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Surgical Technique

Hydro-visco-implantation Technique for Wound-assisted Foldable Intraocular Lens Implantation During Microincision Cataract Surgery

Abstract

We have described a hydro-visco-implantation technique (simultaneous use of sodium hyaluronate and balanced salt solution) for wound-assisted intraocular lens (IOL) implantation and passive removal of ophthalmic viscosurgical device (OVD). In the technique, the capsular bag was filled approximately up to half with OVD, and anterior chamber was formed by bimanual irrigation cannula with continuous irrigation mode from the side port. Sometimes after adequate tonus is provided, continuous mode could be off to reduce wash effect on OVD during injection of IOL. Injection of foldable IOL with the support of wound edges was completed. While the continuous irrigation mode was on, firm downward pressure was applied with the tip of aspiration canula to the posterior lip of main incision, and dynamic outflow was created, and viscoelastic material was removed from the eye.

Introduction

The routine use of ophthalmic viscosurgical device (OVD) has revolutionized many anterior segment surgeries. All agents may be responsible for causing or exacerbating a transient, but occasionally significant, postoperative intraocular pressure (IOP) elevation, anterior chamber reaction. Removal of OVD from the anterior chamber is then very important. Otherwise administration of topical antiglaucomatous, steroid, or mydriatic drops may be needed in averting or controlling the increased IOP, inflammation, or synechiae [1,2]. Less use of OVD is preferable for both cost-effectiveness and easy removal from eye.

Based on this knowledge we have described hydro-visco-implantation technique that is including IOL implantation and passive removal of OVD.

Surgical Technique

The standart stages of micro-incision (2.2 mm) phacoemulsification until the IOL insertion were completed. 1- piece acrylic IOL was loaded on to a cartridge with a very small amount of OVD prior to injection into capsular bag. (Alternatively, a very small amount of balanced salt solution (BSS) can be put in the cartridge and the tip) The capsular bag was filled about up to half with a cohesive OVD (sodium hyaluronate 1.4%), (the amount of OVD can be a little more or less, depends on the anterior chamber depth, posterior capsule fluctuation, low-power IOLs, or capsulorhexis size) and then the irrigation cannula was inserted into the eye through the left side port on continuous irrigation mode. The tip of the cartridge was placed into the incision location in direction of capsular bag. When the tonus of the globe was adequate for injection, IOL was gradually injected. Sometimes after adequate tonus is provided, continuous mode could be off to reduce the wash effect on OVD during injection of IOL. The leading haptic and a part of optic was entered into the capsular bag. The aspiration cannula was inserted through the other side port. The rest of the optic and trailing haptic was inserted into the capsular bag through pressing lightly on the haptic-optic junction to the bag by irrigation cannula (or aspiration canula). Immediately after, aspirasyon canula was removed. While the continuous irrigation mode was on, firm downward pressure was applied a number of times with the tip of aspiration canula to the posterior lip of main incision, and dynamic outflow was created (except the cases with floppy iris). By this way, OVD was removed from the eye easily.

Clinical Experience

I have experience with hundred of cases. The glob tonus is very adequate for injection by this technique. It is especially very useful in cases with high myopia and deep anterior chamber. The posterior capsule fluctuation is minimal during injection. Early postoperative period is very quite in terms of anterior chamber reaction and IOP. I think the passive removal of OVD is enough technique, if IOL is implanted with simultenous use of BSS and OVD.

Discussion

Various techniques have been described to implant IOLs without or with minimal use of an OVD, such as the use of the anterior chamber maintainer [3,4], the empty-bag technique [5], the KS-VF injector [6], and the ultimate soft-shell technique [7]. All these techniques are not widely used because of some limitations.

Generally, there are two techniques which have been used for IOL implantation. In the standart technique [8], the capsular bag and anterior chamber is formed with OVD, and IOL is inserted by injector

and cartridge system. In this technique, remained OVD and related difficulties are inevitable. It may induce postoperative IOP increase and anterior chamber reaction. In the early postoperative period, the remained OVD may affect IOP. The elevation of IOP due to OVD is marked at 6-24 hours [1]. The effect of OVD on IOP may take up to 72 hours [2]. The remained OVD may also cause the transient anterior chamber reaction. Sometimes anterior chamber cell and flare intensity may influence on patient's visual acuity, satisfaction and comfort. The standart technique has some disadvantages especially in high myopic eyes due to excess use of OVD.

The hydro-implantation technique [9] was discussed in the literature before. Based on our experience, this technique has several advantages like reduced surgical time, decrease in postoperative complications related with OVD, reduction in the cost of surgery. In practice, the IOL insertion with the hydro-implantation technique is generally carried out successfully. However it is not preferable for some surgeons. The posterior capsule fluctuations may become a problem during injection for surgeons. I think it may be used in selected cases.

The hydro-visco-implantation technique is a modified technique of both classic and hydroimplantation techniques. We have also used a little OVD for easier IOL manipulation, posterior capsule stabilization, and to help the formation of adequate glob tonus during injection. The passive removal of OVD seems to be enough by this technique. The complications related with remained OVD is minimal. It is also cost-effective due to less use of OVD. Further studies should be conducted on the efficiency and results of hydro-visco-implantation.

There are some disadvantages of the technique. The irrigation solution may show a little wash-effect on OVD during injection, but this movement does not allow the reduction in globe tonus during injection, and any problems during placement of the IOL in the bag. Sometimes after adequate tonus is provided, continuous mode could be stopped during injection to reduce wash effect on OVD. In addition, it makes difficult this new technique, since one of the hands is blocked with irrigation mode, no longer being free on the IOL implantation. On the other hand, the continuous irrigation mode may facilitate the passage of OVD to the vitreous, through the zonulas in the eyes and induce postoperative IOP long lasting. This probable complication is also valid for conventional way with OVD throughout the irrigation / aspiration stage. Although these potential disadvantages are theoretically true, we didn't face with resistant increased IOP or anterior chamber / vitreus reaction. On the contrary, one hand blocked with the irrigation cannula behaves as a forceps and keeps the eye centralized under the field of microscope optics. In addition, simultenous use of BSS and OVD may facilitate the passive removal of OVD. Theoretically, one of the advantages of the technique is protection of cornea from the hydrodynamics of irrigation-aspiration mode. As a result, less endotelial damage, less corneal edema, and rapid improvement may occur. However, further studies should be conducted on these situations.

In conclusion, simultaneous use of BSS and OVD may be preferable for some surgeons who doesn't like the use of OVD too much. Furher comparative studies should be conducted with efficiency and results of the technique.

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