Agreement between anterior segment Optical Coherence Tomography, Lenstar and Ultrasound Biomicroscopy measurements of anterior segment parameters

Ziyan Yu

4th affiliated hospital of china medical university

Ting Huang

Chongqing aier eye hospital

Qiao Yu

Guizhou Provincial People's hospital

Jun Kong

4th affiliated hospital of China Medical University

Bo Qu (✉ dolphinemu@foxmail.com)

4th affiliated hospital of China Medical university <https://orcid.org/0000-0002-2261-8464>

Research article

Keywords: Optical coherence tomography, Central corneal thickness, Anterior chamber depth, Biomicroscopy

Posted Date: March 3rd, 2019

DOI: <https://doi.org/10.21203/rs.2.427/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Purpose To compare anterior chamber depth (ACD) and central corneal thickness (CCT) measurements by anterior segment optical coherence tomography (AS-OCT), Lenstar and ultrasound biomicroscopy (UBM). **Methods** A retrospective cross section study. A total of 83 eyes from 54 patients were included. Central corneal thickness (CCT) and anterior chamber depth (ACD) values obtained from three devices (AS-OCT, Lenstar and UBM) were recorded. All patients were collected from Oct. 2015 to Aug. 2016 in the Fourth Affiliated Hospital of China Medical University. Differences of these three devices (ACD and CCT) were statistically analyzed by randomized blocks analysis. Pearson correlative analysis and Bland-Altman analysis were used to compare the correlation and agreement. **Results** There's no significant difference in measuring ACD by Lenstar and UBM ($P>0.05$), but there were significant differences in other two groups (AS-OCT and UBM, AS-OCT and Lenstar) ($P<0.05$). There were significant differences in the mean CCT measured by the three devices ($P<0.05$). There were high correlation in measuring ACD (all $P<0.001$, $r_1=0.928$, $r_2=0.982$, $r_3=0.932$, respectively), and CCT (all $P<0.001$, $r_1=0.957$, $r_2=0.949$, $r_3=0.928$, respectively). **Conclusion** AS-OCT, Lenstar and UBM yielded comparable results and are all can be used interchangeably for anterior segment measurements.

Introduction

At present, the devices of measuring CCT (central corneal thickness) and ACD (anterior chamber depth) included anterior segment optical coherence tomography (AS-OCT), Lenstar and ultrasound biomicroscopy (UBM), Pantancam etc{Martinez-Albert, 2018 #616;Zhao, 2013 #619;Mansoori, 2017 #620;Ma, 2016 #627}. For example, the healing of the surgical incisions such as conjunctiva, sclera, and cornea, the changes of ACD, angle width and thickness of the lens before and after the operation can be evaluated{Devereux, 2000 #680;Lesiewska-Junk, 2000 #681}. Meanwhile, changes in IOL after cataract surgery and related surgical complications (posterior capsular opacification capsular block syndrome, IOL clamping, IOL turbidity) can be observed{Melese, 2016 #621;Neri, 2013 #622;Fukuda, 2013 #624}. CASIA SS-1000 3-dimensional anterior-segment optical coherencetomography (AS-OCT) is a new cornea / anterior segment intelligent analyzer from Tomey, Japan{Melese, 2016 #621}. It is non-invasive, fast imaging, high-resolution and has been widely applied in the ocular surface diseases, excimer surgery, glaucoma, lens diseases, anterior segment neoplasm etc. Through using AS-OCT, clear ocular surface images such as tear river and corneal structure, height of the tears, CCT, corneal curvature and refractive power can be obtained; and ACD, angle structure (including Schlemm tube), crystal thickness can be displayed.

In this study, the anterior segment parameters were measured by AS-OCT, Lenstar and UBM in normal eyes in order to reveal whether the measurements obtained with those three devices are comparable. The agreement, difference and correlation of ACD and CCT measured by AS-OCT, Lenstar and UBM were estimated.

Materials And Methods

The research adhered to the tenets of the Declaration of Helsinki and was approved by the Institutional Review Board of China Medical University. Trail registration: The name of the trail registry is Agreement between anterior segment Optical Coherence Tomography, Lenstar and Ultrasound Biomicroscopy measurements of anterior segment parameters. The registry's URL is www.medresman.org and the registration number is ChiCTR1900021378.

