



International Journal of Research in Pharmacology & Pharmacotherapeutics



ISSN Print: 2278-2648

IJRPP |Vol.5 | Issue 4 | Oct - Dec - 2016

ISSN Online: 2278-2656

Journal Home page: www.ijrpp.com

Research article

Open Access

Sub tenons anesthesia VIS a VIS peribulbar anesthesia for small incision cataract surgery: a teaching hospital based study

Padmavathi CG¹, Sivasankar Naik B^{2*}

¹Assistant Professor of Ophthalmology, Government Medical College and General Hospital, Anantapuramu, Andhra Pradesh 515001

²Assistant Professor of General Surgery, Government Medical College and General Hospital, Anantapuramu, Andhra Pradesh 515001

*Corresponding author: Dr. B. Sivasankar Naik

ABSTRACT

Cataract is a major causative factor for blindness in India. Cataract extraction is commonest surgery performed both in India and abroad and one of the key procedures for preventable blindness. The popular small incision cataract surgery done for cataract extraction all over the globe for which peribulbar and sub tenons anesthesia are commonly used anaesthetic procedures. The present study is carried out at department of ophthalmology, Government Medical College Anantapuramu, Andhra Pradesh with an objective to compare the efficacies of two commonly used techniques of anesthesia and also to assess the complications arising out of it. The study indicated that sub tenons form of anesthesia is comparatively superior over its counter part in terms of analgesia, akinesia and intraocular pressures.

Keywords: Analgesia, Akinesia, Cataract, Intraocular pressure, MSICS, Peribulbar block, Sub tenon's Anesthesia

INTRODUCTION

Blindness due to cataract form an important social problem to the society in terms of human morbidity, economic loss and social burden in India as well as abroad. The estimated prevalence of blindness in India is 14.9 per 1000[1]. Eighty per cent of this blindness is due to cataract alone. Cataract extraction with intraocular lens implantation is most common surgical procedure performed under local anaesthesia. Retrobulbar block is the commonest anaesthetic procedure used for cataract extraction in the past. The procedure of retrobulbar block is

gradually replaced by Peribulbar anaesthesia because of low incidence of its complications such as retrobulbar haemorrhage, optic nerve damage, globe perforation etc.

In this evident form data from various institutes Sub tenon's anaesthesia is gaining popularity providing a quicker onset of anaesthesia, better analgesia, more consistency, effectiveness, better patient compliance and faster patient rehabilitation. Owing to its safer technique, it is possible to avoid the vascular injuries and nerve injuries which aid in

providing better anaesthesia without the drawbacks of topical anaesthesia.

The current study is carried out with an objective to compare the efficacy of Sub tenon's anaesthesia with peribulbar in terms of analgesia, akinesia, time of onset, duration of action and over effects over intraocular pressure. An effort is also made to study and compare complications that are arising with mentioned forms of anaesthesia like subconjunctival haemorrhage and chemosis.

MATERIALS AND METHODS

The current prospective study was conducted between January 2013 and July 2014 at Department of Ophthalmology, Government Medical College and General Hospital Anantapuramu affiliated to Dr. NTR University of Health sciences after taking consent from the subjects and clearance from Institutional ethics committee and included 200 randomly selected inpatients fulfilling the criteria framed for the study. Subjects who are less than age of 30 years and more than 90 years, subjects

suffering with hypertension, diabetes, glaucoma, subjects having complicated cataract, sub luxated lens and patients with history of convulsions are excluded from the study. The included subjects were categorized into Group-A and Group-B. all the subjects underwent manual small incision cataract Surgery(MSICS) wherein Group-A cases received peribulbar anaesthesia and Group-B people received Sub tenon's Anaesthesia. All the interventions and surgery were carried out using standard protocols and procedures following which the efficacy and safety of the two methods of anaesthesia with regard to perioperative pain, akinesia, lid movements, rise in IOP and complications were compared.

All the data obtained from the study are tabulated in pretested proforma and were analysed using appropriate statistical methods.

Scales designed for standardization

Grading of pain is to be done during the administration of anaesthesia, intra operatively and post op (4 hours after surgery)

Grade 0	No pain
Grade 1	No pain / slight sensation
Grade 2	Slight pain
Grade 3	Moderate pain
Grade 4	Intense pain

Grading of akinesia during surgery is to be done at 5, 10 and 15 mins. Akinesia is scored on a scale designed to measure ocular movements in each

quadrant. According to movements in each quadrant it will be graded from Grade 0 to Grade 12.

