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Case Report

Presence of a soft contact lens during biometry

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ABSTRACT

A case of an intraocular lens (IOL) power calculation error due to the presence of a soft contact lens (CL) is described. During preparation of a routine cataract surgery for a patient in the operating room, a soft CL was discovered on the patient's surgical eye by the scrub nurse. Further, questioning revealed that the patient was a regular CL wearer and had possibly worn them during pre-operative biometric measurement, suggesting a potential error in his IOL calculation. Surgery was not performed, and the patient was given a CL holiday. Examination of the pre-operative B-scan ultrasound by the IOL Master700 confirmed the presence of the soft CL. Four weeks after the CL holiday, re-measurement of the surgical eye with the same biometric formula, lens factor and post-operative visual target revealed a +6.00 dioptre difference in the recommended lens implant. The patient underwent cataract extraction and IOL implantation with the correct IOL implant, with a good visual outcome. Presence of a CL during biometry causes a significant error in the IOL power calculation and should be identified preoperatively for this very common surgery.

Keywords: Contact lens, Biometry, Cataract surgery

INTRODUCTION

It has been well established that regular soft and hard contact lens (CL) use can induce changes in corneal curvature, central corneal thickness, surface regularity, axial length and topography.[1-3] Accuracy of these parameters becomes increasingly critical when calculating the intraocular lens (IOL) power when planning for cataract surgery. Current cataract surgery guidelines recommend that patients refrain from soft CL wear for at least 1 week, and up to 2–4 weeks for rigid gas permeable lenses, before biometric measurements.[4] In this case, a soft-CL was still present on the subject's eye during biometry, which caused significant errors in topography and axial length measurements. Contact lenses can be easily missed in the clinical setting due to their low profile, which can lead to significant errors in IOL power calculations.

CASE REPORT

A 67-year-old lawyer with a history of cataract extraction and multi-focal IOL implantation in his right eye presented as a new patient to the eye clinic for cataract planning for his left eye. His corrected distance visual acuity for the left eye was 20/30, with a refraction of +0.75 spherical equivalent (S.E.). Examination of the eye revealed a 2+ nuclear sclerotic cataract and normal fundus examination. Biometric measurements were obtained using the Carl Zeiss Meditec IOLMaster®700 [Table 1, Pre-CL removal]. The patient opted for the extended depth of focus TECNIS *Synergy* multi-focal IOL. A +20.50 dioptre lens was calculated using the Barrett TK Universal II formula, with a refractive target of emmetropia. During prepping of the patient in the operating room with betadine, the circulating nurse identified a soft CL on the left eye. On further questioning, the patient admitted that he regularly used a CL for his left eye to see in the distance and may have worn it during the day of biometric measurement. This suggested an error in the IOL calculation as well as the pre-operative refraction. Surgery was cancelled, and the patient was instructed to cease use of his CL for at least two weeks. Review of the initial biometric B-scans for both eyes indeed revealed the presence of a CL on the surface of the left eye [Figure 1].

After a four week CL holiday, a refraction was taken and measured to be +5.50 S.E. for the left eye. Biometry was also repeated, and the pre-and post-CL data were compared [Table 1, Post-CL removal]. The IOL power for the TECNIS *Synergy* multi-focal lens was recalculated and a +26.50 dioptre lens was recommended. The patient ultimately decided to pursue the trifocal Acrysof IQ PanOptix lens to match his right eye and underwent cataract surgery with a good postoperative visual outcome.

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Table 1: Biometric data.

	Pre-CL removal	Post-CL removal
Axial length	23.14 mm	22.87 mm
Anterior chamber depth	2.44 mm	2.23 mm
Lens thickness	4.59 mm	4.54 mm
White-to-white diameter	11.7 mm	11.3 mm
Steep keratometry @ Axis	45.05 @ 061°	40.95 @ 099°
Flat keratometry @ Axis	44.37 @ 151°	40.23 @ 099°
Astigmatism	+0.68 D	+0.73 D

CL: Contact lens, D: Dioptre, mm: Millimetres

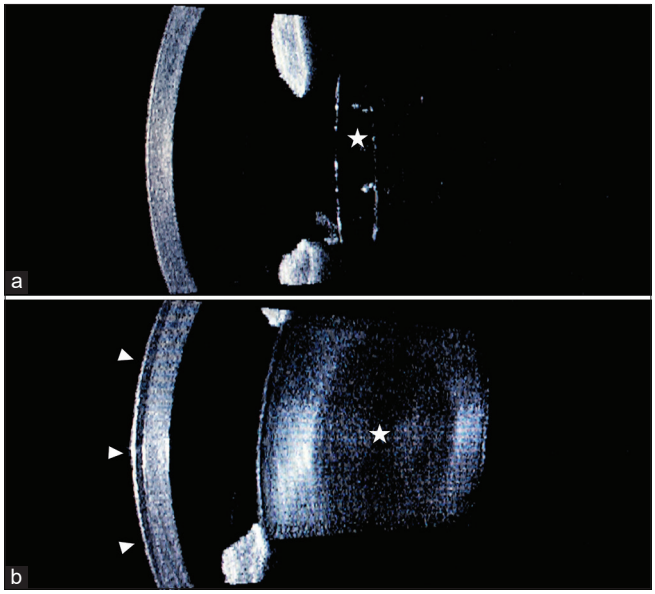

Figure 1: Pre-operative B-scan ultrasound. (a) Right eye with intraocular lens implant (star). (b) Left eye with soft contact lens (arrowheads) and visually significant cataract (star).

DISCUSSION

A CL can have significant effects on the biometric measurements of an eye and IOL power calculations, thus it must be identified preoperatively. A study of 16 myopic eyes from eight patients that underwent biometry revealed that the presence of a CL caused considerably flatter keratometry readings, but without significantly affecting axial length. This resulted in an IOL power calculation error that was proportional to the CL power.[5] In the case presented here, the patient instead had steeper keratometry readings in the presence of his soft CL and a slightly longer axial length, resulting in a +6.0 dioptre difference in estimated IOL [Table 1]. Of note, the anterior chamber depth was measured as longer with the CL in place, while the lens thickness remained constant in both groups. The measured astigmatism was slightly lower in the pre-CL removal group.

A soft CL was missed on clinical examination on the day of biometric measurements and resulted in a significant lens measurement calculation error. Instituting systemic and clinical safeguards to eliminate such occurrences is of paramount importance for every practice. Such practices can include having a standardised questionnaire for every patient interested in cataract surgery with specific questioning about CL use. In addition, scrutiny of secondary outputs from the IOLMaster®700, such as the B-scans, can highlight any irregularities.

Prior CL wear can cause changes in corneal physiology and can thus affect biometry and IOL calculations. Furthermore, a contact lens can easily be missed on clinical examination due to their low profile and must be identified, especially in a patient planning on cataract surgery. The effect of CL wear during biometry has rarely been examined clinically.

CONCLUSION

This case report demonstrates that concurrent CL use with biometry can cause a significant error in IOL calculation. Therefore, systemic and clinical safeguards must be in place to identify CL use in patients undergoing cataract surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest

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