ORIGINAL ARTICLE

Retinal Screening Acceptance, Laser Treatment Uptake and Follow-up Response in Diabetics Requiring Laser Therapy in an Urban Diabetes Care Centre

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ABSTRACT

Objective: To determine the acceptance of retinal screening, Laser uptake and subsequent follow-up in diabetic patients attending the Diabetes Centre of Diabetic Association of Pakistan (DAP), Karachi.

Study Design: Observational case series.

Place and Duration of Study: Diabetic Centre of Diabetic Association of Pakistan (DAP), Karachi, from January 2011 to December 2012.

Methodology: All the diabetic patients were screened for Diabetic Retinopathy (DR) with non-Mydriatic Fundus Camera (NMFC). Patients with DR were examined by the ophthalmologist using fundus lens and slit lamp. DR was graded for severity on the basis of modified Airlie House Classification. Patients with Sight Threatening Diabetic Retinopathy (STDR) were advised Laser treatment. Each patient was followed-up for at least 6 months. The records of patients recommended Laser were retrieved, and called for re-examination.

Results: Retinal screening was accepted by all of the 8368 registered diabetics attending DAP Centre. On fundus photography, 21.2% (1777) individuals were found to have DR. Seven hundred and five (39.5%) patients were found to have STDR. Laser was advised to 96.4% (680) of STDR patients; amongst whom 70.5% (480) accepted Laser treatment. Out of 480 patients who had Laser treatment, 21.2% (107) turned out for follow-up after 6 months.

Conclusion: Acceptance of retinal screening and Laser application was good; but follow-up was suboptional.

Key Words: *Retinal screening acceptance. Laser uptake. Post Laser follow-up. Diabetic retinopathy. Sight threatening diabetic retinopathy (SIDR).*

INTRODUCTION

The prevalence of diabetes and its associated complications are increasing worldwide, affecting Asia more rapidly than other regions of the world.[1] Diabetic Retinopathy (DR) is one of the microvascular complications of diabetes and a leading cause of visual loss and acquired blindness.[2] A systematic review of 35 population-based studies on retinopathy documented that 34.6% of diabetic patients had some form of retinopathy, among them 7.0% had Proliferative Diabetic Retinopathy (PDR) while 10.2% of the patients were found to have STDR.[3] Extrapolation of these results to the global number of diabetics suggests that the estimated number of DR is expected to increase from 126.6 million in 2011 to 191.0 million by 2030. In the same period the number of people with STDR is projected to rise from 37.3 million to 56.3 million, if no prompt action is taken.[4]

The rising trend of diabetes is posing equal threats to Pakistan, expected to be the 10th leading nation of the world according to number of diabetics by the year 2030.[5] According to the national survey on blindness in Pakistan in 2004, the estimated prevalence of posterior segment diseases was 9.5% with diabetic retinopathy accounting for less than 0.5% of the cases.[6] National studies have shown that DR varies from 15% to 58%.[7,8] DR appears to be a serious public health problem and a leading cause of blindness in the future.

Regular eye screening and preventive Laser treatment are instrumental in preventing diabetic blindness. Screening for diabetic eye disease has been one of the most cost-effective health procedures available from a public health standpoint.[9] There is evidence that visual outcome in diabetics is related to early retinal screening.[10]

Due to several reasons, the diabetics do not accept retinal screening and Laser treatment although retinal screening is important to identify diabetic retinopathy

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and Laser photocoagulation plays an important role in the treatment of DR. Laser photocoagulation can prevent blindness in nearly 90% cases.[11,12] It has been shown that non-acceptance of Laser treatment results in progress of the disease.[13] In addition to reluctance on the part of diabetics to accept screening and Laser treatment, poor follow-up on subsequent visits, adequate data on the affectivity of any mode of treatment becomes difficult.

This study was designed to identify the extent of these problems to provide baseline data to the service providers and policy makers to plan appropriate steps to address these problems.

The objective of this study was to determine the acceptance of retinal screening, Laser uptake and subsequent follow-up in diabetic patients attending the Diabetes Centre of Diabetic Association of Pakistan (DAP), Karachi.

