MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/makrjms.2011.340.344

OPEN ACCESS

Key Words
Retinitis pigmentosa, visual acuity, central vision

Corresponding Author
Shalini Rohatgi,
Department of Pathology, Maharana pratap Dental College Kanpur, India

Author Designation
[1]Assistant Professor
[2]Lecture

Received: 10 June 2011
Accepted: 20 June 2011
Published: 25 November 2011

Citation: Sanjeev Rohatgi and Shalini Rohatgi, 2011. Determination of the Contrast Visual Acuity in Patients with Retinitis Pigmentosa and Compare this with Healthy Individuals. Res. J. Med. Sci., 5: 344-340, doi: 10.59218/makrjms. 2011.340.344

Determination of the Contrast Visual Acuity in Patients with Retinitis Pigmentosa and Compare this with Healthy Individuals

[1]Sanjeev Rohatgi and [2]Shalini Rohatgi
[1]Department of Ophthalmology, Major S.D. Singh Medical College, Farrukhabad, India
[2]Department of Pathology, Maharana pratap Dental College kanpur, India

ABSTRACT
In this particular study, we aimed to determine the factors that are associated with the loss of visual acuity by contrasting the measurements of local central visual function with visual acuity over the course of time in patients who sustained Retinitis Pigmentosa. An experienced optometrist was the one who carried out the vision examination. Visual acuity was evaluated for distance vision using Snellen's test type, which was positioned at a distance of six metres from the student and for near vision using the near vision test type, which involved the student holding the chart in his or her hand at a distance of around thirty centimetres from the face throughout the examination. Utilising SPSS 20.0 the data was analysed. Student t-test is the statistical test that is utilised. The p-value was regarded to be significant if it was >0.05. In terms of demographic data, there was no discernible difference between the cases and the controls as examined. When compared to the controls, the patients had a much higher incidence of a decline in their visual acuity. Our individuals who had retinitis pigmentosa and already had strong visual acuity had significantly worse contrast visual acuity than our other patients.

INTRODUCTION

The degenerative condition known as retinitis pigmentosa (RP) causes gradual blurring of both peripheral and central vision over the course of the disease's progression. Reductions in visual acuity and contraction of the visual field are two examples of the deterioration of central vision that these patients experience, both of which contribute to an overall decline in their quality of life. Not only does the disease affect rod photoreceptors but it also causes the slow degeneration of foveal cone photoreceptors, which further restricts the peripheral visual field[1]. In a nutshell the rod cells and eventually the cone cells quit functioning, which results in impairment of vision. However, the field of vision is diminished during the early stages of RP, which does not have an effect on the quality of vision. The focal macular electroretinogram (fmERG), best-corrected visual acuity (BCVA), contrast visual acuity (CVA) and central visual field are some of the methods that are utilised in routine practice for the purpose of evaluating the central visual function in patients with retinopathy. The maximum visual acuity (VA) is determined by evaluating the visual acuity (VA) in ideal conditions. Prior to the VA loss if there is any minute decrease in visual function can be evaluated by CVA[2]. Certain studies stated that even mild VA losses show reduced CVA and contrast sensitivity CS) measurements in RP patients[3-7]. As it is known that there is no therapy to cure RP, despite the lack of treatment it is very important for the patients to have regular eye check-ups as the RP patients are prone to other type of eye problems that can further effect the general population too.The contrast sensitivity of individuals with retinitis pigmentosa was measured using a modified Vistech contrast sensitivity system. The results of these measurements revealed that patients with retinitis pigmentosa have significantly decreased contrast sensitivity across the board, particularly at the medium and high spatial frequencies[8]. It has been demonstrated by other authors that letter charts, as opposed to grating targets, can produce results that are comparable[9-11]. The The findings of their study demonstrated that individuals who suffered from retinitis pigmentosa exhibited a diminished capacity to recognise letters with low contrast across all brightness levels. This contrast sensitivity method with letter targets has two advantages first the letters are easier to identify by patients and sec the ability to use different luminance levels is easier. However, the change in background luminance level is performed by a slide projector, which is not particularly accurate. Both of these advantages are advantageous. In spite of the fact that contrast sensitivity measurements have been acknowledged as a more sensitive tool for monitoring patients who have retinitis pigmentosa, there are a number of challenges that need to be conquered before they can be utilised on a regular basis in outpatient clinics. To begin, the majority of contrast sensitivity measurements are carried out using printed charts, which are notoriously difficult to print with an appropriate contrast. The second benefit is that patients are able to recall the orientation of the gratings or the position of the letter on a chart that has been printed. And finally, slide projectors are not capable of producing accurate and consistent variations in luminance to the absolute maximum extent.

The objective of this study was to evaluate the contrast visual acuity of patients diagnosed with retinitis pigmentosa and to compare this to the visual acuity of those who are considered to be normal. For the purpose of confirming that measurements with lower contrast targets would be more typical of visual stimuli encountered in daily living by individuals with retinitis pigmentosa, we would like to confirm that this is possibly the case.

