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Efficacy of Retrobulbar versus Topical Anesthesia in Cataract Surgery

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ABSTRACT

Aim: To monitor the effect of retrobulbar versus topical anesthesia in cataract surgery patients by comparing different parameters such as: intraocular pressure akinesia and analgesia parameters.
Study type: Interventional case series.
Place and duration of study: Department of Ophthalmology, Niazi Medical & Dental College Sargodha from 1st October 2020 to 31st October 2021.
Methodology: One hundred patients who underwent cataract surgery were enrolled. Study participants were divided into two groups and each group contain fifty 50 participants. Group one give retrobulbar block and group two treated by topical anesthesia. Complete ocular and systematic examinations and relevant examinations like clotting time, blood pressure, blood sugar, complete blood examination and bleeding time were done before starting the surgery.
Results: 80% were males and 20% were females. During topical local anesthesia, 47(94%) patients experienced pain free surgery whereas in retrobulbar anesthesia, only 38(76%) patients experienced pain free surgery. In retrobulbar anesthesia group, complete akinesia was observed in 25(50%) patients. In retrobulbar group, significant increase in intraocular pressure was noted 41(82%) upto 30 mmHg after the administration of local anesthesia as compared to topical anesthesia group.
Conclusion: Topical anesthesia is more safe and effective approach for cataract patients in contrast to retrobulbar group. It prevents many life and sight threatening implications like globe perforation and brain stem anesthesia.
Key words: Efficacy, Retrobulbar, Topical anesthesia, Surgery

INTRODUCTION

Cataract extraction is the most commonly performed operations in Ophthalmology. In the past few decades techniques of cataract surgeries have been revolutionized due to advancements in technology. In addition, methods of anesthesia have been also changed. Qualities of an ideal local and general anesthesia in intraocular surgery is adequate akinesia and analgesia of globe and lids, control of Intraocular pressure, control of systemic blood pressure, relaxation of patients, absence of untoward episodes e.g. oculocardiac reflex, smooth recovery from anesthesia state without vomiting and adequate post-operative analgesia. Numerous methods are present for administrating local anesthesia in cataract surgery. These include retrobulbar, peribulbar, sub-conjunctival, sub-Tenon's, intracameral and topical anesthesia[1]. More than a hundred years ago, sub-Tenon's anesthesia was used to perform enucleation[2].

Nevertheless, retrobulbar injection remained the preferred technique of local anesthesia for ocular surgery for a long time, as it is easy to learn and perform[3,4]. However it is blind procedure so it has numerous unavoidable complications like retrobulbar hemorrhage, globe perforation, optic nerve damage and blindness, diplopia, seizure, brain stem anesthesia, retinal vascular occlusion and cardiopulmonary arrest[5,6]. Due to that reasons topical anesthesia is consider safest than all other procedures of anesthesia. Studies have shown good evidence that topical anesthesia is effective and safe as compared to retrobulbar and peribulbar block[7-9]. Another study has also reported better efficacy of topical anesthesia as compared to retrobulbar technique[10].

The purpose of this study was to monitor the effect of topical anesthesia versus retro-bulbar anesthesia used locally in cataract surgery patients by comparison of analgesia, akinesia as well as its effect on Intraocular pressure.

MATERIALS AND METHODS

It is a hospital based comparative interventional case series involving 100 patients were selected from Outpatient Department of Niazi Medical & Dental College Sargodha after permission from IRB. Patients with complicated or traumatic cataracts and age less than 40 years were excluded. They were divided into two equal groups each comprising of 50 patients. Group 1 received retrobulbar local anesthesia while group 2 received topical local anesthesia. Both groups received one drop of topical anesthetic agent proparacaine 0.5% (Alcaine, Alcon International) was instilled in the conjunctival sac. Pre-anesthesia IOP was measured with Perkins hand held tonometer. The anesthesia was given by retrobulbar method in first group patients. Concentrations of lignocaine 2% and bupivacaine 0.5% were used in this techniques and no additional hyaluronidase or adrenaline was used. Intraocular pressure was again measured at one and ten minute interval after injection. Akinesia was evaluated at 5 and 10 minutes interval after anesthesia. It was graded as 1 = complete movements remaining. 2= moderate movement, 3= slight movement<3mm in any direction and 4 = no movement. Analgesia was evaluated at the time of surgery and was graded as 1 = no pain, 2 = pain present but bearable, 3 = patients complaining of pain and 4 = surgery no more possible due to severe pain. The local anesthesia techniques and surgery were performed by one surgeon .The data was recorded. All the information collected was entered in the SPSS and analyzed. Primary variables of efficacy were assessed and comparison between the two groups was done using Chi square test. Significance was defined as $p<0.05$.

