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Original Article

Hydro-dissection and posterior capsule opacification

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Abstract

Objective: to determine the efficacy of hydrodissection in the reduction of posterior capsule opacity.
Methods: A non-randomised controlled comparative study carried out at the University College Hospital Ibadan between November 1999 and July 2004. 23 subjects with uncomplicated cataract who had cataract surgery using Extracapsular cataract surgery with out hydrodissection were compared to 33 subjects with similar cataracts who had surgery using hydrodissection
Results: A total of 56 subjects were included in the study comprising 33 subjects in the hydrodissection group (22 males, 11 females, age range 8-88, mean 59.7years). No-hydrodissection group (8 males and 15 females, age range 29-73, mean 60.8years). Early post op complications consisted of cornea striate (hydrodissection group 3%, non-hydrodissection group 34.7%), microcystic epithelial oedema (hydrodissection group78.8%, non-hydrodissection group 39.1%), iritis and irregular pupil. Late post operative complications consisted of cornea oedema 1 in each group, irregular pupil (16.3% more common in the hydrodissection group), and posterior capsule opacity (hydrodissection group 6.1%, and no-hydrodissection group 8.7%). The difference in posterior capsule opacity between the 2 groups was not statistically significant (P>0.05).
Conclusion: Hydrodissection is associated with a marginal reduction in post-operative posterior capsule opacity formation following ECCE-IOL surgery. It may however be associated with early post operative complications presumably due to increased manipulation during the procedure. Its use is therefore encouraged but with generous use of viscoelastic material to reduce effect of manipulation on the eye.

Key words: hydrodissection, posterior capsule opacity, cataract extraction,

Introduction

Opacification of the posterior lens capsule (PCO) may follow a successful cataract extraction using either methods of extracapsular extraction or phacoemucilfication[1]. The resultant visual outcome is less than optimal in most cases. The incidence of posterior capsule opacity is affected by the age of the patient as well as the surgical technique[2]. Higher incidences are obtained in young patients due to an age related effect of basic fibroblast growth factor on the proliferation of human lens epithelial cells[3]. The incidence of PCO reduces with greater attention to meticulous surgery including hydrodissection, adequate cortical clean up, and the use of high quality posterior chamber intraocular lens to achieve barrier effect to prevent the proliferation of lens epithelial cells on to the posterior capsule[4,5]. Hydrodissection is said to enhance thorough cortical clean up and there fore reduce incidence of PCO[6].

PCO can be treated by surgical or laser capsulotomy, but the cost of laser equipment is considered high by most developing economies where the burden of cataract blindness is enormous. Secondary surgical capsulotomy may also be considered as an avoidable procedure which takes up operation time and cost in the presence of crowded operation lists. Thus a reduction in PCO incidence through attention to meticulous techniques such as hyrodissection would reduce the cost of PCO treatment in most poor economies. The purpose of this study is to determine the efficacy of hydrodissection in the reduction of PCO.

Materials and methodsA non-randomised controlled comparative study carried out at the University College Hospital Ibadan between November 1999 and July 2004. 23 subjects with uncomplicated cataract who had cataract surgery using extrac apsular cataract surgery with out hydrodissection between November 1999 and May 2001 were compared to 33 subjects with similar cataracts who had surgery using hydrodissection between June 2001 and July 2004. All surgeries were performed by the same surgeon. Maximum pupil dilatation was ensured with phenylephrine and topical tropicamide (phenylephrine was omitted in hypertensives). Local anaesthesia was used for all cases and consisted of peribulbar injection of 3-4ml 2% xylocaine with adrenaline 1:100,000 as well as facial anesthesia using O'brien method. Ocular message usingdigital pressure was done as gentle as possible for between 5-10 minutes to ensure a soft eye before surgery. A standard ECCE surgical technique as earlier described[7] was performed for all cases with minor modifications such as a D-shaped can-opener anterior capsulotomy (with base downwards) to help ensure in the bag placement of IOL was done. For the hydrodissection group, a 27G canular bent at the tip and directed upwards underneath the capsule was used to irrigate the space between the capsule and lens cortex, using balanced salt solution until the nucleus was displaced into the anterior chamber before removal with irrigating vectis. Hydrododissection was omitted for the no hydrodissection group and the nucleus was simply expressed from the eye using counter pressure from a lens extractor and squint hook. Majority of the intraocular lenses were from Aurolab, the rest were from Fred Hollows. They were mostly single piece polymethl metacrylate lenses. Power of IOL was determined from the patients' refraction in the operated eye before the development of cataract or from the refraction of the other eye. Where neither was possible a power was chosen arbitrarily from a standard hospital stock of lenses that ranged from +19-+22 diopters. The incision was closed with five 8-0 virgin silk sutures or 9-0 nylon. The wound was covered with conjunctival flap with or without suturing. Sub-conjunctival gentamycin 20mg, and methyl-prednisolone 20mg, were given, topical antibiotic was instilled and the eye was padded overnight. Post- operative examination included daily slit lamp examination, intra-ocular pressure measurements and visual acuity using Snellens chart with and without pinhole. Patients were discharged as from the second postoperative day on topical dexamethasone steroid drops 2-6 hourly, antibioticThe late post operative complications consisted of cornea oedema 1 in each group, irregular pupil (16.3% more common in the hydrodissection group), and posterior capsule opacity (hydrodissection group 6.1%, and no-hydrodissection group 8.7%). The difference in posterior capsule opacity between the 2 groups was not statistically significant (P>0.05). Initial follow up was at two weeks. Subsequent visits were at 3 weeks intervals. Refraction was done after 8weeks of surgery. Follow up was for between 6months to 5years. **Results:** A total of 56 subjects were included in the study comprising 33 subjects in the hydrodissection group (22 males and 11 females, age range 8-88, mean 59.7years). There were 23 subjects in the no-hydrodissection group (8 males and 15 females, age range 29-73, mean 60.8years). The pre –operative visual acuity ranged from 6/18 –light perception in both groups. The morphological classification of the cataract was uniformly distributed between the 2 groups as is shown in Table 1. There was a slight preponderance of early post op complications among the hydrodissection group and consisted of cornea striate (hydrodissection group 3%, non-hydrodissection group 34.7%), microcystic epithelial oedema (hydrodissection group78.8%, non-hydrodissection group 39.1%), other complications consisted of iritis and irregular pupil. See also Table 2.