MATERIALS AND METHODS

This particular study is a case control study that was carried out at the Major S.D. Singh Medical College in Farrukhabad. There were 50 male and 50 female patients with retinitis pigmentosa who were between the ages of 30 and 50 years old and there were also thirty age-matched controls who participated in the current study. An experienced optometrist was the one who carried out the vision examination. Visual acuity was evaluated for distance vision using Snellen's test type, which was positioned at a distance of six metres from the student and for near vision using the near vision test type, which involved the student holding the chart In his or her hand at a distance of around thirty centimetres from the face throughout the examination. Participants in the study were required to be willing and within the age range of 30-50 years old. Patients who had been diagnosed with retinitis pigmentosa were included in the study. Standard methods that were discussed in the literature were utilised in order to measure visual acuity. Utilising SPSS 20.0, the data was analysed. Student t test is the statistical test that is utilised. The p-value was regarded to be significant if it was less than 0.05.

RESULTS

Table 1 presents demographic data of the participants. There was no significant difference between cases and controls in demographic data. Decline in the visual acuity was more prevalent in cases when compared to controls (Table 2). Data was expressed as frequency and percentage. Decline in the visual acuity was more prevalent in cases when compared to controls.

Table 1: Demographic data of participants

Parameter	Cases	Controls	p-value
Age (years)	39.1±5.3	37.52±4.56	0.0797
Height (cm)	157.40±13.38	160.20±15.59	0.6097
Weight (kg)	68.25±9.52	69.20±7.59	0.6240

Data was presented as mean±SD. (*p<0.05 is significant, **p<0.01 is significant, ***p<0.001 is significant). Demographic data was not significant between cases and controls.

Table 2: Visual acuity in cases and controls

Visual acuity	Cases (n = 50) (frequency)	Percentage	Controls (n = 50) Frequency	Percentage
20/20	0	0	8	16
20/30	0	0	25	50
20/40	5	10	3	6
20/50	2	4	2	4
20/60	13	26	2	4
20/70	3	6	2	4
20/80	10	20	6	12
20/90	5	10	0	0
20/100	10	20	2	4
20/160	2	4	0	0

DISCUSSIONS

A million people all around the world are affected by RP, which has a prevalence of approximately one in every four thousand people. It is possible to inherit the disease in one of three ways as an X-linked trait (which accounts for around 5-15% of cases), as an autosomal dominant (30-40%), or as an autosomal recessive (50-60%) inheritance pattern[12-14].According to a study that was carried out in Japan, RP is the most common reason for people to become visually impaired. According to the findings of the study, RP was the cause of visual issues in twenty-five percent of the patients who were experiencing them[15]. According to the findings of a study that was carried out in Kuwait, chronic obstructive pulmonary disease (RP) is a key main cause of visual handicap among individuals who are younger than sixty years of age.16 According to the findings of a study conducted in Denmark, retinitis pigmentosa and optic neuropathy were the most common causes of blindness among individuals aged 20-64 years old. The study also found that blindness was accounted for in approximately 29% of the cases[16]. Very few people experience symptomatic vision loss during childhood and even fewer patients continue to be asymptomatic until they reach the middle of adulthood. In young people, it is seen that there is a loss of the visual field in the middle of the periphery, which is then followed by a progressive decrease in the vision in the far periphery, which ultimately results in the loss of vision in the centre of the periphery. In many cases the loss of night vision goes unnoticed since the job that is done at night is performed in an environment with adequate lighting, and the use of glasses also contributes to proper eyesight. Retinitis pigmentosa affects one person out of every four thousand people, which is the prevalence rate over the entire world. There are three possible inheritance patterns for the disease: autosomal dominant (30-40%), autosomal recessive (50-60%), or X-linked (6-15%) inheritance[17-19]. According to the findings of a study that was carried out in Kuwait, retinitis pigmentosa is the most common cause of vision impairment associated with people who are younger than sixty years old[20]. In a study conducted in Denmark, retinitis pigmentosa was found to be responsible for 29% of the cases of blindness. On the other hand, Japan was found to be responsible for 25% of the cases that occurred between the ages of 20 and 60[21-22]. The disease is often isolated to the eye, but it has been shown that approximately twenty to forty percent of the cases can be related as non-ocular disease. This means that the condition is connected with hearing impairment, also known as Usher syndrome. The term “Bardet-Biedl syndrome” refers to the condition that occurs when retinitis pigmentosa is accompanied by other symptoms such as hypogenitalism, polydactyly, renal problems and psychological impairment. The disease has a wide

