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VISCOFREE PHAECOIMULSIFICATION IN CATRACT SURGERY

Ophthalmology

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ABSTRACT

A phacoemulsification technique for cataract surgery is described in which continuous circular capsulorhexis and hydrodissection are made without the use of any viscoelastics.In this procedure two side port has been made. Stable anterior chamber is maintaied under continuous irrigation. At the end of the procedure, an intraocular lens is inserted through the self-sealing incision under continuous irrigation. 50 consecutive cataract patients were operated on without the use of viscoelastics and then compared with a group of 50 patients who had been helped with viscoelastics. It is observed that operative time has been decreased.Very few incidence of intraoperative and postoperative rise of intraocular pressure has been noted. No intraoperative complication was encountered. Viscofree cataract surgery is a safe procedure with potential advantages.

KEYWORDS

Cataract,Phacoemulsification, Ophthalmic Viscosurgical Device, Intraocular Lens

Introduction

Phacoemulsification cataract surgery with implantation of a foldable intraocular lens (IOL) is one of the method of choice today in cataract surgery in developing countries like India(1). The introduction of ophthalmic viscosurgical devices (OVDs) was a significant improvement, and OVDs are important tools in phacoemulsification and small incision cataract surgery(2). They are used to reform and maintain a stable anterior chamber and capsular bag, and to safely perform continuous capsulorhexis and in-the-bag placement of IOLs. These devices protect the endothelium and can enhance pupil mydriasis at the same time(3).

There are some possible side effects of OVDs. A number of studies have shown that all viscoelastic substances are capable of increasing IOP in the early postoperative period. The IOP elevation by viscoelastic substances is caused by a reduction of aqueous outflow due to blockage of the trabecular meshwork where the fluids exit the eye. Therefore, complete removal of OVDs is recommended after IOL implantation (4). Blockage of microincisions by OVDs can cause capsular bag distension during hydrodissection, which can cause posterior capsular rupture(5). Excessive injection of OVDs forms a risk factor of floppy iris syndrome(6) and entrapped OVD in the capsular bag can cause early postoperative capsular block syndrome or low grade endophtalmitis(7). Aspiration of OVD after lens implantation requires further surgical manipulation and surgery time . New OVDs improve the protection of the corneal endothelium but increase the surgical cost at the same time(8) .

Above these possible side effects of OVDs and the self-sealing way small incisions are constructed, viscofree cataract surgery is a possible option. A technique is presented performing phacoemulsification cataract surgery with the implantation of a foldable IOL without the use of any viscoelastics.

Surgical technique

The procedure is performed under topical anaesthesia.0.5% Proparacaine is used.Two small self-sealing incisions of 1.3 mm into clear cornea approximately 90 degrees apart. The water tightness of these incisions is of particular importance to reduce the chance of outflow of aqueous out of the eye. Afterwards, an irrigating chopper is introduced into the anterior chamber with the balanced salt solution (BSS) bottle 100 cm above the patient's eye level under continuous irrigation. This provides a stable anterior chamber while introducing this instrument through the small incision. With the use of 26 gauge ½ inch needle cysotome continuous curvilinear capsulorhexis has been done . Hydrodissection is performed under continuous irrigation . Once the nucleus can be easily rotated, phacoemulsification is started. Microincisions of 1.3 mm ensure a minimal outflow of BSS out of the eye. Microincision phacoemulsification is performed by using a chopping technique or by dividing and conquering, depending on the hardness of the nucleus. Phacoemulsification is performed using small amounts of bursts (40%, 50 msec), vacuum of 350 mm Hg and aspiration rate of 30 cc/min for sculpting or chopping, and 40 cc/min for quadrant removal using ultrasound-assisted phacoaspiration. This surgery was performed using the ZEISS (Carl Zeiss Meditec,Germany). After removal of the nucleus, bimanual irrigation and aspiration with capsular polishing is performed through the same microincisions. Bimanual irrigation and aspiration makes the removal of subincisional cortex easier and working through the nonleaking microincisions gives a deep anterior chamber with an open capsular bag.

