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Effect of single intravitreal triamcinolone acetonide injection on intraocular pressure and retinal nerve fibre layer thickness

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Abstract
Purpose: To investigate the intraocular pressure (IOP) changes following intravitreal triamcinolone acetonide (IVTA) injection for inflammatory, proliferative and edematous diseases of posterior segment of eye.
Design: Prospective longitudinal interventional study.
Methods: The prospective longitudinal study included 30 with posterior uveitis (n=12), retinal vascular occlusive diseases (n=10), Eales' disease (n=6), pseudophakic cystoid macular edema (n=1) and idiopathic cystoid macular edema (n=1). 4 mg of IVTA injection IOP increased significantly from baseline IOP of 14.27±3.53 mm Hg to mean IOP of 16.54± 4.29, 18.54± 5.50, 19.00± 5.98, 18.82± 5.00 and 22.50±0.71 mm Hg at 2, 4, 6, 8 and 12 weeks follow up respectively. In study group IOP elevation of ≥6 mm Hg from baseline was seen in 17 out of 30 eyes (64.71% males and 35.29%females). The majority of patients belonged to younger age group. An IOP elevation was seen in 58.82% and 88.24% eyes upto 4 and 6 weeks follow up respectively. In 15 out of 17 eyes, IOP was controlled with topical anti-glaucoma medications while 2 eyes required filtering glaucoma surgery.
Conclusions: After 4 mg of IVTA injection 57.67% of eyes developed IOP elevation ≥6 mm Hg from baseline. In 88.24% eyes raised IOP was controlled with topical anti-glaucoma medications. There was no statistically significant change observed in retinal nerve fibre layer thickness upto 12 weeks follow up, despite elevated IOP. Besides glaucoma no other complication was observed upto 12 weeks of follow up.

Keywords: intravitreal triamcinolone acetonide (IVTA) injection, intraocular pressure (IOP)

Introduction
Triamcinolone acetonide (TA) is a long acting, depot preparation of triamcinolone, which is a potent synthetic corticosteroid with marked anti-inflammatory action that forms the basis for most of its therapeutic uses. It has highly selective glucocorticoid activity without significant mineralocorticoid action and low water solubility in contrast to dexamethasone, insuring its longer persistence in vitreous. The mean elimination half-life of 4mg IVTA injection is 18.6 days in non vitrectomised human eyes (18.7± 5.7 days) and 3.2 days in vitrectomised eyes. In addition complete elimination of TA is not achieved until 93±28 days in non vitectomised eye (Beer *et al*., 2003) [5].
The most commonly reported side effect of IVTA is a transient rise in intraocular pressure (IOP) (Wingate and Beaumont, 1999 and Massin *et al*.., 2004) leading to a secondary chronic open angle glaucoma (Becker and Ballin, 1965; Bigger *et al*., 1972) [6]. Although the mechanism of post-IVTA IOP increase is not completely understood, the only histopathological specimen obtained during a trabeculectomy showed necrotic changes without deposition of TA (Antcliff *et al*, 2001). Clark *et al*, (2005) proposed increased resistance to aqueous outflow due to microstructural changes in the trabecular meshwork, as the mechanism responsible for IOP elevation.
The results on IOP elevation following IVTA differ in every report that has investigated the phenomenon. Using the standard low-dose TA concentration of 4 mg, mild-to-moderate IOP elevation has been reported in 28% to 42% of patients, typically within first 3 months after injection. Wingate and Beaumont, (1999) [39] reported IOP elevation of more than 5 mmHg in 32% of patients after 4-mg IVTA injection and more than 10 mmHg in 11%. Danis *et al*, (2000) reported IOP elevation in 25% of patients after 4-mg IVTA. Shukla *et al*., (2007) [31] observed that innately higher endogenous cortisol levels probably make younger patients more vulnerable to the effects of exogenous steroids but the treatment of raised IOP remained similar to that in older patients.

Elevated blood levels of corticosteroids of endogenous production, as seen in adrenal hyperplasia or neo-plasia (Cushing syndrome) can also cause increase in IOP. After adrenalectomy, increased IOP may retune to normal values (Cohen, 2011) [10]. However other studies failed to show associations between IOP elevation and gender (Smithen *et al*, 2004 and Vasconcelos-Santos *et al*, (2008) [32, 37].

