Soft cataract: improving surgical safety with modified phacoemulsification

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Purpose
The aim was to describe a modified stop and chop technique for managing soft cataract to improve surgical safety.
Materials and methods
Capsulorrhexis is performed as usual with a 27 G 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 hydroprocedure is achieved. Nucleus is emulsified using ultrasound power and intraocular lens is implanted.
Result
This technique results in easy rotation and removal of the nucleus and the epinucleus using low phaco power.
Conclusion
This modified phacoemulsification technique is safe and very effective to emulsify soft to moderate hard cataract where direct chop would be difficult.

Keywords:
complication, easy rotation, hydroprocedure, low phaco power, soft cataract

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Introduction

The past couple of decades have witnessed several technical modifications in cataract surgery. Despite the recent advances in technique and technology, phacoemulsification in soft cataract is challenging for majority of young surgeons.

At the same time, the numbers of soft cataract surgeries are increasing day by day in recent practice owing to the increase in awareness among 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.

Materials and methods

All study participants provided written informed consent before enrollment. This prospective study was approved by the Institutional Review Board of Mission Nethralaya, Shillong, Meghalaya.

Surgical technique

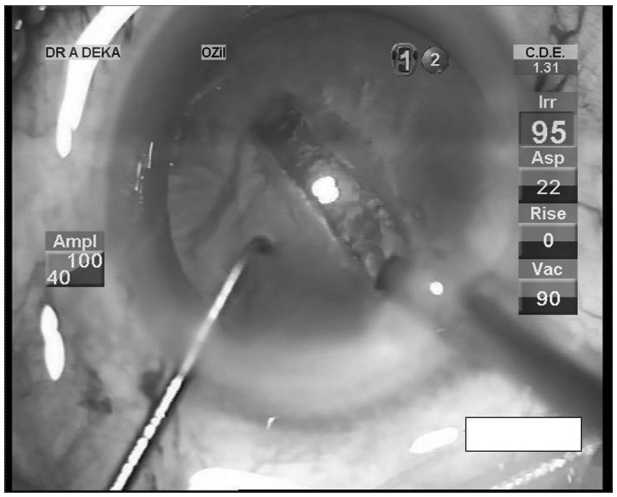
A meticulous preoperative evaluation is performed prior to scheduling phacoemulsification. Surgeries are performed under topical anesthesia. A 2.2 mm corneal incision is made. After continuous curvilinear capsulorrhexis, a central trench is sculpted extending from one edge of the capsulorrhexis to the other edge (Fig. 1). Low phaco parameters are used (Table 1). The depth of the trench is about 70% of the total lenticular thickness. A 29 G cannula fitted in a 2 ml syringe filled with balance salt solution is used to performed delineation (Fig. 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 hydrodelineation is completed, cannula is penetrated between the anterior capsule and the cortex to perform hydrodissection (Fig. 3). In cases of posterior subcapsular cataract, central soft nucleus is emulsified with low ultrasonic power (Fig. 4). In NS2 cataract with posterior subcapsular cataract the nucleus was emulsified using the stop and chop technique. As the nucleus collapses during hydrodelineation due to central trench, nuclear rotation is easier and phacoemulsification is safer. The epinucleus and the cortex are aspirated out and intraocular lens is implanted.

Result

Total 49 eyes of 37 patients were operated with this modified technique. A total of 17 patients were men

Figure 1

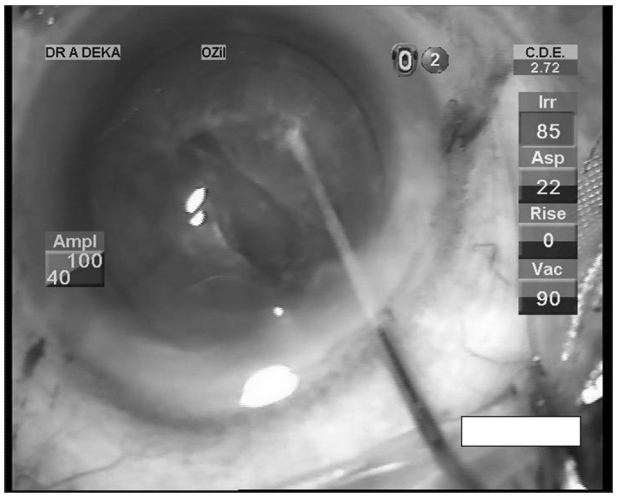


Central trench is created before the hydroprocedure.

