Original Article

ASSESSMENT OF MACULAR FUNCTION IN DENSE CATARACT USING MADDOX ROD

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ABSTRACT
Cataract is a leading cause of blindness worldwide. However there is surgical option available for treatment with complete cure in majority of patients. For dense cataract Maddox Rod was evaluated. A total of 200 patients were recruited. Maddox Rod test for macular function appears to be useful in a great majority of patients. The assessment of macular function in dense cataract is difficult but the Psycho physiological test like Maddox rod test was found to be the reliable in patients with cataract and its quick and understandable

Key Words: Cataract, macular function test, Maddox rod assessment.

INTRODUCTION

Cataract is the prominent cause of vision loss globally, resulting in 47.8% (equals to 17.7 million) people blind (1). The survey was conducted to explore prevalence of blindness and reported to have 570 000 blind adults in Pakistan due to cataract, additional 3560000 eyes have reduced visual acuity at <6/60 as a result of cataract. Though the surgical management is now hallmark of treatment with complete reversal of vision but there are people who develop mature cataract and some present with hypermature due less privileged population with inadequate health care facilities (2). As reported in the literature that 253 million people around the globe are living with some degree of vision loss, out of which 36 million have complete vision loss to the degree of blindness and remaining 217 million with varying degree of impairment ranging from moderate to severe vision impairment. A demographic study report suggested that 81% of blind people or patients with varying degree of vision impairment are aged 50 years or older. Primary cause of vision impairment globally is chronic eye diseases. Untreated cataract and refractive errors which left untreated are most commonly reported causes of vision loss worldwide. However in developing and low-middle income countries untreated cataract remains at the top(3).

The macula is a pigmented area, oval in shape presented in human eye adjacent to the center of the retina. In human's eye macula measures around 5.5 mm (0.22 in) in diameter. It is mainly responsible for the central, high-resolution, color vision in good light. If the macula is damaged this kind of high resolution light vision is impaired, such condition include macular degeneration(4). The diagnosis and treatment outcome measurement in cases of macular diseases Macular function tests are needed. This tests is also required for the evaluation of the macular function with opaque media in conditions including dense cataract and vitreous hemorrhage. Dense cataract is a challenge for assessment of macular function. There is limited information regarding Maddox rod is available for utilization in dense cataract. Thus we have designed this study to evaluate the response of macular function in patients presenting with dense cataract by using Maddox rod.

METHODS

This was hospital based cross-sectional, observational study. Patients were selected by using a non-probability convenient sampling method, where all the patients without any gender restriction coming to Out Patient Department (OPD) of Al-Ibrahim Eye Hospital, Karachi, Pakistan were included. The study was conducted between May 2019 to October 2019. The patients included were presenting with dense cataract and above 30 years of age. Their visual acuity must be ≤ 6/60-1/60, with no fundus glow and consented to be part of the study.

Maddox Rod Test method

All patients were asked to sit approximately 1 foot away (33 cm) from a bright light source and Maddox rod was placed in front of the eye planned to be examined. Patient was asked to close the other eye. The Maddox rod was rotated in two peaks in vertical and horizontal directions. Patients were asked to see in a line, look at its color, focus on the continuity, the direction of the line and straightness it shows. The results were then graded as per standard protocol.

Statistical Methods

Statistical package for social sciences (SPSS) version 20.0 was used for data collection and analysis in our project. Mean and standard deviation were considered for continuous variables while the categorical variables were presented as frequency distribution.

RESULTS

Out of 200 patients selected for this study there were 156 (78%) females and 44 (22%) males.

Mean age of the participants was 57.02 ± 9.0 years (range 38- 85 ±SD=9.011). The visual acuity of 62 (31.0%) patients was 1/60, 53(26.5%) had 6/60, 41(20.5%) had 3/60, 35(17.5%) had 2/60 and 9(4.5%) had 5/60. Out of 200 patients 164 (82.0%) had shown a Grade 1 response, 22 (11.0%) had shown Grade 2 response, 9 (4.5%) had shown Grade 3 response and 5 (2.5%) had shown Grade 4 response with Maddox rod (Figure 1). The grading of Maddox rod according to Visual Acuity is presented in Table 1.