Before insertion of a standard foldable IOL , one of the microincisions is widened to 2.6 mm under continuous irrigation. The BSS bottle is raised to 120 cm above the eye level to obtain a deep anterior chamber and capsular bag for widening the incision. The IOL is inserted under continuous irrigation of the irrigation and aspiration cannula . The IOL is mounted in the cartridge after filling the cartridge with BSS. While inserting the IOL into the eye, the lip of the cartridge is set at the corneal tunnel and the IOL is slowly injected through the tunnel in the capsular bag . The IOL haptics are placed in the fornix of the capsular bag . While inserting the IOL inside the eye, care is taken that there is not too much outflow of BSS out of the eye. This could make the capsular bag narrower, increasing the chance of touching the posterior capsule. If the posterior capsule is touched, the IOL is lifted and introduced into the eye. The injector is withdrawn, and due to the self-sealing incision, the irrigating port of the bimanual irrigation and aspiration provides us with a wide capsular bag. This irrigating port can then be used to introduce the haptics in the capsular bag. The irrigating cannula is withdrawn from the eye and the microincisions are sealed by slight hydration of the wound.

Study

Two groups of 50 eyes with nuclear hardness grade I-III were compared regarding pre- and postoperative intraocular pressure and total surgery time. All eyes were given a full ophthalmologic examination. Besides cataract, no other pathology was noted. All eyes had a good dilatation of the pupil. Group 1 was operated on according to the above described surgical technique without the use of any OVD, group 2 with the use of OVD. In group 2, hydroxypropyl methylcellulose 2% was used for capsulorhexis and implantation of the IOL. At the end of the procedure, OVD was aspirated out of the eye.

Intraocular pressure was measured using non contact tonometer .

Results

All eyes recovered 6/12 vision or better 1 month postoperatively. No other intraoperative complication was encountered. Mean intraocular pressure rise 19 (range: 19+/-2) in group 1 and 20 (range: 20+/–2) in group 2. The difference was statistically insignificant (student t-test p = 0.2874).

Mean surgery time was 14.0 min in group 1 and 15.5 min in group 2.

Discussion

The advantages of continuous anterior chamber infusion using an anterior chamber maintainer have been stressed by Blumenthal and colleagues (1994)(9). Schipper (1996) presented a technique of phacoemulsification and implantation of an IOL with the anterior chamber maintainer and without the use of visco-elastic substances(10). The use of an irrigating chopper and bimanual irrigation and aspiration eliminates the need for an anterior chamber maintainer and a third incision. There was a definite learning curve as in the first 20 eyes while additional OVD for lens implantation was necessary in 7 eyes. The different steps for this technique without the use of OVD demand some surgical dexterity.

A similar technique was reported by Galan (2005) without the use of viscoelastics, and had a success rate of 60% He performed phacoemulsifiaction with 1.6 mm incisions and an enlargement to 3 mm for IOL implantation(11). The higher success rate in our technique could be due to the narrower incisions of 1.3 mm and 2.6 mm for IOL implantation, rendering a more stable anterior chamber throughout the procedure.

There are additional clinical advantages of viscoless cataract surgery:

1) Intraocular pressure spikes are less likely to occur, as no viscoelastics can block the outflow channels. Schipper and colleagues (2000) presented a series of 33 patients, on whom they performed cataract surgery without viscoelastics using an anterior chamber maintainer. Patients in this study showed less intraocular pressure elevation. An anterior chamber maintainer for the introduction of foldable IOLs has been described, with the potential for fewer intraocular pressure spikes(12) . Therefore, cataract surgery without the use of viscoelastics can be of value in glaucoma patients.
2) As no injection or aspiration of viscoelastics is needed, the procedure can shorten surgery time. In this study, mean surgery time was 1.5 minutes less than conventional phacoemulsification with the use of OVD.
3) Hydrodissection under continuous irrigation lessens the chance of blocking the microincisions and subsequent capsular bag distension, and lowers the risk of floppy iris syndrome as the result of a sudden decompression of the anterior chamber.
4) The absence of viscoelastics during the procedure reduces cataract surgery costs substantially. In India, costs of OVD are approximately Rs.400 per case.
5) There is always an easy conversion to the use of viscoelastics at any stage of the procedure and to progress with a conventional phacoemulsification procedure.

In conclusion, viscofree phacoeemulsification cataract surgery was a safe and effective procedure. Due to the additional advantages, further attention to this procedure is merited, in order to make phacoemulsification cataract surgery easier and more cost effective.

Disclosure

The author reports no conflicts of interest.

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