Grade 0	No movement
Grade 1	Mild movements
Grade 2	Moderate movement
Grade 3	Severe movements

Grading of lid movements during surgery is to be done at 5, 15 and 25 mins.

Grade 0	Little or no lid squeezing.
Grade 1	Moderate or ill sustained squeezing throughout.
Grade 2	Instantaneous and sustained squeezing

Grading of Chemosis

Grade 0	No chemosis
Grade 1	Chemosis in one quadrant
Grade 2	Chemosis in two quadrants
Grade 3	Chemosis in three quadrants
Grade 4	Chemosis in four quadrants

Grading of Sub Conjunctival Haemorrhage

Grade 0	No SCH
Grade 1	SCH in one quadrant
Grade 2	SCH in two quadrants
Grade 3	SCH in three quadrants
Grade 4	SCH in four quadrants

IOP is to be measured using a Schiottz’s tonometer before giving anaesthesia and at 1 min.

RESULTS AND DISCUSSION

Pain during administration

(Table-1): Pain during Administration

Grading of pain	Peribulbar(A)		Sub tenons(B)	
	No	%	No	%
0	0	0	0	0
1	0	0	30	30.0
2	44	44.0	62	62.0
3	56	56.0	8	8.0
4	0	0	0	0
Total	100	100.0	100	100.0

$\chi^2 = 48.07$, $p < 0.001$ very highly significant

It is evident from table-1 that 62% of the subjects from the Sub tenon’s group had slight pain on administration, in the peribulbar group, 56% of patients had moderate pain and 44% had slight pain on administration of the block. It can be inferred

from this statistically significant finding that Sub tenons anaesthesia offers relatively less pain when compared to peribulbar anaesthesia. Similar findings are presented in studies conducted by Stevens JD et al, Guise PA et al and Roman SJ et al [2-4].

Intra operative analgesia

Table-2: Intra operative Analgesia

Grading of pain	Peribulbar(A)		Sub tenons (B)	
	No	%	No	%
0	32	32.0	72	72.0
1	49	49.0	21	21.0
2	16	16.0	5	5.0
3	3	3.0	2	2.0
4	0	0	0	0
Total	100	100.0	100	100.0

$\chi^2 = 31.8$, $p < 0.001$ very highly significant

Studies conducted by Kollaritis et al, Roman SJ [4-5] et al postulated Intra operative Pain is minimal in Sub tenon's anaesthesia is minimal when other methods for this type of cataract surgery. Similar findings are seen in the current study as seen in Table-2 that in the peribulbar group, 32% had no pain or sensation while 49% felt mild discomfort or slight

sensation during the surgery whereas in sub tenons group, 72% had no pain or sensation, 21% had mild discomfort but 5% experienced moderate pain at the end of the surgery during administration of subconjunctival injection. This finding is statistically highly significant.

Post-operative comparison of pain

Table -3: Post-operative Pain

Grading of pain	Peribulbar(A)		Sub tenons(B)	
	No	%	No	%
0	3	3.0	19	19.0
1	43	43.0	54	54.0
2	47	47.0	27	27.0
3	7	7.0	0	0.0
4	0	0	0	0
Total	100	100.0	100	100.0

$\chi^2 = 41.62$, $p < 0.001$ very highly significant.

Post-operative analgesia 4 hours after surgery

It is inferred from Table-3 that 43% of subjects had slight sensation or discomfort, 47% of cases had slight pain 4 hours postoperatively and in the sub tenons group, 19% cases had no pain/ no sensation,

54% had slight sensation or discomfort and 27% had slight pain 4 hours postoperatively. Similar results are observed in studies conducted by other researchers [6-7].

Akinesia (Table-4)**Table -4: Ocular movements at 5 mins**

Ocular movements at 5 mins	Peribulbar (A)		Sub tenons (B)	
	No	%	No	%
0	41	41.0	4	4.0
2	31	31.0	14	14.0
4	13	13.0	28	28.0
6	8	8.0	37	37.0
8	5	5.0	10	10.0
10	2	2.0	5	5.0
12	0	0.0	2	2.0
Total	100	100.0	100	100.0

$\chi^2 = 76.37$, $p < 0.001$ very highly significant

It is understood from current study (table-4) that at 5 mins only 4% of the Sub tenons group had no ocular movements when compared to the 41% of the Peribulbar group. At 10 mins 60% of the Peribulbar group had no movements as compared to only 12% in the Sub tenons group. 78% of the Peribulbar group has no ocular movements at 15 mins when compared

to only 15% of the Sub tenons group. However, this finding is quite variable in different studies conducted by different authors [8-9]. This Difference in the time of assessment and in the volume or mixture of the anaesthetic solution administered can explain the various reports of akinesia depending on publications.

