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Original Research Paper

Short Term Effect of Intravitreal Injection of Bevacizumab on Intraocular Pressure

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Abstract

Purpose: *To study the short-term effect of intravitreal injection of bevacizumab on intraocular pressure (IOP).*

Methods: *Total of 180 patients were included in this study who received intravitreal injection of bevacizumab (1.25mg/0.05ml;Avastin) for various intraocular conditions like macular edema associated with diabetic retinopathy, wet –age related macular degeneration and macular edema in retinal venous occlusions. IOP was measured at just before giving injection and then at 5minutes, 10 minutes, 30 minutes, 60 minutes, 24 hours, day 3 and day 7 post injection using Goldman Applanation tonometry.*

Results: *Mean pre-injection IOP was 14.41±3.64 mmHg which rose to mean IOP of 39.08±9.54 mmHg (p value-0.000) at 5 minutes after giving injection. Mean IOP was 32.79±7.66 mmHg (p value-0.000) at 10 minutes, 27.16±6.41 mmHg (p value-0.000) at 30 minutes, 23.26±5.25mmHg (p value 0.000) at 60 minutes, 14.78±3.62 mmHg (p value-0.013) at 24 hours, 14.6±3.59 mmHg (p value -0.164) at day 3 and 14.53±3.55 mmHg (p value-0.327) at day 7 after giving the injection.*

Conclusion: *we found that IOP can quite high just after giving intravitreal injection which usually comes down to normal range within an hour after injection. so there is no need to give antiglaucoma medication like oral acetazolamide or topical drops to control IOP in these patients.*

Introduction

Intravitreal injections is a common procedure done nowadays by vitreoretinal specialists. Various drugs that are given by intravitreal route include anti-VEGF (Ranibizumab, Bevacizumab, Pegaptanib), triamcinolone acetonide, antibiotics etc. Intravitreal injections is a relatively safe procedure with none or few non- sight threatening complications which include post-injection IOP rise, subconjuctival hemmorhage, vitreous hemmorhage, RPE tear and Endophthalmitis. Though a safe procedure it is important to investigate ways to ensure patient safety while improving the overall patient experience.

Post injection care is very important for patients receiving intravitreal injections and monitoring IOP changes following injection is part of it. Recent guidelines for intravitreal injections recommend monitoring of IOP after injection and provide therapy when elevated IOP warrants

intervention[1].However when to best monitor IOP is debatable. In clinical trials with ranibizumab and pegaptanib, IOP was measured upto one hour following injection[2]. A series on pegaptanib injections has demonstrated short-term safety from an IOP standpoint when patients were evaluated at 30 minutes and 5 to 7 days later and questioned the need for IOP monitoring after 30 minutes after injections[3].Although some studies conclude monitoring of IOP may not be necessary, others suggest monitoring of IOP post-injection but do not give guidance as to when or for how long it should be monitored.[4] Some studies even suggest to do paracentesis following injections[3].

In current practice intravitreal injections are given in different volumes and with different needle bore size. We studied the short term IOP changes following intravitreal injection of bevacizumab (1.25mg in 0.05ml) using a 30 gauge needle in all patients to know weather is it necessary to do post-injection monitoring of IOP or not. This may enhance patient experience by avoiding repeated IOP measurements and shortening clinic visit times.

Methods

This was a prospective study of intravitreal injections given by a single retina specialist in an out-patient setting between July 2016 and October 2016 in a tertiary care hospital in north India. This study was approved by the ethical committee of the institute. The needle used was a 30 gauge bore size. Bevacizumab (Avastin: Genentech, San Francisco, California, USA) was used in a dose of 1.25mg in 0.05 ml of solution in all patients with different retinal pathologies. Patients who were having glaucoma were excluded from the study.

Written consent was taken from all patients. Before injection periocular skin and lid margins were drapped with 10% povidone iodine and 5% povidone iodine drops were put into conjuctival sac and then washed with sterile saline. Eye drape was put and self retaining lid speculum was applied. Sterile cotton tipped applicator was soaked in 4% xylocaine and kept at injection site for one minute. Injection site was supero-temporal quadrant 3.5 to 4mm from limbus. Conjuctiva was slightly displaced at injection site before injection and after injection, injection site was occluded temporarily and was massaged with cotton tipped applicator to prevent the reflux.

