Intraocular Pressure Changes To Peribulbar Anaesthesia And The Effect Of Digital Massage

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Citation

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Abstract

Background: To observe the effects of peribulbar injection of local anaesthetic agent and digital massage on intraocular pressure in patients undergoing elective cataract surgery.

Methods: 35 eyes of patients for elective cataract surgery were recruited for the study. Each received a fixed volume local anaesthetic agent by the peribulbar technique and subsequent external digital massage. IOP was measured immediately before and after the injection was given, and at 5and 10 minutes of digital massage.

Results: 32(91.47%) of the eyes had a rise in intraocular pressure. There was a mean IOP rise of 8.68mmHg from a mean pre-injection IOP of 11.26 mmHg. This was statistically significant, (P=0.000).The mean IOP recorded at 5 and 10 minutes of massage were 6.57mmHg and 3.37mmHg.The fall from the immediate post injection pressure were statistically significant, (P=0.000).

Conclusion: Our findings show that intraocular pressure rises in great majority of eyes following peribulbar injection for cataract extraction. External digital massage is effective in lowering this pressure.

INTRODUCTION

Peribulbar injection of local anaesthetic agent is one of the techniques of anaesthesia in cataract surgery [1,2] . It is used to achieve akinesia and anaesthesia of the globe. It involves injection of the agent into the extraconal space, a tissue compartment[3]. This compartment is confined centrally by the muscle cone, laterally by the periosteum and bony wall of the orbit, and anteriorly by the orbital septum and conjunctiva. This method of block was developed to avoid some of the complications associated with retrobulbar anaesthesia [4,5] in which the agent is deposited in the intraconal space. Because of the confinement of these boundaries, orbital pressure rise which is transmitted to the globe thus raising the intraocular pressure (IOP) is expected. The extent to which the IOP rises following the injection, and external digital massage reduces it in Nigerians is what this study is designed to show.

MATERIALS AND METHODS

The study was carried out on 35 eyes of 35 patients admitted for elective cataract surgery. During the period of the study, all admitted patients were selected who met the requirements. Patients with a history of glaucoma, previous ocular surgery , secondary cataract and those under general anaesthesia were excluded from the study.

Informed consent was obtained from the patients .Each patient was placed in a prone position. The periocular and preauricular areas were wiped with spirit swab. 5ml of 2% Lignocaine with adrenaline (1:100,000 dilution) was administered into the peribulbar space through two injection sites. 3ml was delivered through the skin from the junction between the middle and lateral 1/3rd of the inferior orbital margin. 2ml was given at the junction between the middle and nasal 1/3rd of the superior orbital margin. 5ml of the agent was used for facial block by the O'Brien's method to achieve orbicularis akinesia. A 23guage needle measuring 30mm was used for the injections, mounted on a ten ml syringe. The IOP was measured with the handheld Perkin's applanation tonometer immediately before and after the injections. Digital massage was then commenced. The

massage was carried out with the index and middle fingers of both hands, with the former resting on the cornea. Firm pressure was applied for two seconds and then released for the next two seconds and continued in this manner. The IOP was taken at the end of 5 and 10 minutes of massage. All the procedures and observations were carried out by the same observer for uniformity and elimination of interobserver error. The results were analysed using the Student's T-test.

RESULTS

35 eyes of 35 patients were studied. The results are summarised in tables 1 and 2.

Figure 1

Table 1: Intraocular pressure readings.

	IOPmmHg			
Subject	Pb	Pa	P_5	P_{10}
1	8	26	4	4
2	12	14	5	0
3	19	34	14	9
4	13	24	14	10
5	10	36	14	8
6	11	31	2	0
7	15	23	2	0
8	12	16	8	0
9	18	22	4	0
10	14	23	6	2
11	10	14	1	0
12	6	26	8	5
13	8	20	6	5
14	16	16	8	6
15	6	14	4	1
16	11	13	4	2
17	6	14	3	2
18	14	18	10	6
19	10	16	8	4
20	13	32	14	10
21	14	42	10	5
22	10	16	2	2
23	13	16	7	2
24	14	20	10	2
25	10	10	6	2
26	12	16	4	2
27	7	24	6	4
28	14	16	6	4
29	7	14	2	2
30	4	10	4	0
31	16	22	10	7
32	10	12	7	2
33	11	12	2	0
34	10	10	5	1
35	10	26	20	9

Pb=IOP immediately before injection.
Pa=IOP immediately after injection.
P_5=IOP after 5 minutes of massage.
P_{10}=IOP after 10 minutes of massage.