This was a hospital-based, retrospective, and cross-sectional study that patients underwent routine ophthalmologic examinations (including visual acuity, IOP, integrated optometry, slit lamp examination and fundus examination) and Lenstar, UBM and AS-OCT examination in the Ophthalmology Department of the 4th Affiliated Hospital of China Medical University between October 2015 and August 2016. Potential risks associated with the Lenstar, UBM and AS-OCT examination were fully discussed, and a written informed consent on invasive examination was obtained from all participants.

Inclusion criteria: 1) any age; 2) either gender; 3) naked visual acuity > 0.1, and the fixation can cooperate with the inspection; 4) IOP within the normal range. Exclusion criteria: 1) previous history of ocular trauma; 2) history of other eye diseases: dry eye, secondary glaucoma, angle-closure glaucoma, disease of cornea, choroid and retina; 3) previous history of ocular surgery (refractive surgery, intraocular surgery); 4) previous history of ocular inflammation or inflammatory activity; 5) using local or systemic drugs which will affect the anterior chamber shape; 6) pterygium, corneal scars and other diseases affecting the anterior segment's observation; other dioptric media turbidity.

The patients were examined in the order of Lenstar, AS-OCT and UBM. The interval of examinations was about 5 minutes; all the examinations of the same device were performed by the same operator and in the same brightness environment. 3 measurements values of CCT and ACD obtained from the same eye were recorded for each device, and their means were used in [statistical analysis](#). ACD: Distance from the central corneal internal surface to the front surface of the lens. CCT: Central corneal distance between the anterior and posterior surfaces. Anterior segment optical coherence tomography analyzer (AS-OCT, SS-1000, CASIA, Tomey, Nagoya, Japan). Lenstar (LS 900, Haag-Streit AG, Koeniz, Switzerland). Ultrasound biomicroscopy (UBM, MD-300L, Tianjin Maida Medical Technology Co., Ltd, China).

In this study, all descriptive analysis, difference analysis and correlation analysis were performed using SPSS19.0 (SPSS Inc, USA). and the agreement analysis was performed using MedCalc15.0 (MedCalc Software, Belgium). Descriptive statistics (means $\pm$ standard deviations [SDs]) of normally distributed variables (age) were calculated. The data were in accordance with the normal distribution and the variance was homogeneous. Differences of three devices were analyzed by the randomized block analysis of variance (LSD); the differences of any two devices were analyzed by paired t-test. Otherwise, the nonparametric tests were used. Correlations and agreement of three devices used Pearson correlation analysis and Bland-Altman analysis (Significance was set at $P < 0.05$).

Results

Patients

A total of 54 patients (83 eyes) were enrolled in this study. Measurements of ACD and CCT were performed using AS-OCT, Lenstar and UBM. There were 17 males (25 eyes) and 37 females (58 eyes). And mean age of all patients (27-83 years old) was 58.96 ± 14.384 years.

ACD and CCT measured by AS-OCT, Lenstar and UBM

The mean values of ACD provided by Lenstar was (2.2201 ± 0.5514) mm, by AS-OCT was (2.2998 ± 0.5439) mm, and by UBM was (2.2508 ± 0.5724) mm. And the values of ACD from high to low were AS-OCT, UBM and Lenstar.

The mean values of CCT provided by Lenstar was (539.55 ± 38.68) μm , by AS-OCT was (534.15 ± 38.81) μm , and by UBM was (542.89 ± 34.41) μm . And the results of CCT from high to low were UBM, Lenstar and AS-OCT (Table1).

Differences of ACD and CCT measured by the three devices

The measurements of ACD and CCT of three groups are all with the normal distribution and the homogeneity of variance, and the differences of three were compared using the randomized block analysis of variance. There was a significant difference of the three groups in measuring ACD ($P < 0.05$). The differences of ACD except measured by Lenstar and UBM were not statistically significant ($P = 0.124$). The other comparisons (AS-OCT and Lenstar, AS-OCT and UBM), the differences were statistically significant ($P < 0.05$). There were significant differences among three groups in measuring CCT ($P < 0.05$). There were significant differences between any two groups ($P < 0.05$) (Table2).

