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Comparison of 0.5% Bupivacaine with 0.5% Bupivacaine and Dexamethasone in Peribulbar Block for Small Incision Cataract Surgery: A Prospective Randomized Controlled Study

Shantala Arun Kumar[1], Shaik Nilofer Ahmed[2], Arun Kumar[3]

[1]Professor and Head of Department of Ophthalmology [2]Post Graduate [3]Professor and Head, Department of Anaesthesiology, S.S. Institute of Medical Science and Research Centre, Davangere, Karnataka 577005, India.

Abstract

Objective: To compare the anesthetic efficacy and postoperative analgesia between 0.5% bupivacaine and 2mg dexamethasone and 0.5% bupivacaine alone in peribular block for small incision cataract surgery. *Methods*: 50 patients were randomized into 2 groups of 25 each to receive peribulbar anesthesia using 0.5% bupivacaine and 2mg dexamethasone in group I and 0.5% bupivacaine alone in group II. The patients were assessed for onset and duration of akinesia and postoperative analgesia. *Results*: Akinesia was achieved faster (6.32±1.11 mins) in group II when compared to group I (14.12±2.99 mins) which was statistically significant. The duration of akinesia was longer in group I (2.52±0.51 hrs) when compared to group II (1.36±0.40 hrs) which was also significant. The VAS scores were significantly lower at 0, 1, 2 hrs in group I than group II. *Conclusion*: The addition of dexamethasone to bupivacaine in peribulbar block provided prolonged duration of akinesia and analgesia with lower VAS scores postoperatively.

Keywords: Bupivacaine; Dexamethasone; Peribulbar Block; Postop Analgesia.

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Introduction

The majority of ophthalmic procedures are performed under local anaesthesia as the patient being often elderly with inter-current diseases. Moreover, it is associated with less hemodynamic instability, less respiratory depression, better postoperative pain relief, and, less nausea and vomiting than general anaesthesia [1]. There is reduced risk for globe perforation and optic nerve damage with peribulbar (extraconal) than retrobulbar (intraconal) block.

The addition of adjuvant to local anaesthesia in peribulbar block could be a method to prolong the duration of block. Dexamethasone is a high potent, long acting glucocorticoid with little mineralocorticoid effect and reduces inflammation, post op pain, post op nausea and vomiting and edema [2,3].

Aims of Study

1. To compare the anaesthetic efficacy of 0.5% bupivacaine with 0.5% bupivacaine and 2mg dexamethasone in peribulbar block in cataract surgery.
2. To compare the efficacy of 0.5% bupivacaine with 0.5% bupivacaine and 2mg dexamethasone for post operative analgesia in cataract surgery

Corresponding Author: Shaik Nilofer Ahmed, Final Year Postgraduate, Department of Anesthesiology, S.S. Institute of Medical Sciences & Research Centre, Davanagere, Karnataka 577005, India.
E-mail: niloferahmed90@gmail.com

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Materials and Methods

Data Collection

Based on a previous study [2], we selected 50 ASA physical status 1 and 2 patients undergoing small incision cataract surgery and power of study to be 80% and 95% significance level . After thorough pre anaesthetic evaluation patients refusing consent, taking anticoagulants, allergic to amide local anaesthetic or hyaluronidase, contraindication to steroids, patients with psychiatric illness and major systemic diseases and with a single eye were excluded from the study. Study was conducted at Department of anaesthesiology, SSIMS & RC, Davangere and the study period was from April-May 2018.

Procedure of Blocks

After a written informed consent from the patients and institutional ethical committee approval, they were randomized by block randomization method to receive peribulbar anaesthesia using 0.5% bupivacaine, 2mg dexamethasone and hyaluronidase 50 IU/ml in Group I (n=25) or 0.5% bupivacaine and hyaluronidase 50 IU/ml in Group II (n=25). Standard monitoring were established and vitals were monitored.

The anaesthetic solution was prepared individually and immediately before the block. The investigators performing the injections and assessment were blinded to the solution used. Peribulbar local anaesthetic was given by using 25G, 1 inch needle at the junction of lateral $1/3^{rd}$ and medial $2/3^{rd}$ directed deliberately towards the orbital floor and the drug was injected until peribulbar fullness was observed or to a maximum volume of 7ml. light massage was applied over the globe for the spread of solution for a minute. Movements in superior, inferior, medial and lateral quadrants were scored according to akinesia score as 0 (no movement), 1 (flutter), 2 (partial movement) and 3 (full movement). This gave a range of 0 (complete akinesia) to 3 (full movement). A score of upto 2 was suggested a successful block [4].

Postoperatively, patients were shifted to post anaesthesia care unit and monitored for akinesia, pain (VAS) score at 0, 1, 2, 3 hrs and the time to first rescue analgesic required. The tool for pain assessment is the 0-10 pain scale (VAS), with numeric values ascribed to pain level, where 0 represents no pain and 10 is the worst pain imaginable. Patients with VAS score more than 4 were given rescue analgesic in the form of Tab. Diclofenac 50mg orally.

