ORIGINAL RESEARCH PAPER

OPHTHALMOLOGY

VERTICAL CHOPPING PREFERRED OVER HORIZONTAL CHOPPING IN PHACOEMULSIFICATION OF CATARACTS IN PSEUDOEXFOLIATION SYNDROME.

KEY WORDS: Pseudoexfoliation, phacoemulsification, vertical chopping, horizontal chopping.

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ABSTRACT

Previously during cataract surgery for pseudoexfoliation syndrome there was an increased incidence of capsule rupture and tears, zonular dehiscence and vitreous loss. Nowadays phacoemulsification has emerged as a safe and an effective management option in patients of cataract with pseudoexfoliation syndrome and though extremely effective, it has to be performed with extreme caution and prudence. In this study we observed that vertical chopping scores over horizontal chopping in pseudoexfoliation syndrome because sometimes the blunt horizontal chopper may pass over the anterior capsular margin leading to zonular dialysis and associated complications. Moreover the nucleotomy is easier by a sharp vertical chopper as the cleavage plane is initiated easily. The pseudoexfoliative material on anterior capsule limits the visibility of the capsulorrhexis margin which may be compounded by the poor dilation of pupil and the poor fundal grow especially in hard cataracts. Thus performing a horizontal chopping by sliding the blunt chopper over the hard crystalline lens and under the capsulorrhexis margin is a rather risky proposition to achieve nucleotomy. Thus vertical chopping is the preferred direct chopping technique which causes minimal stress on the already weak zonules in phacoemulsification syndrome.

Aim : To determine if vertical chopping should be preferred over horizontal chopping in phacoemulsification of cataracts in pseudoexfoliation syndrome.

Introduction : Exfoliation syndrome is a fairly common condition affecting the anterior segment of the eye (1). This was first described by Llindberg in 1917 and is now well recognised as a generalized systemic disorder involving abnormal production and/or turnover of extracellular matrix material. For ophthalmologists it is a spectrum of intraocular and extraocular manifestations caused by changes resulting from the deposition of pseudoexfoliative material in ocular tissues(2). The incidence of pseudoexfoliative glaucoma is common and the incidence continues to rise with the duration of the disease(3,4). Previously there were numerous reports of increased incidence of capsular rupture and tears, zonular dehiscence and vitreous loss with manual extracapsular cataract extraction in patients with pseudoexfoliation syndrome (5). Phacoemulsification is now a safe and effective management option in patients of cataract with pseudoexfoliation syndrome(6). Vasavada et al (6) did not encounter any intraoperative complications even though 60% of eyes in the cohort group had a hard cataract. Vasavada et al (6) were able to perform endocapsular phacoemulsification fully in majority of the eyes with pseudoexfoliation syndrome. They recommend chopping techniques which they have evolved which can divide the hardest of nuclei with minimal stress to the capsular bag and zonules.

Several studies have concluded and recommended that phacoemulsification with IOL implantation can be performed routinely in these patients if special care is exercised in preoperative evaluation as well as intra-operatively(6,7).

Phacoemulsification in cases of pseudoexfoliation syndrome has to be performed with extreme caution and prudence so as not to damage the already weakened and compromised zonules(7,8). Excellent results can now be achieved with improvement in phacoemulsification technology, careful manipulation intraoperatively and use of various intra-operative surgical adjuncts such as iris hooks and capsule tension rings(9,10).

However Howard Fine et al recommend non-rotational cracking as they consider this the least traumatic method of dismantling the nucleus into quadrants that are easy to mobilize. Fine et al (11) disapproved of downslope sculpting as nudging the nucleus in subincisional area can stress the already compromised zonules. He recommends using a second instrument which when passed through a side port will help stabilise the nucleus as well as lift it up slightly so as to push and feed it into the phacotip. In both of the above mentioned techniques of Vasavada et al and Fine et al, a good hydrodelination helps with the epinuclear shell stabilizing the nucleus and thus preventing transfer of mechanical and phacoemulsification forces to the capsule and zonules.

Few authors have advocated two handed rotations of the nucleus as the nature of the forces then become tangential avoiding any zonular traction, thus preventing any intra-operative complication. Also the intraoperative manouvres need to be extremely gentle and preventing any undue stress on the already compromised zonules (12,13).

However an uneventful surgery does not guarantee a permanent success as pseudoexfoliation is an ongoing process and there are numerous reports of late dislocation of intraocular lenses(14). The corneal endothelium is compromised in pseudoexfoliation and utmost care needs to be taken to protect it during surgery. Nonetheless on a few occasions despite adequate methods to protect endothelium, there occurs endothelial decompensation with disastrous consequences(15). A careful follow-up of the fellow eyes of unilateral pseudoexfoliation patients is imperative as these may over time develop pseudoexfoliation and glaucoma(16).