Correlations of ACD and CCT measured by the three devices

There was high correlation between any two devices for ACD measurements. Lenstar and AS-OCT ($r=0.928$, $P < 0.001$) (Figure 1A). Lenstar and UBM ($r=0.982$, $P < 0.001$) (Figure 1B). AS-OCT and UBM ($r=0.932$, $P < 0.001$) (Figure 1C).

There was high correlation between any two devices for CCT measurements. Lenstar and AS-OCT ($r=0.957$, $P < 0.001$) (Figure 2A). Lenstar and UBM ($r=0.949$, $P < 0.001$) (Figure 2B). AS-OCT and UBM ($r=0.928$, $P < 0.001$) (Figure 2C).

Agreement of ACD and CCT measured by the three devices

The agreement of the ACD measurements of the three devices were analyzed by Bland-Altman diagram. Lenstar and AS-OCT: 1 out of 166 points (1/166, 0.60% approximately) were outside the 95% confidence interval (Figure 3A); Lenstar and UBM: 4 out of 166 points (4/166, 2.41% approximately) were outside the 95% confidence interval (Figure 3B); AS-OCT and UBM: 2 out of 166 points (2/166, 1.20% approximately) were outside the 95% confidence interval (Figure 3C). The results from Bland-Altman diagram showed that the data of any two groups of ACD measurements were within the 95% agreement interval and the

confidence interval was relatively narrow, with no significant difference, and could be clinically acceptable. Bland-Altman diagram analysis showed good agreement of the ACD measurements of three groups.

The agreements of the CCT measurements of three devices were analyzed by Bland-Altman diagram. Lenstar and AS-OCT: 4 out of 166 points (4/166, 2.41% approximately) were outside the 95% confidence interval (Figure 4A); Lenstar and UBM: 3 out of 166 points (3/166, 1.81% approximately) were outside the 95% confidence interval (Figure 4B); AS-OCT and UBM: 4 out of 166 points (4/166, 2.41% approximately) were outside the 95% confidence interval (Figure 4C). The Bland-Altman diagram of any two of three devices CCT measurements showed that more than 95% of the data points were in the 95% agreement interval and the confidence interval was relatively narrow, with no significant difference, and could be clinically accepted. The results of Bland-Altman diagram analysis showed that the results of CCT measurements measuring by three devices were in good agreement. The Bland-Altman diagram showed that the data of any two groups of CCT measurements were within the 95% agreement interval and the confidence interval was relatively narrow, with no significant difference, and could be clinically acceptable. The results of Bland-Altman diagram analysis showed that the results of CCT measurements of the three groups were in good agreement.

Discussion

The anterior chamber is a structure which central is deep and peripheral shallow, mean ACD of normal people is about 3mm, which varies with age and refractive status (young people and myopia are deeper, the elderly and hyperope are shallower) {Fukuda, 2013 #630}. When the chamber angle structure cannot be directly measured, the ACD can reflect the opening and closing state of the anterior chamber angle to a certain extent. It is also one of the most simple and easy-to-obtain anatomical parameters, which has reference value for early screening of glaucoma {Baskaran, 2007 #687}. According to the too thin or unregular corneal thickness, the keratoconus may appear after the excimer laser and corneal ulcer easily lead to corneal perforation; CCT will result in some errors of intraocular pressure and other tests {Abolbashari, 2013 #631; Elgin, 2016 #632}. Therefore, accurate measurements of ACD and CCT can be helpful in early screening and diagnosis.

They are some of factors that can influence the measurements of CCT and ACD such as accuracy of eye position and fixation, accurate position of the measurement, accurate front and rear boundaries, and change of the body position. By looking at the fixation point inside the machine while in sitting position, patients take measurements by AS-OCT and Lenstar in less than 10 seconds and can easily maintain the stability of eye and fix fixation. AS-OCT and Lenstar are automatic measurements, but Lenstar can not manually correct the measurement of the front and rear limits {Wasielica-Poslednik, 2016 #633}. As for the UBM measuring, the center of the optic axis and the center of the lens are nonoverlapping incompletely while measuring, so the measurement errors increased and ACD measurements are shorter. Body position may also affect ACD measurements. UBM is performed in supine position, the lens-iris diaphragm moving forward due to the gravity making the anterior chamber shallow {Sano, 2001 #657}.