Lid movements**Table -5: Lid movements at 15 mins**

Lid movements 15 mins	Peribulbar(A)		Sub tenons(B)	
	No	%	No	%
0	85	85.0	67	67.0
1	15	15.0	24	24.0
2	0	0.0	9	9.0
Total	100	100.0	100	100.0

$\chi^2 = 8.88$, $p < 0.05$ significant

The current study indicated that at 5 mins 66% of the peribulbar and 40% of the sub tenons group have no lid movements. At 15 mins (Table-5) none of the patients in the peribulbar group have grade 2 movements whereas 9% of the sub tenons group still

have grade 2 movements. At 25 mins 95% in the peribulbar group have no lid movements compared to 74% in the sub tenons group. Similar findings are observed in studies conducted by Kumar CM etal [10].

Intra ocular pressure

Table -06: Comparison of IOP

IOP	Peribulbar(A)		Sub tenons(B)		Z test p-value and significance
	Mean	± SD	Mean	± S.D	
Pre-op	16.21	±1.259	16.336	±1.478	Z = 0.67, p > 0.05 NS
1 min	18.82	±1.81	17.43	±1.42	Z = 6.16, p < 0.01 HS

As depicted in Table No 6, a statistically significant difference in the mean IOP between the peribulbar and sub tenons group at 1 minute after the administration of anaesthesia. The mean preoperative IOP of the peribulbar group was 16.21 mm of Hg and at 60 seconds it was 18.82 mm Hg. While in the sub

tenons group the mean IOP was 16.33 mm Hg and at 60 seconds, it was 17.43 mm Hg. The rise in IOP in the peribulbar group was more (2.6 mm Hg) as compared to the sub tenon group (1.1 mm Hg). Identical findings were noticed in other studies [11-13]

Chemosis

Table-7: Chemosis

Grading of Chemosis	Peribulbar(A)		Sub tenons(B)	
	No	%	No	%
0	65	65.0	58	58.0
1	19	19.0	26	26.0
2	14	14.0	13	13.0
3	2	2.0	3	3.0
4	0	0	0	0
Total	100	100.0	100	100.0

As for as chemosis is concerned, in the peribulbar group, 19% had chemosis in one quadrant, 14% had chemosis in two quadrants and in sub tenons group 26% had chemosis in one quadrant, 13% had

chemosis in two quadrants and 3% had chemosis in four quadrants. No significant difference is noticed in two groups with respect of chemosis. The findings tallied with study conducted by Varghese etal [14]

Sub conjunctival haemorrhage

Table -16: Comparison of Subconjunctival Hemorrhage (SCH)

Grades of SCH	Peribulbar(A)		Sub tenons(B)	
	No	%	No	%
0	64	64.0	43	43.0
1	23	23.0	48	48.0
2	10	10.0	8	8.0
3	3	3.0	1	1.0
4	0	0	0	0
Total	100	100.0	100	100.0

$\chi^2 = 13.16, p < 0.05$ significant

It is observed in our study that 23% of the subjects in peribulbar group and 48% in the sub tenons group developed sub conjunctival haemorrhage in one quadrant. This finding is correlating with studies conducted by other authors [14-15]

Complications

In the current study no complications were encountered as to lid injury, retrobulbar haemorrhage, retinal detachment as occurred in other studies. [16-18].

CONCLUSION

At the end of study, the authors would like to conclude that Perioperative pain was dramatically lower in the sub tenon group of patients with significantly fewer patients experiencing unacceptable levels of pain. Peribulbar anaesthesia had an upper hand in terms of perioperative akinesia when compared with sub tenon anaesthesia. Intraoperative lid movements were slightly more in

the sub tenon group of patients. It is observed in peribulbar group that rise in IOP was significantly higher when compared to the sub tenons group. The incidence of chemosis was almost similar in both the study groups. Subconjunctival haemorrhage was more in sub tenon group as compared with patients. On the other hand, Sub tenon's anaesthesia is superior comparatively in elimination of risks of sharp needle techniques as the anaesthetic drug volume is very little and raise of IOP is little and globe compression is not required. According to the observations made in this study, it shows that sub tenon form of anaesthesia is as safe as peribulbar technique giving good analgesia during surgery.

