MEDICAL CHANNEL

Original Article

OUTCOME AFTER PAN-RETINAL LASER PHOTOCOAGULATION FOR PROLIFERATIVE DIABETIC RETINOPATHY: A THREE YEARS FOLLOW UP.

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ABSTRACT

Objective: In this observational study we document the outcomes and complications of pan-retinal photocoagulation in type-II diabetic patients having proliferative diabetic retinopathy.

Material and Methods: This Observational cohort Study was conducted at the Department of Ophthalmology, Unit II, Civil Hospital, Dow University of Health Sciences, Karachi from January 2006 to June 2009.Three hundred and sixty five eyes of 254 patients were treated in three sessions. Follow up was planned at one week, one month, and three months and then yearly for three years and all the complications were documented. Visual acuity and retinal examination was performed at each follow up and any complication was documented. Data was entered on SPSS –Version 16 for Windows and analyzed.

Results: Three hundred and eighty seven eyes of 254 patients underwent pan-retinal photocoagulation. There were 130(56%) females and102 (44%) males with a mean age of 62.07 years(SD=8.15). Mean laser shots applied were 3200 with a minimum of 2700 to a maximum of 3800 and an average power of 360 mv (SD=55.63). Intra-operative complications occurred in 183 patients. Long term complications included, progression of diabetic retinopathy after a period of complete resolution of new vessels, vitreous hemorrhage, tractional retinal detachment, progression of cataract , macular edema, pre-macular fibrosis and macular hemorrhage. At last follow up visual acuity improved in 147 eyes, deteriorated in 183 and remained unchanged in 35 eyes.

Conclusion: Pan retinal photocoagulation is a safe and effective procedure. A close follow up is needed after this procedure to avoid long term complications and to treat them as soon as possible.

Key Words: Laser, Panretinal photocoagulation, diabetic retinopathy.

INTRODUCTION

Diabetes Mellitus is a global epidemic and has assumed crisis proportion in Pakistan[1,2]. The International Diabetes Federation (IDF) estimated in 2011 that 366 million adults, aged 20–79 years, of the world's 7 billion population have diabetes[3]

A recent survey shows that about 8.8 million people are suffering from diabetes in Pakistan and this number is estimated to be doubled in the year 2025[4]. Studies performed by Afghani[5] and Kayani et al.[6] suggest the prevalence of diabetic retinopathy between 22.29% and 33.3 % in Pakistani diabetics. According to the US Census Bureau, International Data Base 2004 the extrapolated incidence (the number of new cases diagnosed each year) of diabetic retinopathy in Pakistan is 38,043[7]. Proliferative diabetic retinopathy is the leading cause of blindness among diabetic population and in Pakistan ranked

sixth position among treatable causes of blindness[8] . There are different treatment modalities to deal with proliferative diabetic retinopathy. Early treatment diabetes retinopathy study group recommends pan-retinal photocoagulation.

In this observational study we document the outcomes and complications of pan-retinal photocoagulation (PRP) in type-II diabetic patients having proliferative diabetic retinopathy(PRP).

PATIENTS AND METHODS

This Observational cohort Study was conducted at the Department of Ophthalmology, Unit II, Civil Hospital, Dow University of Health Sciences, Karachi January 2006 to June 2009.Three hundred and sixty five eyes of 254 patients fulfilled the inclusion and exclusion criteria, which included type 2 diabetic patients of both gender with proliferative diabetic retinopathy, visual acuity 6/12 or better, age over 30 years and below 90 years, clear media without clinically significant macular edema or other posterior segment pathologies and no history of previous photocoagulation or uncontrolled glaucoma. All the patients signed an informed consent written in local language.

Socio-demographic Data was entered on a prescribed form including age, gender, address, contact number, occupation and level of education. Prior to treatment each patient underwent a full ophthalmic assessment which included slit-lamp biomicroscopy and binocular indirect ophthalmoscopy. Selected patients were subjected to fluorescein angiography and fundus color photography prior to laser treatment.

The patients were treated through a maximally dilated pupil with a PRP lens. The Goldman three-mirror lens was also used if only partial treatment was obtained with a PRP lens. The patients were treated in three treatment sessions at an interval of one week with topical anesthesia (Proparacaine). Two thousand and five hundred burns were applied to each eye, of spot size 500 micron and duration 0. I second. The power was adjusted to produce just noticeable immediate blanching of the retinal pigment epithelium. No additional laser treatment was given during the six weeks period. Additional laser burns were considered after six weeks period if the treatment seemed insufficient. After completion of pan-retinal photocoagulation, follow up was planned at one week, one month, and three months and then yearly for three years . Visual acuity and retinal examination was performed at each follow up and any complication was documented. Data was entered on SPSS –Version 16 for Windows. All categorical variables were presented as frequencies and percentages in the form of frequency tables. Mean, standard deviation, and range was measured for all continuous variables.

