

Medical Device Alert

Action

Ref: MDA/2010/008 Issued: 21 January 2010 at 15:00

Device
Intraocular lens (IOL) – hydrophilic acrylic.

Problem	Action
Opacification of IOLs may occur following intracameral use of alteplase (recombinant tissue plasminogen activator, r-tPA).	<ul style="list-style-type: none">• Ensure that all relevant staff are made aware of this issue.• Report all IOL opacification incidents to the MHRA.
Action by	
Ophthalmologists Ophthalmic nurses Ophthalmic pharmacists Eye units	
CAS deadlines	
Action underway: 04 February 2010 Action complete: 18 February 2010	

Problem

The MHRA has been notified of five reports of the opacification of hydrophilic acrylic IOLs from one UK hospital. Opacification was noted between five months and seven years after alteplase treatment.

A study carried out by the hospital concluded that IOL opacification may be caused by intracameral use of alteplase to treat fibrinous membranes after cataract surgery.

Alteplase is a drug indicated for use in acute stroke, myocardial infarction, and pulmonary embolism. It is not licensed for intracameral use.

This could potentially be a problem with all hydrophilic acrylic IOLs. No manufacturing fault was found with the IOLs in this study.

Details of the study were presented as a poster at UKISCRS, 2009 (United Kingdom and Ireland Society of Cataract and Refractive Surgeons). The poster is attached in the appendix to this alert.

Distribution

This MDA has been distributed to:

- NHS trusts in England (Chief Executives)
- Care Quality Commission (CQC) (Headquarters)
- HSC trusts in Northern Ireland (Chief Executives)
- NHS boards in Scotland (Chief Executives)
- NHS boards and trusts in Wales (Chief Executives)

Onward distribution

Please bring this notice to the attention of all who need to know or be aware of it. This may include distribution by:

Trusts to:

CAS and SABS (NI) liaison officers for onward distribution to all relevant staff including:

- Ophthalmic nurses
- Ophthalmologists
- Ophthalmic pharmacies
- Ophthalmology departments
- Eye units
- Ophthalmology, directors of

Care Quality Commission (CQC) (England only) to:

The MHRA considers this information to be important to:

- Hospitals in the independent sector
- Independent treatment centres

England

If you are in England, please send enquiries about this notice to the MHRA, quoting reference number **MDA/2010/008 or 2009/010/005/081/020**

Technical aspects

Ian Smith or Michelle Kelly
Medicines & Healthcare products Regulatory Agency
Market Towers
1 Nine Elms Lane
London SW8 5NQ

Tel: 020 7084 3306 or 3145

Fax: 020 7084 3106

E-mail: ian.smith@mhra.gsi.gov.uk
michelle.kelly@mhra.gsi.gov.uk

Clinical aspects

Dr Christopher Brittain
Medicines & Healthcare products Regulatory Agency
Market Towers
1 Nine Elms Lane
London SW8 5NQ
Tel: 020 7084 3126
Fax: 020 7084 3111
E-mail: christopher.brittain@mhra.gsi.gov.uk

How to report adverse incidents

Please report via our website <http://www.mhra.gov.uk>
Further information about **CAS** can be found at <https://www.cas.dh.gov.uk/Home.aspx>

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Alerts in Northern Ireland will continue to be distributed via the NI SABS system.
Enquiries and adverse incident reports in Northern Ireland should be addressed to:

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How to report adverse incidents in Northern Ireland

Please report directly to NIAIC, further information can be found on our website <http://www.dhsspsni.gov.uk/niaic>
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Fax: 0131 314 0722
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<http://www.hfs.scot.nhs.uk/online-services/incident-reporting-and-investigation-centre-irc/>

Wales

Enquiries in Wales should be addressed to:

Dr Sara Hayes
Senior Medical Officer
Medical Device Alerts
Welsh Assembly Government
Cathays Park
Cardiff CF10 3NQ
Tel: 029 2082 3922
E-mail: Haz-Aic@wales.gsi.gov.uk

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Appendix

Intraocular Lens Opacification with Recombinant Tissue Plasminogen Activator after Cataract Surgery

Dawn Sim¹, Simon Fung¹, Niaz Islam², Dipak Parmar¹

¹Whipps Cross University Hospital, London, UK ²Queen's University Hospital, Greater London, UK

Introduction: Fibrinous uveitis in uneventful cataract surgery and intraocular lens (IOL) implantation occurs in less than 3% of cases.

Dramatic fibrinolysis has been observed with intracameral injection of recombinant tissue plasminogen activator (r-tPA), a highly potent fibrinolytic protein usually used for coronary thrombolysis. Reported complications of r-tPA include corneal oedema, band keratopathy, anterior chamber turbidity, and hyphaema. They are uncommon and the general consensus of previous work is that r-tPA is well tolerated in the anterior chamber.

Purpose: To report 5 cases of intraocular lens (IOL) opacification following treatment of fibrinous uveitis with recombinant tissue plasminogen activator (r-tPA) after cataract surgery.

Methods: 5 consecutive patients who developed intraocular lens opacification at Whipps Cross University Hospital, London, between February 2008 and August 2009. All patients underwent uncomplicated cataract surgery and IOL implantation in the capsular bag. Fibrinous membranes developed between 1 to 4 weeks of surgery and were treated with intracameral injection of 10-25 micrograms of recombinant tissue plasminogen activator (r-tPA). Resolution of fibrin plaques occurred in all cases within 24 hours. IOL opacification was noted between 5 months to 7 years after r-tPA treatment with reduced visual acuity.

