MANAGEMENT OF COMPLICATIONS OF
PHACOEMULSIFICATION

By

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My first phacoemulsification machine (Surgical Design)

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Top quality cataract surgery has now been achieved through the acquisition of high skills and the provision of high technology.

Cataract surgery is the most common surgical procedure in ophthalmic practice.

It should be relatively safe with a relatively low incidence of complications.

However, this requires a high quality surgeon who is performing high volume-surgery & who has developed and is dynamically developing high skills; and who is capable of dealing with complications in the safest and most effective way.
CHALLENGES IN PHACOEMULSIFICATION

• Added to this, a perfect understanding of the machine and its basic functions is essential: US power, vacuum, aspiration rate (flow rate) i.e. the fluidics.

• And don’t be overwhelmed by the pioneers, experts and innovators; they face problems, often serious!!

• I will be talking on challenging complications including capsular breaks and vitreous derangement, residual and falling back cortical masses and the dropped nucleus.
Surgeons are reluctant to admit a significant rate of difficulties and complications. They probably will do so, only when solutions are found to those difficulties and complications!!

A perfect surgical procedure consists of several perfect steps. Otherwise if one step fails e.g. capsulorhexis the rest of the steps will be difficult, risky, loaded with complications and very disappointing.
BASIC SKILLS IN MODERN CATARACT SURGERY (seven)

1. Tunnel incision: proper configuration, self-sealing nature
2. Capsulorhexis: continuous, curvilinear, complete
3. Hydrodissection: proper, safe, and complete
4. Lens rotation: carefully done, safe
5. Nucleus division: in different ways
6. Phaco – aspiration: low US power, high vacuum
7. Foldable or hydrophilic IOL implantation
MAJOR INTRAOPERATIVE COMPLICATIONS OF PHACOEMULSIFICATION

1. Posterior capsular breaks
   - Early or late
   - Small or large

2. Residual dropped cortical fragments

3. Dropped nucleus or nuclear segments—(the nightmare of the phaco-surgeon)
MAJOR INTRAOPERATIVE COMPLICATIONS
OF PHACOEMULSIFICATION

Posterior Capsular Breaks

It is very important to recognize the incidence once it happens
In order to minimize the problem
Posterior Capsular Breaks

- If small, plug with healon, lower the bottle, use bimanual irrigation-aspiration - pushing the vitreous back with irrigation and removing the cortical remains away from the capsular tear with aspiration.

- With limited cortical matter, a vitreous cutter may be used both to aspirate & to cut and remove a limited amount of vitreous that may be entangled in the aspiration port.
Posterior Capsular Breaks

If large, or has enlarged, and especially if the pupil has closed, with vitreous already mixed with lens matter, and out of the wound!!

WHAT SHOULD YOU DO ???
This is what you should do:

Use a micro sponge and scissors to clean the wound from prolapsed vitreous, enlarge the wound, implant a PMMA IOL or a foldable IOL in the sulcus, clean the wound more, and close, or hydrate, the wound.
This is what you should do:

Use a superblade 15° incision, 3.5 mm from the limbus in the suitable quadrant. The vitrectomy probe is introduced through the pars plana, behind the IOL, to remove the cortical remains & may be the posterior capsule on vitreous support. Complete & safe removal is achieved with a very low possibility of cortical matter falling back, and with minimum or no vitreous traction, removing as much vitreous as just necessary.
This is what you should do (cont.):

Now turn to the anterior chamber with the vitreous cutter and the irrigation hand piece (bimanual technique) remove vitreous, lens matter & healon from the AC, in front of the IOL. You can use Kenacort (Triamcinolone Acetonide) to visualize the vitreous better, especially strands attached to the wound.
Complications of Phaco
This approach **saves the anterior segment structures from excessive surgical trauma & avoids marked vitreous hydration & traction behind the pupillary plane.**

Another **useful technique** is what is called Posterior Assisted Levitation **PAL** described by Kelman 2003 consists in introducing a cyclodialysis spatula behind the posterior capsule and elevating the spatula slowly, with a side-to-side manoeuvre to gently coax the lens matter up and above the iris plane. This technique is **NOT RECOMMENDED**
RESIDUAL CORTICAL REMAINS IN THE VITREOUS AFTER PHACOEMULSIFICATION

- This can be dealt with within one week after the operation.

