

THE EMPLOYMENT OF YAG-LASER IN THE RESOLUTION OF CERTAIN COMPLICATIONS IN IOL CARRIERS

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In the last decade, the use of IOL in cataract surgery has constantly increased. The validity of IOL for optical correction in aphakic patients has not in fact been challenged. However, despite the careful selection of patients to be implanted and the refinement of surgical techniques and lens material, ophthalmologists must often face several complications of this type of surgery. Some of these complications overlap with those that may occur with conventional intra or extracapsular cataract extraction, whereas other are closely associated with the use of IOL, both in AC and PC. The complications may be divided into two categories: intraoperative and postoperative (early and late). The first type of complications include: hyphaema (1 to 2 percent of cases)^{1, 2}, often caused by the iridectomy, which may determine occurrence of anterior synechia even at a later date; vitreous loss (1 to 2% of operated eyes)^{3, 4}; posterior capsule rupture; endothelial damage and pupillary straining (due to traction of the anterior vitreous fibers and/or action of the lens in iris tissue). The mayor early post-operative complications include: flattening of the AC which is due to detachment of the choroid or incomplete closure of the surgical wound; corneal edema; acute uveitis with marked vitreous reaction (1 to 3 percent of cases)^{1, 3} which is often followed by the formation of secondary membranes and posterior synechiae; endophthalmitis, lens dislocation, glaucoma caused by pupillary block or of irritative hypersecretion due to inflammation of the uveal tract or by angle obstruction.

Other late complications include: lens precipitates (formed by inflammatory cells and/or iris-derived pigment)^{5, 6}, posterior capsule opacification, formation of pseudomembranes, glaucoma (due to anterior synechia), UGH syndrome, corneal dystrophy, retina detachment and cystoid macular edema (Table I)⁷.

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TABLE I
MAJOR COMPLICATIONS IN IOL CARRIERS (ELLINGSON)

| Intraoperative | Post-operative | |
|-----------------------------|--|--------------------------------|
| | Early | Late |
| — Hyphaema | | |
| — Posterior capsule Rupture | — Pupillary straining | — Capsule Opacification |
| — Vitreous loss | — Anterior chamber reduction | — Precipitates |
| — Endothelial damage | — Corneal Edema | — Pseudo-membrane |
| | — Uveitis (posterior synechia) | — Glaucoma (anterior synechia) |
| | — Endophthalmitis | — U. G. H. syndrome |
| | — Lens Dislocation | — Corneal Dystrophy |
| | — Secondary Glaucoma (pupillary block) | — Cystoid macular edema |
| | | — Retina detachment |

The aim of our work was to show the usefulness of Yag-laser in the resolution of certain of the above mentioned complications in IOL carriers without further surgery which is often time consuming and complex⁴.

MATERIALS AND METHODS

From february 1986 to january 1987, 85 patients, aged 50 to 83, were treated with Yag laser. There were 40 males and 45 females; they all were IOL carriers in the posterior chamber, showing postoperative complications (that occurred four months to two years after surgery). Minimal follow-up was carried out for at six months. In all the patients studied, we observed six cases of inclusion of vitreous fibers in the surgical wound; four cases of iridolenticular posterior synechia; eight cases of iridoentelhal anterior synechia; 26 cases of posterior capsule opacification; 22 cases of precipitates on IOL; 14 cases of pseudomembrane formation in the pupil and five cases of pupillary seclusion.

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In addition, ten cases showed two or more associated complications. A Topaz Yag laser (by Lasag) was used with different lenses according to type of treatment. Low voltage and several sessions were preferred when possible, with the objective of splitting the total amount of energy administered to the tissue and, therefore, limiting the possibility of inflammatory complications^{9, 10, 11, 12}.

All subjects were treated on an outpatient basis and had previously received corneal anesthesia with benoxinate hydrochloride 0.4 and we adopted CGI or CGA contact lenses according to the type of disorder. In several cases of precipitates, pseudomembranes or capsule opacification, it was necessary to use a mydriatic (tropicamide 1%), whereas for anterior synechia a myotic agent (Dapiprazol 0.5%) was instilled to allow a more accurate visualization of the area to be treated. Anti-inflammatory treatment was carried out with indomethacin (50 mg) administered orally starting 24 hours prior to treatment and continuing for 5 days; topical therapy was performed with cortisone preparations or NSAID according to the case. The parameters used are listed in Table II. Follow-up was carried out for a minimum of six months and included daily examination for the first week, a weekly examination in the first month and one monthly visit thereafter. Each examination included eye check, tonometry, biomicroscopy, endothelial exam and visual field (at six months).

