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A STUDY ON INCIDENCE OF ACUTE INTRAOCULAR PRESSURE ELEVATION IN DIABETIC PATIENTS TREATED WITH LASER PHOTOCOAGULATION IN TERTIARY CARE HOSPITAL.

Ophthalmology

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ABSTRACT

AIM: This study was undertaken to determine the acute changes in IOP following laser photocoagulation used in the treatment of diabetic retinopathy.

METHODS AND METHODOLOGY: This study was conducted at the Department of Ophthalmology, Chalmeda Ananda Rao Institute Of Medical Sciences from July 2017 to June 2018 . This study was intended to see the onset and duration of intraocular pressure spikes in diabetic retinopathy patients after green laser photocoagulation.

RESULTS: Out of 45 patients, 6 patients had severe non proliferative diabetic retinopathy with maculopathy, 39 having proliferative DR. Out of 6 NPDR patients, 3 (50%) developed immediate post laser angle closure (Schaffer's grade 1) which persisted for 3 days and other 3 had shown no change in angle structure. Out of 39 PDR patients, 12(30.7%) had post laser angle closure.These results are clinically and statistically significant.Overall 33.33% of patients showed raised intraocular pressure following PRP.

CONCLUSION: The present study clearly shows that after extensive laser photocoagulation in diabetic retinopathy patients, elevation in IOP may appear immediately or 1-2 hours or 1-2 days later and this last for 2-3 days

KEYWORDS

Diabetic Retinopathy(dr), Laser Photocoagulation, Intraocular Pressure(iop), Proliferative Diabetic Retinopathy(pdr) And Non Proliferative Diabetic Retinopathy(npdr)

INTRODUCTION:

Diabetic retinopathy is one of the most frequently occurring and is a leading cause of visual loss in people with diabetes mellitus[1]. The predominant causes of visual loss in diabetic retinopathy are proliferative diabetic retinopathy (PDR) and diabetic macular edema (DME). The most effective treatment, for now, is systemic regulation of diabetes, but the systemic regulation is not enough to reduce the retinopathy and DME. The proper treatment of DR includes proper and timely fundus examination, strict glucose control and laser therapy along with vitrectomy.

According to diabetic retinopathy study (DRS) it is proved that the chances of progression to vision loss is less in eyes of high risk charac teristics treated with pan retinal photocoagulation(PRP)[2]. Patients who underwent PRP showed better visual outcomes than patients who did not undergo any treatment. The aim of PRP is to make hypoxic retina anoxic thereby decreasing oxygen demand and regression of neovascularization[3]. Cystoid macular edema and macular puckering are the main complications caused by PRP which lead to visual loss. Less frequently, PRP causes transient rise of intraocular pressure which lasts for 1-2 weeks[9].

Raise in IOP is seen in patients who underwent extensive laser photocoagulation of retina.Of these patients, very few of them showed closed angle initially or later in course[8]. The mechanism behind raised intraocular pressure is thought to be forward displacement of lens iris diaphragm either due to outpouring of fluid from choroid to the vitreous which lead to forward displacement of lens iris diaphragm or due to swelling of the ciliary body[6]. There is an increased risk of raised intraocular pressure spikes following PRP in patients who have preexisting open angle or closed angle glaucoma with coexisting DR.

A 6-8 mmHg variation of IOP even if the reading are within the limit generally accepted as normal (18 -21 mmHg) are likely to have glaucoma. These periodic variations can cause field defects in patients with weak lamina cribrosa[11].

This study is undertaken as there is scarcity of literature regarding acute rise in intraocular pressure in diabetic patients treated with laser photocoagulation and among those few studies that were conducted had very few patients with wide age variation.

MATERIAL AND METHODS

A hospital based descriptive study was conducted during January –May 2018 among 82 patients who attended OPD clinic in Ophthalmology department of Chalmeda Institute of Medical Sciences, Karimnagar. The study protocol was approved by the institutional ethics committee of the institute. The purpose of the study was explained and written and signed informed consent was obtained. A total of 82 patients were screened and examined and out of them 40 patients were selected. These 40 patients were followed for 3 weeks. This study was intended to see the onset and duration of intraocular pressure spikes in diabetic retinopathy patients after laser photocoagulation.

INCLUSION CRITERIA

All the patients of severe non proliferative diabetic retinopathy and proliferative diabetic retinopathy who require laser treatment and patients of diabetic retinopathy who are also having coexisting glaucoma were included during the study period, those who were willing to participate and gave consent for the study.

EXCLUSION CRITERIA

Patients having ischemic maculopathy, patients who have dense media opacities, patients with high myopia and those with any other ocular diseases and patients not willing to participate in the study were excluded.

Socio-demographic characteristics include information regarding the age of the respondents, gender and duration of diabetes. A detailed history and examination was done. All patients underwent the follo wing detailed ocular assessment. And the fundus findings were graded as: severe non proliferative diabetic retinopathy and proliferative diabetic retinopathy.

