A Comparison of Four Different Foldable Intra-ocular Lenses: Anterior Capsular Changes, Posterior Capsular Changes and Optic Transparency.

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AIM:

To assess the long-term outcome (eighteen months to twenty-four months) of four different intra-ocular lenses made of hydrophobic acrylic and hydrophilic acrylic for small incision and foldable lens cataract surgery. The parameters investigated were anterior capsule size changes, posterior capsular changes affecting visual acuity, and transparency factors affeding the refracting medium of the intrat-ocular lens.

BACKGROUND:

This study was prompted by the necessity to find, in a market of many new intra-ocular lens products, the lens best suited to high turn over cataract surgery in a unit where teaching for cataract surgery is necessary and optimal outcome is required with respect to both cost and minimal re-intervention.

DESIGN:

Non-randomised retrospective study.

METHOD AND MATERIALS:

Sixty-five patients. who underwent uncomplicated small incision cataract and foldable lens surgery, between January 2000 and June 2000, were recalled. Patients underwent 2.5mm steep axis incision, followed by continuous curvilinear capsulorrhexis of between 5 and 5.5 mm in diameter. A divide and conquer phacoemulsification technique was used with cortex aspiration and posterior capsular polish. No anterior capsular polishing was performed. IOL's were implanted through minimally enlarged wounds unless necessary for astigmatic control. Sutureless wound hydration techniques were used for wound closure. Intra-ocular Gentamycin and adrenalin are the only additives used. Surgical time was approximately fifteen minutes.

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Patients included in the study were measured to have best corrected visual acuities of 6/9 or better, at the two-week postoperative visit, following uncomplicated surgery only.

The following was the distribution of lenses within the group:

- Ten Ciba vision MemoryLens CV232; Hydrophilic acrylic; Round edge design
- Twelve Lenstec SofTec I; Hydrophilic acrylic; Sharp edge design
- Eighteen Alcon Acrysof MA60BD; Hydrophobic acrylic; Sharp edge design
- Eleven Alcon Acrysof MA30BA; Hydrophobic acrylic; Sharp edge design

The following examination parameters were documented:

- Visual acuity
- Intra-ocular pressure
- Pupil sizes as measured by pupilometer under scotopic and mesopic conditions
- Anterior chamber clarity (cells, flare)
- Glare (as produced by light shown from 45 degrees, increasing brightness to 3 Lux, objectively observed as loss in visual acuity, subjectively observed by patient).
- Anterior capsular assessed for size of CCC and clarity CCC, with a diameter of smaller than 4mm were considered to have shrunk
- Posterior capsular changes (graded from 0 to 3)
  - Grade 0: being clear posterior capsule
  - Grade 1: less than one third of posterior capsule affected
  - Grade 2: more than one third affected, but vision unaffected, and
  - Grade 3: vision affected by changes in posterior capsule or Nd YAG posterior capsulotomy

• Optic transparency: The optic transparency was assessed for surface changes and intrinsic changes, haziness, milkiness, glistenings. Glistenings was graded from 0 to 3:

Grade 0: being clear
Grade 1: less than 5 glistenings observed
Grade 2: more than 5 glistenings observed but not affecting vision, and
Grade 3: glistenings affecting the vision

RESULTS:

Optic transparency:

We did not observe surface changes on any of the lenses[1].

Nor have there been any of the lenses in the group that had a milky appearance.

VVe found glistening and graded it as stated in method.

The results were as follows:

Fig. 1 Optic transparency

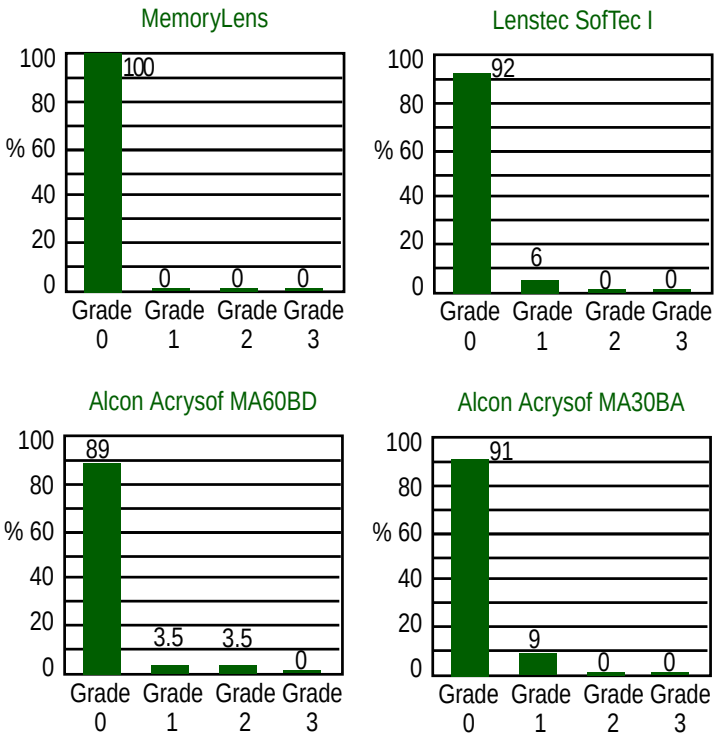
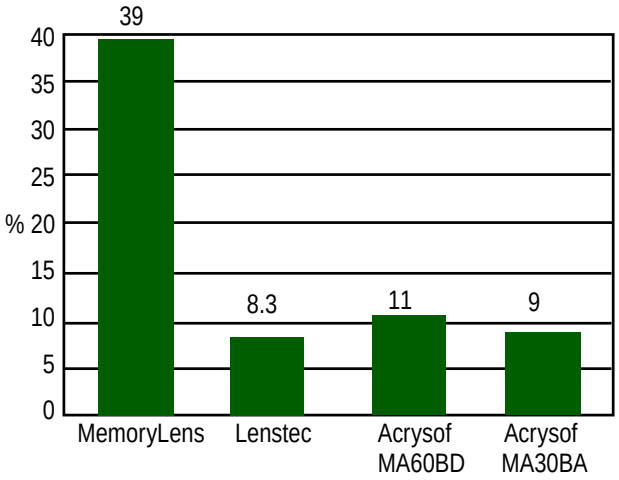