Conflict of Interest: None

Source of Funding: Nil

Acknowledgements

The authors sincerely thank all authors and researchers; whose articles and works are used in this publication and extend unconditional apology if their opinions are misrepresented.

BIBLIOGRAPHY

- [1]. Angra SK, Murthy GV, Gupta SK, Angra V. Cataract related blindness in India & its social implications. The Indian journal of medical research. 106, 1997, 312-24.
- [2]. Stevens JD. A new local anesthesia technique for cataract extraction by one quadrant sub-Tenon's infiltration. British journal of Ophthalmology. 76(11), 1992, 670-4.
- [3]. Guise PA. Sub-Tenon Anesthesia A Prospective Study of 6,000 Blocks. Anesthesiology: The Journal of the American Society of Anesthesiologists. 98(4), 2003, 964-8.
- [4]. Roman SJ, Sit DA, Boureau CM, Auclin FX, Ullern MM. Sub-Tenon's anaesthesia: an efficient and safe technique. British journal of ophthalmology. 81(8), 1997, 673-6.
- [5]. Kollaritis CR, Jaweed S, Kollarits FJ. Comparison of pain, motility, and preoperative sedation in cataract phacoemulsification patients receiving peribulbar or sub-Tenon's anesthesia. Ophthalmic Surgery, Lasers and Imaging Retina. 29(6), 1998, 462-5.
- [6]. Kwok AK, Van Newkirk MR, Lam DS, Fan DS. SUB-TENON'S ANESTHESIA IN VITREORETINAL SURGERY: A Needleless Technique. Retina. 19(4), 1999, 291-6.
- [7]. Parkar T, Gogate P, Deshpande M, Adenwala A, Maske A, Verappa K. Comparison of subtenon anaesthesia with peribulbar anaesthesia for manual small incision cataract surgery. Indian journal of ophthalmology. 53(4), 2005, 255.
- [8]. Chuang LH, Wu WC, Yang KJ, Tsao YP, Chen TL, Lai CC. Sub-Tenon Anesthesia for Segmental Scleral Buckling and Assessment of Postoperative Pain. Chang Gung medical journal. 25(1), 2002, 16-22.
- [9]. Rowley SA, Hale JE, Finlay RD. Sub-Tenon's local anaesthesia: the effect of hyaluronidase. British Journal of Ophthalmology. 84(4), 2000, 435-6.
- [10]. Kumar CM, Williamson S, Manickam B. A review of sub-Tenon's block: current practice and recent development. European journal of anaesthesiology. 22(8), 2005, 567-77.
- [11]. Azmon B, Alster Y, Lazar M, Geyer O. Effectiveness of sub-Tenon's versus peribulbar anesthesia in extracapsular cataract surgery. Journal of Cataract & Refractive Surgery. 25(12), 1999, 1646-50.

- [12]. Pianka P, Weintraub-Padova H, Lazar M, Geyer O. Effect of sub-Tenon's and peribulbar anesthesia on intraocular pressure and ocular pulse amplitude. *Journal of Cataract & Refractive Surgery*. 27(8), 2001, 1221-6.
- [13]. Joshi N, Reynolds A, Porter EJ, Rubin AP, Kinnear PE. An assessment of intraocular pressure during fractionated peribulbar anaesthesia. *Eye*. 10(5), 1996, 565-8.
- [14]. Varghese I, Sivaraj R, Lai YK. The effectiveness of sub-Tenon's infiltration of local anaesthesia for cataract surgery. *Clinical & Experimental Ophthalmology*. 24(2), 1996, 117-20.
- [15]. Stevens JD: A new local anaesthesia technique for cataract extraction by one quadrant subtenon infiltration. *Br J Ophthalmol* 76, 1992, 670.
- [16]. Friedman DS, Bass EB, Lubomski LH, Fleisher LA, Kempen JH, Magaziner J, Sprintz M, Robinson K, Schein OD. Synthesis of the literature on the effectiveness of regional anesthesia for cataract surgery. *Ophthalmology*. 108(3), 2001, 519-29.
- [17]. Eke T, Thompson JR. Serious complications of local anaesthesia for cataract surgery: a 1 year national survey in the United Kingdom. *British Journal of Ophthalmology*. 91(4), 2007, 470-5.
- [18]. Chuang LH, Wu WC, Yang KJ, Tsao YP, Chen TL, Lai CC. Sub-Tenon Anesthesia for Segmental Scleral Buckling and Assessment of Postoperative Pain. *Chang Gung medical journal*. 25(1), 2002, 16-22.