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Estimation of Refractive Errors-A Comparative Study of Auto Refraction and Streak Retinoscopy

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ABSTRACT

The mean spherical and Cylindrical error in right eye was 1.46 ± 0.94 and 0.83 ± 0.55, with a minimum of 0.25 and 0.25 maximum of 5.50 and 3.75 as assessed by AR without dilatation. The mean spherical and Cylindrical error in Left eye was 1.17 ± 0.91 and 0.87 ± 0.58 with a minimum of 0.12 and 0.25 maximum of 5.00 and 3.75, as assessed by AR without dilatation. Simple Astigmatism was 16% and the remaining 61% had compound astigmatism, as assessed by AR after dilattion. Cylindrical error in right eye was 1.14 ± 0.84 and 0.64 ± 0.53, with a minimum of 0.12 and 0.25 maximum of 4.50 and 4.25 as assessed by AR after dilatation. The mean spherical and Cylindrical error in Left eye was 0.97 ± 0.86 and 0.67 ± 0.55with a minimum of 0.12 and 0.25 maximum of 5.00 and 3.37. With spherical error were 32%, Simple Astigmatism were 27% and the remaining 41% had compound astigmatism, as assessed by PMT.

Key words: Astigmatism, Dilation

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INTRODUCTION

As we already know that the most common anomalies of eyes are the myopia, astigmatism and myopia which are grouped as refractive errors [1-3]. The currently used technique for objective refraction is retinoscopy and auto refraction. This study aims at the estimation of refractive errors by comparative study between Auto refraction and Streak retinoscopy in adults between age group of 20 and 30 years.

MATERIAL AND METHODS

100 adult patients in an age group of 20-30 years presenting to the ophthalmology outpatient department at Sree Balaji medical college & hospital, Chennai with refractive errors were involved for the study. Auto refraction were performed using TOPCON RM 8800 auto refractometer. The average values were calculated by the machine. Retinoscopy was performed by keeler's self-illuminating streak retinoscopy.

RESULTS

Majority (46%) subjects belonged to up to 24-year age group, followed by 25 to 28-year age group (40%). The proportion of subjects in 29 years and above age group was 14% (Table 1). The proportion of subjects with Snellen's visual acuity> 6/12 in right eye were 71 (71 %). The proportion of subjects with 6/18 to 6/24 were 25%, 6/36 to 6/60 were 4% respectively. The proportion subjects with Snellen's visual acuity >6/12 in Left eye were 79 (79%). The proportion of subjects with 6/18 to 6/24 were 16%, 6/36 to 6/60 were 5% respectively.

The mean spherical and Cylindrical error in right eye was 1.46 ± 0.94 and 0.83 ± 0.55, with a minimum of 0.25 and 0.25 maximum of 5.50 and 3.75 as assessed by AR without dilatation. The mean spherical and Cylindrical error in Left eye was 1.17 ± 0.91 and 0.87 ± 0.58 with a minimum of 0.12 and 0.25 maximum of 5.00 and 3.75, as assessed by AR without dilatation (Table 2).

Correlation between AR, retinoscopy and PMT values (Right & left eye)

The degree of correlation as assessed by Intra class correlation coefficient was assessed for both AR (after dilatation) and retinoscopy, assuming PMT as the gold standard. Both the modalities of assessment have shown very high correlation with PMT findings. In right eye assessment of spherical power, the AR had an ICC of 0.938 (P value<0.001). For cylinder and axis the ICC values were o.890 (P value<0.001) and 0.960 (P value<0.001) respectively. The corresponding values of retinoscopy were slightly higher for both sphere (0.982 (P value<0.001)) and cylinder (0.942 (P value<0.001)). But the ICC value for axis was slightly lower than that of AR (0.546, p value<0.001). In the left eye the ICC values of AR in assessment of sphere, cylinder and axis were 0.952,

0.947 and 0.774 respectively. All these ICC values were statistically significant (P value<0.001). The corresponding values for sphere and cylinder were higher for retinoscopy as compared to AR. But as right eye, the ICC value for assessment of axis was slightlylower for retinoscopy than that of AR (0.695, p value <0.001) as shown in Table 3.

Table 1: Descriptive analysis of age group in study population (N=l00).

Age Group	Frequency	Percentages
Up to 24	46	46.00%
25-28	40	40.00%
29 and above	14	14.00%

Table 2: Mean spherical and cylindrical error in right and left eye.

AR (Before Dilation)	Mean ± STD	Median	Min	Max	95% C.I. for EXP(B)	
					Lower	Upper
			Right Eye			
Sphere (N=77)	1.46 ± 0.94	1.25	0.25	5.5	1.24	1.67
Cylinder (N=69)	0.83 ± 0.55	0.75	0.25	3.75	0.7	0.97
Axis (N=69)	130.26 ± 54.27	150	10	180	117.22	143.3
			Left EYE			
SPHERE(N=83)	1.17 ± 0.91	1	0.12	5	0.98	1.37
CYLINDER(N=76)	0.87 ± 0.58	0.75	0.25	3.75	0.74	1.01
AXIS(N=76)	123.55 ± 60.83	147.5	10	180	109.65	137.45

Table 3: Retinoscopy.

Visual parameter	AR (After dilatation) with PMT		Retinoscopy (After dilatation) with PMT	P value
	Intra class correlation coefficient	P value	Intra class correlation coefficient	
		Right eye		
Sphere	0.938	<0.001	0.982	<0 .001
Cylinder	0.89	<0 .001	0.942	<0.001
Axis	0.969	<0.001	0.546	<0.001
		Left eye		
Sphere	0.952	<0.001	0.974	<0.001
Cylinder	0.947	<0.001	0.94	<0.001
Axis	0.774	<0.001	0.695	<0.001

DISCUSSION AND CONCLUSION

In this study for sphere there is higher agreement between retinoscopy and subjective refraction for the spherical component. There was no statistically significant difference for cylindrical powers in similarity with the study done by Jorge et al. [4-10] the study for axis shows suggests that the autorefractometer gives more accurate axis. Hence in this study, refractive errors obtained by subjective refraction and retinoscopy on adults were compared and the results showed that retinoscopy yields reliable and valid measurements of refraction. But AR estimates the axis of astigmatism more precisely than retinoscopy.

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