Optical coherence tomography (OCT) is a commonly used imaging technology in the evaluation of glaucomatous structural damage. Once glaucoma is diagnosed, a sensitive method for detection of progression is essential because appropriately intensifying treatment can slow retinal ganglion cell (RGC) loss and preserve vision. The detection of glaucoma progression with OCT remains a challenge because when assessing structural changes over time, it is difficult to discriminate between glaucomatous structural damage and measurement variability or age-related structural loss. Leung *et al*, (2012) conducted a study to examine the use of RNFL thickness map to detect RNFL progression and identify the pattern of progressive changes of RNFL defects in glaucoma. They concluded that analysis of serial RNFL thickness maps generated by the spectral-domain OCT facilitates the detection of RNFL progression in glaucoma.

Xu *et al*, (2014) in a prospective longitudinal study found that ONH surface depression occurred before RNFL thinning in a significant proportion of patients with glaucoma. A time window for therapeutic intervention may exist on detection of ONH surface depression before there is observable RNFL thinning in glaucoma.

The most commonly reported side effect of IVTA injection is transient rise in IOP. Various authors have reported rise in IOP after IVTA injection (Singh *et al*, 2004; Jonas *et al*, 2005; Bakri *et al*, 2009) [8, 15]. Till date no study has been done to evaluate changes in retinal nerve fibre layer thickness due to intraocular pressure elevation following IVTA injection in various inflammatory pathologies of posterior segment of eyes.

Materials and Methods

The present study was a hospital based prospective study conducted at the Institute of Ophthalmology, Jawaharlal Nehru Medical College Aligarh Muslim University, Aligarh. Tenets of the declaration of Helsinki were followed. Ethics committee clearance was obtained from the institutional ethics committee. A well informed written consent for repeated ocular examination, fundus fluorescein angiography (FFA), OCT and IVTA injection was taken from all patients recruited in the study.

Study group comprised of 30 eyes of 30 patients having inflammatory, proliferative or oedematous diseases of posterior segment requiring IVTA injection. All patients received one intravitreal injection of 4mg of preservative free TA in 0.1ml (injection Aurocort 40mg/ml by Aurolab pharmaceuticals) trans conjunctively through pars plana with a 27G needle attached to a tuberculin syringe under aseptic conditions. Control group consisted of 30 untreated healthy other eye of the patients enrolled in the study.

Patients who have had previous intra-ocular surgery, ocular trauma, glaucoma, infective ocular disease, received laser photocoagulation, received systemic or local corticosteroids within past 4 wks, eyes with significant corneal opacities, dense cataract, and significant vitreous haze or hemorrhage were excluded.

Posterior segment OCT (Cirrus HD-OCT Model 5000, Carl Zeiss Meditec) was done at baseline and in the follow ups at 6 weeks and at 12 weeks. FFA was done before IVTA injection and in the follow- up after IVTA and later whenever possible during follow-up.

IOP was measured before IVTA injection, and at intervals of 2 weeks upto follow up period of 12 weeks after IVTA injection using applanation tonometry. Topical anti-glaucoma medication was initiated if IOP elevation of ≥6 mm Hg from baseline was measured.

Statistical analysis was done using SPSS software version 21. Continuous variables were expressed as means, standard deviation (SD) & range. Paired t- tests was used to assess the statistical significance of differences in various variables at baseline and in the follow up within the group. The difference was considered as statistically significant when p value < 0.05.

Results

The study group included 30 patients (30eyes) (17 males and 13 females, the age ranged from 15 to 75 years with the mean age of 36.36±16.93 years) with posterior uveitis (n=12, 40%), retinal vascular occlusive diseases (n=10, 33.33%), Eales' disease (n=6, 20%), pseudophakic cystoid macular edema (n=3.33%) and idiopathic cystoid macular edema (n=1, 3.33%). Out of 30 patients enrolled in the study 17 (56.57%) were males and 13(43.33%) were females. Maximum number of patients were seen in the 20-30 years of age group. (Table: 1)

Table 1: Age and Gender Wise Distribution of Patients

Age Range (Years)	Males No. (%)	Females No. (%)	Total No. (%)
≤10	0	0	0
11-20	4 (13.33)	2 (6.67)	6 (20.00)
21-30	5 (16.67)	4 (13.33)	9 (30.00)
31-40	1 (3.33)	1 (3.33)	2 (6.67)
41-50	5 (16.67)	3 (10.00)	8 (26.67)
51-60	0	1 (3.33)	1 (3.33)
61-70	2 (6.67)	1 (3.33)	3 (10.00)
71-80	0	1 (3.33)	1 (3.33)
Total	17 (56.57)	13(43.33)	30(100.00)

