc lidocaine in the infratrochlear region, 2 cc in the infraorbital region, 2 cc in 5 mm superior to the medial canthus at the depth of 15-20 mm, and 2 cc subcutaneously on the flat side of the nose beneath the incision site. We did not use cottonoid pledgets placed in the middle meatus. In the GA group, atropine 0.5 mg, midazolam 1-2 mg, sufentanly 2 cc, and atracorium 0.5-1 mg/kg were used for anesthesia induction and 100-140 microgram per kilogram per minute propofol was infused with pump. In some patients, muscle relaxant and small amount of narcotic were also used, according to physician’s considerations. In some patients with prolonged procedure time, infusions of some anesthetic around the incision site or nasal mucosa were used. We did not use any solution of epinephrine subdermally at incision site for hemostasis or any nasal tamponade in the middle meatus. We measured our serum on the operating table at the beginning of the operation through the end, and subtracted it from the amount of blood in the suction container at the end of the operation. So, intraoperative blood loss was determined.

Patients in both groups underwent standard external DCR. After a straight 12-15 mm incision through the skin, blunt dissection between skin and orbicularis muscle was performed. The periosteum was incised and elevated. Bony rhinostomy was made in front of lacrimal sac. In a conscious patient, it is essential to control all bleeding before opening the mucosa, since any oozing thereafter can drain to the throat. After opening the lacrimal sac, in patients who had canalicular obstruction, silicone tube were passed through the canaliculi, and finally the mucosa was incised and nasal flaps created in the usual manner. Anastomosis was also performed as the final step.

At the end of surgery, postoperative nausea, vomiting and pain were checked. All patients were asked about their satisfaction at the end of surgery.

For statistical analysis, independent sample t-test was performed using SPSS version 14.

Results
In this study, we performed 149 external DCR, 76 DCRs with LA and 73 with GA (Table 1).

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Table 1. Characteristics of groups by treatment

<table>
<thead>
<tr>
<th></th>
<th>Local (Group A, n=76)</th>
<th>General (Group B, n=73)</th>
<th>P-value (A vs. B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60.07±14.64*</td>
<td>43.7±13.7*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Blood pressure (mmHg)</td>
<td>124.5±11.8</td>
<td>117.5±24.7</td>
<td>0.028</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>65.14±11.3</td>
<td>63.58±11.4</td>
<td>0.403</td>
</tr>
<tr>
<td>Hemoglobin (mg/dl)</td>
<td>12.97±1.3</td>
<td>12.96±1.06</td>
<td>0.96</td>
</tr>
<tr>
<td>Hematocrite</td>
<td>39.18±3.76</td>
<td>39.52±3.26</td>
<td>0.561</td>
</tr>
<tr>
<td>Prothrombine time</td>
<td>12.17±1.07</td>
<td>12.22±1.25</td>
<td>0.785</td>
</tr>
<tr>
<td>Partial thromboplastin time</td>
<td>37.96±3.67</td>
<td>36.92±4.15</td>
<td>0.109</td>
</tr>
<tr>
<td>Intraoperative bleeding (cc)</td>
<td>50.5±42.6</td>
<td>62.6±59.9</td>
<td>0.157</td>
</tr>
<tr>
<td>Operation time (min)</td>
<td>39.86±11.97</td>
<td>38.42±14.01</td>
<td>0.499</td>
</tr>
<tr>
<td>Nausea</td>
<td>0</td>
<td>1</td>
<td>0.306</td>
</tr>
<tr>
<td>Pain</td>
<td>2</td>
<td>3</td>
<td>0.591</td>
</tr>
<tr>
<td>Patient satisfaction</td>
<td>75</td>
<td>68</td>
<td>0.112</td>
</tr>
</tbody>
</table>

*: Values are mean±SD.

There were 54 female and 22 male in the LA group and 54 female and 19 male in the GA group. Mean age in the LA group was 60.07±14.64 years and in the GA group was 43.7±13.7 years (P<0.001). Mean blood pressure was 124.5±11.8 mmHg in the LA group and 117.5±24.7 mmHg in the GA group (P=0.028). Preoperative mean hemoglobin, hematocrite, prothrombine time, and partial thromboplastin time are shown in table 1.

The mean blood loss was 50.5±42.6 cc in the LA group and 62.6±59.9 cc in the GA group (P=0.157). The mean operation time was 39.86±11.97 minutes in the LA group and 38.42±14.01 minutes in the GA group (P=0.499).

The mean blood loss in operations with budkins intubation was 61.9 cc and without it, it was 53.4 cc (P=0.42). Only one of our patients in the GA group had mild postoperative nausea and vomiting. Two patients had mild pain and one had moderate pain in the GA group.

All of them were completely satisfied with their procedure except one patient in the LA group that reported medium degree of satisfaction, five cases in the GA group were so.

Discussion

Many studies have shown the usefulness of LA in the elderly patients, who frequently have coexisting cardiovascular disease. Kratky et al reported 25 consecutive DCRs under LA in the elderly patients, that none had to convert to GA, and none suffered any adverse effects. McNab and Simmiewestablished the effectiveness, complications, and patients acceptance of LA with intravenous sedation for external DCR.

In the study by Ciftci et al length of hospital stay was significantly lower in LA group compared to GA (2.29±0.46 days in the GA group, and 1.23±0.42 days in the LA group (P<0.01)). DCR with LA has both economic and health advantages. Most of our patients, who are candidates for DCR, are old persons with urgent need for cataract surgery, in order to prevent endophthalmitis. Many of them have comorbidities such as hypertension and cardiovascular disease, so we did not use epinephrine in the procedure. We performed surgery under LA with intravenous sedation. This study found that DCR could be successfully accomplished with LA with sedation. This is an method appropriate for many patients who might benefit from sedation in case of anxiety or pain, and anesthesia monitoring of certain medical conditions.

There have been excellent previous descriptions of haemostatic techniques for external DCR. Blood loss has been published to be between 5 and 25 cc,
measurements of blood loss have varied from means of 6.3 to 250 cc.\textsuperscript{8,9} Ciftci et al. revealed that intraoperative blood loss was lower in LA group (range: 8-20 ml, mean: 16.93±3.23 ml) compared to GA group (range: 5-14 ml, mean: 8.98±2.79 ml) (P<0.01).\textsuperscript{2} Caeser and McNab reported the mean blood loss of 4.5 ml (range: 1 to 14 ml).\textsuperscript{3} In our study, we had 15 cc less blood loss in the LA group (P=0.157). Duration of operation was nearly equal in both groups. Maheshwari\textsuperscript{1} reported the duration of operation to be 15.50 minutes in LA (range 14-18 minutes), and Caeser and McNab\textsuperscript{3} reported it to be about 36 minutes (range: 25 to 65 minutes).

Postoperative nausea and vomiting is the most common complication after surgery under GA, which has a multifactorial nature. We had only one case with this problem. Maheshwari reported no case of nausea or vomiting after local DCR.\textsuperscript{1} Ciftci et al reported higher rate of postoperative nausea and vomiting after GA compared to LA.\textsuperscript{2}

**Conclusion**

Our study had some limitations; difficulty in randomization of patients, selection bias due to exclusion of some patients that were not suitable for LA or GA, the older cases that preferred LA and concomitant systemic disorders that can affect the results. Therefore, this paper could be considered as a pilot study. Finally, with proper patient education, adequate anesthesia and a meticulous surgical technique, complications related to GA can be removed by LA. LA also could be more economic because of lower need for hospitalization.

**References**