METHODOLOGY

This observational study was carried out at the Diabetes Centre of Diabetic Association of Pakistan (DAP), Karachi, a World Health Organization (WHO) collaborating centre in Karachi, Pakistan. All patients attending DAP from January 2011 to December 2012 were included. Patients with uncontrolled diabetes, unreadable photograph, with no DR, history of previous Laser and unwilling to participate were excluded from the study.

Ethical approval for the study was taken from institutional review board of the institute. Written consent was obtained from the respondents, after explaining the procedure. Data on demographic and clinical parameters were collected from each patient on a specially designed proforma. Past history of any eye surgery or Laser treatment was taken from each patient.

After checking best corrected visual acuity, retinal screening was done with a non-Mydriatic fundus camera Canon CR-1 by an optometrist trained in fundus photography. Screening was performed without instillation of mydriatic drops in a dark room after adaptation of pupil in the dark. Two 45° retinal images, one centre to the optic disc and other centre to the macula of each eye were taken and stored by patient's name and identification number on the hard disk and a compact disc (CD).

The images acquired at DAP were read by the optometrist. Patients with normal fundus were referred for follow-up and excluded from the study. Patients with inconclusive photographs were also excluded from the study; but were referred to Al-Ibrahim Eye Hospital (AIEH), Karachi, a tertiary care teaching hospital in ophthalmology for evaluation by a retina specialist. Presence of signs of retinopathy in any photographs was taken as sufficient evidence to classify the patients in retinopathy group. These patients were called for ophthalmoscopy and bio-microscopy with 90-D fundus lens by an ophthalmologist trained in medical retina.

Grading of diabetic retinopathy was done according to modified Airlie House Classification,[14,15] adopted and modified by Early Treatment Research Group (ETRG). Diabetic retinopathy (NPDR) mild and moderate without clinically Significant Macular Edema (CSME) was categorized as Non Sight Threatening DR (NSTDR) group and advised follow-up. Patients with Proliferative Diabetic Retinopathy (PDR), CSME alone or in combination with NPDR or PDR and Advanced Diabetic Eye Diseases (ADED) were included in the category of STDR and advised Laser therapy. Patients with Advanced Diabetic Eye Diseases (ADED) were referred to AIEH for pars-plana vitrectomy. Patients with severe non-proliferative diabetic retinopathy without CSME were considered clinically on individual basis and decided either for follow-up or treatment. However, for the purpose of analysis this category was summed in the NSTDR.

Patients with CSME were given the choice of anti-Vascular Endothelial Growth Factor (VEGF) intra-vitreous injections. They were explained about financial involvement, advantages, and possible risks of the Laser application and intra-vitreous anti-VEGF. The patients who opted for anti-VEGF injections were referred to AIEH, and those who accepted Laser were treated at DAP hospital after the written approval of the patient. Laser used was light Laser S32 (Taiwan). Pattern of Laser application depended upon the type of DR. Pan Retinal Photocoagulation (PRP) in PDR was done in 2 - 3 sittings, at weekly intervals. Grid laser in CSME and focal Laser in macular oedema were done in one sitting.

After Laser application the patients were followed at monthly and later on 3 monthly intervals. On each visit, best corrected visual acuity was taken and fundus photograph was repeated for record. Minimum follow-up after Laser treatment was 6 months. After this period the case records of all patients with STDR advised Laser were retrieved. Patients were traced and contacted for follow-up. Final call for follow-up was given in July 2013.

Statistical Package for Social Sciences (SPSS) version 20.0 was used for analysis. Categorical variables were presented as frequency and percentage.

RESULTS

A total number of 8368 respondents were advised retinal screening with 3984 (47.6%) males and 4384 (52.4%) females with a ratio of 0.89 - 1. All the patients agreed for screening. On fundus photography, 1777 (21.2%) respondents were found to have DR (Table I). On further examination by the ophthalmologist, 705 (39.5%) were grouped into STDR group and 1072 (60.5%) in to

Table I: Diabetics screened with NMFC (n=8368).

Gender	Total screened	No diabetic retinopathy normal	Diabetic retinopathy	Un-readable photographs
Male	3984	3018	865	101
Female	4384	3321	912	151
Total	8368	6339 (75.75%)	1777 (21.23%)	252 (3%)

Table II: Classification of non-sight threatening diabetic retinopathy (n=1072).

