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COMPARISON OF VARIOUS CHOPPING TECHNIQUES FOR NUCLEOTOMY DURING PHACOEMULSIFICATION IN PSEUDOEXFOLIATION SYNDROME

Dr. Santosh Kumar MS,DNB,FICO,FAICO,FRCS(Glasg), Associate Professor, Army Hospital(Research & Referral), Delhi Cantt-10

Dr Bibhu Kalyan Nayak* MD(Physiology), Specialist on Deputation, Sports Injury Centre, Safdarjang Hospital, New Delhi-110029 *Corresponding Author

Dr Pradeep Kumar MS, DNB, Senior Resident, Vitreo-retinal surgery, Dr RP Centre for Ophthalmic Sciences, AIIMS, New Delhi

ABSTRACT

It has been described that pseudoexfoliation is the most common cause of lenticular instability affecting mainly the population beyond the seventh decade. As a result of the lens instability associated with this disease, the surgical management is always a challenge for the operating surgeon. After due considerations of the peculiar nature of disease process and the anticipated surgical hurdles, we embarked on a study to select the best possible method of_phaco-nucleotomy in these cases. Three techniques of nucleotomy namely vertical chop, stop and chop and the horizontal chop were employed after randomly distributing 60 patients in three groups of 20 patients each._We concluded and recommend that amongst the three chopping techniques, the vertical chop and stop and chop is the one preferred over the horizontal chop.

INTRODUCTION

Pseudoexfoliation syndrome is a common condition affecting primarily the anterior segment of the eye, although the fibrillar material is found in other parts of the eye as well as multiple systemic tissues. The prevalence varies between 2%-35% in various studies. Although the origin is unknown, the disease process is complex and progressive in nature. It is postulated that the abnormal production / turnover of extracellular matrix material leads to deposition of this fibrillary material. It has been further described that pseudoexfoliation is the most common cause of lenticular instability affecting mainly the population beyond the seventh decade. As a result of the lens instability associated with this disease, the surgical management is always a challenge for the operating surgeon (1,2,3). After due considerations of the peculiar nature of disease process and the anticipated surgical hurdles, we embarked on a study to select the best possible method of phaco-nucleotomy in these cases(4). We found and recommend that direct chop techniques are the best suited for such situations (5,6,7). Amongst the three chopping techniques, the vertical chop and stop and chop is the one preferred over the horizontal chop (7,8).

MATERIAL AND METHODS

60 eyes of 60 patients of cataract with pseudoexfoliation underwent cataract surgery by using the standard phacoemulsification technique on an advanced peristaltic phacoemulsification system. All cases were operated by a single surgeon using any of the three nucleotomy techniques.

The exclusion criteria applied was patients with preoperative zonular dialysis / laxity more than 03 clock hours, poor and hazy corneas, pre-existing posterior segment pathology, high myopes and glaucoma.

The patients were divided into three groups based on the technique used for nucleotomy during phacoemulsification.

Group A - Stop and chop technique (20 cases)
Group B - Vertical chop technique (20cases)
Group C - Horizontal chop technique (20cases)

The capsule was stained in all cases with trypan blue dye so as to assist in capsulorrhexis as the fundal glow was expected to be poor in some cases due to the harder and denser nuclei. Moreover the stained capsular margin is easily delineated when dealing with smaller pupils of pseudoexfoliation syndrome. The Y-hook was used intraoperatively to engage and displace the pupillary margin outwards making for full visualization during capsulorrhexis. Standard phacoemulsification techniques using either of the chopping methods namely stop and chop, vertical or horizontal technique was utilized after randomly distributing the cases into 03 groups of 20 cases each. After a thorough cortical matter irrigation and aspiration, implantation of a foldable hydrophobic acrylic intraocular lens was done.

Capsule tension ring was implanted in cases who had intra-operative zonular dialysis(9). In cases of vitreous loss, adequate vitrectomy was performed using a 23-G vitrectomy system. In situations with inadequate capsular support, the patients were left aphakic for a glued IOL surgery at a later date. Post-operatively topical corticosteroids were used and tapered over subsequent 06 weeks. Topical antibiotic eye drops were used for 04 weeks. Regular post-operative follow-up was done on day 01,07,30 and 42.

Intraocular pressure was taken pre-operatively and post-operatively to see for any change in the readings after phacoemulsification procedure. The intraocular pressure variation pre and post-operatively was not more than 02 mmHg with applanation tonometry(10).

RESULTS

Success was achieved in majority of the cases and the results were tabulated to assess the optimal and the safest procedure of the three chopping methods in cases of pseudoexfoliation syndrome undergoing phacoemulsification.

In Group A cases where nucleotomy was done by stop and chop technique using a sharp chopper, there was a zonular dialysis of 04 clock hours in 01 case which was managed intra-operatively with insertion of a Cionni's ring followed by in the bag implantation of a foldable hydrophobic acrylic intraocular lens. Rest of the 19 cases were uneventful intra-operatively and in the bag implantion of foldable hydrophobic acrylic intraocular lens was achieved in all cases.

In Group B cases where nucleotomy was done by vertical chop technique using a sharp chopper, there was a zonular dialysis of 03 clock hours in 01 case which was managed intra-operatively with insertion of a capsule tension ring followed by in the bag implantation of a foldable hydrophobic acrylic intraocular lens. Rest of the 19 cases were uneventful intra-operatively and in the bag implantion of foldable hydrophobic acrylic intraocular lens was achieved in all cases.

In Group C cases where nucleotomy was done by horizontal chop technique using a blunt chopper, there was a zonular dialysis of 03 clock hours in 02 cases which was managed intra-operatively with

insertion of a capsule tension ring followed by in the bag implantation of a foldable hydrophobic acrylic intraocular lens. In 01 case there was a zonular dialysis of 05 clock hours which was managed intra-operatively with insertion of a Cionni's ring followed by in the bag implantation of a foldable hydrophobic acrylic intraocular lens. In 02 case there was zonular dialysis of more than 06 clock hours with vitreous loss. The entire lens with the capsular bag was removed and adequate vitrectomy was performed using a 23-G vitrectomy system. Rest of the 15 cases were uneventful intra-operatively and in the bag implantion of foldable hydrophobic acrylic intraocular lens was achieved in all cases.

CONCLUSIONS

Cataract surgery in a case of pseudoexfoliation syndrome is a challenge in all cases and due precautions need to be taken intra-operatively to prevent complications. On the basis of above findings and procedures undertaken to emulsify the nucleus, it is evident that chopping is preferred method for nucleotomy in pseudoexfoliation syndrome. In the three chopping techniques applied for nucleotomy, the stop and chop and the vertical chopping score over horizontal chopping as evident from the results indicated above. In pseudoexfoliation syndrome the pupil size even after dilation is usually smaller. This poses a great risk in horizontal chopping where one has to go behind the iris and under the capsulorrhexis blindly. As compared to horizontal chopping, all movements are within a small central area in the stop and chop and the vertical chopping technique. This is done with help of a sharp chopper which induces minimal stress on already compromised zonular apparatus especially when dealing with hard cataracts as in cases of pseudoexfoliation syndrome. Thus a cleavage plane can be easily achieved in these cases of smaller pupils as seen in pseudoexfoliation syndrome. It is recommended that stop and chop and the vertical chopping technique be undertaken in all cases of pseudoexfoliation syndrome undergoing cataract surgery which minimizes the occurance of intra-operative complications.

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