Phacoemulsification in eyes with compromised CCC:

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Introduction:
Central Curvilinear Capsulorhexis has been one of the greatest inventions in cataract surgery. It has singularly made phacoemulsification a safe procedure and hence contributed to the immense popularity of phacoemulsification as the current gold standard for cataract extraction. CCC provides enormous strength to the anterior capsule and resists tear during surgical manipulations. On the contrary any other form of capsulotomy, like the Can Opener type runs the risk of radial extension of the capsular tears towards the equator of the lens during intra-operative manipulations. Peripheral extension of anterior capsular tear has a great potential of traversing beyond the equator and causing posterior capsular tear. In the absence of an intact CCC the risk of complications during phacoemulsification increase by manifold. The most serious concern would be the potential for nucleus drop. A compromised CCC is more commonly seen in white intumescent cataracts (Argentinian Flag Sign) and hypermature cataracts. A CCC can get damaged intra-operatively as well during surgical maneuvers by the chopper or the phaco tip.
It is critical to identify a compromised CCC at the earliest and to modify the surgical strategies so that more serious complications like posterior capsular tear and dropped nucleus can be prevented.

Surgical strategies in the presence of a compromised CCC.

In the event of a compromised CCC and the presence of a large nucleus or many nuclear fragments, the decision to continue with phaco or to convert to ECCE or Manual SICS has to be taken based on the following considerations:
1. The surgeon's experience
2. The presence of back up team (Vitro Retinal) in the event of a nucleus drop
3. The density of the cataract
4. Co-existing Ocular pathologies

Phaco emulsification in the presence of compromised CCC:
When faced with the situation of performing phacoemulsification in an eye with an incomplete CCC the primary goal is to ensure that the anterior capsular tear does not extend beyond the equator and cause a posterior capsular tear. Each intra-operative maneuver like nucleus rotation, chopping the nucleus, lateral separation of the fragments has the potential to cause equatorial
extension of the anterior capsular tears. Hence it is critical to be very gentle with all the maneuvers.

Certain key strategies to follow:

1. If the CCC has run away radially at one end, the rhesis is re-initiated after a tangential cut using a vanass scissors and completed towards the other side.
2. Hydro dissection needs to be avoided especially if we are dealing with white intumescent cataracts.
3. We need to ensure a stable anterior chamber depth during all stages of the surgery. Intra-operative fluctuation of anterior chamber can easily extend the torn anterior capsule well beyond the equator.
4. Using sufficient quantity of a dispersive OVD (like Viscoat) is very helpful in such situations. Since it resists aspiration easily, it helps to maintain a stable anterior chamber throughout the procedure, reduces the amount of turbulence inside the anterior chamber, protects the corneal endothelium and also can be used beneath nucleus to plug any tear in the posterior capsule.
5. Endocapsular phacoemulsification can performed in most cases if the nucleus is not large and hard. The slow motion technique described by Dr Osher, which utilizes low parameters, can be used to emulsify the nucleus with least turbulence.
6. Supra capsular phacoemulsification of the nucleus can be done by maneuvering the nucleus out of the bag and emulsifying in the iris plane or the anterior chamber. Adequate amount of dispersive OVD is critical to minimize corneal endothelial damage.
7. In the event of a presence of a posterior capsular tear dispersive OVD (Viscoat) is used to plug the defect in the posterior capsule and the nuclear fragments are emulsified in the anterior chamber.
8. In the event of a risk of an impending nucleus drop, it is wise to convert to ECCE or Scleral tunnel Manual SICS. In the presence of a large nucleus / Fragment, the author prefers to convert to Manual SICS by creating a separate superior 6.00 mm scleral tunnel incision 90 degrees to the temporal clear corneal incision. The nucleus is maneuvered out of the capsular bag and extracted out with lens dialer and a vectis under the cover of OVD.