The mean intraocular pressure (IOP) at baseline before IVTA injection in study group was 14.27±3.53 mm Hg. After IVTA injection mean IOP increased to16.54± 4.29, 18.54± 5.50, 19.00± 5.98, 18.82± 5.00 and 22.50±0.71 mm Hg at 2 weeks, 4 weeks,6 weeks, 8 weeks and 12 weeks follow up respectively (p<0.05). The mean intraocular pressure (IOP) in control group was 14.20±3.25, 14.25± 3.01, 15.58± 3.90, 14.53± 3.69, 13.33± 3.46, and 14.74±3.29 mm Hg at baseline, 2 weeks, 4 weeks,6 weeks, 8 weeks and 12 weeks follow up respectively. The mean changes in follow up were not found to be statistically significant at all follow ups (p>0.05) (Table 2, 3 and Figure: 1).

Table 2: Mean Intraocular Pressure on Follow-Up after IVTA

Time of Examination	Intraocular Pressure (mm Hg) (Mean±SD)	
	Study Group	Control Group
Baseline	14.27±3.53	14.20±3.25
2 weeks	16.54±4.29 (0.028)	14.25±3.01 (0.190))
4 weeks	18.54±5.50 (0.000)	15.58±3.90 (0.066)
6 weeks	19.00±5.98 (0.000)	14.53±3.69 (0.705)
8 weeks	18.82±5.00 (0.008)	13.33±3.45 (0.205)
12 weeks	22.50±0.71 (0.001)	14.74±3.29 (0.553)

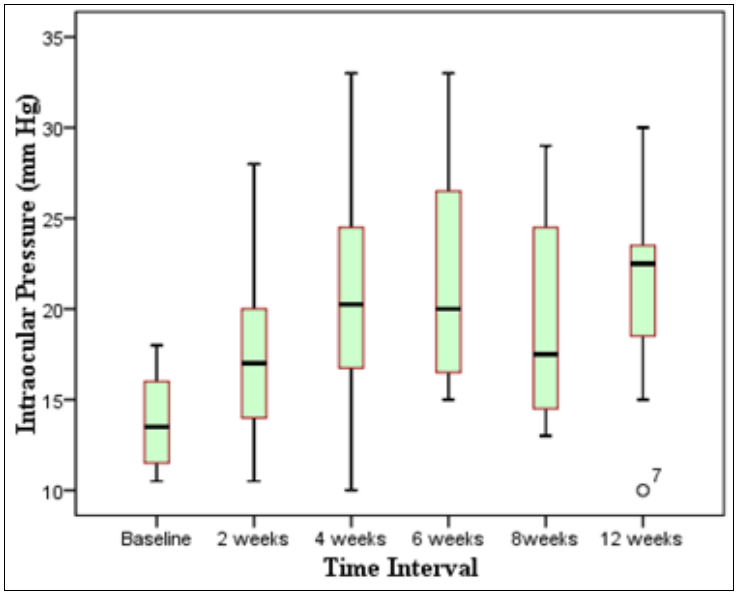

Fig 1: Effect Of Intravitreal Triamcinolone acetonide on Intraocular Pressure in Study group

Out of 30 eyes in the study group IOP elevation of ≥6 mm Hg from baseline was seen in 17 (57.67%) eyes (Table 3). Out of which 11 (64.71%) were males and 6 (35.29%) were females. The majority i.e.,12 (70.59%) eyes developing IOP elevation ≥6 mm Hg belonged to younger age groups who were less than 30 years of age. 8 (47.05%) eyes were of patients in 21-30 years age group (Table: 3).

Out of total 17 males patients enrolled in the study 11 patients (64.74%) and out of 13 female patients 6 patients (46.15%) developed IOP elevation of ≥6 mm Hg from baseline IOP.

In 8 out of 12 eyes (66.67%) of posterior uveitis and 4 out of 6 eyes of Eales' disease an IOP elevation of ≥6 mm Hg was seen from baseline and majority of these patients were from younger age group.

