Normative Data of Anterior Chamber Volume in Normal Indian Adults by Pentacam

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ABSTRACT

The present study was conducted in 250 normal Indian subjects (500 eyes) of either sex to assess anterior chamber volume (ACV) to establish normal values in the adult Indian population without any eye disease for reference for future studies. The ACV was assessed by using pentacam. ACV was found to be 164 ± 27.75 mm^3. There was no significant difference in ACV values of right and left eyes (p=0.6839). ACV values were not comparable with different studies due to variation in ethnicity of various countries.

Keywords: Normative Data, Anterior Chamber Volume, Normal Indian Adults, Pentacam

INTRODUCTION

The measurement of the anterior chamber volume which is useful for evaluating the anterior ocular segment topography in narrow angle is also done by pentacam. [1, 2] Vicent et al described that all the parameters of anterior segment of eye can be easily and accurately measured with pentacam.[3]

Integral calculus is used to calculate anterior chamber volume as a solid bounded by posterior surface of cornea (12.0 mm around the corneal vertex) and the iris and lens (pentacam instruction manual).

MATERIALS AND METHODS

There were 111 females (222eyes) and 139 males (278eyes). OCULUS Pentacam, sterile cotton/gauzes, spirit, black cloth were used. After obtaining the written informed consent, participants were examined using the OCULUS Pentacam. Subjects were examined in sitting position. The study was conducted in 250 Indian participants (500 eyes) attending Ophthalmology OPD in NIMS Medical College and Hospital, Jaipur. Both eyes of each participant were scanned by same observer. All participants underwent a complete ophthalmological and optometric examination, including visual acuity evaluation, slit lamp examination and ocular fund us examination. Testing was done with natural pupils under same conditions in ambient lighting.

The machine was used in automatic release mode to rule out confounding operated related variables. The imaging device was automatically calibrated prior to the start of each new set of measurements. Participants were made to sit comfortably on examination stool. Participants were instructed to keep both eyes open and look directly at black fixation target for 2 seconds. The chin was placed at chin rest and forehead was placed on forehead rest. A black cloth was placed on subject's head to omit any light. The eyes were randomly examined. In order to avoid the documented daily changes in corneal thickness and other parameters, all measurements were conducted between 9:00 am to 2:00 pm and at least 4 hours after waking. It was ensured that all participants had at least 6 hours of overnight sleep. Three readings of all measurements were taken and their mean value were considered. ACV were recorded

and tabulated separately in the 250 left eyes as well as 250 right eyes.

Statistical analysis

The statistical analysis was done by using unpaired students' 't' test by using Prism software. The p value ≤ 0.05 was considered statistically significant and the p value <0.001 was considered as very highly significant.

RESULTS

Table 1: Minimum, Maximum, Median, Mean, SD, SEM, Lower and Upper 95% CI of anterior chamber volume

	ACV (mm^3) of left eyes	ACV (mm^3) of right eyes	ACV (mm^3) of both eyes
Minimum	85	79	79.00
Maximum	246	245	246
Median	165	166	165
Mean	163.5	164.5	164
SD	27.64	27.91	27.75
SEM	1.748	1.765	1.241
Lower 95% CI of mean	160	161.0	161.5
Upper 95% CI of mean	166.9	168.0	166.4
Mean± SEM of ACV (mm^3)	**163.5 ± 1.748**	**164.5 ± 1.765**	

The mean difference of anterior chamber volume of left and right eyes was not significant (p 0.2894) (Table 1).

DISCUSSION

Fernández-Vigo et al studied ACV with the pentacam in normal Caucasian subjects of mean age 49.1 ± 15.2 years (range 18-84) and 61% of participants were women. The mean value of ACV was 161 ± 47.8 mm^3, maximum being 277 mm^3 and minimum 67 mm^3.[4]

Rabsilber et al studied anterior chamber parameters in Germans. They studied in 76 healthy volunteers (mean age 46.6 years $\pm$ 16.8). Three consecutive readings of one eye ACV were evaluated. The mean ACV was 160.3 ± 36.81 mm^3 (range 91.83 to 240mm^3). Increasing age was associated with reduced ACV. There was good correlation between ACD and ACV (R= 0.92). The ACD and mean ACA correlated only moderately (R= 0.65), and the correlation coefficient between ACA and minimum ACA was smaller (R= 0.58). The ACA and mean ACA did not correlate (R= 0.37). Minor standard deviations were noted and ACV 2.48 ± 1.65 mm^3.[5]

Hashemi et al studied in 283 Iranian subjects with mean age 29.1 ± 7.5 years. In emmetropic group, ACV (171.8 ± 36.5) was found. On comparing emmetropic group ACD with myopic and hyperopic groups, it was found highly significant (p<0.001).[6] Lam and Tse observed ACV 161.03 ± 37.79 mm^3.[7] Perez Cambrodi et al observed 168.35 ± 34.27 mm^3.[8] Emre et al reported ACV 186.3 ± 38.4 mm^3.[9]

In the present study, the mean of ACV value in normal adult Indian population of both eyes is 164 ± 27.75 mm^3 by using pentacam. The mean of ACV values of left and right eyes is 163.5 ± 1.748 mm^3 and 164.5 ± 1.765 mm^3 respectively. There was no significant difference in ACV values of right and left eyes (p 0.6839) (Table 1). Our findings of ACV are comparable with the studies of Fernández-Vigo et al ($161\pm47.8mm^3$), Rabsilber et al ($160.3\pm36.81mm^3$), Hashemi et al ($171.8\pm36.8mm^3$), Lam and Tse (161.03 ± 37.79 mm^3) and Perez Cambrodi et al (168.35 ± 34.27 mm^3) while Emre et al reported higher values of ACV 186.3 ± 38.4 mm^3.[4,5,6-9]

CONCLUSION

The mean of ACV value in normal adult Indian population of both eyes is 164 ± 27.75 mm^3 by using pentacam. There was no significant difference in ACV values of right and left eyes (p0.6839). ACV values were not comparable with different studies due to variation in ethnicity of various countries.

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