Figure 2

Table 2: Comparing pre and immediate post injection pressures.

IOP range mmHg	No of eyes	
	Pre-injection	Post-injection
0-5	0	0
6-10	16	3
11-15	15	8
16-20	4	10
21-25	0	6
26-30	0	3
>30	0	5
Total	35	35

All the patients had IOP of 20mmHg or less pre-injection, but post injection, 14 of the eyes had IOP above 20mmHg.

PRE-INJECTION IOP

The mean pre-injection pressure was 11.26 mmHg(±3.51).The individual IOP ranged from 4-19mmHg.

Immediate Post-Injection IOP

The mean immediate post injection pressure was 19.94 mmHg (±7.93).The values ranged from 10 to 42mmHg.

There was a mean pressure rise of 8.68mmHg from the pre-injection pressure.

IOP AT 5 MINUTES OF DIGITAL MASSAGE

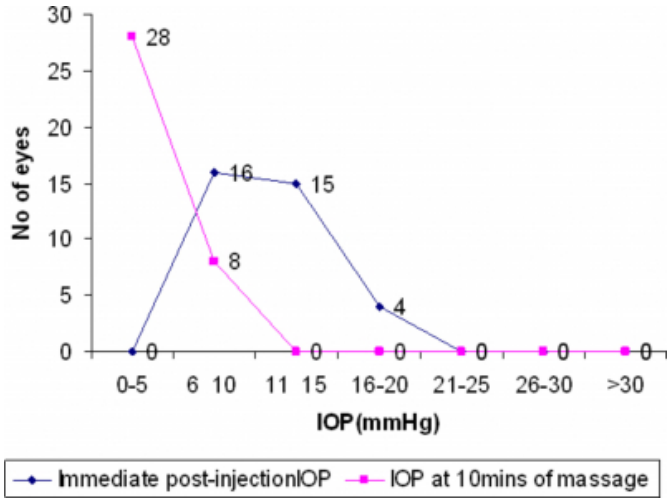
The mean IOP after 5 minutes of digital massage was 6.57 mmHg (±4.36).The IOP recorded ranged from 1mmHg to 14mmHg.This showed a mean drop of 13.37mmHg from the immediate post-injection pressure(P=0.00).

IOP AT 10 MINUTES OF DIGITAL MASSAGE

The mean IOP after 10minutes of digital massage was 3.37mmHg (±3.12).The pressures ranged from 0 to 10mmHg.This showed also a mean drop of 16.57mmHg from the immediate post-injection pressure. This was statistically significant (P=0.00). Refer to Fig.1.

Figure 3

Figure 1: Comparing Immediate Post-Injection Iop And The Pressure At 10 Minutes Of Massage



28 of the 35 eyes had IOP values that fell within the 0-5mmHg range at 10mins of digital massage, while no such value was recorded immediately post injection. No eye had a pressure of greater than 15mmHg at 10minutes of massage, unlike the post injection pressures.

The results show variable individual responses to intraocular pressure.8.57%, that is 3 of the 35 eyes did not show any change in the pressure. The amount of rise was not synonymous with the starting pressure. These patients who had no change in IOP also had minimal akinesia and had to be given supplemental injections. The difference between the mean pre-injection and mean post-injection intraocular pressures was statistically significant (P=0.00).

DISCUSSION

Peribulbar anaesthesia has been shown to cause rise in intraocular pressure 6,7,8 .The study shows that not only does a rise occur following peribulbar injection of local anaesthesia but that the level of rise is variable and sometimes very high. The IOP rise could be attributed to the volume of the agent used, as well as other factors like the orbital volume and tightness in the orbital septum. Some authors have also recorded marked rise in IOP over 50mmHg in ten patients 8.The patients who showed no change in IOP after the injection had to be given additional injection to achieve akinesia.A total of up to 15 ml of agent was given in one patient. With digital massage, there was an appreciable and significant fall in the intraocular pressure. By 10minutes of massage, there was further fall in IOP. Pressure of 0mmHg was recorded in eight of the patients. Digital massage has been shown to effectively lower the IOP prior to cataract extraction. The most rapid fall was observed to occur in the first 5 minutes of massage in this study.

Digital massage is not standardized and unfortunately the pressure exerted has not been measured and will vary greatly among persons. Pressure exerted could be presumably high and may be enough to induce retinal vascular occlusion. However, the intermittent release employed during the digital massage in this study will likely re-establish the circulation promptly and adequately.

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