Table 3: Age And Gender Wise Distribution of cases with intraocular pressure Elevation of ≥6 mm Hg from Baseline

S. No	Age Range (Years)	Total No. Of Patients (%)	No. Of Cases With IOP Elevation of ≥6 mm Hg From Baseline		
			Male	Female	Total (%)
1	≤10	0	0	0	0 (00.00)
2	11-20	6	2	2	4(23.53)
3	21-30	9	4	4	8 (47.06)
4	31-40	2	0	0	0(00.00)
5	41-50	8	5	0	5 (29.41)
6	51-60	1	0	0	0 (00.00)
7	61-70	3	0	0	0 (00.00)
8	71-80	1	0	0	0 (00.00)
Total (%)		30	11(64.71)	6 (35.29)	17 (100.00%)

In 15 out of 17 (88.24%) eyes which developed IOP elevation, IOP was controlled with topical anti-glaucoma medications. However in 2 eyes filtering glaucoma surgery was done to control increased IOP.

An IOP elevation of ≥6 mm Hg from baseline was seen in 10 out of 17 eyes (58.82%) upto 4 weeks after IVTA injection and 15 out of 17 eyes (88.24%) IOP elevation was seen upto 6 weeks follow up (Table: 4).

Table 4: Eyes with Intraocular Pressure (IOP) Elevation of ≥ 6 mm of Hg after Intravitreal Triamcinolone Acetonide Injection on Follow-ups

Time of Examination	1 Week	2 weeks	4 weeks	6 weeks	8 weeks	12 weeks
No. (%)	3 (17.65)	3 (17.65)	4 (23.53)	5 (29.41)	0 (0.00)	2 (11.77)

Mean Retinal Nerve Fibre Layer Thickness on Follow-Ups after Intravitreal Triamcinolone Acetonide Injection in study group

Changes in Average Retinal Nerve Fibre Layer Thickness: The mean baseline average retinal nerve fibre layer thickness in 30 eyes of 30 patients in study group was 117.63±49.11µm. After intravitreal triamcinolone acetonide injection it decreased to 111.60±44.29 µm at 6 weeks follow up which was not found to be statistically significant (p= 0.078). At 12 weeks follow up mean average retinal nerve fibre layer thickness slightly decreased to 108.53±25.29µm which was not found to be statistically significant (p= 0.282. The mean average retinal nerve fibre layer thickness in 30 control eyes were 94.47±11.01 µm, 93.79±10.51 µm and 92.92±11.63 µm at baseline, 6 weeks and 12 weeks follow up respectively. These changes in mean average retinal nerve fibre layer thickness from baseline were not found to be statistically significant (p>0.05) (Table: 5) (Figure 2,3 and 4).

Table 5: Mean retinal nerve fibre layer thickness on follow-ups after intravitreal triamcinolone acetonide injection in study group

RNFL Thickness (µm)± SD	Time of Examination					
	Study Group			Control Group		
	Baseline	6 weeks	12 weeks	Baseline	6 weeks	12 weeks
Average RNFL Thickness	117.63±49.11	111.60±44.29(0.078)	108.53±25.29(0.282)	94.47±11.01	93.79±10.51 (0.425)	92.92±11.63 (0.788)
Superior RNFL Thickness	140.23±66.20	126.07±39.60(0.109)	128.33±50.46(0.224)	113.90±16.74	112.45±18.42(0.335)	114.50±16.60(0.527)
Inferior RNFL Thickness	155.03±69.89	152.40±70.78(0.509)	155.23±63.02(0.982)	119.05±20.57	118.95±19.77(0.945)	113.40±19.54(0.106)

