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Comparison of Efficacy of Subconjunctival and Peribulbar Anesthesia in Cataract Surgery – A Rural Hospital Based Study

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ABSTRACT

Peribulbar anesthesia for cataract surgery is the most popular technique, while subconjunctival anesthesia has many advantages associated with it. The following study was done with an aim to evaluate the efficacy of subconjunctival anesthesia, in adjunct to the peribulbar anesthesia. The results suggested that subconjunctival anesthesia gives better operative time with less complications and is cost effective when used with peribulbar anesthesia

KEYWORDS Subconjunctival Anesthesia, Peribulbar Anesthesia, Cataract

INTRODUCTION

Peribulbar anesthesia for cataract surgery was the most popular technique in the previous decade. Kelmanin (1970) was the first to perform this technique in 1970. In 1986, Davis and Mandel reported the use of peribulbar anesthesia in intraocular surgeries[1-3].

Unlike peribulbar anesthesia, subconjunctival anesthesia eliminates the risk of globe perforation, retrobulbar hemorrhage, and optic-nerve trauma. It is associated with minimal discomfort and was considered safe[4, 5].

Looking at the documented shortcomings of peribulbar anesthesia, a need was felt for a shorter duration & less invasive method of anesthesia for cataract surgery.

Thus evolved the role of subconjunctival anesthesia, which is used as an adjunct to peribulbar anesthesia. If manipulation of sclera is done for constructing a scleral tunnel, rapid onset of anesthesia in the area immediately adjacent to the bleb, is seen. Superior subconjunctival anesthesia produces adequate analgesia, but not adequate akinesia[6].

AIM

To evaluate the efficacy of sub conjunctival anesthesia compared to peribulbar anesthesia for pain control during injection and operation (manual small incision cataract surgery).

OBJECTIVES

- To evaluate the operative time (eyelid speculum insertion and removal).
- To observe the operative complications related to local anesthesia.
- To evaluate the cost effectiveness.

STUDY DESIGN

Randomized cross-sectional study

MATERIALS AND METHOD

The study was performed at the Department of Ophthalmology (AVBRH). The patients undergoing cataract surgery were selected randomly for the study. They were further divided into two groups of 100 patients each.

DURATION OF STUDY: 2 years
SAMPLE SIZE: 200 patients

INCLUSION CRITERIA: All patients undergoing cataract surgery with no other ocular association.

EXCLUSION CRITERIA:

1) Patients on pre-operative sedatives, analgesics or anxiolytics.
2) Patients with profound cognitive impairments who couldn't grade for pain or or who couldn't give written informed consent.
3) Patients with sensitivity to lignocaine or hyaluronidase.
4) Patients with hypertension, ischemic heart disease, diabetes, glaucoma, bronchial asthma and previous eye surgery.

Out of 200; 109 patients were male while 91 patients were female. The mean age for patients undergoing cataract surgery was 61 to70 years for both the groups.

Group A (100 patients) received subconjunctival anesthesia, while Group B (100 patients) received peribulbar anesthesia. To reduce the bias and disparity in surgical technique, MSICS in all the patients was performed by a single surgeon.

In Group A; 2ml of 2% lignocaine with 1: 200000 adrenaline with 150 units of hyaluronidase and 2ml bupivacaine (0.75%) was drawn into 5 ml syringe. Out of this 4 ml, only 2 ml was injected in the sub conjunctival space at 12 o'clock position, superior conjunctiva was perforated with 26G needle with beveled edge down to minimize the chances of perforation of deeper structures. A well-defined bleb indicated proper subconjunctival injection[7-9].

In Group B, 3ml of 2% lignocaine with 1:200000 adrenaline with 150 units of hyaluronidase and 2 ml bupivacaine (0.75%) was drawn into 5 ml syringe.This 5 ml was injected with 24 G needle inferiorly at the junction of outer 1/3rd and inner 2/3rd of lower orbital rim. Similarly, 3 ml was injected at the junction of outer 2/3rd and inner 1/3rd of upper orbital rim. 2 minutes of intermittent pressure was applied over the eyeball after injection to achieve hypotony[10].