range of manifestations; some people experience symptomatic vision loss as early as childhood, while others may not experience any symptoms until they are in the middle of adulthood[24]. When they reach maturity, the majority of them report having difficulties adapting to dark environments, experiencing night blindness and losing the mid-peripheral visual field, which further leads to tunnel vision. If the condition is not addressed, it can also result in the entire loss of central vision by the age of sixty. To a greater extent than the decline in cone sensitivity the majority of the varieties of retinitis pigmentosa exhibit an excess of rod function loss. When all three groups were subjected to the same level of illumination, the difference in visual acuity between the 10% contrast visual acuity and the 100% contrast visual acuity measured was about the same. Despite the fact that the light response is significantly impaired in patients with retinitis pigmentosa, as demonstrated by the fact that patients were unable to recognise a 5% contrast Landolt ring, these findings suggest that a reduction in target contrast has an almost identical impact on visual acuity in normal individuals as well as in patients with retinitis pigmentosa. In addition the current study demonstrated that RP is associated with a reduction in visual acuity. In the next ten years the concentration of researchers, their efforts and their interest in therapeutic approaches for RP promises to have significant impact on the development of more advanced treatments. ConclusionOur individuals who had retinitis pigmentosa and already had strong visual acuity had significantly worse contrast visual acuity than our other patients. When individuals with retinitis pigmentosa and good visual acuity have subjective visual complaints, contrast visual acuity may be a sensitive approach to monitor for small changes in foveal function. This is because contrast visual acuity is a method that measures the contrast between two or more images.

REFERENCES

1. Hartong, D.T., E.L. Berson and T.P. Dryja, 2006. Retinitis pigmentosa. Lancet., 368: 1795-1809.
2. Regan, D. and D. Neima, 1983. Low-contrast letter charts as a test of visual function. Ophthalmol., 90: 1192-1200.
3. Otani, A., M. Oishi, H. Nakamura, M. Hangai, A. Oishi and N. Yoshimura, 2012. Contrast visual acuity in patients with retinitis pigmentosa assessed by a contrast sensitivity tester. Ind. J. Ophthalmol., 60: 545-549.
4. Alexander, K.R., D.J. Derlacki and G.A. Fishman, 1995. Visual acuity vs letter contrast sensitivity in retinitis pigmentosa. Vision. Res., 35: 1495-1499.
5. Hata, A., K. Ogata, T. Sugawara, A. Hagiwara, A. Hata and S. Yamamoto, 2011. Evaluation of contrast visual acuity in patients with retinitis pigmentosa. Clin. Ophthalmol., 5: 1459-1463.
6. Spellman, D.C., K.R. Alexander, G.A. Fishman and D.J. Derlacki, 1989. Letter contrast sensitivity in retinitis pigmentosa patients assessed by regan charts. Retina., 9: 287-291.
7. Invest. Ophthalmol. Vis. Sci., 1992. Contrastthresholds for letter identification in retinitis pigmentosa. Invest. Ophthalmol. Vis. Sci., 33: 1846-1852.
8. Sucs, F.,E. and A. Uvijls, 1992. Contrast sensitivity in retinitis pigmentosa at different luminance levels. Clin. Vision. Sci., 7: 147-151.
9. Regan, D., 1995. Do letter charts measure contrast sensitivity? Clin. Vision. Sci., 6: 401-408.
10. Bunker, C.H., E.L. Berson, W.C. Bromley, R.P. Hayes and T.H. Roderick, 1984. Prevalence of retinitis pigmentosa in maine. Am. J. Ophthalmol., 97: 357-365.
11. Novak-Lauš, K. and S. Suzana Kukulj, 2002. Primary tapetoretinal dystrophies as the cause of blindness and impaired vision in the republic of croatia. Acta. Clin. Croat., 41: 23-27.
12. GRøNDAHL, J., 1987. Estimation of prognosis and prevalence of retinitis pigmentosa and usher syndrome in Norway. Clin. Genet., 31: 255-264.
13. Hata, H.,M. Yonezawa. and T. Nakanishi, 2003. Causes of entering institutions for visually handicapped persons during the past fi fteen years. Jpn. J. Clin. Ophthalmol., 57: 259-262.
14. Buch, H., T. Vinding, M. la Cour, M. Appleyard, G.B. Jensen and N.V. Nielsen, 2004. Prevalence and causes of visual impairment and blindness among 9980 scandinavian adults. Ophthalmol., 111: 53-61.
15. Novak-Lauš, K., 2002. Primary tapetoretinal dystrophies as the cause of blindness and impaired vision in the republic of Croatia. Acta. Clin. Croat., 41: 23-27.
16. Al-Merjan, J.I., M.G. Pandova, M. Al-Ghanim, A. Al-Wayel and S. Al-Mutairi, 2005. Registered blindness and low vision in Kuwait. Ophtha. Epid., 12: 251-257.
17. Hata, H.,M. Yonezawa. and T. Nakanishi, 2003. Causes of entering institutions for visually handicapped persons during the past fi fteen years. Jpn. J. Clin. Ophthalmol. 57: 259-262.

18. Pennings, R.J.E., A.F. Deutman, R.R. Fields, W.J. Kimberling, P.L.M. Huygen and W.R.J. Cremers, 2003. Usher syndrome type iii can mimic other types of usher syndrome. Ann. Otol. Rhinol. Laryngol., 112: 525-530.
19. Tieder, M. and M. Levy, 1982. Renal abnormalities in the Bardet- Biedl syndrome. Int. J. Pediatr. Nephrol., 3: 199-203.