TABLE II

| | Subjects treated | Type of treatment | Power | Defocus |
|---------------------------|------------------|------------------------|-----------|---------|
| - Pupillary straining | 6 | Vitreous band section | 3-6mj | 0-2 |
| -- Posterior synechia | 4 | Posterior Synechiotomy | 1-3mj | 0-2 |
| --- Anterior synechia | 8 | Anterior Synechiotomy | 3-7mj | 0 |
| --- Capsule Opacification | 26 | Posterior Capsulotomy | 1-2mj | 0-2 |
| --- Precipitates | 22 | Lens Cleaning | 0.5-0.7mj | 0 |
| --- Pseudo-membrane | 14 | Membranotomy | 0.7-3mj | 0 |
| --- Pupillary seclusion | 5 | Iridotomy | 3-7mj | 0 |
| TOTAL | 85 | | | |

RESULTS

The results obtained are listed in Table III.

The results were satisfactory for pupillary straining with vitreous fibrils (five patients), whereas major problems occurred in a case where the lens was found in iris tissue. The anterior synechiotomy was shown to be particularly effective when surgery was timely (at onset of complications), whereas in posterior synechiotomies, several difficulties occurred regarding 'focusing in' of the area to be treated. Extremely good results were obtained with precipitates and pseudomembranes, when sight was reported as being significantly impaired. For example, in one case (patient 11), combined interventions in several sessions allowed freeing of pupillary margin, vaporization of precipitates and removal of pseudomembranes, thus restoring a 20/20 vision to the patient (see Figs. A and B). Excellent results were obtained with posterior capsulotomies, with the exception of four eyes; of these four eyes, two showed a considerably thickened membrane and two showed damage to the retina prior to laser treatment. Iridotomy was found to be effective in controlling ocular pressure in four cases of pupillary seclusion with hypertone.

TABLE III

| | Anatomic results | Functional results | Negative results |
|-------------------------|--------------------|--------------------|--|
| — Pupillary straining | 5 (83.3%) | 5 (83.3%) | 1 case of iris sequestration (16.7%) |
| Posterior synechia | 3 (75%) | 3 (75%) | 1 case of unclearly focusable synechiae (25%) |
| — Anterior synechiae | 7 (87.5%) | 6 (75%) | 2 cases of particularly large and resistant synechiae (25%) |
| - Capsule Opacification | 26 (100%) | 22 (84.6%) | 4 cases of pre-existing vitreous-retina lesions (15.4%) |
| - Precipitates | 22 (100%) | 22 (100%) | |
| --- Pseudo-membrane | 13 (92.8%) | 11 (78.5%) | 2 cases of pre-existing vitreous-retina lesions 1 case of very compact pseudomembrane (21.5%) |
| — Pupillary seclusion | 5 (100%) | 4 (80%) | 1 case of irreducible hypertone (20%) |
| TOTAL | 83 (97.6%)* | 69 (81%) | 12 (19%) |

* Some eyes had more than one complication.

COMPLICATIONS

The complications observed were as follows: (Tab. IV).

Bleeding: 7 cases (1 iridotomy, 6 synechiotomies); (8,2%) slight damage to IOL: 4 cases (1 during cleaning of anterior surface of the IOL, 3 posterior capsulotomies); (4.7%).

Transient hypertone: 5 cases (2 during cleaning of anterior surface of the IOL, 2 synechiotomies, 1 posterior capsulotomy); (5.8%).

More marked inflammatory reaction: 1 case (posterior synechiotomy). (1.1%).

However, these complications were promptly treated with hypotensive and anti-inflammatory drugs which resulted in complete remission of symptoms.

TABLE IV
COMPLICATIONS OF LASER APPLICATION

| | | |
|-----------------------|---------|---|
| Bleeding | 7 cases | 1 iridotomy - 6 synechiotomies |
| IOL. damage | 4 cases | 1 case during cleaning of anterior surface of the IOL 3 in posterior capsulotomies |
| Transient hypertone | 5 cases | 2 cases during cleaning of anterior surface of the IOL 2 in synechiotomies 1 in posterior capsulotomy |
| Inflammatory reaction | 1 case | 1 posterior synechiotomy |

CONCLUSIONS

It was clearly shown that the use of yag laser in resolving certain complications associated with the use of IOL, is a valid tool in cataract surgery but does not exclude the possibility of further surgery if the laser fails. This method is undoubtedly useful in reducing social costs both for patients and the community. It has real potential for success also with respect to the relatively low incidence of complications observed with its use.

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