

Comparison of Inferotemporal Approach and the Medial Canthus Approach with Short Needle Length in Regional Ophthalmic Anesthesia

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Abstract: Background: The usage of short needle in ophthalmic anesthesia is getting more popular with the inferotemporal approach being the most common site tested by the anesthetists. In this study, we compared the efficacy of using short needle (12 mm) in peribulbar anesthesia in two different approaches; inferotemporal approach and the medial canthus approach. **Methods:** 110 patients undergoing elective cataract surgery under local anesthesia were enrolled in this study. They received single injection peribulbar anesthesia with a 12 mm needle. The needle was inserted either into the inferotemporal area or in the medial canthus. Ocular akinesia was assessed 10 minutes after the block using the simple akinesia score. A score of 3 or less was accepted to provide adequate akinesia for the surgical procedure to be performed. If the block was inadequate for surgery after 10 minutes, supplementary anesthesia was provided using the same needle. **Results:** There was high statistically significant difference with respect to the volume injected, being higher in group 1 compared to group 2 (7.91±0.92 and 7.350.±97 respectively). No significant differences were noted between groups with respect to supplementation, akinesia and complications. **Conclusion:** peribulbar blockade performed either in the inferotemporal area or in the medial canthus using a short 12 mm needle is comparable.

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1. Introduction

Regional anesthesia is commonly performed for ophthalmic procedures. A variety of local anesthetic techniques have been developed and refined⁽¹⁾. Peribulbar anesthesia remains a popular choice for patients undergoing cataract surgery⁽²⁾. Both non-akinetic and akinetic methods are widely used^(3,4). Non-akinetic methods include topical, subconjunctival, deep fornix anesthesia and lidocaine gel⁽⁴⁾. Although akinesia is not essential for modern cataract surgery, some ophthalmic surgeons may prefer to operate on immobile eyes. A study suggests that patients also prefer an akinetic regional ophthalmic block⁽⁵⁾. Single-injection medial canthus periocular anesthesia is a promising technique of ophthalmic regional anesthesia⁽⁶⁾. The aim of this study was to compare inferotemporal approach to medial canthus approach with short needle length (12 mm) in regional ophthalmic anesthesia regarding akinesia and analgesia.

2. Patients and Methods:

After approval of the Ethical Committee of The Research Institute Of Ophthalmology and informed patient written consent, 110 patients of ASA I and II physical status undergoing elective cataract surgery were enrolled in this study. Patients were allocated into two groups (1 and 2); 55 patients each. The two groups received single injection peribulbar block via a 12 mm

needle. Group 1 received the injection by the medial canthus approach. Group 2 received the injection by the inferotemporal approach. In the perioperative area, a 22-gauge cannula was inserted intravenously in all patients. ECG, pulse oximetry and non-invasive blood pressure monitoring were applied to all patients in the study. The anesthetic mixture used was: in the ratio of 1:1 0.5% bupivacaine and 2% lidocaine to which hyaluronidase 10 units/ml was added. In group 1, the needle was inserted in the most medial part of the medial canthus and introduced forward without piercing the medial check ligament. In group 2, the needle was inserted through the lower eyelid as far lateral as possible in the inferotemporal quadrant until its hub reached the orbital rim. Digital pressure was applied by the thumb and index finger around the needle hub during anesthetic injection. In the two groups, after negative aspiration was done, a volume of 6-8 ml of local anesthetic solution was injected until achieving total drop and fullness of the upper eyelid. Digital compression was applied, using the index and middle fingers of both hands above each other, in the two groups for five minutes. Ocular akinesia was assessed ten minutes after the block using the simple akinesia score. Ocular movements were scored for each direction of gaze in the superior, inferior, medial and lateral directions with a maximum score for each direction of 3 points and a possible total maximum of 12 points (3 = full movement, 2 = moderate movement,

1 = flicker, 0 = no movement). A score of 3 or less was accepted to provide adequate analgesia for the surgical procedure to be performed. If the block was inadequate for surgery after 10 minutes, supplementary anesthesia was provided using the same needle and technique according to the group. Axial lengths were recorded. The volume injected and the needs for supplementary local anesthetic were also recorded as well as any complications occurring during the block.