IOP was measured before injection and post injection monitoring was done at 5min, 10min, 30min, 60min, 24 hours, 3rd day and 7th day after injection using Goldman applanation tonometer under aseptic conditions.

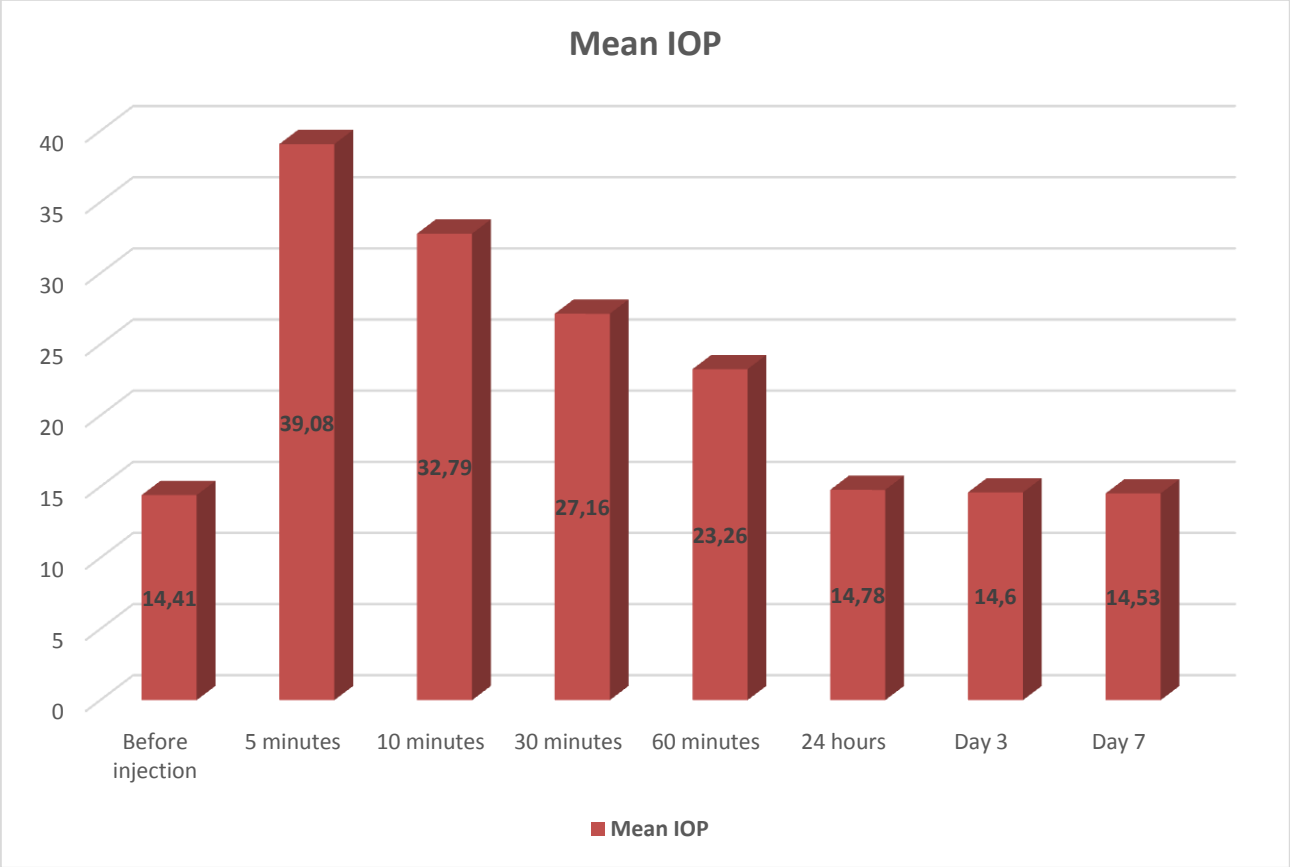
Results

Mean age of the 180 patients was 47.8 years±7.8 years.