While UBM measurement is affected by the measurement time and has no fixation point, it can easily cause eye movement and body position change, making CCT longer and ACD shorter{Yu, 2008 #679}. In this study, the ACD results of Lenstar, AS-OCT and UBM were $(2.2201 \pm 0.5514) \mu\text{m}$, $(2.2998 \pm 0.5439) \mu\text{m}$ and $(2.2508 \pm 0.5724) \mu\text{m}$, respectively, which conforms to the above inference. And attention should also be paid to the influence of manual corrections of the front and rear boundaries and body positions.

Tear film thickness might have played a role in measuring CCT by Lenstar and AS-OCT{El-Fayoumi, 2018 #675}. Without adjusting the curve of the anterior corneal surface, the CCT measurements will be much longer, but adjusting the curve may cause the measured value shorter. The single measurement time of AS-OCT is about 3 to 4 seconds, which is shorter than Lenstar. So in the measuring time of AS-OCT, interference of blink and tear film rupture is small, but is still larger than the other two devices. The corneal curve of AS-OCT can be manually adjusted, and the tear film interference can be excluded to the maximum degree in high resolution, so the measured value is minimal. The single measurement time by Lenstar is about 6 seconds, measured after blinking, so it is more easily to be affected by the tear film{Luft, 2015 #676}. Lenstar is measured automatically by the computer, so the measurements are higher than of AS-OCT. Patients with symptoms and signs of DED (tear osmolarity, sodium fluorescein tear break-up time, ocular surface staining, Schirmer test) and significant tear hyperosmolarity symptoms showed reduced CCT using Fourier-domain optical coherence tomography{Deinema, 2017 #690}. UBM is measured in the medium, the tear film thickness may be thickened due to the influence of the medium{Wolfel, 2018 #677}. When the thickness of the CCT is manually drawn, due to the influence of the resolution, the interference of the tear film is high and the measured value is high. Therefore, The CCT measurement by UBM is the thickest among the three devices{Wolfel, 2018 #677}. The thickness of the tear film is about $7 \mu\text{m}$. In this study, the CCT results of Lenstar, AS-OCT and UBM were $(539.55 \pm 38.68) \mu\text{m}$, $(534.15 \pm 38.81) \mu\text{m}$ and $(542.89 \pm 34.41) \mu\text{m}$, respectively, which conforms to the above inference.

At present there is no definite gold standard for ACD measurement, and there is no uniform standard for the fluctuation range of ACD{Mosler, 2015 #678}. Therefore, non-contact examination is an effective alternative, with less damage to obtain more accurate results. In addition to measuring ACD and CCT, Lenstar is also be used for eye axial and corneal curvature measurement, IOL calculation, preoperative safety analysis of IOL, preoperative design and postoperative follow-up observation, and it also has an important reference significance for surgical method option in glaucoma patients. So in terms of the practicability, Lenstar in cataract surgery is greater, and its repeatability is better than UBM that can easy to follow up. However, UBM and AS-OCT can simultaneously measure anterior chamber angle during measuring ACD, and can examine the entire anterior segment structure, which can be used to diagnose glaucoma or suspected glaucoma. UBM is a contact examination in supine position, and doctor's skillful operation and patient's high coordination are very important too. The characteristics of early glaucoma screening should be simple, noninvasive, fast, accurate and can obtain comprehensive ocular parameters. Measuring by AS-OCT is more simple, fast, easy to operate, more practical and so on. In the early screening of glaucoma, AS-OCT has more advantages. And UBM is still be necessary for further confirmation.

Conclusion

In conclusion, although there were differences in the measurement values, a significant correlation and agreement was observed in CCT and ACD measurements. The three devices can be interchanged in some cases. AS-OCT can be used as the first choice for early glaucoma screening, evaluation before anterior segment surgery and also for the follow-up of ICL implantation.

Declarations

Trail registration

Trail registration: The name of the trail registry is Agreement between anterior segment Optical Coherence Tomography, Lenstar and Ultrasound Biomicroscopy measurements of anterior segment parameters. The registry's URL is www.medresman.org and the registration number is ChiCTR1900021378.

Acknowledgements

No.

Funding source

We have not financial interest and we have not received direct or indirect funding.

Availability of data and materials

The datasets for the analysis of this study are readily available from the corresponding author on reasonable request. And an administrative permission from the 4th affiliated hospital of China Medical University is required to access the raw data.

