CANALOPLASTY

PROMISING SURGICAL MANAGEMENT OF GLAUCOMA

ESSAY

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Thank you

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LIST OF ABBREVIATIONS

AC	**anterior chamber**
BCVA	**best-corrected visual acuity**
CA	**carbonic anhydrase**
CC	**collector channel**
CIGTS	**Collaborative Initial Glaucoma Treatment Study**
CV	**coefficient of variation**
DM	**Descemet's membrane**
DMD	**Descemet membrane detachment**
FD-OCT	**Fourier-domain optical coherence tomography**
ICC	**intraclass correlation coefficient**
IOP	**Intra ocular pressure**
MD	**mean deviation**
MHC	**major-histocompatibility-complex**
Nd:YAG	**neodymium:yttrium-aluminum-garnet**
OVD	**ophthalmic viscosurgical device**
p	**p value**
POAG	**primary open-angle glaucoma**

SD	**Standard deviation**
SC	**Schlemm's canal**
SD-OCT	**spectral-domain optical coherence tomography**
(Na+/ K+ ATPase)	**sodium-potassium-activated adenosine triphosphatase**
TM	**trabecular meshwork**
UBM	**ultrasound biomicroscopy**
VA	**visual acuity**
WDR36	**T-cell activation WD repeat-containing protein**

INTRODUCTION

Open angle glaucoma is a disease which results in optic nerve damage with subsequent visual field loss due to ineffective drainage of aqueous humor through the eye's natural aqueous outflow channels. ***(Jones et al., 2005)***

Open angle glaucoma is typically treated first with topical drops followed by surgical intervention if there is no response. The gold standard for the surgical treatment of glaucoma has historically been trabeculectomy with the use of antifibrotic agents. The trabeculectomy procedure serves to create a bypass route for the aqueous humor to drain out the eye and into a subconjunctival vascular network. despite, trabeculectomy procedure can effectively lower the intraocular pressure (IOP), it is associated with the risk of intra operative and post operative complications. ***(Borisuth et al., 2011)***

Post surgical hypotony and a lifetime risk of blebitis are two of the most serious postoperative complications after a trabeculectomy procedure which opened the door widely for a new surgical technique which can avoid these complications. ***(Jampel et al., 2005)***

Increasing interest in blebless surgery has led to innovative surgical procedures aimed at rejuvenating the natural trabeculo canalicular outflow pathway and to avoid shunting aqueous to a

non physiological drainage site. Circumferential catheterization with suture tensioning of Schlemm's canal has emerged as a safe and effective way to surgically treat open angle glaucoma that is less likely to result in postoperative hypotony. ***(Anand et al., 2006)***

Typically, a fornix based conjunctival incision is created to allow for a superficial scleral flap followed by a deeper inner scleral flap to attain access to Schlemm's canal. The first flap is approximately 50% thick and the subsequent deeper flap is fashioned to expose and unroof Schlemm's canal. The canal's ostia are then viscodilated to allow for insertion of the micro catheter. The lighted tip allows for the surgeon to visualize the cannulation of Schlemm's canal for 360 degrees while the injector allows for simultaneous injection of viscoelastic every two clock hours as the catheter is advanced. After complete circumferential catheterization of the canal the distal tip of the catheter emerges at the scleral cut down at which point a 10-0 polypropylene suture is tied to the tip. The micro catheter is then retracted pulling the suture in the canal. The suture is then cut away from the micro catheter and seated against the inner wall of Schlemm's canal and tied in a loop. Tension is then placed on the suture to maintain an inward radial force on the trabecular meshwork. High-resolution ultrasound biomicroscopy is then utilized to visualize the amount of distention placed on trabecular meshwork in order to assess suture tensioning. Once adequate tension is obtained, the suture is

secured with locking knots. The descemetic window which was partially created while fashioning the deep scleral flap is now enlarged anteriorly. The deep scleral flap is then excised and the superficial flap is sutured watertight to limit bleb formation. The conjunctiva is then re approximated to limbus. ***(Godfrey et al., 2009)***

Canaloplasty with suture tensioning of Schlemm's canal is a minimally invasive way to surgically treat open angle glaucoma. Further, this procedure results in lower intraocular pressure (IOP) without the formation of a conjunctival bleb. ***(Gedde et al., 2007)***

However, canaloplasty is not without limitations. The surgery is technically challenging and there is definitely a steep learning curve. In addition, not all patients with glaucoma are surgical candidates for canaloplasty. The procedure is contraindicated in eyes with angle recession, neovascular glaucoma, chronic angle closure, narrow angle glaucoma, and patients with previous ocular surgery that would prevent circumferential catheterization of Schlemm's canal. ***(Feiner and Piltz-Seymour, 2013)***

Finally; canaloplasty with suture tensioning of Schlemm's canal appears to offer the glaucoma specialist a surgically effective way to treat open angle glaucoma by restoring the natural outflow pathway of the eye without the formation of a bleb or the complications associated with trabeculectomy. Therefore,

canaloplasty seems to be a viable surgical option in patients with early open angle glaucoma and promising filtering surgery for more severe stages of the disease. ***(Musch et al., 2009)***

Aim of the work

The aim of this work is to evaluate canaloplasty operation as a new surgical management of open angle glaucoma compared with subscleral trabeculectomy regarding effectiveness, rate of complications, as a combined surgery with phacoemulsification and learning curve considering skills acquainting with the technique.