- Some cases can tolerate fallen-back residual cortical remains for varying periods of time. But if causing problems should be removed by the three-port vitrectomy removing as much vitreous as necessary.

- This reduces secondary glaucoma and yields favorable visual outcomes.
Pars plana removal of dropped cortical remains
• Physicians are quite eager to report surgical success but comparably very reluctant to report serious complications

• Favorable visual outcome has been reported with vitrectomy performed within one week of cataract surgery; this reduces uveitis, CME and glaucoma

• **But is PPV always necessary?** May be 1/3 of eyes can be controlled medically

• But secondary glaucoma is a major reason for vision loss and vitrectomy **within the first week is protective**

• Cataract surgeons should refer patients promptly to a retinal surgeon

CONCLUSIONS:
MAJOR COMPLICATIONS OF PHACO

Dropped Nucleus Or Nuclear Segments
(The nightmare of the phaco surgeon)

- The anterior segment surgeon is advised to implant in the sulcus foldable or PMMA and to close the cataract wound.

- Three-port vitrectomy to fragment & remove the dropped nucleus or nuclear segments with the ultrasonic tip (low power high vacuum) through the sclerotomy (or can be done at a later date, but preferably within one week after surgery by a vitreo-retinal surgeon)
Dropped Nucleus Or Nuclear Segments (The nightmare of the phaco surgeon)

• Alternatively, 3-port vitrectomy to remove the vitreous cleanly and free the nucleus from vitreous, then float it on PFCL, up to, and out through, the widened incision.

• If you had a good capsulorhexis, a good support is available for implantation of a PMMA IOL, or a foldable lens in the sulcus.

• Now fluid PFCL exchange is done making sure not to leave any PFCL remains.
BLOW OUT BREAK OF THE POSTERIOR LENS CAPSULE DURING HYDRODISSECTION

**SIGNS:**

- Iris prolapse during hydro dissection (this means a blowout capsular break)
- Miosis.
- Failure to rotate the nucleus.
- Tilting and displacement of the nucleus which starts to sink into the vitreous!! (don’t try to fish it out!!). Avoid using a scoop! Say bye bye, and close.
HOW ABOUT A NICE UPDATED ECCE ??!!

- A nice stepped incision -- do not enter the AC yet
- Do the capsulorhexis ------ train yourself !!
- Hydro-dissect , rotate nucleus very well
- Two paracenteses for bimanual IA
- Open wound, as is necessary , remove nucleus
HOW ABOUT A NICE UPDATED ECCE (Continued):

- Wound closure by three interrupted sutures
- Bimanual IA in the closed stable chamber
- Removal of the central suture, implant the IOL in the bag
- Shoe-lace running suture – minimum astigmatism

LET US SEE
CHALLENGES IN PHACOEMULSIFICATION (CONCLUSIONS)

- With the highly publicized success rate of modern cataract surgery serious complications can be visually and psychologically devastating.
- Delayed problems such as CME and RD create disappointment, but immediate complications such as retained lens fragments can precipitate malpractice suits.
- When faced with capsular rupture and posterior lens fragment dislocation fear, frustration or inexperience the surgeon may opt to finish quickly leaving vitreous in the AC incarcerated in the wound.
- Aggressive cataract surgeons may try to fish the lens fragments by infusing saline into the vitreous, some may try posterior assisted levitation (PAL) through the pars plana which can induce RD.
- The surgeon’s immediate goal should be to avoid either overreacting or underreacting, do just as much surgery as indicated but no more.