Table 1: Morphology of cataracts studied

Type of cataract	Hydro dissection	No hydro dissection
	No/%	No/%
Mature cataract	15(65.2)	22(66.7)
Post.subcapsular	5 (21.7)	10(30.3)
Ant.capsular	1 (4.4)	1(3.0)
Nuclear	2(8.7)	-
Total	23(100)	33(100)

Table 2: Hydrodissection related early complications of ECCE-IOL surgery

Complication	hydro dissection	No hydro dissection
	No / %	No/%
Cornea striae	1(3.0)	8(34.7)
Epith oedema	26(78.8)	9(39.1)
Iritis	16 (48.5)	13(56.5)
Irregular pupil	11 (33.0)	3(13.0)

A review of the post op visual acuity among subjects who were followed up for six weeks or more showed that 41.4% of the hydrodissection group compared to 47.4% of the no-hydrodissection group had uncorrected vision of 6/18 or better. With refraction the number of subjects with vision of 6/18 or better improved to 82.1% for the hydrodissection group and 94.7% for the no-hydrodissection group

Discussion:

This study showed a marginal reduction in the rate of posterior capsule formation following the use of hydrodissection during ECCE -IOL cataract surgery. Hydrodiisection is believed to enhance thorough cortical wash out and it is carried out by the use of a 27G cannula with a bend at the tip which allows an upward flow of fluid to efficiently separate capsule from cortex which can subsequent be aspirated from the eye once the nucleus has been extracted[6]. It also reduces the time and amount of fluid required to carry out cortical wash out[8]. Hydroexpression exerts minimal pressure on the zonules and is particularly helpful in preventing vitreous loss in the presence of some degree of zonular weakness or dialysis as in some cases of hypermature cataract. However hydrodissection entails additional instrumentation especially during the process of dislocating the nucleus into the anterior chamber as was done in the patients studied, generous use of viscoelastics is therefore essential to prevent endothelial loss from contact between lens nucleus and endothelium with resultant striae or corneal oedema post op. Thus post op epithelial oedema was a common post op complication among the hydrodissection group when compared to the no hydrodissection group in this study. There were also more cases of post op iritis and pupil irregularities among the hydrodissection group than the no hydrodissection group presumably also associated with increased manipulation during surgery. These complications were however short lived and had all virtually disappeared by the first to second post op visit. The final post operative visual acuity was slightly superior among the no-hydrodissection group with 94.7% as opposed to 82.% having corrected vision of 6/18 or better. This was due to presence of posterior segment disease such as optic atrophy, macular degeneration and glaucoma among 4 patients in the hydrodissection group and whose refracted vision was less then optimal.

Conclusion:

Hydrodissection is associated with a marginal reduction in post-operative posterior capsule opacity formation following ECCE-IOL surgery. It may however be associated with early post operative complications such as cornea striae, epithelial oedema and iritis due to increased manipulation during the procedure. Its use is therefore encouraged but with generous use of viscoelastic material.

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