Acute clouding of a trifocal intraocular lens during implantation: A case report

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ABSTRACT

Purpose: In this paper, we present a case of acute clouding of a trifocal intraocular lens (IOL) that resolved spontaneously by the day after surgery.

Observations: A 68-year-old woman with a nuclear cataract in the right eye was scheduled for cataract surgery with +21.00 diopter trifocal IOL (AT LISA tri 839MP, Carl Zeiss Meditec AG, Germany) implantation. Phacoemulsification was uneventful until the implantation of the IOL. Although the IOL was initially transparent, we observed acute clouding of the IOL optic immediately upon implantation into the eye, and the IOL remained cloudy at the end of the surgery. On the day after surgery, we observed that the clouding was completely resolved.

Conclusions and Importance: We think that the sudden temperature change of the IOL upon implantation into the anterior chamber may have caused acute clouding. If a similar situation is encountered, clinicians should avoid explantation or replacement of the Zeiss AT LISA trifocal IOL, as the clouding resolves spontaneously.

1. Introduction

Acrylic intraocular lenses (IOLs) are manufactured from a wide variety of copolymers with varying refractive indexes, water contents, glass-transition temperatures, and surface properties. Hydrophobic acrylic IOLs have very low water contents (<1%) compared with hydrophilic IOLs, whose water contents vary from 18% to 38%. Postoperative delayed opacification of hydrophilic acrylic IOLs leading to eventual explantation has been reported previously. Acute clouding of acrylic hydrophilic IOLs is a less-encountered intraoperative phenomenon that has been reported primarily in monofocal hydrophilic acrylic IOLs.

We present a case of acute clouding of a trifocal IOL that resolved spontaneously by the day after surgery.

1.1. Case presentation

A 68-year-old woman with a nuclear cataract in the right eye was scheduled for cataract surgery with +21.00 diopter trifocal IOL (AT LISA tri 839MP, Carl Zeiss Meditec AG, Germany) implantation. Phacoemulsification was carried out under topical anesthesia and was uneventful until IOL implantation. Although the IOL was initially transparent, we observed acute clouding of the IOL optic immediately upon implantation into the eye (Fig. 1, Video). The IOL remained cloudy at the end of the surgery (Fig. 2, Video). However, we decided to leave the IOL in place. On the day after surgery, we observed that the clouding was completely resolved (Fig. 3).

2. Discussion

Due to the ever-increasing postoperative vision expectations of patients, premium IOLs are often implanted in modern cataract surgery. Recently, trifocal IOLs have gained great interest due to their intermediate vision advantage over multifocal IOLs. We report a patient who developed acute clouding of a trifocal IOL following intraocular implantation. Acute clouding of acrylic hydrophilic IOLs has been reported primarily in monofocal hydrophilic acrylic IOLs. Unlike the hydrophilic acrylic lenses previously reported to become cloudy in vivo, the AT LISA trifocal IOL has hydrophobic surface properties. The anticipated cause of acute intraoperative clouding of acrylic hydrophilic IOLs is the external temperature fluctuation that occurs when the IOL is transferred to the operating room from an outside facility shortly before surgery.
subsequent abrupt change of the IOL temperature upon implantation into the anterior chamber may facilitate acute clouding. The Zeiss AT LISA manufacturer’s manual indicates that the IOL temperature should be kept within a specified range (2–45 °C) before implantation. Clinicians should be aware of this phenomenon, especially during winter, and IOLs should be allowed to acclimate to the operating room temperature before implantation. When hydrophilic acrylic (25%) IOLs with hydrophilic surface properties are stored in a cool location, short-term opacification can occur immediately after implantation. This reaction is related to the significant change of temperature (cold to hot) when the lens is taken from a cool location, such as the trunk of a car in winter, to the warmth of the patient’s eye within a short period of time. The phenomenon behind this opacification is a temporary reorganization of water molecules, a totally reversible reaction that does not change the chemical, mechanical or geometric properties of the polymer. After the temperature of the lens is equalized with the ambient temperature, this phenomenon mainly encountered in hydrophilic acrylic IOLs. We anticipate that acute intraoperative clouding of the trifocal IOL (Zeiss AT LISA) is caused by external temperature fluctuation. Therefore, we suggest that the IOL temperature should be kept within the manufacturer-specified range before implantation, especially in winter. This may avoid acute clouding caused by an abrupt temperature change during implantation. If clouding is encountered, clinicians should avoid explantation or replacement of the Zeiss AT LISA trifocal IOL as the clouding resolves spontaneously. However, to better clarify this clouding phenomenon, in vitro clouding testing of the lens implanted at different temperature extremes would be appropriate.

3. Conclusion

In conclusion, despite its hydrophobic surface properties, the Zeiss AT LISA trifocal IOL is still prone to the intraoperative acute clouding phenomenon mainly encountered in hydrophilic acrylic IOLs. We report a case in which acute clouding of a posterior chamber intraocular lens (hydrogel) intraocular lens: a clinicopathological analysis of 106 explants. Ophthalmology. 2004;111:2094–2101.

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