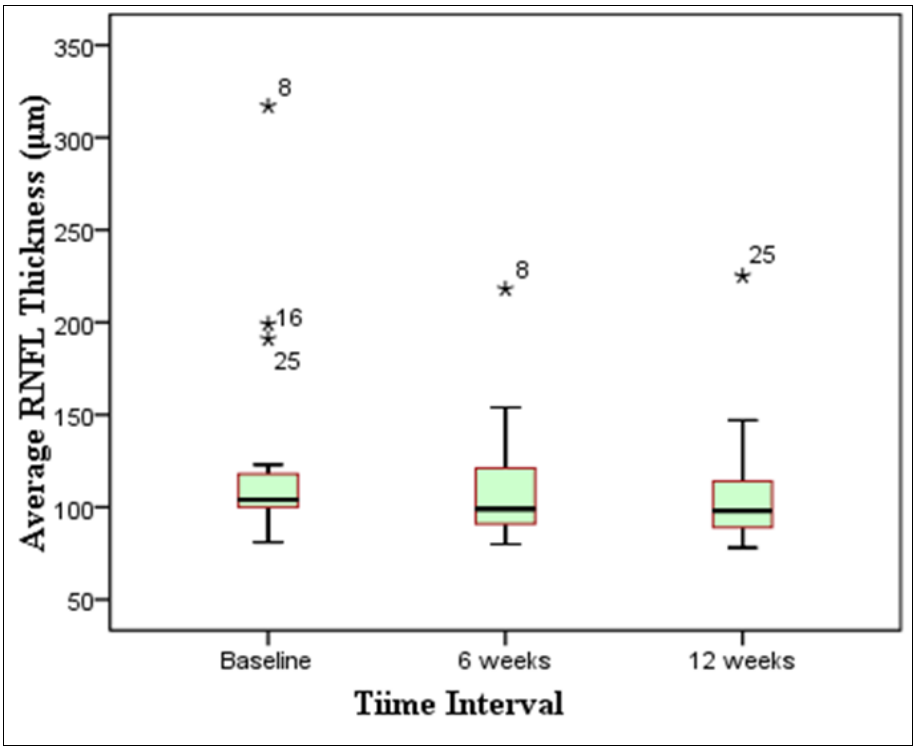

Fig 2: Effect of intravitreal triamcinolone acetonide injection on average retinal nerve fibre layer thickness in study group

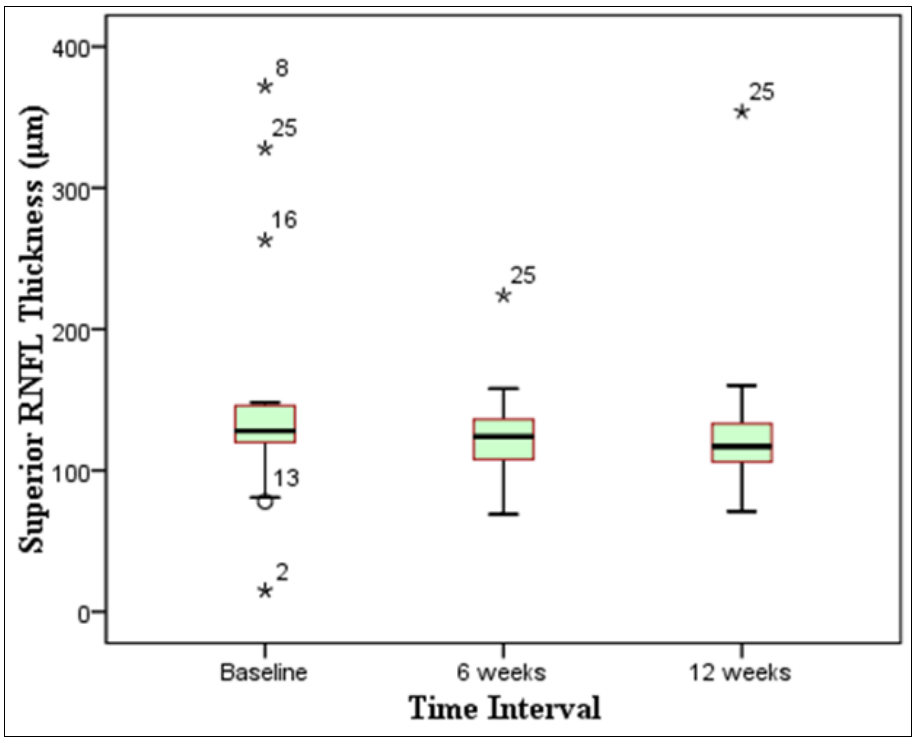

Fig 3: Effect of intravitreal triamcinolone acetonide injection on superior retinal nerve fibre layer thickness in study group