Authors' contributions

BQ contributed to the study design. ZY and TH collected the data and drafted the manuscript. All the authors including ZY, TH, QY, JK and BQ were involved in the critical revision of the manuscript, supervision of the manuscript and final approval of the submission.

Ethics approval and consent to participate

The research adhered to the tenets of the Declaration of Helsinki and was approved by the Institutional Review Board of China Medical University.

Competing interests

The authors declare that they have no competing interests.

References

1. Martinez-Albert N, Esteve-Taboada JJ, Montes-Mico R (2018) Repeatability assessment of anterior segment biometric measurements under accommodative and nonaccommodative conditions using an anterior segment OCT. *Graefes Arch Clin Exp Ophthalmol* 256: 113-123 DOI 10.1007/s00417-017-3832-5
2. Zhao J, Chen Z, Zhou Z, Ding L, Zhou X (2013) Evaluation of the repeatability of the Lenstar and comparison with two other non-contact biometric devices in myopes. *Clin Exp Optom* 96: 92-99 DOI 10.1111/j.1444-0938.2012.00793.x
3. Mansoori T, Balakrishna N (2017) Anterior Segment Morphology in Primary Angle Closure Glaucoma using Ultrasound Biomicroscopy. *J Curr Glaucoma Pract* 11: 86-91 DOI 10.5005/jp-journals-10028-1230
4. Ma XY, Zhu D, Zou J, Zhang WJ, Cao YL (2016) Comparison of ultrasound biomicroscopy and spectral-domain anterior segment optical coherence tomography in evaluation of anterior segment after laser peripheral iridotomy. *Int J Ophthalmol* 9: 417-423 DOI 10.18240/ijo.2016.03.16
5. Devereux JG, Foster PJ, Baasanhu J, Uranchimeg D, Lee PS, Erdenbeleig T, Machin D, Johnson GJ, Alsbirk PH (2000) Anterior chamber depth measurement as a screening tool for primary angle-closure glaucoma in an East Asian population. *Arch Ophthalmol* 118: 257-263
6. Lesiewska-Junk H, Kaluzny J (2000) Intraocular lens movement and accommodation in eyes of young patients. *J Cataract Refract Surg* 26: 562-565
7. Melese E, Peterson JR, Feldman RM, Baker LA, Bell NP, Chuang AZ, Blieden LS (2016) Comparing Laser Peripheral Iridotomy to Cataract Extraction in Narrow Angle Eyes Using Anterior Segment Optical Coherence Tomography. *PLoS One* 11: e0162283 DOI 10.1371/journal.pone.0162283
8. Neri A, Pieri M, Olcelli F, Leaci R, Gandolfi SA, Macaluso C (2013) Swept-source anterior segment optical coherence tomography in late-onset capsular block syndrome: high-resolution imaging and morphometric modifications after posterior capsulotomy. *J Cataract Refract Surg* 39: 1722-1728 DOI 10.1016/j.jcrs.2013.05.039
9. Fukuda R, Usui T, Miyai T, Mori Y, Miyata K, Amano S (2013) Corneal thickness and volume measurements by swept source anterior segment optical coherence tomography in normal subjects. *Curr Eye Res* 38: 531-536 DOI 10.3109/02713683.2012.745878
10. Baskaran M, Oen FT, Chan YH, Hoh ST, Ho CL, Kashiwagi K, Foster PJ, Aung T (2007) Comparison of the scanning peripheral anterior chamber depth analyzer and the modified van Herick grading system in the assessment of angle closure. *Ophthalmology* 114: 501-506 DOI 10.1016/j.ophtha.2006.08.019
11. Abolbashari F, Mohidin N, Ahmadi Hosseini SM, Mohd Ali B, Retnasabapathy S (2013) Anterior segment characteristics of keratoconus eyes in a sample of Asian population. *Cont Lens Anterior Eye* 36: 191-195 DOI 10.1016/j.clae.2013.01.005