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RESULTS

There were 80% males and 20% females with a ratio of 4:1. Age of these patients ranged from 60-90 years with a mean value of 71±6.45 years. Patients who receiving retrobulbar local anesthesia, 38(74%) experienced pain free surgery as compared to topical local anesthesia where 47(94%) experienced no pain. Additional local anesthesia was required in 10(30%) patients of retro bulbar group where as in topical anesthesia group only two patients received additional more dose of dropping. The difference in total analgesia of the two techniques was statistically significant ($p=0.03$).

Adequate akinesia was achieved in retrobulbar group as compared to topical anesthesia group where akinesia was inadequate. Total akinesia of eyeball was found in 25(50%) cases of retrobulbar anesthesia and 6(12%) cases of topical anesthesia.

The difference was statistically significant (p=0.004). Moderate and slight movements were seen in 40% and 50% of patients in group1 and 2 respectively. Regarding effect on Intraocular pressure there was significant elevation of IOP in retrobulbar group as compared to topical anesthesia group immediately after administrating the local anesthesia. In retrobulbar group IOP of 41(82%) patients raised to 23-33 mmHg immediately after giving the anesthesiawhile in topical anesthesia group not even single eye had IOP increase in this range and this difference was highly significant (p=0.001). However after 10-15 minutes the variations in both groups were almost equal. In retrobulbar local anesthesia group, surgery was not possible in 2(4**%)** patients as 1(2**%)** patients developed retrobulbar hemorrhage and 1(2**%**) developed lid hematoma. Assessment of akinesia, analgesia and IOP was not possible in these 2 patients.

Table 1: Pain score during surgery

Pain Score	Retrobulbar LA	Topical LA
No pain	38(76%)	47(94%)
Pain present but bearable	7(14%)	3(6%)
Patient complaining of pain	1(2.0%)	-
Surgery no more possible due to severe pain	2(4.0%)	0(0%)
Surgery not performed due to other side effects	2(4%)	0(0%)

Table 2: Analysis on the basis of extra-ocular muscles akinesia

Akinesia Score	Retrobulbar LA	Topical LA
Complete movement remaining	6(12%)	24(48%)
Moderate movement	4(8%)	11(22%)
Slight movement <3mm in any direction	13(26%)	9(18%)
No movement	25(50%)	6(12%)
Assessment not conducted due to other side effects	2(4%)	-

Table 3: Analysis of Patients of Intraocular pressure immediately after local anesthesia

IOP (mmHg)	Retrobulbar LA	Topical LA
23-33	41(82%)	0(%)
13-23	7(14%)	49(98%)
1-12	0(0%)	1(2%)
Assessment not conducted due to other side effects	2(4%)	0(0%)

DISCUSSION

Cataract surgeons have wide choices for giving akinesia and anesthesia to the patient's such as: sub-conjunctival, general anesthesia, sub-tenon's, retrobulbar and peribulbar. Each and every type has its own risks and benefits. Topical anesthesia has become popular for many years because injection technique has lessened the chances of associated risks with retrobulbar injections. In our study there was no topical anesthesia related complications. Mein and Woodcock[11] described that, increased intraocular pressure was observed in patients immediately after the administration of only 6 ml injection. Another study by Olitsky and Trope[12] reported an orbital hemorrhage after retrobulbar local anesthesia injection.

Depth of analgesia had been described by different researchers using these techniques of anesthesia for cataract surgery. Regarding retrobulbar local anesthesia we had to wait for at least 10 to 20 minutes before the effect of anesthesia was achieved, whereas in case of topical local anesthesia, the onset was rapid and we could start surgery immediately. This clearly saves the time of surgeon[13-15].

In present case, akinesia was always limited with topical anesthesia. When measured after anesthetic injection, 50**%** patients had total akinesia and complete eye movements persisted in only 12**%** of patients. This result is in accordance with Tsuneoka et al[16] who is also reported the similar results. Another study indicated complete akinesia after 1.5ml of an anesthetic injection with 1**%**lignocaine and 0.75%bupivacaine solution mixed with hyaluronidase. Different time was observed to attain complete akinesia but that usually does not cause problems to the surgeon as most of the times patients do not have eye movements and any unwanted movements can be controlled with instruments. Good counselling of the patients also reduced the unwanted eye movements.

In one study[17] IOP increased significantly in the retrobulbar group one minute after the injection while there was no increase in the topical anesthesia group. In retrobulbar group, IOP returned to pre-injection levels by 10 minutes post-operatively.[18-2]0 In patients receiving retrobulbar local anesthesia we need the Honan's balloon for ocular compression to reduce the pressure. Due to that reason, in patients of glaucoma surgery topical anesthesia was better than retrobulbar anesthesia[21-23].