Fig. 5 Anterior Size Capsular Changes



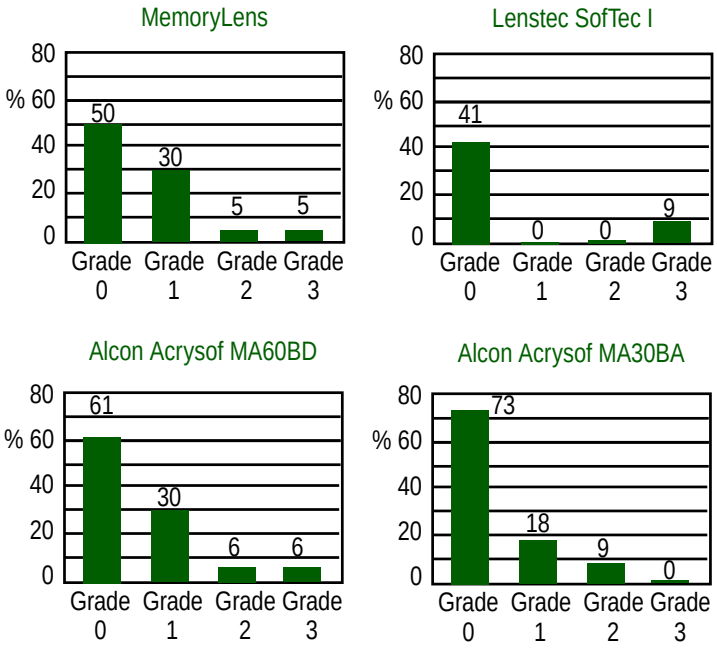
Intra-ocular lens decentrations:

MemoryLens
Two of these lenses were not centered (20%).

Posterior Capsular Changes:

Posterior capsular thickening was graded from 0 to 3:

Grade 0: no posterior capsular opasification
Grade 1: less than a third and not affecting vision
Grade 2: more than a third but not of visual significance
Grade 3: affecting the vision or had Nd: YAG posterior capsulotomy



CONCLUSION:

Optic Transparency:

For this modality[1] none of the lenses had any surface changes or visible folds that were due to the folding, handling or placement of the lenses. No milky changes were observed in any of the lenses. As far as glistenings[2] are concerned, only the MemoryLens had no glistenings. The other lenses all had glistenings but it was not of visual significance.

In the lenses we observed, a significant number had optic transparency changes, but it was not of visual significance.

Anterior capsullar changes:

Anterior capsular shrinkage was defined as a capsulotomy that had shrunk to 4mm. The anterior capsular changes were markedly more in the MemoryLens group and two of the lenses in this group were also decentered in the bag. The sharp edged lenses all kept their postion. We postulate5 that the lens design and material composition of the MemoryLens allows for less friction and more movement in the capsular bag and that leads to an unstable configuration.

Posterior capsular changes:

In this modality[2,3] the hydrophobic acrylic lenses, as expected, had the highest percentage of clear posterior capsules and the lowest incidence of Nd:YAG posterior capsulotomies. This confirms the finding of many other studies. The other two materials were very comparable, but the sharp edge lens design of the Lenstec lens had less lenses in Group 2 and 3, which is the groups of visual significance.

DISCUSSION:

For the parameers we chose to investigate the lenses were very comparable. We know that edge design[3,6] plays an important part in anterior and posterior lens capsular clarity. It is, however, important to remember that the lens material also plays a roll in maintaining a clear capsule. As expected the Alcon Acrysof lenses had the least posterior capsular changes, but the other two lenses tested were quite comparable.

As far as the optic transparency is concerned, none of the lenses we used had any surface changes[1]. This is important in the teaching setting where lenses are sometimes handled more than predicted. None of the milky changes[2,4] has been seen. We are aware that the glisternings has been described before[3]. Although glisternings has been noted in a significant number of lenses, it was of no visual significance and we do not think it plays a part in glare.

We have noted more anterior capsular changes in the Ciba vision MemoryLens and it must be noted that this lens does not have a square edge design. None of the lenses had anterior capsular phimosis, needing Nd- YAG laser.

As far as posterior capsular changes are concerned the Lenstec SofTec I and Alcon Acrysof lenses had 90% plus grade 0 and 1, while the MemoryLens had 80%. These findings does not correlate with the very low rate of posterior capsular opacification in other studies, but is also much lower than that found with other lens designs.

Refefences:

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