Complications due to Inadvertent Release of Cannula During Phacoemulsification

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Aim: To report the occurrence of intraoperative complications caused by accidental release of either a viscoelastic or hydrodissection cannula.

Methods: This was a retrospective study from 1 January 2004 to 30 December 2009. The records of patients undergoing phacoemulsification during this period were reviewed. The records of patients with complications due to inadvertent release of either a viscoelastic agent cannula or a hydrodissection cannula were reviewed and the data were collected.

Results: Four patients had complications due to inadvertent cannula release during this period. The complications noted were zonular dialysis with vitreous prolapse, hyphaema, posterior capsular rupture with vitreous loss, and nucleus drop with vitreous loss. The final best-corrected visual acuity in 3 patients was 20/30, and 20/40 in the fourth patient due to chronic cystoid oedema.

Conclusion: Complications due to accidental release of the cannula are unfortunate and can be easily avoided by adopting few simple precautions.

Key words: Cannula, Intraoperative complications, Phacoemulsification, Viscoelastic substances

Inadvertent Release of Cannula During Cataract Surgery

6'o clock. This led to zonular dialysis, and vitreous prolapse occurred. Phacoemulsification was converted to extracapsular cataract extraction (ECCE) and anterior vitrectomy was performed. The intraocular lens (IOL) was placed in the bag along with the capsular tension ring.

In patient 2, the tip of the cannula hit the iris in the inferior quadrant, leading to severe intraoperative persistent hyphaema. Intraoperative visibility was compromised and the IOL was inadvertently placed in the sulcus. Postoperatively, IOL decentration was noted resulting in a best-corrected visual acuity (BCVA) of 20/30.

In patient 3 the hydrodissection cannula released during hydrodissection. This led to rupture of the posterior capsule, near to the equatorial region. Phacoemulsification had to be aborted and was converted to ECCE.

Patient 4 had nucleus drop. After hydrodissection, while injecting viscoelastic to ascertain free rotation of the nucleus, the cannula became dislodged and hit the centre of the nucleus. The force of the viscoelastic agent and the cannula was transmitted to the posterior capsule via the nucleus, which ruptured and the nucleus dropped into the vitreous. The patient underwent pars plana vitrectomy and the nucleus was removed. The IOL was placed in the sulcus. Postoperatively, the patient developed chronic macular oedema, which compromised the final BCVA of 20/40.

The details of the 4 patients are shown in Table 1.

**Discussion**

Complications due to inadvertent release of a cannula from the syringe have been reported for both hydrodissection and viscoelastic cannulas. A hydrodissection cannula can be accidentally released during hydrodissection\(^1,2\) or corneal wound hydration.\(^2-4\) The reported complications due to accidental release of a cannula are severe hyphaema,\(^2,6\) posterior capsular rupture,\(^2,3,5\) vitreous haemorrhage,\(^3\) retinal breaks and retinal detachment,\(^5\) subhyaloid haemorrhage,\(^6\) and macular scarring (Table 2). However, to the authors' knowledge, nucleus drop has not been reported as a complication.

The accidental release of a cannula during anterior segment surgery may be attributed to 4 main factors.\(^2\) The first factor is insecure attachment of the cannula to the syringe. The second...
factor is the forceful injection of the agent into the eye. The third factor involves the physical properties of the syringe and intraocular agent injected, in terms of the viscosity of the injected agent, the ratio of the diameter and length of the cannula, and the patency of the cannula. The resistance to flow is directly proportional to the viscosity of the agent injected and length of the cannula and inversely proportional to the diameter of the cannula (Bernoulli’s law). The fourth factor relates to a non-patent or partially patent cannula, which increases the force required to inject the viscoelastic or BSS inside the eye and the tendency for sudden detachment of the cannula.3

These complications can be avoided by following precautions such as using syringes with locks (eg, Luer Lock syringe) while injecting BSS or viscoelastic into the eye. The surgeon should attempt to inject the solution outside the eye to ensure the security of the cannula and its patency. If the surgeon encounters any undue resistance while injecting the solution, then the patency of the cannula should be questioned and it should be replaced. Intraocular injection should be slow and gentle. The assisting staff should tighten the cannula onto the syringe, which should be cross-checked by the operating surgeon. Holding the cannula during intraocular injection will further reduce the risk of inadvertent release of the cannula. The cannula’s tip should point towards the periphery or angle of the anterior chamber and not the posterior pole when filling up the anterior chamber, while the tip should point towards the ciliary processes when filling up the posterior chamber. This helps to avert any sight-threatening complications if accidental release of the cannula does occur.

In conclusion, accidental release of a cannula during anterior segment surgery is a rare avoidable iatrogenic intraoperative complication that may cause serious sight-threatening intraocular injuries and hence adequate preventive measures should be taken.

References