CONCLUSION

Topical anesthesia is simple, safe, atraumatic and minimally invasive technique as compared to retrobulbar local anesthesia. Its benefits are numerous and it can be proposed as good alternative to retrobulbar anesthesia in anterior segment eye surgery because it avoids patient fear of needle, provide analgesia and it has no incidence of life threatening.

REFERENCES

1. Kanski JJ. Lens. In: Kanski JJ, ed. Clinical ophthalmology: a systematic approach. 6thed. New York: Butterworth-Heinemann 2007:337-69.
2. Steven JD.A new local anesthesia technique for cataract extraction by one quardrant sub-Tenon's infiltration. Br J Ophthalmol 1992; 76: 670-74.
3. David SF, Eric BB, Lisa HL, Lee AF, John HK, Jeffery M, et al. Synthesis of the literature on the effectiveness of regional anesthesia for cataract surgery. Ophthalmology 2001;108:19-29.
4. Jacob PC, Dietlein TS, Jacobi FK. A comparative study of topical vs retrobulbar anesthesia in complicated cataract surgery. Arch Ophthalmol 2000;118(8):1037-43.
5. Boezaart A, Berry R, Nell M. Topical anesthesia versus retrobulbar block for cataract surgery: the patients' perspective. J Clin Anesth 2000;12(1):58-60.
6. Balkan BK, Iyilikci L, Gunenc F, Uzumlu H, Kara HC, Celik L, et al. Comparison of sedation requirements for cataract surgery under topical anesthesia or retrobulbar block. Eur J Ophthalmol 2004;14(6):473-7.
7. Bahcecioglu H, Unal M, Artunay O, Rasier R, Sarici A. Posterior vitrectomy under topical anesthesia. Canad J Ophthalmol 2007; 42(2): 272-7.
8. Claoue C, Lanigan C. Topical anesthesia for cataract surgery. Aust NZ J Ophthalmol 1997;25:265-8.
9. Celiker H, Katanas L, Sahin O. A comparison of topical anesthesia for 23-guage posterior vitrectomy. J Ophthalmol 2014;2014:237028.
10. Deka S, Bhattacharjee H, Barman MJ, Kalita K, Singh SK. No-patch 23-guage vitrectomy under topical anesthesia: a pilot study," Indian J Ophthalmol 2018; 59(2).
11. Mein CE, Woodcock MG. Local anesthesia for vitreoretinal surgery. Retina 1990;10:47-49.
12. Olitsky S,Trope GE.Prospective study of sub-Tenone's versus retrobulbar anesthesia for in patients and day surgery trabeculectomy. Ophthalmology 1993;100:1585-9.
13. Mete A, Saygili O, Kimyon S, Pamukcu C, Ceri S, Gungor K, et al. Comparison of pain experience during 23-G vitreoretinal surgery under topical and retrobulbar anesthesia. Int Ophthalmol 2017;37(2):349-56.
14. Hansen EA, Mein CE, Mazzoli R. Ocular anesthesia for cataract surgery: direct sub-Tenon's approach. Ophthalmic Surg 1990; 21:696-9.
15. Friedburg MA, Palmer RM. A new technique of local anesthesia for panretinal photocoagulation. Ophthalmic Surg 1991; 22: 619-21.
16. Tsuneoka H, Ohki K, Taniuchi O. Kitahara K. Tenon's capsule anesthesia for cataract surgery with IOL implantation. Eur J Implant Refract Surg 1993;5:40.
17. Bahcecioglu H, Unal M, Artunay O, Rasier R, Sarici A. Posterior vitrectomy under topical topical anesthesia. Can J Ophthalmol 2007; 42(2): 272-7.
18. Ritch R, Leibmann JM. Sub-Tenon's anesthesia for trabeculectomy. Ophthalmic Surg 1992;23:502-4.
19. Aras C, Ozdamar A, Yolar M, Bahcecioglu H, Karacorlu M, Ozkan S. Topical anesthesia in posterior vitrectomy. Retina 2000; 20(5): 566-7.
20. Kwok AK, Lee YW, Lam DS. Topical anesthesia in posterior vitrectomy. Retina 2000; 20(5): 565-6.
21. Chan WM, Loo AVP, Tam BSM, et al. Topic anesthesia in posterior vitrectomy. Retina 2000; 20(5): 563-4.
22. Gangolf G, Jost BJ. Topical versus peribulbar anesthesia for cataract surgery. Acta Ophthalmol Scand 2003;81:596-9.
23. Chuang LHL, Yeung WC, Ku KJ, Yang Y, Lai CC. Safety and efficacy of topical anesthesia combined with lower concentration of intracameral lidocaine in phacoemulsification: paired human eye study. J. Cataract Refract. Surg 2007; 33:29396.