Original Article

Pain associated with Peribulbar Injection for Cataract surgery

Zulfiqar Uddin Syed, Haroon Javed, Amjad Akram, Amir Mustaqeem Qureshi, Tariq Shakoor, Muhammad Saqib

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See end of article for authors affiliations

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Correspondence to:
Zulfiqar Uddin Syed
Classified Eye Specialist
Combined Military Hospital
Sialkot

Purpose: Patients planned/admitted for cataract surgery have a fear of worst pain due to peribulbar injection for anaesthesia rather than surgery itself. The principal objective and aim of this evidence based study is to find out the degree of pain associated with the anaesthetic peribulbar injection for cataract surgery.

Materials and Method: This prospective randomised study was carried out at Ophthalmology department CMH Sialkot from 12th Feb2008 to 22nd April 2008. 300 patients undergoing elective cataract surgery were administered a peribulbar block. Before injection all patients were briefed about the procedure and counselled regarding the degree of pain that they may experience. Patients were asked to grade the pain of peribulbar anaesthetic injection, using a Visual Analogue Scale (VAS).

Result: Focus of the study was on the degree of pain associated with anaesthetic peribulbar injection for cataract surgery. 300 patients (180 males and 120 females) were included in the study. 200 patients were having their first surgery, they were more apprehensive especially about the injection associated pain. 100 patients with history of previous cataract surgery (61 right eye and 39 left eye operated) were calm, confident and had low anxiety level.28 (9.2%) patients claimed that they felt no pain at all. 252 (84%) patients had just needle prick to feeling of heaviness/ mild pain. Only small percentage of patients i.e. 20 (6.66%) had injection associated moderate to severe pain.

Conclusion: The study revealed that the peribulbar anaesthesia for cataract surgery is safe and highly effective. The degree of pain associated with

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peribulbar injection is much less than what the patients actually have in their mind and fear of. The study also shows 'pain threshold' and anxiety level as major factors for pain perception.

Age related cataract surgery is done under different forms of anaesthesia i.e. local anaesthesia with or without sedation, topical anaesthesia and general anaesthesia, local anaesthesia being the commonest. Different techniques have been used to administer the local anaesthesia like retro-bulbar injection, peribulbar injection and sub tenon blockade[1].

The pain often experienced during peribulbar injection for local anaesthesia is partly related to the needle prick and partly to the solution injected and it's PH (true for solutions with adrenaline). However there is evidence that adding preservative free sodium bicarbonate to the local anaesthetic solution reduces the discomfort on injection[2]. The Visual Analogue Scale (VAS) was used to grade the intensity of pain or how much pain the patient was feeling. VAS is a straight line marked from 0 to 10, with the left end of the line '0' representing no pain and the right end of the line '10' representing the worst pain. Patients are asked to mark on the line where they think their pain is[3].

MATERIAL AND METHODS

The study included 300 patients (180 male and 120 female), between the ages 24 to 95 years undergoing elective cataract surgery. All patients were pre-medicated with tablet Valium 5mg 12 hours and tablet Acetazolamide 500mg 3 hours before surgery. Pre-operatively pupil were dilated with 1% Tropicamide and 10% Phenylephrine eye drops (2.5% in hypertensive patients) at 60, 45, 30 and 15 minutes before surgery. Topically local anaesthetic 0.5% proxymethacain drops were instilled into conjunctival sac of all patients before administration of peribulbar injection and the patients were properly positioned. All peribulbar injections were given by an experienced Ophthalmologist, at the junction of middle and lateral third of lower lid using 5ml syringe having 23g lure slip 0.60,30 mm needle with a standard acidic local anaesthetic solution of 2.5ml 2% Lignocain with adrenaline 1:1000 and 2.5ml 0.5% Bupivacain, filled beforehand. Before administration of injection patients were asked to grade the pain of peribulbar injection after administering the blockade on a standard Visual Analogue Scale (provided to all the patients) which was enlarged to facilitate these visually impaired patients. Identical questions were phrased for all patients. To adjust for cofounding effects of possible prognostic factors i.e. 'pain threshold' and 'injector' spss statistical software was consulted using the 'drop pain' scores as a covariate for 'injection pain'.