There were 106 males and 74 females.

Mean pre-Injection IOP was 14.41±3.64 mmHg which rose to a mean IOP of 39.08±9.54 mmHg five minutes after injection. This subsequently started to decrease and almost reached the pre-injection baseline at day 7 of injection (14.53±3.55mmHg).

	Range of IOP (mmHg) n=180	Mean ±SD (mmHg)	t-stat (n=180)	p-value
Before injection	10-22	14.41±3.64		
5 minutes	20-52	39.08±9.54	39.81	0.000
10 minutes	17-40	32.79±7.06	38.24	0.000
30 minutes	14-34	27.16±6.41	25.81	0.000
60 minutes	14-31	23.26±5.25	23.65	0.000
24 hours	11-27	14.78±3.62	2.48	0.013
Day 3	12-22	14.6±3.59	1.39	0.164
Day 7	12-22	14.53±3.55	0.981	0.327



Discussion

Since the intravitreal injections is the preffered route of drug administration for many conditions like macular edema associated with diabetes, retinal venous occlusions and posterior uveitis and other conditions like neovascular AMD, investigating the need for IOP monitoring is very important for patient safety. In this study we tried to know the importance of IOP monitoring in these patients. In this study we found that IOP spikes after intravitreal injections is very common but fortunately these IOP spikes are transient and do not threaten patients vision. This is in agreement with the previous studies[3,4,5]. In our study the intravitreal injections were well tolerated by the patients with normalisation of IOP to less than 30mmHg in all patients by 60 minutes and thereafter remained normal in subsequent follow-ups. This is in agreement with the study done by Judy E Kim et al[6] who found that normalisation of IOP was below 30mmHg within 30 minutes after giving the injection, but they did not did monitoring after 30 minutes. They also found that IOP rise after intravitreal injection was dependant on needle bore size and volume of drug injected. They found that IOP rise was more in small bore needle size due to less chances of reflux and in patients in which higher volume of drug was injected (like in triamcinilone in which 0.1 ml of drug is needed).

We excluded the patients with glaucoma, so it is possible that IOP normalisation may be delayed in these patients. Information on short term IOP changes in eyes with glaucoma is limited and clinical trials on antivascular endothelial growth factor therapies tend to exclude eyes with glaucoma. In two studies that included glaucoma patients, one found that glaucoma was not a statistically significant variable, and the other found that eyes with glaucoma were less likely to have an IOP less than 35 mmHg at 10 minutes after injection, but this difference became less marked with time[7]. Judy E Kim et al[6] found that eyes with preexisting glaucoma took longer time to achieve an IOP to less than 30 mmHg within 30 minutes. This may be because of the compromised outflow. So a study with good number of

glaucoma patients is required to know the actual trend of post injection IOP in these patients.

The another factor that affect the post injection IOP is the needle bore size. In our study we used only 30 gauge needle but needle with a larger size like 27 gauge may have a different results. Judy E Kim[6] et al found that incidence of IOP elevation was higher in small bore needle than larger bore needles, this is most likely because of less reflux through a small bore needle, whereas larger bore needle allow more reflux. In addition to needle size and volume of drug, other factors such as size of globe and sclera rigidity also may play a role in IOP spike after intravitreal injections. In absence of variable of reflux, hyperopic eyes may have higher IOP elevation after injection because of smaller size of the globe [8].

In conclusion all eyes in our study achieved normalisation of IOP within one hour and remained normal thereafter too without need for any intervention such as paracentesis or antiglaucoma drugs like oral acetazolamide. Therefore in most cases repeated or prolonged IOP monitoring after intravitreal injections may not be necessary, and such an absence does not seem to compromise patient safety. In cases where more than 0.05 ml of drug is injected with a small bore needle or in patients with history of glaucoma, cautious monitoring of IOP may be needed, because these eyes seem to have a higher incidence of significant pressure hike post injection.

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