



Soft Cataract: Improving Surgical Safety with Modified Phacoemulsification Technique

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Abstract

Purpose: To describe a modified stop and chop technique for managing soft cataract that we have modified to improve the surgical safety.

Method: Capsulorrhesis is performed as usual with a 27 gauge needle. A trench is fashioned using low ultrasonic power. Hydrodelineation is performed by a cannula introducing directly in central lens substance. Hydrodissection follows next and precise hydro procedure is achieved. Nucleus is emulsified using ultrasound power and intraocular lens is implanted.

Result: This technique results easy rotation and removal of nucleus & epinucleus.

Conclusions: This modified phacoemulsification technique is safe and very effective to emulsify soft to moderate hard cataract where direct chop is not possible. The past couple of decades have witnessed several technical modifications in cataract surgery. Despite recent advances in technique and technology, phacoemulsification in soft cataract is challenging for majority of young surgeons.

Introduction

At the same time, numbers of soft cataract surgery are increasing day by day in recent practice owing to increase in awareness among the patients. Several techniques are described for soft cataract [1-3]; however, scopes of improvement are always desired. We propose a modified technique to perform precisely phacoemulsification in soft cataract.

Surgical Technique

A meticulous preoperative evaluation is performed prior to scheduling phacoemulsification. Surgeries are performed under topical anesthesia. A 2.2 mm corneal incision is made. After continuous curvilinear capsulorrhesis, a central trench is sculpted extending from one edge of capsulorrhesis to other edge (Figure 1). Low phaco parameters are used (Table 1). The depth of the trench is about 70% of the total lenticular thickness. A 29 gauge cannula fitted in a 2 cc syringe filled with balance salt solution is used to performed delineation (Figure 2). The cannula penetrates the central lens substance through the wall of the trench and injected rapidly. A golden ring within the lens is confirmation of successful delineation. Once hydro delineation is completed, cannula is penetrated between anterior capsule and cortex to perform hydrodissection (Figure 3). In cases of posterior subcapsular cataract (PSC) central soft nucleus is emulsified with low ultrasonic power

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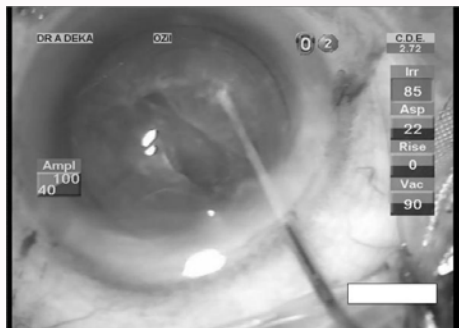
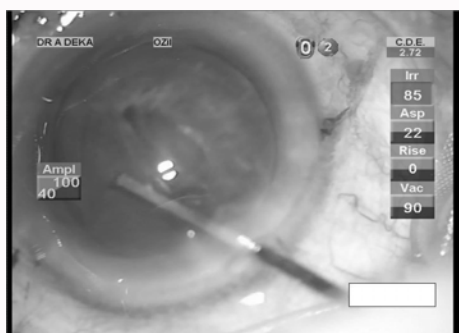
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Figure 1: Central trench is created before hydro procedure.

Table 1: Phaco parameters.

| Stages | Vacuum (mmHg) | Aspiration rate (cc/min) | Power (%) | Bottle height (cm) |
|-------------------------|---------------|--------------------------|---------------|--------------------|
| Sculpting | 90 linear | 22 linear | 50 linear | 90 |
| Chop/quadrant removal | 220 linear | 23 linear | 50-100 linear | 100 |
| Aspiration & irrigation | 330 linear | 30 linear | -- | 110 |

**Figure 2:** Cannula is introduced in the central lens substance after sculpting to perform inside-out delineation.**Figure 4:** Phacoemulsification is performed.**Figure 3:** Cannula is introduced between capsule and cortex after delineation to perform hydro dissection.

(Figure 4). In NS2 cataract with PSC nucleus was emulsified using stop and chop technique. As the nucleus collapse during hydro delineation due to central trench, nuclear rotation is easier and phacoemulsification is safer. Epinucleus and cortex is aspirated out and intraocular lens is implanted.

Discussion

Soft nuclei are not generally conducive to traditional chopping techniques and required alternate technique to remove it safely [1]. Several techniques are described for safe phacoemulsification of soft cataract [1-4]. However each technique has its own limitations. Variations are made to make the technique more endothelial cells friendly and lower complication rates [4]. Vasavada and Raj [5] described inside-out delineation in context of posterior polar cataract; however certain steps are different in cases of soft cataract as described here. In this technique of reverse hydro procedure, we created a central trench then hydro procedure was carried out. As

low phaco power is used during this step, it doesn't stress on the zonules. Surgeons have the option of injecting fluid into the desired plane for cleaving the nucleus with precision. Then hydro dissection collapses the nucleus at the centre due to the space created by the central trench. Also, a chance of posterior capsular pulling is less during hydro procedure in compare to conventional approach. It is also observed that rotation of the nucleus during phacoemulsification was smoother in this procedure. Loose soft nucleus can be emulsified easily by using low phaco power. Several phacoemulsification techniques are described for soft cataract. All claimed safe surgery and good outcome. In most of cases rotation of nucleus is difficult owing to softness of the nucleus. Sometime even emulsification of soft nucleus is difficult due to stickiness with epinucleus. In this modified technique we have observed that prior sculpting doesn't stress the zonules. Intralenticular delineation is possible so that surgeon can precisely delineate at desirable site. This technique results easy rotation and removal of nucleus & epinucleus. This technique is recommendable for soft to moderate hard cataract where direct chop is not possible.

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