Table 1 Phaco parameters

Stages	Vacuum (mmHg)	Aspiration rate (cm^3/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 and irrigation	330 linear	30 linear	–	110

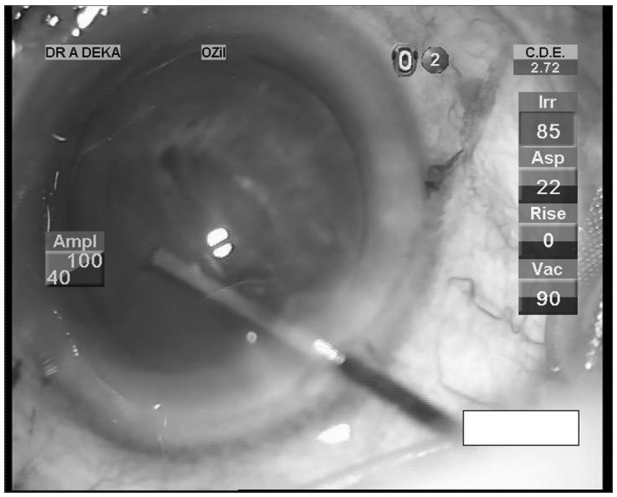
Figure 2



Cannula is introduced in the central lens substance after sculpting to perform inside-out delineation.

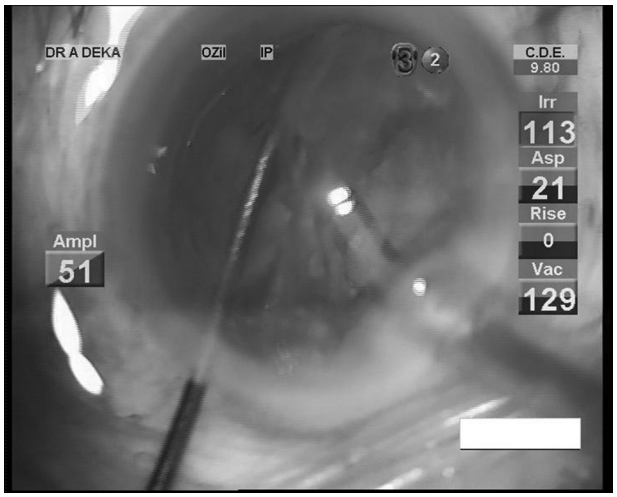
and the remaining 20 patients were women with a mean age of 58±4.5 years. The mean follow-up time was 12.5 months. Preoperative visual acuity was 20/40 in 16 eyes, 20/60 in 21, and 20/80 in 12 cases. Optical biometry was performed in 22 eyes and in remaining 27 eyes contact biometry was performed. Cataract grading

Figure 3



Cannula is introduced between the capsule and the cortex after delineation to perform hydrodissection.

Figure 4



Phacoemulsification is performed.

as per Lens Opacities Classification System III [1] was NS1+P2–10 eyes, NS1+P3–13 eyes, P3–nine eyes, P4–eight eyes, and P5–nine eyes.

Mean surgical time was 7 min and low phaco parameters were used (Table 1). A best corrected postoperative visual acuity of 20/20 was achieved in all the cases.

Discussion

Soft nuclei are not generally conducive to traditional chopping techniques and required an alternate technique to remove it safely [2]. Several techniques are described for safe phacoemulsification of soft cataract [2–5]. However, each technique has its own limitations. Variations are made to make the technique

more endothelial cells friendly and to lower the complication rates [5]. Vasavada and Raj [6] described inside-out delineation in the context of posterior polar cataract; however, certain steps are different in cases of soft cataract as descried here.In this technique of reverse hydroprocedure, we created a central trench then hydroprocedure was carried out. As low phaco power is used during this step, it does not stress on the zonules. Surgeons have the option of injecting fluid into the desired plane for cleaving the nucleus with precision. Then hydrodissection collapses the nucleus at the center due to the space created by the central trench. Also, a chance of posterior capsular pulling is less during hydroprocedure compared to the conventional approach. It is also observed that the rotation of the nucleus during phacoemulsification was smoother in this procedure. Loose soft nucleus can be emulsified easily using low phaco power.

Several phacoemulsification techniques are described for soft cataract. All claimed safe surgery and good outcome. In most of the cases, rotation of the nucleus is difficult owing to the softness of the nucleus. Sometime even emulsification of soft nucleus is difficult due to its stickiness with the epinucleus.

In this modified technique, we have observed that prior sculpting does not stress the zonules. Intralenticular delineation is possible so that the surgeon can precisely delineate at the desirable site. This technique results easy rotation and removal of nucleus and epinucleus. This technique is recommendable for soft to moderate hard cataracts in which direct chop is not possible.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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