Results

- Uneventful IOL exchange was carried out in 4 patients with a mean final visual acuity of 6/9.
- In-vivo OCT imaging demonstrated a central band shaped of echogenic deposits centrally located on the non-echogenic convex anterior IOL surface. (Figure 1)
- This corresponded to a band-shaped fine granular whitish material was observed in the central part of all explanted IOL optics. (Figure 2)
- Light microscopic evaluation further revealed diffuse fine granular deposits, on the anterior surface of the optic and a parallel, linear granular layer, just below the anterior surface of the optic which diminished towards the periphery of the IOL optic. (Figure 3, 4)
- Both granular deposit layers stained positive with special stains for calcium (von-Kossa and alizarin red).
- The granular material was not observed or detected on the posterior region of the cut section, the haptics and the edge of the lens.

Discussion:

Calcification of IOLs is an uncommon complication of IOL implantation, resulting in symptoms of visual loss or glare, and usually necessitating IOL explantation and exchange.

IOL calcification, first reported in 1994 by Jensen et al, was initially thought to be associated Sodium Hyaluronate 1.4% (Healon GV) 29. It was hypothesized that the phosphate components in the viscoelastic preparation reacted with calcium in the irrigating solution and aqueous, to cause precipitation on the IOL surface.

The 'calcium-phosphate reaction' theory was further supported by the Bucher et al in 1995 who described a case of dystrophic calcification of the IOL and paracentesis site in a 80-year-old woman with chronic lymphatic leukemia. Disruption of calcium homeostasis in the aqueous as a resultant of systemic disease, intraocular surgery, inflammation or drug administration can and has been associated with dystrophic calcification, and furthermore band keratopathy was observed in one of our cases.

In our series, all patients had fibrinous uveitis and successful treatment with r-tPA within the first 24 hours. This increased cell lysis and the release of ionized calcium. The anterior chamber becomes saturated with both cellular aggregates and inflammatory debris, in ensuing weeks, thereby creating an ideal environment for binding of free calcium and precipitation of calcium salts. The scaffold, which has been formed by the network of fibrin on the anterior surface of the IOL, provides the site for initial calcium accumulation. This hypothesis is supported by our finding of calcification only involving the optic's anterior surface.

Conclusion: Intracameral r-tPA, though rapidly effective in the treatment of fibrinous membranes, may cause IOL opacification.

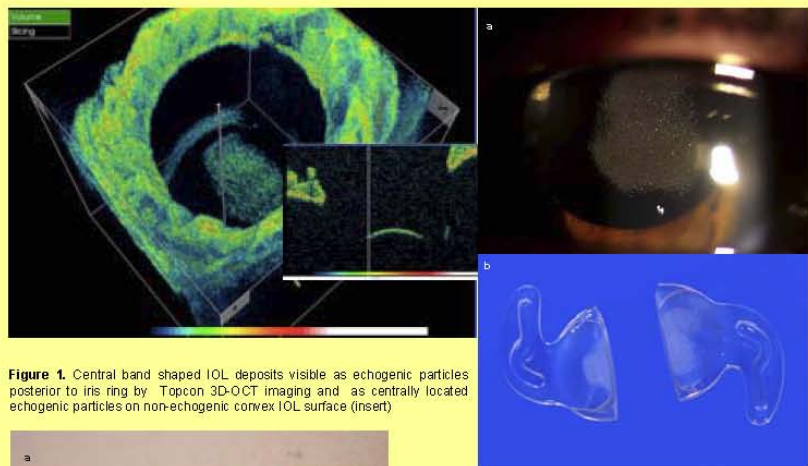


Figure 1. Central band shaped IOL deposits visible as echogenic particles posterior to iris ring by Topcon 3D-OCT imaging and as centrally located echogenic particles on non-echogenic convex IOL surface (insert)

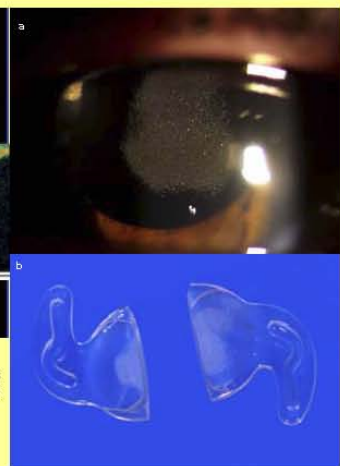


Figure 2. (a) Opacified IOL in-vivo, (b) explanted IOL

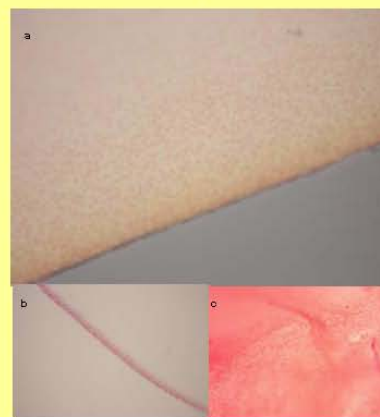


Figure 3. (a) Alizarin Red Stain, IOL in 40X Magnification, (b) Cross section of IOL showing linear granular deposit just below anterior surface of IOL, (c) Alizarin Red Stain, IOL and capsular bag remnant in 4X magnification.

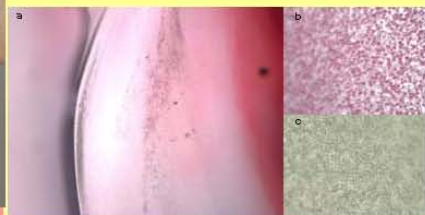


Figure 4. (a) Alizarin Red Stain, IOL in 4X magnification (b) Alizarin Red Stain, IOL in 10X magnification, (c) Optic glisening - IOL in 10X magnification

References

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