12. Elgin U, Sen E, Simsek T, Tekin K, Yilmazbas P (2016) Early Postoperative Effects of Cataract Surgery on Anterior Segment Parameters in Primary Open-Angle Glaucoma and Pseudoexfoliation Glaucoma. *Turk J Ophthalmol* 46: 95-98 DOI 10.4274/tjo.92604
13. Wasielica-Poslednik J, Lisch W, Bell K, Weyer V, Pfeiffer N, Gericke A (2016) Reproducibility and Daytime-Dependent Changes of Corneal Epithelial Thickness and Whole Corneal Thickness Measured With Fourier Domain Optical Coherence Tomography. *Cornea* 35: 342-349 DOI 10.1097/ICO.0000000000000714
14. Sano R, Kurokawa T, Kurimoto Y, Miyazawa D, Yoshimura N (2001) [Comparison between the anterior chamber configuration in the supine position and that in the prone position in patients with narrow angle]. *Nippon Ganka Gakkai Zasshi* 105: 388-393
15. Yu AY, Lin ZD, Chen XQ, Cai XY, Liu YZ, Luo SK (2008) Position of myopic iris-claw phakic intraocular lens by Scheimpflug photography and ultrasound biomicroscopy. *Eye (Lond)* 22: 233-239 DOI 10.1038/sj.eye.6702829
16. El-Fayoumi D, Youssef MM, Khafagy MM, Badr El Dine N, Gaber W (2018) Assessment of Corneal and Tear Film Parameters in Rheumatoid Arthritis Patients Using Anterior Segment Spectral Domain Optical Coherence Tomography. *Ocul Immunol Inflamm* 26: 632-638 DOI 10.1080/09273948.2016.1261165
17. Luft N, Hirnschall N, Farrokhi S, Findl O (2015) Comparability of anterior chamber depth measurements with partial coherence interferometry and optical low-coherence reflectometry in pseudophakic eyes. *J Cataract Refract Surg* 41: 1678-1684 DOI 10.1016/j.jcrs.2015.08.013
18. Deinema LA, Vingrys AJ, Chinnery HR, Downie LE (2017) Optical Coherence Tomography Reveals Changes to Corneal Reflectivity and Thickness in Individuals with Tear Hyperosmolarity. *Transl Vis Sci Technol* 6: 6 DOI 10.1167/tvst.6.3.6
19. Wolfel AE, Pederson SL, Cleymaet AM, Hess AM, Freeman KS (2018) Canine central corneal thickness measurements via Pentacam-HR((R)) , optical coherence tomography (Optovue iVue((R))), and high-resolution ultrasound biomicroscopy. *Vet Ophthalmol* 21: 362-370 DOI 10.1111/vop.12518
20. Mosler MP, Werner JU, Lang GK (2015) [Chamber Angle Assessment in Clinical Practice - A Comparison between Optical Coherence Tomography and Gonioscopy]. *Klin Monbl Augenheilkd* 232: 874-880 DOI 10.1055/s-0034-1383299

Table

Table1. Mean values of ACD and CCT evaluated by Lenstar, AS-OCT and UBM

	N	Lenstar	CAS-OCT	UBM
ACD mean $\pm$ SD (%) (mm)	83	2.2201 $\pm$ 0.5514	2.2998 $\pm$ 0.5439	2.2508 $\pm$ 0.5724
CCT mean $\pm$ SD (%) (μ m)	83	539.55 $\pm$ 38.68	534.15 $\pm$ 38.81	542.89 $\pm$ 34.41

SD, standard deviation

Table2 Significance of differences of ACD and CCT measured by Lenstar, AS-OCT and UBM

	Three devoices	Lenstar/AS-OCT	Lenstar/UBM	AS-OCT/UBM
ACD(<i>P Value</i>)	<0.001	<0.001	0.124	0.015
CCT(<i>P Value</i>)	<0.001	<0.001	0.019	<0.001

Significance of differences (p value)

Figures

Figure 1

The correlation diagram of ACD measured by the three instruments a Lenstar and AS-OCT. b UBM and Lenstar. c, The X axis represents UBM.

Figure 2

The correlation diagram of CCT measured by the three instruments. a Lenstar and AS-OCT. b UBM and Lenstar. c UBM and AS-OCT.

Figure 3

Bland–Altman plot of agreement showing the mean differences and limits of agreement of anterior chamber depth (ACD) measurements between the three devices. A, Lenstar and AS-OCT. B Lenstar and UBM. C, AS-OCT and UBM.

Figure 4

Bland–Altman plot of agreement showing the mean differences and limits of agreement of anterior chamber depth (CCT) measurements between the three devices. A, Lenstar and AS-OCT. B Lenstar and UBM. C, AS-OCT and UBM.