Statistical Test

Student's t-test was used to compare continuous variables and Chi-square test was used to analyze categorical variables. p-values of < 0.05 will be considered statistically significant.

Results

In Table 1, akinesia was achieved faster in (6.32±1.11 mins) Group II when compared to (14.12±2.99 mins) in Group I which was statistically significant ($p<0.005$).

Also, Group I (2.52±0.51) shows longer postoperative akinesia than Group II (1.36±0.40) which was also statistically significant ($p<0.005$).

Table 2 shows statistically significant ($p<0.005$), lower VAS scores at 0 hr,1 hr and 2 hr in Group I when compared to Group II.

Table 1: Showing demographic data, akinesia and post op akinesia

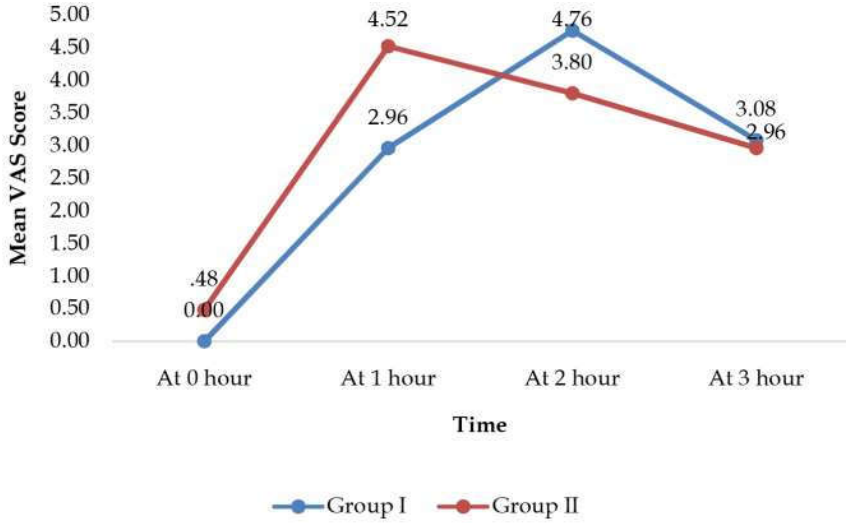
Variable	Group I	Group II	p value
Age	63.68±10.92	62.56±6.91	0.667
Gender (M/F)	14/11	12/13	0.571
Akinesia (mins)	14.12±2.99	6.32±1.11	0.000
Postop akinesia (hours)	2.52±0.51	1.36±0.40	0.000

Table 2: Comparing vas scores at various intervals

Variable	Group I	Group II	p value
At 0 hour	0.00±0.00	0.48±1.12	0.043
At 1 hour	2.96±0.54	4.52±0.87	0.000
At 2 hour	4.76±0.66	3.80±0.87	0.000
At 3 hour	3.08±0.70	2.96±0.35	0.450

Table 3: Comparing time to first rescue analgesic

Variable	Group I	Group II	p value
First rescue analgesic in hours	2.04±0.35	0.88±0.33	0.000



Graph 1: A Graph comparing vas scores at different time intervals

Table 4 shows that first rescue analgesic was taken at a longer time period in Group I (2.04±0.35) when compared to Group II (0.88±0.33) which was statistically significant ($p<0.005$).

Discussion

The aim of our prospective, randomized study was primarily to assess the anaesthetic efficacy of adding dexamethasone and secondarily, to evaluate its effect on postoperative analgesia.

Surgeries for posterior segment are lengthy procedures and are associated with relatively significant post operative pain [5]. The addition of adjuvant to local anaesthesia in peribulbar block could be a method to prolong the duration of block. Many drugs had been added including opioids, clonidine, ketamine and dexamethasone. All could be injected either intrathecally, extradurally, or into the peripheral nerves [6].

In our study, the addition of dexamethasone led to siginificantly prolonged duration of akinesia with prolonged postoperative analgesia and time to first rescue analgesic.

The pathophysiological mechanisms for steroid effects may be related to the anti inflammatoryaction, edema reduction or shrinkage of connective tissue. Local steroid application was found to suppress transmission in thin unmyelinated C-fibres [7].

The analgesic efficacy of dexamethasone was found not to be related to the route of administration, this was supported by multiple studies that reported an analgesic effect after intravenous dexamethasone [8]. Others reported its analgesic effect after epidural administration [9].

In our study, we have given it in through the peribulbar route, which also prolonged the duration the duration of akinesia and analgesia.

Conclusion

From our study, we concluded that adding dexamethasone to bupivacaine as an adjuvant in peribulbar block provided prolonged duration of akinesia and analgesia with longer time to first rescue analgesic.

Limitations

In our study, we did not assess the post operative inflammation or for any complications.

We also did not compare the effect of other drugs that increase the duration of local anaesthetic like clonidine, etc. Further studies are to be done in these aspects.

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