Statistical Analysis:

Results were expressed as means \pm standard deviation (SD) or number (%). Comparison between the mean values different parameters of the two studied groups was performed using unpaired student t test. Comparison between categorical data was performed using Chi square test. The data were considered significant if p values was ≤ 0.05 and highly significant if $p < 0.01$. Statistical analysis was performed with the aid of the SPSS computer program (version 12 windows).

3. Results:

There were 110 patients in this study, 55 in each group. Group 1 received medial canthus injection and group 2 received inferotemporal injection. All patient data were included in the statistical analysis where no patients were excluded. Patient's demographic data in the two groups were similar and no significant differences were detected. (Table 1). The axial length, measured in cms, was similar in both groups (24.39 ± 2.39 in group 1 and 24.55 ± 2.43 cm in group 2) with no statistical significance. The volume injected in both groups showed high statistical significance (7.91 ± 0.92 in group 1 and 7.35 ± 0.97 in group 2). No statistical significance was detected regarding the need for supplementation of local anesthetic in the two groups where 83.3% in group 1 did not need supplementation in comparison to 76.4% in group 2. No complications were detected in both groups, (Table 2).

Table 1: Demographic Data

Characteristics	Group 1 Medial canthus (n= 55)	Group 2 Inferotemporal (n= 55)	P value
Age (yrs)			
Range	30-81	26-78	
Mean \pm SD	58.06 ± 11.64	56.44 ± 11.79	0.472 ^{NS}
Sex (female/male)	30/25 (55.6%/44.4%)	25/30 (45.5%/54.5%)	0.292 ^{NS}
ASA (I/II)	18/37 (33.3%/66.7%)	23/32 (41.8%/58.2%)	0.361 ^{NS}

Data are expressed as mean \pm standard deviation or number (%).
 $p > 0.05$ = NS = not significant.

Table 2: Volumes of local anesthetic initially injected, need for supplementation and complications

Characteristics	Group 1 Medial canthus (n= 55)	Group 2 Inferotemporal (n= 55)	P value
Axial length	24.39 ± 2.39	24.55 ± 2.43	0.723 ^{NS}
Volume injected	7.91 ± 0.92	7.35 ± 0.97	0.002 ^{**}
Efficiency			
Do not need supplementation	45 (83.3%)	42 (76.4%)	0.365 ^{NS}
Need supplementation	10 (16.7%)	13 (23.6%)	0.365 ^{NS}
Complication (yes)	0 (0%)	0 (0%)	1.00 ^{NS}

Data are expressed as mean \pm standard deviation or number (%).
 $p > 0.05$ = NS = not significant. ****** $p < 0.01$ = highly significant.

4. Discussion:

Our results demonstrated that both approaches, the medial canthus and the inferotemporal, were similar in terms of needs for supplementation, akinesia and complications. Also, the study revealed that the use of a 12 mm needle in both groups with digital pressure

in group 2 gave a satisfactory degree of akinesia. The satisfactory akinesia produced by either technique can be partly explained by anatomical details. The spread of local anesthetic after periocular injection outside the muscle cone is greatly affected by the connective tissue septa of the orbit⁽⁷⁾. The so-called muscle cone not a

well defined anatomical entity, but is instead composed of a complicated network of muscles and intermuscular connective tissue septa with communicating fat compartments⁽⁷⁾. The only statistically significant difference detected in our study was regarding the volume of local anesthetic initially injected. The volume injected was found to be higher in group 1 (medial canthus group) compared to group 2 (inferotemporal group) (7.91±0.92 and 7.35±0.97 respectively). The fascial sheath of the eye ball extends to the rectus muscle sheaths⁽⁶⁾. This explains why a large volume of local anesthetic was preferentially guided to those muscle sheaths to produce good akinesia. In the present study none of the techniques were associated with any major complication. The most frequent side effect was conjunctival chemosis, which did not affect the surgical procedure. All the techniques were associated with acceptable patient satisfaction; additional analgesics during surgery were rarely needed and almost all the patients said they would have their second eye operated upon under regional anesthesia.

In conclusion, the data of the present study suggested that the medial canthus approach and the inferotemporal approach were comparable, with the exception of the volume of local anesthetic initially injected which was found to be higher in the medial canthus group.

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