All patients were on treatment and they investigated for blood sugar on their first visit to the department. These patients then underwent laser photocoagulation under topical anesthesia. After that we repeated visual acuity, gonioscopy and applanation tonometry at immediate post treatment and hourly for 2 hours on the day of treatment and then on first and third post treatment day. The data thus collected was coded and entered on a Microsoft excel sheet and analyzed by using Epi Info version 7 and the results are presented in the form of tables and percentages

RESULT

The socio-demographic characteristics of the respondents are depicted in table-1. Among a total of 45 respondents, about 33 (73%) were below the age of 50 years while 12 (27 %) were belonging to the age above 50 years. Among the study participants, the majority were 38(84%) male while only a few 7 (16 %) were female. Regarding the duration of diabetes, the majority of the respondents were diabetic for <5 yrs of duration among the males.

TABLE 1: COMPARING SOCIO DEMOGRAPHIC DATA

DURATION OF DM	MALES	FEMALES	TOTAL
<50 YRS	32	1	33 (73%)
>50 YRS	6	6	12 (27%)
TOTAL	38 (84%)	7(16%)	45 (100%)

Table-2 represents pre laser angle structures among the study respondents. Among 45 patients, before laser photocoagulation 41(91%) had open anterior chamber angle (Schaffer's grade 4) and 4(9%) had closed angle (Schaffer's grade 0) due to angle neovascularization as determined by the Gonioscope. These had pre-laser high IOP. Among 45 patients, 6 had severe NPDR and 39 had PDR.

TABLE 2: PRE LASER ANGLE STRUCTURE AMONG STUDY RESPONDENTS

PRE LASER	OPEN ANGLE	ANGLE CLOSURE	TOTAL
SEVERE NPDR	6	-	6
PDR	35	4	39
TOTAL	41(91%)	4(9%)	45(100%)

All 45 patients underwent PRP, out of 6 severe NPDR patients, 3 (50%) developed immediate post laser angle closure (Schaffer's grade 1) which persisted for 3 days and others had shown no change in angle structure.

Table-3 represents development of angle closure in the proliferative diabetic retinopathy patients and non proliferative diabetic retinopathy patients. Out of 39 PDR patients, 12(30.7%) had post laser angle closure which included 4 patients who had angle closure in this group. Among these 8 patients, 7 developed angle closure immediately (Schaffer's grade 1) and 1 developed the same 1 day later and this angle closure (Schaffer's grade 1) remained for 3 days.

TABLE 3: DEVELOPMENT OF ANGLE CLOSURE AMONG STUDY RESPONDENTS

POST TREATMENT	OPEN ANGLE	CLOSED ANGLE	TOTAL
SEVERE NPDR	3	3	6
PDR	27	12	39
TOTAL	30(66.66%)	15(33.33%)	45(100%)

DISCUSSION

Incidence of Diabetes is increasing because of increasing life expectancy of patients and Diabetic Retinopathy is a one of the grievous complication of diabetes mellitus. Any delay in treatment can lead to severe irreversible diminution of vision or even total blindness[11]. The first line of treatment for treating diabetes is by controlling blood sugar levels. Laser photocoagulation is a treatment option for patients with proliferative diabetic retinopathy with or without high risk characteristics and in patients with very severe non proliferative diabetic retinopathy (classified under ETDRS)[5].

It is seen that in patients who have been treated with laser photoco agulation showed improved visual status[4].Laser photocoagulation causes limitation of disease process thereby improving the prognosis.

In this study, we have studied the acute onset of raised IOP and its incidence and duration after laser photocoagulation. in this study, out of 45 patients 84% were males and 16% were females of these 33(73%) were of age < 50 yrs and 12(27%) were > 50 yrs.this shows that now diabetes is affected in patients at relatively earlier age. and most of the patients who seek early treatment are of younger age group than those of older age group. The reason for very few female patients seeking treatment mostly in advanced stages is due to poor literacy rate and lack of awareness in developing countries like India.

In this study, it is seen that 30.7%(12) PDR patients who showed raised iop after laser photocoagulation. Among those 58.3% patients showed immediate raise in angle closure and 8%(1) developed 1 day later and it remained raised for 3 days which is similar to the results of other studies like Mensher et al[3] and Blondeau et al[7].

In this study, we have taken more patients and also included patients with neovascular glaucoma when compared to the study done by Blondeau et al[7].

All the patients in this study underwent retinal green laser photocoa gulation and transient raise in iop was noted in 15 (33.33%) patients and remaining 30(66.66%) patients showed normal iop whereas in a study conducted by Blondeau et al[7] only 3% of patient showed normal iop. In another study, 60% of patients showed normal iop[8]. In this present study it is evident that 100% of patients with angle closure before laser treatment showed acute rise in IOP post laser treatment which was not mentioned in other studies. However, the number of patients who might experience raised IOP after 3days remains to be seen as study followed up patients only upto 3 days. Therefore, longer follow up and larger patient cohort can help to identify whether there is any chronic raise in IOP post pan retinal photocoagulation.

CONCLUSION

Raised intraocular pressure may be seen immediately after pan retinal photocoagulation which has become normal within 1-2 days.
Patients with angle closure before the laser treatment are at high risk of developing acute raised IOP than those of patients.

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