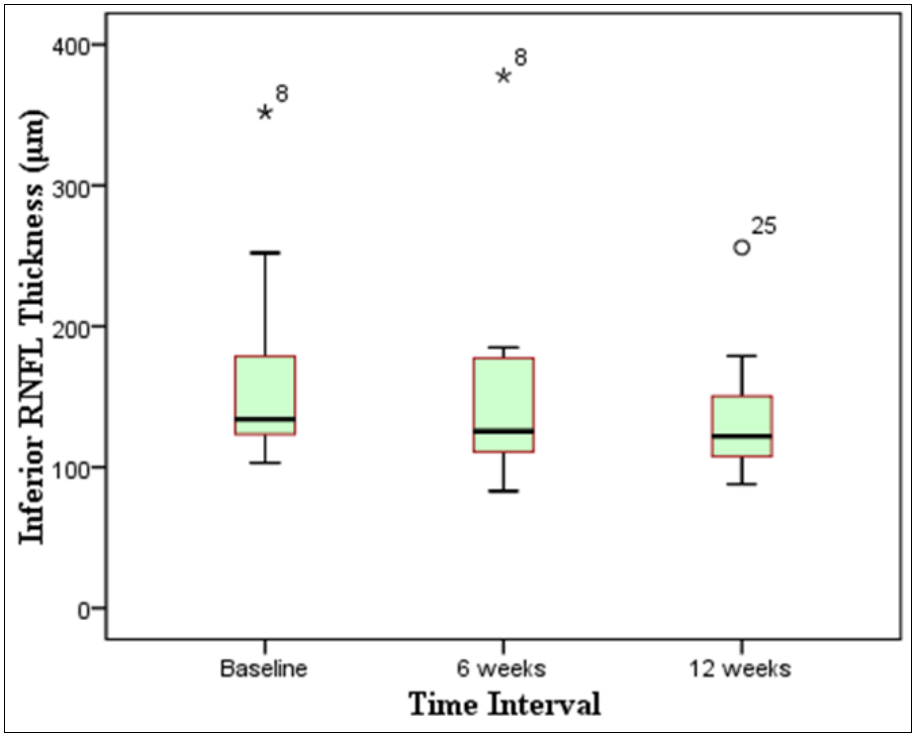

Fig 4: Effect of intravitreal triamcinolone acetonide injection on inferior retinal nerve fibre layer thickness in study group

Discussion

Triamcinolone acetonide is a long acting, water soluble depot preparation of triamcinolone, which is a potent synthetic corticosteroid with marked anti-inflammatory action, that forms the basis for most of its therapeutic uses. Triamcinolone has the capacity to modulate epithelial cell resistance. TA has been shown to decrease mediators of inflammation including interleukin-5, interleukin-8, prostaglandins, interferon gamma and tumour necrosis factor (Floman and Zor, 1977; Umland *et al*., 1997, Kang *et al*, 2001) [11, 36, 17]. The frequency of application of IVTA injection for the treatment of intraocular edematous and neovascular diseases has increased exponentially over the last few years. IVTA has also been shown to be effective in refractory cystoid macular edema with birdshot retinochoroidopathy (Martidis *et al*., 2001) [21], refractory diabetic macular edema (Martidis *et al*., 2002) [13], macular edema secondary to retinal vascular diseases (Bakri *et al*, 2005), central retinal vein occlusion (Greenberg *et al*, 2002) [13], branch retinal vein occlusion (Yepremyan *et al*., 2005), subfoveal choroidal neovascularization caused by age-related macular degeneration (Gillies *et al*, 2003), proliferative diabetic retinopathy and proliferative vitreoretinopathy (Munir *et al*., 2005) [23], radiation induced maculopathy (Shields *et al*., 2005; Shields *et al*, 2006) [30] and radiation induced papillopathy (Sheilds *et al*, 2006) [30], idiopathic retinal periphlebitis (Pathengay *et al*, 2005; Agrawal *et al*, 2006; Ishaq *et al*., 2007; Shahid *et al*, 2007) [26, 1, 14, 29].

The most commonly reported side effect of IVTA is a transient rise in intraocular pressure (IOP) (Wingate and Beaumont, 1999 and Massin *et al*., 2004) [39] leading to a secondary chronic open angle glaucoma (Becker and Ballin, 1965; Bigger *et al*., 1972) [6, 7]. The results on IOP elevation following IVTA differ in every report that has investigated the phenomenon (Danis *et al*., 2000; Wingate and Beaumont, 1999 and Bakri and Beer, 2003) [39, 5].

In the present study the mean IOP at baseline before IVTA injection in 30 eyes in the study group was 14.27±3.53 mm Hg. After IVTA injection mean IOP increased to16.54± 4.29, 18.54± 5.50, 19.00± 5.98, 18.82± 5.00 and 22.50±0.71 mm Hg at 2 weeks, 4 weeks,6 weeks, 8 weeks and 12 weeks follow up respectively which were found to be statistically significant ($p<0.05$).

