·Monograph·

Posterior segment nucleotomy for dislocated sclerotic cataractous lens using chandelier endoilluminator and sharp tipped chopper

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Abstract

• AIM: To describe a new surgical technique for managing dislocated sclerotic cataractous lens.

• METHODS: Six patients with advanced posteriorly dislocated cataracts were operated at a tertiary care centre and analyzed retrospectively. After standard 3 port 23 G pars plana vitrectomy and perfluorocarbon liquid (PFCL) injection, the dislocated white cataract was held with occlusion using phaco fragmatome and then chopped into smaller pieces with a sharp tipped chopper using 25 G chandelier endoilluminator. Each piece was emulsified individually. Following aspiration of PFCL, Fluid Air Exchange was done in all the cases and surgery completed uneventfully.

• RESULTS: Best corrected visual acuity (BCVA) in all the patients was better than 6/12 after one month of follow up. No serious complications were noted till minimum 6mo of follow up.

• CONCLUSION: Four port posterior segment nucleotomy with a chandelier endoilluminator, fragmatome and a chopper appears to be a safe, easy and effective procedure for managing dislocated sclerotic cataractous nuclei. Ultrasonic energy used and adverse thermal effects of the fragmatome on the sclera may be lesser.

• KEYWORDS: posterior segment nucleotomy; intravitreal nucleotomy; dislocated sclerotic lens; dislocated hard lens; dislocated lens; complications of phacoemulsification
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INTRODUCTION

Posteriorly dislocated cataractous lens is a potentially devastating complication of phacoemulsification, well managed with conventional vitrectomy systems [1]. With advances and introduction of surgical adjuncts [2], the surgery has improved and simplified. While newer techniques continue to emerge [3,4], surgeons may encounter dislocated large mature nuclei that are difficult to fragment into smaller pieces using the standard 3 port vitrectomy. Infact surgeons continue to consider levitating and delivering hard fragments through the anterior route. We introduce a simple technique using chandelier endoilluminator (CE), fragmatome and chopper to overcome such a situation safely and easily.

SUBJECTS AND METHODS

Six surgeries were performed with the new technique over the past 6mo and then retrospectively reviewed (Table 1). Surgeries were done by a single surgeon. Four patients were pseudophakic, referred from peripheral centers and operated as a secondary procedure while 2 were aphakic and operated immediately at the time of complication. All the patients were documented to have advanced cataracts preoperatively. All study procedures adhered to the Declaration of Helsinki. Institutional review Board approval was taken. A minimum of 6mo follow up was done in all the cases.

During the surgery, 3 standard 23 G ports were made for pars plana vitrectomy. After aspirating residual cortical matter in the anterior segment as required, limited central vitrectomy was done and triamcinalone assisted posterior hyaloid dissection was performed. Then peripheral vitrectomy was completed in all the quadrants, with scleral depression as necessary. Retinal breaks when detected were lasered. Perfluorocarbon liquid (PFCL) was injected at the posterior pole thereby causing the nucleus to float upon the bubble. A 25 G port was then made in the infero nasal quadrant and a CE introduced through it. One superior port was enlarged with a micro vitreoretinal knife blade for the phacofragmatome while the cannula of the other superior port was removed to allow the entry of a sharp chopper without enlarging the port. Using suction and ultrasonic energy the nucleus was safely gripped and held with occlusion before prolapsing it to the midvitreous cavity, where the second instrument, *i.e.* sharp chopper, was used to perform a nucleotomy and divide the nucleus into 2 halves (Figure 1). One half fell back on to the PFCL bubble while the other half still engaged in the probes' grip was then again chopped. All these small nuclear fragments were then emulsified one by one, re chopping/feeding pieces into the fragmatome with the chopper as and when necessary. The

Table 1 Case characteristics and outcomes

Age (a)	IOL present	Time after cataract surgery	Pre-operative BCVA	Post-operative BCVA at 1mo	Intra-operative complications	Post-operative complications
63	Y	24d	CF 0.5 m	6/12	None	None
75	Y	22d	6/12	6/9	None	None
72	N	Immediate	CF 0.5 m	6/9	2 PVD induced retinal breaks	None
65	Y	30d	6/18	6/9	None	None
75	N	Immediate	6/18	6/9	None	None
70	Y	30d	CF 0.5 m	6/12	None	None

CF: Counting fingers; PVD: Posterior vitreous dissection.

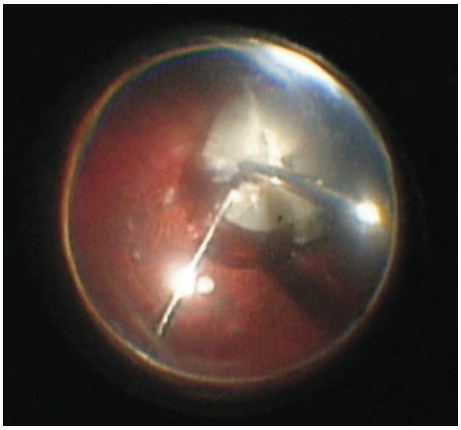

Figure 1 Intraoperative photograph showing the nucleus occluded with the fragmatome and the chopper being used to divide the nucleus into two halves.

PFCL bubble was aspirated and residual cortical matter removed with the vitrectomy cutter. Fluid air exchange was performed, port sites indented for ruling out retinal breaks and ports closed. Routine post operative care was prescribed.

RESULTS

Mean age of the patients was 70y and all were females. In all the 6 cases, the operative settings and the procedure were similar. Best corrected visual acuity (BCVA) better than 6/12 was achieved in all the patients at 1mo of follow up (Table 1). One case operated immediately after lens dislocation had 2 retinal breaks formed at the time of posterior vitreous dissection during the surgery which were lasered. Otherwise no significant complication was noted intra operatively or at 6mo of follow up.

DISCUSSION

Hard nuclei are difficult to chop as protein distribution is dense [5]. Fragmenting such nuclei using the hand held illuminator is difficult and anecdotally such dislocated nuclei have been delivered through limbal route (sometimes even requiring IOL explantation). Phacoemulsification is itself related to thermal injury [6], and due to the higher ultrasonic energy involved in such sclerotic cases there is always a theoretical risk of sclerotomy site dehiscence.

Decision to perform nucleotomy was taken in view of the advanced cataract noted pre-operatively. Endoillumination with chandelier allows usage of a second instrument, a chopper, for performing nucleotomy and making the smaller fragments more amenable to emulsification in lesser time. The sharp tip of the chopper allows for quicker and more controlled division of the nucleus. Due to the rapid nucleotomy, ultrasonic power applied appears to be less as well as for reduced duration hence causing minimal thermal damage to scleral port. The complication of retinal breaks in 1 case operated immediately at the time of nucleus drop was related to posterior vitreous dissection rather than the new technique and occurred before introduction of the CE. This technique is safe for both immediate and delayed fragmentation of nucleus and there is no difference in outcomes, visual or anatomical. It may however be more helpful in cases being operated immediately after nucleus drop where quicker surgery is needed in view of risk of intra operative stromal corneal edema. We have achieved good functional and anatomical outcomes in 6 cases and the procedure appears to be free of complications with a favourable learning curve.

CONCLUSION

Four port posterior segment nucleotomy using a CE and chopper appears to be a safe, easy and effective procedure for managing dislocated sclerotic cataractous nuclei. Ultrasonic energy used and adverse thermal effects of the fragmatome on the sclera may be lesser.

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