

Intraocular Lens (IOL) Implantation Hydrophobic Acrylic versus Hydrophilic Acrylic Executive Summary

[Adapted from the report by DR JUNAINAH SABIRIN]

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Background

Cataract is the most prevalent ophthalmic disease and cataract surgery is a commonly performed surgery in all ophthalmology centres. Late postoperative opacification of IOL caused by dystrophic calcification requiring explantation has been reported with some hydrophilic acrylic IOL designs. This has also been encountered in a few government hospitals in Malaysia.

Technical Features

Hydrophilic acrylic (hydrogel) is a soft hydrophilic material. The material used is polyhydroxyethylmethacrylate (PolyHema) with a water content varying from 18% to 30% and a refractive index of 1.47. Hydrophobic acrylics are polymers synthesised from esters of acrylic or methacrylic acid. It contains tiny amounts of water (less than 1%). Hydrophobic acrylic IOLs have a refractive index of 1.55. The hardness of the hydrophobic acrylic is temperature dependent.

Policy Question

Should hydrophilic acrylic IOL implants be routinely used for adult cataract surgery in Ministry of Health Facilities?

Objective

To assess the safety of commonly used foldable IOLs (hydrophilic acrylic and hydrophobic acrylic IOL implants)

Methods

Electronic databases such as MEDLINE, PubMed, EBM Reviews-Cochrane Database of Systematic Reviews, EBM Reviews-Cochrane Central Register of Controlled Trials, EBM Reviews-HTA databases, FDA website and MHRA were searched. There was no limitation in the search. All relevant literature was appraised using the Critical Appraisal Skills Programme (CASP) and evidence was graded based on guidelines from U.S./Canadian Preventive Services Task Force.

Result and conclusion

There was poor to fair level of evidence to suggest that the incidence of IOL opacification affecting vision was only reported in hydrophilic acrylic IOL and not with hydrophobic acrylic IOL. IOL opacification of hydrophilic acrylic IOL was caused by deposition of calcium and phosphate on the IOL surface, or within the optic material or both (on the surface and within the IOL material) depending on the designs of the hydrophilic acrylic IOL. However, the pathophysiology of the causes of such complications has not yet been fully elucidated. Diabetic patients appeared to be more often and more severely affected by IOL opacification.

Recommendation

Based on the above review, we recommend the use of hydrophobic acrylic IOLs. Patients who had hydrophilic acrylic IOLs implantation need longer and more frequent follow-up, particularly in the presence of predisposing factors such as diabetes. In view of the absence of Medical Device Act in Malaysia, an incident reporting mechanism for IOL opacification irrespective of materials and designs need to be established to provide more information regarding IOL opacification locally.