Out of 30 eyes in the study group IOP elevation of ≥6 mm Hg from baseline was seen in 17 (57.67%) eyes. Out of which 11 (64.71%) were males and 6 (35.29%) were females.

According to the Standard Care Vs Corticosteroid for Retinal Vein Occlusion (SCORE) Study Report-15, Younger age, 4-mg IVTA vs 1-mg IVTA treatment, and higher baseline IOP were found to confer greater risk for IOP-related events ($P < 0.05$ for all). The median number of days from time of first IVTA injection to IOP elevation more than 10 mm Hg from baseline was 34.0 and 52.5 days in patients treated with 1-mg and 4-mg IVTA, respectively. Eyes that received IVTA need to be monitored for IOP changes especially during the first 3 months, but the IOP may still rise 6 months and even 12 months after a single injection.

In present study out of 30 eyes in the study group IOP elevation of ≥6 mm Hg from baseline was seen in 17 (57.67%) eyes. Out of which 11 (64.71%) were males and 6 (35.29%) were females. The majority i.e.,12 (70.59%) eyes developing IOP elevation ≥6 mm Hg belonged to younger age groups who were less than 30 years of age. 8 (47.05%) eyes were of patients in 21-30 years age group.

In present study an IOP elevation of ≥6 mm Hg from baseline was seen in 10 out of 17 eyes (58.82%) up to 4 weeks after IVTA injection and in 15 (88.24%) eyes IOP elevation was seen upto 6 weeks follow up.

Jonas *et al*., (2005) [15] in a meta-analysis observed that there was a tendency toward a higher increase in IOP in patients with uveitis and patients with central retinal vein occlusion.

In present study 8 Out of total 17 (47.06%) patients who developed IOP elevation from baseline were suffering from posterior uveitis, 4 out of 17 (23.53%) were from retinal venous occlusive disease group and 1 out 17 (5.88%) patient was with idiopathic cystoid macular edema.

8 out of 12 eyes (66.67%) of posterior uveitis and 4 out of 6

(66.67%) eyes of Eales' disease developed an IOP elevation of ≥6 mm Hg from baseline and majority of these patients were from younger age group.

Shukla *et al*., (2007) [31] evaluated the effect of patient age on IOP response IVTA injection. They observed that innately higher endogenous cortisol levels probably make younger patients more vulnerable to these effects of exogenous steroids but the treatment of raised IOP remained similar to that in the older patients. Elevated blood levels of corticosteroids of endogenous production, as seen in adrenal hyperplasia or neoplasia (Cushing syndrome) can also cause increase in the intraocular pressure. After adrenalectomy, increased intraocular pressure may return to normal values (Cohen, 2011) [10].

Somnez and Faruk, (2012) reported that younger male patients with higher baseline IOP were at greater risk for the development of an IOP elevation. Males were nearly four times more likely to experience an IOP elevation after IVTA. Similarly, Rhee *et al*, (2006) reported that women were less likely to experience an IOP elevation at a rate nearly three and a half times that of their male counterparts. The fact that males are more prone to develop IOP elevation may be explained by gender-related differences such as the number and function of the steroid receptors or metabolism. However, other studies failed to show associations between IOP elevation and gender (Smithen *et al*., 2004 and Vasconcelos-Santos *et al*, 2008) [32, 37].

In present study out of total 17 eyes with IOP elevation ≥6 mm Hg from baseline 11 patients (64.71%) were males and 6 (35.29%) were females.

Ansari, (2008) observed an IOP elevation greater than 21 mmHg developed in 53.8% of eyes, starting on an average 7.5 weeks after the injection. In 98.1%, IOP was normalised by topical medication alone 6 months after the injection.

In present study 15 out of 17 (88.24%) eyes who developed IOP elevation, IOP was controlled with topical anti-glaucoma medications. However in 2 eyes filtering glaucoma surgery was done to control raised IOP. Out of these 2 patients one patient required filtering glaucoma surgery within 12 weeks follow up (8 weeks) and other patient required filtering glaucoma surgery beyond 12 weeks follow up.