Pain analysis for both the groups while injecting and intraoperatively was recorded by the surgeon based on visual analog scale. Operative time was recorded by the surgeon for both the groups from the insertion and removal of the speculum. 20 minutes was considered as the average time and more than 20 minutes was considered as above average. Complications like chemosis, black eye, lid oedema, subconjunctival

haemorrhage if present were noted by the same surgeon for both the techniques.

OBSERVATIONS

Table 1: Score of pain during the injection in both the groups

Pain during injection	Group A	Group B	ϰ2-value	p-value
Grade 0	00	00	184.6	P<0.0001 Significant
Grade 1	07	00		
Grade 2	49	00		
Grade 3	26	00		
Grade 4	06	26		
Grade 5	05	65		
Grade 6	04	03		
Grade 7	02	04		
Grade 8 Grade 9	01 00	02 00		
Grade 10	00	00		
Total	100	100		

Table 2: Scores of Intraoperative pain in both the groups

IntraOp pain	Group A	Group B	ϰ2-value	p-value
Grade 0	83	89	184.9	P<0.0001 Significant
Grade 1	16	09		
Grade 2	01	02		
Grade 3	00	00		
Grade 4	00	00		
Grade 5	00	00		
Grade 6	00	00		
Grade 7	00	00		
Grade 8	00	00		
Grade 9 Grade 10	00 00	00 00		
Total	100	100		

Table 3: Scores of Postoperative pain in both the groups

Post-op pain	Group A	Group B	ϰ2-value	p-value
Grade 0	00	00	184.9	P<0.0001 Significant
Grade 1	12	18		
Grade 2	48	52		
Grade 3	26	20		
Grade 4	10	03		
Grade 5	02	04		
Grade 6	02	01		
Grade 7	00	02		
Grade 8	00	00		
Grade 9 Grade 10	00 00	00 00		
Total	100	100		

Table 4: Operative time in both the groups

Operative Time	Group A	Group B	ϰ2-value	p-value
Average 20 minutes	97	94	1.04	0.30 NS,p>0.05
Above Average	3	6		
Total	100	100		

Table 5: Complications of the techniques

Complications	Group A	Group B	ϰ2-value	p-value
Chemosis	1	0	4.20	0.52 NS,p>0.05
SCH	8	3		
Black Eye	0	1		
Lid Oedema	0	8		
Nil	91	88		
Total	100	100		

DISCUSSION

A total of 200 patients with all types of cataracts were recruited for the trial. 100 patients were allocated to receive subconjunctival anesthesia (Group A) and100 were allocated to receive peribulbar anesthesia (Group B).

During injection, intraoperative & postoperative pain was analyzed with the help of visual analog scale (pain score 0-10 Numerical Rating) [11]

The injection pain score in Group A was 49% (Grade 2) which is significantly lower than in Group B where the score was 65% (Grade 5). This indicates that the administration of subconjunctival anesthesia (Group A) causes less pain as compared to peribulbar anesthesia (Group B) as shown in the statistical significance[12-19].

The pain scores during the operation (VAS-OP) were not significantly different between the two groups, suggesting that subconjunctival anesthesia provides equal pain control as peribulbar anesthesia during MSICS[14-19].

No significant difference was noted with reference to the operating time in both the groups.

Anesthetic complications such as localized subconjunctival hemorrhage are also more common when using this technique, which is in agreement with the results of Tulvatana et al[20]. Unlike peribulbar anesthesia, subconjunctival anesthesia eliminates the risk of globe perforation, retrobulbar hemorrhage, and optic-nerve trauma, and is associated with minimal discomfort[21].

In group A, the total volume of anesthetic solution used was only 2 ml, whereas in group B, total volume used was 8 ml. Thus subconjunctival anesthesia was found to be more cost effective[10].

Retrobulbar anesthesia induces a high reduction of velocity in the retrobulbar vessels in contrast with sub-conjunctival anesthesia. Therefore, subconjunctival anesthesia should be preferred, particularly in patients with problems of ocular perfusion, for example, glaucoma[6].

CONCLUSION

Subconjunctival anesthesia produces adequate analgesia but not adequate akinesia. subconjunctival anesthesia showed lower pain score at the time of administration, and is safer and more comfortable with less severity of complications during MSICS. So it can be used as an effective alternative to peribulbar anesthesia. Also, subconjunctival anesthesia was found to be more cost effective than peribulbar anesthesia.

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