Material and Methods

A prospective case analysis of 60 patients of pseudoexfoliation syndrome taken up for phacoemulsification with posterior chamber intraocular lens implantation surgery was done. Patients recruited for the study had nuclear opalescence and nuclear colour grade four to five of LOCS III classification. All surgeries were performed by a single surgeon on a peristaltic high end phacoemulsification system.

Group A consisted of 30 patients who were scheduled for vertical chopping technique using a chopper with a sharp tip at 90° to the shaft of the instrument.

Group B had 30 patients in whom a horizontal chopping technique was planned using a curved chopper with a blunt tip.

All patients achieved a preoperative dilation ranging from 04-07mm. In cases where pupillary dilation was 04-06mm, a Malyguin ring was used to assist dilation intraoperatively. Trypan

blue dye was used to stain the anterior capsule so as to facilitate capsulorrhexis in all cases. In order to protect and coat the endothelium, a cohesive viscoelastic was used before emulsifying the hard cataracts routinely observed in pseudoexfoliation syndrome. During the phacoemulsification procedure, attempt was made to divide the nucleus into at least 06-08 fragments with either technique using vertical or horizontal chopping. In patients where chopping was not possible using a particular technique, another method preferably a stop and chop technique was used to complete the nucleotomy procedure.

Exclusion Criteria

(1) Preoperative phacodonesis,iridodonesis,subluxation or gross zonular instability.
(2) Glaucoma
(3) History of ocular trauma
(4) Pupillary dilation < 5mm
(5) Corneal opacity of any type
(6) Nuclear colour grade >5 of LOCS III classification

Results

Group A - In 29 of 30 patients who were subjected to vertical direct chopping technique using a sharp chopper, we were able to achieve nucleotomy of 06- 08 fragments without use of additional maneuvers, iris/capsular hooks or capsule tension ring. 01 patient developed zonular dialysis of 2'0 clock hours intraoperatively which was managed with insertion of a capsule tension ring. In all these 30 patients a hydrophobic acrylic single piece intra-ocular lens could be implanted in the bag.

Group B - In only 21 of 30 patients we could achieve a nucleotomy of 06 fragments using a horizontal direct chopping technique by a blunt chopper.The nucleotomy in other 09 patients could not be achieved by the horizontal chopping technique and was then performed using a sharp chopper by a vertical direct chop or stop chop technique. 03 patients intraoperatively developed zonular dialysis of 3'0 clock hours which was managed with insertion of a capsule tension ring. 02 patients intraoperatively developed a posterior capsular rent with vitreous presentation which was managed with anterior vitrectomy without loss of any fragments in the vitreous cavity. In 24 of 30 patients we were able to implant a hydrophobic acrylic single piece intra-ocular lens in the bag. In 03 patients, a 3-piece IOL with hydrophobic acrylic optics and polypropylene haptics was inserted into the bag. In 02 patients with posterior capsular rent with vitreous presentation and intraoperative complications, a rigid polymethylmethacrylate intraocular lens was implanted in the sulcus on the remnants of anterior capsule. 01 patient developed a posterior capsular rent during chopping with loss of half of nuclear fragment into the vitreous cavity. After a good anterior vitrectomy and aspiration of cortical matter the case was closed and referred for vitreoretinal surgeon consultation.

Conclusions

In cases of pseudoexfoliation syndrome there is an increased incidence of capsule rupture and tears, zonular dehiscence and vitreous loss with the technique of manual extra capsule cataract extraction. Nowadays phacoemulsification has emerged as a safe and an effective management option in patients of cataract with pseudoexfoliation syndrome and though extremely effective, it has to be performed with extreme caution and prudence. Some authors have described endocapsular phacoemulsification uneventfully in majority of eyes with pseudoexfoliation syndrome, but not many have validated the use of vertical chopping exclusively for pseudoexfoliation syndrome. In this study we observe that vertical chopping scores over horizontal chopping in pseudoexfoliation syndrome because of the following reasons.

(I) In cases where pupillary dilation is 5-6mm, sometimes the blunt horizontal chopper may pass over the anterior capsular margin leading to zonular dialysis and associated complications.
(ii) The nucleotomy is easier by a sharp vertical chopper as the cleavage plane is initiated easily. In contrast the horizontal chopper requires a large amount of force in these unusually hard nuclei and this may compromise the already weak zonules.
(ii) The pseudoexfoliative material on the anterior capsule especially in disc like shape may at times limit the clear visibility of the capsulorrhexis margin. This may be compounded by the poor dilation of pupil and the poor fundal grow especially in hard cataracts. Thus performing a horizontal chopping by sliding the blunt chopper over the hard crystalline lens and under the capsulorrhexis margin is a rather risky proposition to achieve nucleotomy.

Thus vertical chopping is the preferred direct chopping technique which causes minimal stress on the already weak zonules in phacoemulsification syndrome.

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