Artificial intelligence: Development and applications in cataract surgery.

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Abstract

One of the most frequently done operations worldwide is cataract surgery. In addition, it is among the oldest. Improvements in intraocular lens replacement technologies have coincided with breakthroughs in cataract surgery methods. One of modern medicine's most effective treatments may be cataract surgery. It is the main contributor of blindness and reduced vision globally. Currently, the sole option for treating cataracts is cataract surgery, which is quite successful in recovering vision. An artificial intraocular lens is used to replace the clouded natural lens of the eye during cataract surgery. There are numerous methods for removing the lens and there are numerous varieties of intraocular lenses that can be used.

Keywords: Cataract Surgery, Surgical techniques, Intraocular lens.

Introduction

The most frequent cause of preventable blindness in the world is cataracts. The majority of cataracts are age-related, while some may be congenital, the result of trauma or drug-induced. The opacification of the lens is what causes cataracts that are age-related. A biconvex structure called the crystalline lens concentrates light onto the retina. It has a 10 mm diameter, a 4mm axial length and is translucent. The lens is made up of fibres generated from the lens epithelium, a thin capsule around it and zonular fibres that work with the ciliary body to accommodate. Age-related lens stiffening causes presbyopia, a form of farsightedness. Although focusing light is one of the lens's primary duties, it is not a passive optical component [1].

The lens features a sodium channel-driven microcirculation route that transports nutrients to deeper fibres through extracellular inward flow while preserving transparency. Gap junctions sustain intracellular outward flow, which is utilised to eliminate waste. The lens protects the retina by acting as a UV filter. Finally, the lens functions as an oxygen sink because it contains some of the body's greatest levels of the antioxidant glutathione. In addition to being a co-factor for repair enzymes and scavenging reactive oxygen species, glutathione is hypothesised to be released into the aqueous humour for usage by avascular tissues like the cornea and trabecular network. As we become older, oxidative damage can build up and obscure the lens [2].

Two significant advances have been made in intraocular lens design. These lenses had spherical anterior and posterior surfaces until recently. Reduced image quality (spherical aberration) results from the fact that light travelling through more peripheral sections of such spherical lenses is bent more than light travelling through more central parts. Aspheric lenses have long been the norm in fields like microscopy, astronomy and photography [3]. There are currently some aspheric intraocular lenses on the market that neither increase nor decrease spherical aberration in the eye. Other lenses are made to minimise the amount of positive spherical aberration that most corneas experience. There is some evidence that the eye may work better with a small amount of spherical aberration, even though this enhances image contrast in low illumination. For instance, spherical aberration improves depth of focus and patients wearing intraocular lenses made to prevent spherical aberration in the eye have worse uncorrected reading vision [4].

The normal crystalline lens of the eye is a transparent structure held in place by zonular fibres that emerge from the ciliary body. A capsule, lens epithelium, cortex and nucleus are all components of the lens. The lens has two main purposes: accommodating the eye and refractively focusing light so that a sharp image is focused on the retina. A cataract causes the crystalline lens to become opaque, impairing vision. A number of diseases can lead to cataract development. The most frequent cause, which has multiple contributing factors, is ageing. Use of tobacco products and UV radiation are two preventable risk factors for cataract [5].

Conclusion

When to do cataract surgery is not subject to any strict guidelines. Surgery is essentially considered when the likelihood of improved eyesight relative to current issues justifies accepting the risk of severe, sight-threatening consequences. In the past, cataracts were often kept untreated until they were highly advanced due to a combination of very rudimentary surgical techniques and inadequate visual rehabilitation afterwards. Surgery is being performed at a much earlier stage due to superior visual outcomes and more advanced surgical procedures. Indeed, if the cataract is allowed

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to progress to an advanced degree, the risks of catastrophic consequences may now be higher.

References

1. Lin WC, Chen JS, Chiang MF, et al. Applications of artificial intelligence to electronic health record data in ophthalmology. Transl Vis Sci. 2020;9(2):13-18.
2. Kelly SP, Thornton J, Edwards R, et al. Smoking and cataract: review of causal association. J Cataract Refract Surg. 2005;31(12):2395-404.
3. Taylor HR, West SK, Rosenthal FS, et al. Effect of ultraviolet radiation on cataract formation. N Engl J Med 1988;319(22):1429-33.
4. Touma S, Antaki F, Duval R. Development of a code-free machine learning model for the classification of cataract surgery phases. Sci Rep. 2022;12(1):1-7.
5. Prajna NV, Chandrakanth KS, Kim R, et al. The Madurai intraocular lens study II: Clinical outcomes. Am J Ophthalmol. 1998;125(1):14-25.

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