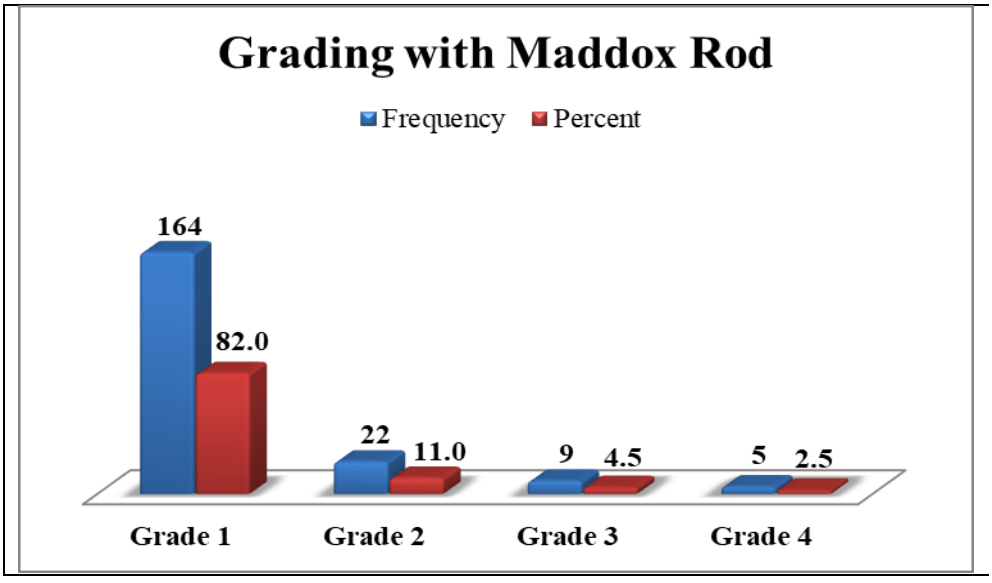

Figure 1. Pattern of distribution of Grading with Maddox Rod

Table 1. Frequency distribution of Visual Acuity according to Grading with Maddox rod

Grading with Maddox rod	Visual Acuity					Total
	6/60	5/60	3/60	2/60	1/60	
Grade 1	51	8	33	28	44	164
Grade 2	1	0	6	6	9	22
Grade 3	1	1	2	1	4	9
Grade 4	0	0	0	0	5	5
Total	53	9	41	35	62	200

DISCUSSION

In this study total of two hundred patients attended OPD during the data collection period. The Maddox rod test appeared reasonable in making a diagnosis in dense cataract cases. It was recognized as a preferable clinical test to assess the functioning of macula prior to cataract surgery. However there were only 5 patients where the test did not appear to be useful which makes 2.5% only. The previously reported cases have shown that Maddox rod test is a reliable pre-clinical assessment test before cataract surgery in addition to the clinical examination, visual acuity and ophthalmologic ultrasound(5). There is a wide variation in the ophthalmologists practice in the preference of tests being used in clinical practice. A national survey from St. Lious reported in 1995, and showed that a considerable number of ophthalmologists did not perform such tests to make a firm diagnosis(6). In this study 164 (82.0%) patients given Grade 1 response 22 (11.0%) had shown Grade 2 response, 9 (4.5%) had shown Grade 3 response and 5 (2.5%) had shown Grade 4 response with Maddox rod. which give a sign that they had potential visual acuity behind the cataract. On the other hand a study of conventional macular function test in cases of cataract was conducted in the Rotary eye hospital in Gujarat, India, out of operated 100 cases 80% achieved a visual acuity of 6/6 to 6/9 post surgically (7). These patients had Grade I response on Maddox rod test. In these reported cases four had grade II response to Maddox rod test. A total of six patients gained a visual acuity of 6/24 to 6/36, five of these cases were categorized as Maddox rod response grade III, and one was reported to have a grade I response. There has been reported variations in the interpretation of the ophthalmic reports between clinician(8). According to the previous study they performed the Maddox rod test after cataract surgery and in this study the Maddox rod test performed before cataract surgery. The answer to my question I finally found that the most common response in this study was Grade 1 with Maddox rod in 164(82.0%) amongst the total 200(100%) patients with dense cataract of 200 eyes, which gives the sign that the macula was functioning and the visual potentials were present behind the cataract.

The limitations to the study were that the limited time duration, sample size and the category of visual acuity in patients with dense cataract. The macular diseases which inhibit the grading of Maddox rod in some patients, was not documented in this study and the follow up results must be checked with Maddox rod after the surgery. The recommendations to the study were to assess the macular functioning by Psycho physiological test; Maddox rod in opaque media if other devices like B-scan are not available, it is helpful in the assessment whether the macula is functioning or not, and the cataract surgery will reliable in any severe condition.

CONCLUSION

The assessment of macular function in dense cataract is difficult but the Psycho physiological test like Maddox rod test was found to be the reliable in patients with cataract and its quick and understandable.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

ETHICAL CONSIDERATION

The study was approved by local ethical committee

FUNDING

The study was conducted from Departments own resources no additional funds required.

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