Video Article

A Novel Technique of Rescuing Capsulorhexis Radial Tear-out using a Cystotome

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Abstract

Part 1 : Purpose: To demonstrate a capsulorhexis radial tear out rescue technique using a cystotome on a virtual reality cataract surgery simulator and in a human eye. Part 2 : Method: Steps: When a capsulorhexis begins to veer radially towards the periphery beyond the pupillary margin the following steps should be applied without delay. 2.1) Stop further capsulorhexis manoeuvre and reassess the situation. 2.2) Fill the anterior chamber with ophthalmic viscosurgical device (OVD). We recommend mounting the cystotome to a syringe containing OVD so that the anterior chamber can be reinflated rapidly. 2.3) The capsulorhexis flap is then left unfolded on the lens surface. 2.4) The cystotome tip is tilted horizontally to avoid cutting or puncturing the flap and is engaged on the flap near the leading edge of the tear but not too close to the point of tear. 2.5) Gently push or pull the leading edge of tear opposite to the direction of tear. 2.6) The leading tearing edge will start to do a 'U-Turn'. Maintain the tension on the flap until the tearing edge returns to the desired trajectory. Part 3 : Results: Using our technique, a surgeon can respond instantly to radial tear out without having to change surgical instruments. Changing surgical instruments at this critical stage runs a risk of further radial tear due to sudden shallowing of anterior chamber as a result of forward pressure from the vitreous. Our technique also has the advantage of reducing corneal wound distortion and subsequent anterior chamber collapse. Part 4 : Discussion The EYESI Surgical Simulator is a realistic training platform for surgeons to practice complex capsulorhexis tear-out techniques. Capsulorhexis is the most important and complex part of phacoemulsification and endocapsular intraocular lens implantation procedure. A successful cataract surgery depends on achieving a good capsulorhexis. During capsulorhexis, surgeons may face a challenging situation like a capsulorhexis radial tear-out. A surgeon must learn to tackle the problem promptly without making the situation worse. Some other methods of rescuing the situation have been described using a capsulorhexis forceps. However, we believe our method is quicker, more effective and easier to manipulate as demonstrated on the EYESi surgical simulator and on a human eye. Acknowledgments: List acknowledgements and funding sources. We would like to thank Dr. Wael El Gendy, for video clip. Disclosures: describe potential conflicting interests or state We have nothing to disclose. References: 1. Brian C. Little, Jennifer H. Smith, Mark Packer. J Cataract Refract Surg 2006; 32:1420 1422, Issue-9. 2. Neuhann T. Theorie und Operationstechnik der Kapsulorhexis. Klin Monatsbl Augenheilkd. 1987; 1990: 542-545. 3. Gimbel HV, Neuhann T. Development, advantages and methods of the continuous circular capsulorhexis technique. J Cataract Refract Surg. 1990; 16: 31-37. 4. Gimbel HV, Neuhann T. Continuous curvilinear capsulorhexis. (letter) J Cataract Refract Sur. 1991; 17: 110-111.

Video Link

The video component of this article can be found at http://www.jove.com/video/2317/

Protocol

1. Purpose

To demonstrate a capsulorhexis radial tear out rescue technique using a cystotome on a virtual reality cataract surgery simulator and in a human eye.

2. Method

When a capsulorhexis begins to veer radially towards the periphery beyond the pupillary margin the following steps should be applied without delay.

1. Stop further capsulorhexis manoeuvre and reassess the situation.
2. Fill the anterior chamber with ophthalmic viscosurgical device (OVD). We recommend mounting the cystotome to a syringe containing OVD so that the anterior chamber can be reinflated rapidly.
3. The capsulorhexis flap is then left unfolded on the lens surface.
4. The cystotome tip is tilted horizontally to avoid cutting or puncturing the flap and is engaged on the flap near the leading edge of the tear but not too close to the point of tear.
5. Gently push or pull the leading edge of tear opposite to the direction of tear.
6. The leading tearing edge will start to do a 'U-Turn'. Maintain the tension on the flap until the tearing edge returns to the desired trajectory.

3. Results

Using our technique, a surgeon can respond instantly to radial tear out without having to change surgical instruments. Changing surgical instruments at this critical stage runs a risk of further radial tear due to sudden shallowing of anterior chamber as a result of forward pressure from the vitreous. Our technique also has the advantage of reducing corneal wound distortion and subsequent anterior chamber collapse.

Discussion

The EYESI Surgical Simulator is a realistic training platform for surgeons to practice complex capsulorhexis tear-out techniques. Capsulorhexis is the most important and complex part of phacoemulsification and endocapsular intraocular lens implantation procedure. A successful cataract surgery depends on achieving a good capsulorhexis. During capsulorhexis, surgeons may face a challenging situation like a capsulorhexis radial tear-out. A surgeon must learn to tackle the problem promptly without making the situation worse. Some other methods of rescuing the situation have been described using a capsulorhexis forceps. However, we believe our method is quicker, more effective and easier to manipulate as demonstrated on the EYESi surgical simulator and on a human eye.

Disclosures

No conflicts of interest declared.

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