RESULTS

Patients were assessed on the basis of sex, age, associated illnesses with medications including analgesics, history of cataract surgery, anxiety level and pain threshold using a Visual Analogue Scale (VAS).

300 patients were included in the study, 180 (60%) male and 120 (40%) female.

100 patients (33.3%) had previous cataract surgery. They were more confident, calm and composed before their surgery. 200 (66.7%) patients undergoing surgery for the first time were more worried and anxious about the peribulbar injection and its associated pain rather than the surgery itself.

36 (12%) patients were relaxed, calm and claimed that they had no pain at all not even a needle prick. 224 (74.7%) patients were anxious and had just feeling of needle prick and slight heaviness. 28 (9.3%) patients were very anxious and complained of mild pain during injection. 12(4.0%) patients created a panic were extremely worried, and it was difficult to administer peribulbar injection had very low pain threshold complained of moderate to very severe pain. There is strong association between anxiety level, pain threshold 'drop pain' and injection pain. Greater is the anxiety level, lower is the pain threshold and more is the pain perception. Counselling regarding injection and pain however relaxed/calmed down the anxious patients and made the administration of injection easy.

225 (75%) patients included in the study were otherwise healthy, 39 (13%) hypertensive and 25 (8.3%) diabetics. Associated diseases and their medication had no effect on the degree of pain.

Frequency distribution of injection pain reveals that 28 patients (9.3%) claimed that they had no pain at all and marked '0' on VAS. 156 patients (52%) graded their pain '1' on VAS, when they were asked to

explain, had just needle prick sensation. 66 patients (22%) felt heaviness and graded their pain '2'. 30 patients (10%) had mild pain so marked '3' on VAS.. Only 20 patients (6.66%) had moderate to very severe pain and graded their pain from '4' to '9' on VAS.

Hence most of our patients i.e. 252 patients (84%) claimed NO to mild pain i.e. '0'-'3' on VAS.

DISCUSSION

Surgery for age related cataract is the highest volume surgical procedure carried out throughout the world. Cataract surgery is almost exclusively performed as an out-patient in local anaesthesia. There are considerable national and international variations in anaesthesia management strategies for cataract surgery[4]. Regional anaesthesia for eye surgery has traditionally consisted of retro bulbar block, peribulbar block, a facial nerve block and intravenous sedation. The use of local anaesthesia has risen from around 20% in 1991 to over 75% in 1996 and 86% in 1997 and the use of sedation with local anaesthesia has fallen from 45% in 1991 to 6% in 1996[5]. Although less invasive than general anaesthesia with endotracheal intubation and less likely to be associated with postoperative nausea, local anaesthesia is not without complications like retro bulbar haemorrhage, glob perforation especially with an axial length greater than (26mm), optic nerve atrophy, oculocardiac reflex, etc[1]. The peribulbar block is performed with the patient supine and looking directly ahead. After topical anaesthesia of conjunctiva an inferotemporal injection is given half way between the lateral canthus and the lateral limbus. The needle is advanced under the globe parallel to the orbital floor and when it passes the equator of the eye it is directed slightly medial (20 degree) and cephalad (10 degree), injecting 5ml local anaesthetic solution[1]. In peribulbar block the needle does not penetrate the cone formed by extra-ocular muscles, as in retro bulbar block. Both the techniques achieve akinesia of the eye quite well. The effectiveness of regional block for cataract surgery has traditionally been assessed by describing the completeness and adequacy of globe akinesia (prevention of eye movement) and pain control[4].

Advantages of the peribulbar technique include minimum risk of globe, optic nerve and artery penetration, and less pain on injection. Disadvantages include a slower onset and an increased likelihood of ecchymosis[6].

Local anaesthetic used for nerve block must cross perineural sheath and nerve membrane. These structures are permeable to these agents only in non ionized form. Alkalinisation of anaesthetic agent also contributes to the reduction of pain in peribulbar injection due to many reasons. Firstly adjustment of pH towards 7.0-7.4 reduces direct tissue irritation caused by injection of acidic solution. Secondly, the increased relative concentration of non ionised form allows for a more rapid diffusion through tissues and results in immediate nerve blockade. Thirdly nocioceptor receptors may be less sensitive to non ionised form. Therefore the greater diffusebility of non ionised form may result in greater inhibition of pain transmission, thereby preventing nocioceptive impulses from being fully appreciated[7].