RESULTS

Three hundred and eighty seven eyes of 254 patients underwent pan-retinal photocoagulation from January 2006 to December 2009 at the department of ophthalmology unit 1, Civil Hospital Karachi. Twenty two patients were lost to follow up so three hundred and sixty five eyes of 232 patients are presented for analysis. These patients had a follow up of at least three years after which they were censored from the study. There were 130(56%) females and102 (44%) males with a mean age of 62.07 years(SD=8.15). Duration of diabetes mellitus ranged from 11 to 35 years. All the patients had type II diabetes mellitus. NVD(new vessels on the disc) were found in 245 eyes NVE(New vessels elsewhere) in 65 eyes and both in fifty five eyes. Visual acuity range was 6/12 in 124 patients 6/9 in 86 and 6/12 in 155 patients. Mean laser shots applied were 3200 with a minimum of 2700 to a maximum of 3800 and an average power of 360 mv (SD=55.63). Intra-operative complications occurred in 183 patients that include severe pain requiring retro-bulbar anesthesia in 18 patients and vitreous hemorrhage in three patients. Post laser complications within first four weeks occurred in 192 patients that included in table 1. No regression of new blood vessels was observed in 16 cases for which additional burns were applied. Long term complications included, progression of diabetic retinopathy after a period of complete resolution of new vessel, vitreous hemorrhage, tractional retinal detachment, progression of cataract , macular edema, pre-macular fibrosis and macular hemorrhage (Table II). At last follow up visual acuity improved in 147 eyes deteriorated

TABLE. I

Complications	frequency	percent
Blurred vision	22	6.0
Punctate corneal erosions	12	3.2
Clinically Significant Macular Edema	56	15.3
Defective night vision	82	22.4

TABLE II

S. No.	Complications	frequency	Percent
	Recurrence of proliferative diabetic retinopathy.	43	11.7
	Vitreous hemorrhage.	12	3.2
	Tractional retinal detachment.	08	2.2
	Progression of cataract.	64	17.5
	Macular edema.	38	10.4
	Pre-macular fibrosis and	21	5.7
	Macular hemorrhage.	07	1.9

in 183 and was unchanged in 35 eyes.

DISCUSSION

In this cohort of 254 patients, complications after PRP are documented. We will discuss only the long term complications. In a cohort of 1380 eyes, by Dubey et. al [9]treated for proliferative diabetic retinopathy and followed for 4 years long term complications requiring surgical interventions developed in 23% cases. In our series these kinds of complications occured only in 12.3% cases. This might be due to the fact that we performed PRP in three sessions and our follow up is shorter. In a recent study by Aimee et al [10] recurrence or persistence of new vessels was observed in 34% cases after a follow up of six months. Macular edema after PRP has an incidence of 34%, in patients with prior normal macula, when documented by OCT,[11] but clinically significant macular edema in our series was present in only in 15.3 percent eyes. Another study by McDonald and Schatz reported macular edema in 43 percent eye as evidenced by fluorescein angiography[12]. A recent study shows that macular edema did not develop in any eye after pan-retinal photocoagulation. In this study author performed pan-retinal photocoagulation in four sessions and the patients included in the study were free of macular edema before photocoagulation[13]. In our study macular edema, after pan-retinal photocoagulation developed only in 15.3 percent eyes. It might be due to the fact that we have performed the procedure in three sessions and the patients included in the study had no or minimal macular edema before photocoagulation. The incidence of vitreous hemorrhage after PRP as reported by Kaiser et al is in 37 percent eyes[14]. Another study reported 39 percent eyes.[15] In our study vitreous hemorrhage occurred only in 3.2 percent eye after a period of quiescent stage. This lower incidence was due to the fact that we included in our study only those patients who had no previous vitreous hemorrhage and were in an initial stage of diabetic retinopathy. Additionally we performed a complete PRP with a larger number of laser shots. Retinal detachment as reported by Kaiser et al [14] is in 4 percent cases while in our study it is 2.2 percent this might be due to the facts described previously.

CONCLUSION

Pan retinal photocoagulation is a safe and effective procedure. A close follow up is needed after this procedure to avoid long term complications and to treat them as soon as possible.

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