The mean IOP at baseline in 30 eyes of 30 controls was 14.20±3.25 mm Hg. The mean IOP was 14.25± 3.01, 15.58± 3.90, 14.53± 3.69, 13.33± 3.46, and 14.74±3.29 mm Hg at 2 weeks, 4 weeks, 6 weeks, 8 weeks and 12 weeks follow up respectively. The mean changes in follow up were not found to be statistically significant at all follow ups (p>0.05).

A number of other complications associated with IVTA have been reported by various authors like cataract (Thompson, 2006; Galor *et al*, 2007 and Somnez and Faruk, 2012) [28], pseudoendophthalmitis (Roth *et al*, 2003; Sutter and Gilles, 2003 and Jonisch *et al*, 2008) [33, 16], infectious endophthalmitis Nelson, 2003 and Jonas, 2006) [15, 24], pseudohypopyon (Moshfeghi *et al*., 2004) [22], ptosis (Newsome *et al*, 1971 and Viola *et al*, 2007) [25, 38] entrapment of triamcinolone behind the lens (Salman *et al*, 2009) [27] and conjunctival necrosis (Srinivasan and Prasad, 2006) [31].

In present study beside IOP elevation no other local or systemic complication was seen after IVTA injection upto 12 weeks follow up.

The most commonly reported side effect of IVTA injection is transient rise in IOP. Various authors have reported rise in IOP after IVTA injection (Singh *et al*, 2004; Jonas *et al*, 2005; Bakri *et al*, 2009) [8, 15]. The first study to show the potential of OCT in detecting glaucoma progression used an event-based approach to evaluate TD-OCT RNFL thickness measurements over time and reported a mean loss of average RNFL thickness of 11.7 μm over 4.7 years in glaucoma subjects (Wollstein *et al.*, 2005). Till date no study has been done to evaluate changes in retinal nerve fibre layer thickness due to intraocular pressure elevation following IVTA injection in various inflammatory pathologies of posterior segment of eyes.

In present study statistically insignificant (p>0.05) loss in mean average RNFL thickness and mean superior RNFL thickness was observed. At 12 weeks follow up statistically insignificant (p>0.05) improvement in mean inferior RNFL thickness was observed.

The mean average retinal nerve fibre layer thickness in study group was 117.63±49.11μm, 111.60±44.29 μm and 108.53±25.29 μm at baseline, 6 weeks and 12 weeks respectively which was not found to be statistically significant (p> 0.05).

The mean superior retinal nerve fibre layer thickness was 140.23±66.20 μm, 126.07±39.60 μm, and 128.33±50.46 μm at baseline, 6 weeks and 12 weeks respectively which was not found to be statistically significant (p> 0.05).

The mean baseline inferior retinal nerve fibre layer thickness was 155.03±69.89 μm 152.40±70.78, and 155.23±63.02 μmat baseline, 6 weeks and 12 weeks respectively which was not found to be statistically significant (p> 0.05).

Leung *et al*, (2012) conducted a study for assessing age-related RNFL loss. 100 healthy subjects for cross sectional evaluation were enrolled in the study and then 35 subjects were randomly selected for 30 months of longitudinal evaluation. Cross-sectional analysis of healthy subjects demonstrated a significant negative correlation between age and average RNFL thickness of −0.33 μm/year while the longitudinal analysis reported a −0.52 μm/year rate of age-related loss of RNFL. Furthermore, the same study reported that age-related structural loss varies as a function of baseline RNFL where a higher baseline thickness is subject to higher rates of decline.

In present study statistically insignificant (p>0.05) loss of mean average RNFL thickness, mean superior RNFL thickness and mean inferior RNFL thickness was observed at 6 weeks and 12 weeks follow up.

Conclusions

After IVTA injection there was significant rise in intraocular pressure especially in young males. This increase in intraocular pressure was mainly observed within 6 weeks of IVTA injection but in few eyes it developed 12 weeks after injection. Therefore all the cases should be closely monitored after IVTA injection for an early diagnosis and timely treatment of various complications especially, late rise of intra ocular pressure. After IVTA injection there was a higher tendency towards rise in intraocular pressure in posterior uveitis and eales disease. In majority of eyes which developed IOP elevation after IVTA injection, IOP was controlled with topical anti-glaucoma medications. However in very few eyes filtering glaucoma surgery was done to control increased IOP. After IVTA injection there was no statistically significant change observed in retinal nerve fibre layer thickness upto 12 weeks of follow up, despite an increase in intra ocular pressure. Besides glaucoma no other complication was observed after IVTA injection upto 12 weeks of follow up.

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