Most anaesthetic agents are weak bases, although they are supplied as acidic solution to improve stability. In this form anaesthetic agents are ionised and therefore achieve nerve blockade more slowly than alkaline and lipid soluble solution/agents. Alkalinisation of local anaesthetic agent with bicarbonate increases the amount of non ionised form, lipid solubility and despite ionised form being active in solution, penetrate the membrane and tissues faster[8].

Regarding pain associated with administration of block, there was obvious evidence that peribulbar block was slightly less painful than retro-bulbar block and weak evidence that sedation or analgesia improves anxiety level, pain relief and patient satisfaction during cataract surgery and that one sedative or analgesic agent was superior to the other[9].

The pain experienced during injection is also related to the temperature of Injectate and speed of delivery of the solution. Pain is much reduced if solution is at body temperature and delivered slowely[10].

Table 1: Sex wise distribution of patients

	Frequency n (%)	Valid %	Cumulative %
Valid Male	180 (60)	60	60
Valid Female	120 (40)	40	100
Total	300 (100)	100	

Table 2: Patients with history of cataract surgery

	Frequency	Valid %	Cumulative

	n (%)		%
Valid No	200	66.7	66.7
Right Eye	61	20.3	87
Left Eye	39	13.0	100
Total	300 (100)	100	

Table 3: Anxiety level

	Frequency n (%)	Valid %	Cumulative %
Valid Calm	36 (12)	12	12.0
Anxious	224 (74.7)	74.7	86.7
V. Anxious	28 (9.3)	9.3	96.0
Panic	12 (4)	4.0	100
Total	300 (100)	100	

Table 4: Co. Morbid

	Frequency n (%)	Valid %	Cumulative %
Valid No	225 (75)	75	75
DM	25(8.3)	8.3	73
HTN	39(0.3)	13	96.3
Arthritis	1(03)	0.3	96.7
Asthma	7(2.3)	2.3	99
Uveitis	1(0.3)	0.3	99.3
Glaucoma	2 (0.7)	0.7	100
Total	300 (100)	100	

In our study, Table 5 revealed that majority of the patients 156 (52%) had just needle prick sensation, i.e. '1' on VAS and only few patients experienced severe pain '8' and'9'on VAS.

Table 5: Frequency distribution of peribulbar injection pain

	Frequency n (%)	Valid %	Cumulative %
Valid 0.00	28 (9.3)	9.3	9.3
1.00	156 (52.0)	52.0	61.0
2.00	66 (22.0)	22.0	83.3
3.00	30 (10.0)	10.0	93.3
4.00	5 (1.7)	1.7	95.0
5.00	6 (2.0)	2.0	97.0
6.00	6 (2.0)	2.0	99.0
7.00	1 (0.3)	0.3	99.3
8.00	1 (0.3)	0.3	99.7
9.00	1 (0.3)	0.3	100
Total	300 (100)	100	

CONCLUSION

A variety of commonly employed anaesthesia management strategies for cataract surgery appears to be safe and effective. There is obvious evidence that peribulbar block is less painful than retro bulbar block[4]. Our study also revealed that the degree of pain associated with peribulbar injection for cataract surgery is much less than what the patients actually have in their mind and fear of. Counselling improves patient satisfaction, lowers anxiety and hence pain perception.

Brief patients about the peribulbar injection, its administration and the way it will help them as well as the surgeon during cataract surgery (analgesia and akinasia).

Reassurance, that the degree of pain they will have with peribulbar injection and cataract surgery is much less than what they actually have in their mind and fear of.

Author's affiliation

Dr. Zulfiqar Uddin Syed
Classified Eye Specialist
Combined Military Hospital
Attockt

Haroon Javed
Classified Eye Specialist
CMH, Sialkot

Lt. Col. Dr. Amjad Akram
Classified Eye Specialist
CMH, Multan

Amir Mustaqeem Qureshi
Classified Eye Specialist

CMH, Okara

Tariq Shakoor
Classified Eye Specialist
CMH, Lahore

Dr. Muhammad Saqib
Classified Anaesthetist
Department of Anaesthesia
CMH, Sialkot

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