	Classification of non STDR			Grand total
Gender	Mild	Moderate	Severe	
Male	191	162	150	503
Female	211	196	162	569
Total	402	358	312	1072

Table III: Classification of sight threatening diabetic retinopathy (n=705).

			Classification of STDR			Total STDR
Gender	PDR	CSME	CSME+NPDR	CSME+PDR	Advanced DR	
Male	32	54	216	1	15	318
Female	36	78	257	3	13	387
Total	68	132	475	4	26	705

Table IV: Acceptance or refusal of Laser treatment (n=680).

Gender	Laser advised	Laser accepted	Laser refused
Male	308	198	110
Female	372	282	90
Total	680	480	200

NSTDR group (Tables II and III). Laser was advised in 680 (96.45%) patients amongst whom 480 (70.6%) patients accepted Laser and 200 (29.5%) either refused or did not turn up for the treatment (Table IV).

A follow-up call was given to all STDR patients (680), treated or not, to see the progress of DR. At the end of the study 21.2% (102 out of 480) of those who had accepted laser and 7.3% (15 out of 200) of those who had declined laser turned up for follow-up.

DISCUSSION

Laser photo coagulation is an important mode of treatment in the prevention of blindness due to DR beyond blood pressure and glycemic control.[14,15] Laser treatment reduces the vascular load by destroying the hypoxic tissues and close leaking of micro-aneurysms thus, allows the remaining tissue to receive an adequate blood supply.[16] Reports of Early Treatment Diabetic Retinopathy Study Research Group demonstrated 50% or more reduction of risk for severe visual loss after Laser photocoagulation.[17] Apart from preservation of vision, early detection, and timely intervention by Laser treatment is economically more cost-effective than managing severe complications of DR such as vitreous hemorrhage and neo-vascular glaucoma.[18] Despite of beneficial effects of Laser treatment, lack of adherence to diabetes care guidelines among patients with diabetes has been recognized as a persistent and complex health issue for both developed and developing countries. In the US, nearly one-third of the patients with diabetes failed to follow vision care guidelines.[19] Similarly, in China, non-adherence to ophthalmic care has reached to a crisis proportion where more than 60% of diabetic patient did not follow recommended screening advice.[20] In most of these studies, the lack of physician's communication with the patients has been considered as an important factor in patient's non-adherence. In a recent survey in urban Indonesia, less than 50% of the patients with diabetes reported being told of the need for eye examinations by their physicians.[21]

In the present study, 100% compliance was observed for the screening of retinopathy. Screening was done on the same day with NMFC without dilating pupil and free of cost. In addition to this, a team of diabetes educator and attending physician counselled the patient about the importance of retinal screening and its role in preventing visual impairment. Ideal patient's compliance in this study can be attributed to the physician's compliance with recommended ophthalmic care guidelines. Encouraging results of this model should, therefore, be implemented and practiced in other institutions for holistic care of the patients with diabetes.

Regarding Laser treatment uptake, it was found to be 70%, lower than the 85% compliance rate to the advice of Laser treatment reported by Will *et al*.[22] but better than 33% reported in India,[23] and 10% in Sri Lanka.[15] The higher compliance reported in Will's study as compared to low reported from India and Sri Lanka can be attributed to the level of health literacy of different countries. In present study, low compliance rate of Laser as compared to that of retinal screening can be explained by fear of Laser, affordability and not doing the Laser on same day.

Follow-up compliance in this study was poorer than Laser uptake; but follow-up response was poorest. On

final call for follow-up, only 21.25% of the patients who availed Laser attended turned up follow-up. Low compliance of the patients for follow-up in the present study needs adoption of mechanisms that enhance compliance. There seems to be a dire need to develop the materials and tools that facilitate diabetes education and management in patients with low health literacy. Adequate patient outreach and reminder programs have a proven benefit in this regard. Moreover, it is also suggested that injecting an incentive mechanism into eye care programs may be helpful in improving compliance to annual eye examination and Laser treatment.[15] Higher patient compliance is likely to be achieved by improving health literacy, updated tracking systems and effective physician-patient communication.[23]

CONCLUSION

Retinal screening with NMFC is a patient friendly strategy and should be adopted by all tertiary centres. The concerned physician can play an important role in changing the patient's response to treatment up take and follow-up.

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