

OUR EXPERIENCE WITH 25 GAUGE TRANSCONJUNCTIVAL SUTURELESS VITREORETINAL SURGERY

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SUMMARY – The discovery of the 25 gauge minimally invasive vitreoretinal surgery (Fujii *et al.*) has made possible to perform surgical procedures through small openings in conjunctiva and sclera of no more than 0.55 mm. Today, the procedure becomes ever more popular due to a reduced surgical trauma and faster postoperative recovery. The purpose of this report is to present first cases of minimally invasive transconjunctival sutureless 25 gauge vitreoretinal surgery (25 G TSV) in Croatia and to evaluate advantages of this new procedure. A case series of four patients (eyes) with posterior segment disease are presented. The new technique consisted of transconjunctival insertion of a small diameter cannula (0.5 mm) through sclera after conjunctival displacement. An Accurus 800 basic vitrectomy unit with 25 gauge Alcon system was used. Median postoperative Snellen visual acuity was 0.6 and mean postoperative intraocular pressure 14 mm Hg. Mean total vitrectomy time was 15 minutes. The mean postoperative follow up was 3 months. Intraoperatively, two conjunctival hemorrhages were noted at entry sites. Postoperative complications included retinal rupture without detachment in one eye. According to our initial experience, 25 gauge sutureless vitrectomy is a good choice for selected patients. Postoperative time is reduced and surgical trauma minimal with no signs of inflammation after two weeks.

Key words: *vitrectomy, transconjunctival, pars plana*

Introduction

Basic instruments that we use for pars plana vitrectomy today were introduced 15 years ago, and first attempts at sutureless vitreoretinal surgery were described 10 years ago¹⁻³. There is a tendency towards smaller incisions in every invasive surgical method. The best example in ophthalmology is cataract surgery where smaller sutureless corneal incisions fasten recovery time. The discovery of 25 gauge minimally invasive vitreoretinal surgery enables to perform procedures on the posterior eye segment with minimal tissue destruction and postoperative inflammation^{4,5}. Through scleral incisions of only 0.55 mm different instruments are introduced. At the end of the surgical procedure there is no need of

sutures. The advantages of this procedure are less inflammation and better comfort for the patient. Inclusion criteria for this type of surgery are vitreal hemorrhages and opacities with retained lens fragments. The purpose of this paper is to report on the first cases of minimally invasive transconjunctival 25 gauge vitreoretinal surgery (25 G TSV) in Croatia and our results achieved with the new method.

Patients and Methods

Four patients (eyes) underwent 25 G TSV under local anesthesia at University Department of Ophthalmology, Rijeka University Hospital Center in Rijeka, in the period from November 2005 to March 2006. This was a retrospective review of single cases at one center. Previous vitrectomies in those patients were not done. An Accurus 800 25 G transconjunctival system for vitrectomy (Alcon) was used in all cases. Surgical indication was

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Received January 30, 2007, accepted March 26, 2007

diabetic vitreous hemorrhage and vitreal opacities with retained lens fragments in two eyes each (Table 1). Eyes with additional vitreoretinal pathology were excluded. Patient age, sex, preoperative and postoperative Snellen visual acuity, intraocular pressure, signs of inflammation, total vitrectomy time and complications were analyzed. Patients with vitreous hemorrhage underwent additional ultrasonography examination to exclude the possible additional retinal pathology. Lens status was analyzed on a biomicroscope. Inclusion criteria included follow up of at least 1 month. Exclusion criteria included any history of previous eye surgery, signs of proliferative vitreoretinopathy and anterior segment disease that may affect visualization. Transconjunctival surgery with the previously described techniques was used^{4,5}. 25 G TSV cannulas were introduced 3.5 mm from corneal limbus with the support of a special trocar. Conjunctiva was displaced to the side at the time of introduction. Inferotemporal cannula was the infusion site and superotemporal and nasal cannulas were used for instrument introduction. Core vitrectomy was done for vitreous hemorrhage and opacities and careful fragmentation for retained lens material. After completing vitrectomy procedure and peripheral retinal examination with scleral indentation the cannulas were withdrawn. After conjunctival massage with cotton tip scleral incision sites were inspected for possible leakage. At the end of the procedure subconjunctival antibiotic and steroid were given. Patients were evaluated on the first postoperative day and then at one and every 4 weeks.

Table 1. Indications for 25 gauge vitrectomy

Indication	N
Vitreous hemorrhage	2
Vitreous opacities	1
Retained lens fragments	1

Results

Four patients, two male and two female, mean age 58 (range 40-75) years, underwent 25 G TSV procedure. The mean postoperative follow up was 3 (range 1-5) months. Median preoperative visual acuity was 2/60 (HM to 0.1). All eyes were phakic. On the last visit median postoperative visual acuity was significantly improved to 0.6 (0.1 to 0.9). Mean preoperative intraocular pressure was 17 mm Hg (14-19 mmHg). Mean post-

operative intraocular pressure was 14 mm Hg (10-20 mm Hg). Two cases of conjunctival hemorrhages at entry sites were noted as intraoperative complications. One case of new retinal rupture two weeks after the surgery was photocoagulated with argon laser. Two patients had significant cortical cataract progression after surgery. The mean total vitrectomy time was 15 minutes. Small incisions required no suturing and intraocular pressure was stable during the postoperative follow up period. No signs of inflammation, retinal detachment and endophthalmitis were noted.

Discussion

25 G TSV is characterized by incision that is half size of the classic one (0.55 *versus* 1.1 mm). This incision requires no suturing. Total operating time is shortened and there is less eye trauma and inflammation. Patient recovery is better and faster. Before the introduction of 25 TSV sutureless 20 G vitrectomy with the help of scleral tunnel incisions (1, 7 and 8) were performed. This method was not widely accepted because of a large number of complications.

25 G TSV consists of a system with microcannulas, infusion cannula, trocar, cannula forceps and plugs. Vitrectomy and other instruments and fiberoptic light pipe must be adjusted to fit the diameter of 0.5 mm. Microcannulas have polyamide sharp edges and interior diameter of 0.5 mm. The trocar for cannulas helps introduce cannulas through the conjunctiva and sclera. Infusion line is easy to fix with no sutures. For our first cases we selected patients with less complex vitreoretinal pathology. As the result these cases have better potential for good postoperative anatomic and functional results. Anatomic results with this type of surgery can be compared with expectations after classic 20 G vitreoretinal surgery⁹. Cataract progression after 25 G TSV in our group was smaller than after 20 G vitrectomy⁹⁻¹¹, but our mean postoperative follow up was limited to 3 months. Subconjunctival hemorrhage as intraoperative complication was noticed in two cases with no impact on visual acuity. Initially, the lack of experience with trocar insertion was the possible cause of this complication. On slit lamp examination taken two weeks of the surgery, no signs of intraocular inflammation were noticed and less traumatic external appearance was observed. The only postoperative complication was a single case of retinal rupture. Complications such as endophthalmitis, postoperative hypotonia, retinal and vitreal

incarcerations could be objectively evaluated because of the small number of eyes.

This new method has some disadvantages. Small and flexible instruments are limiting eye movements and positioning during the surgical procedure. Vitreous base is not easy accessible for complete vitrectomy, and light sources are weak because of small diameter. Irrigation and aspiration volume is six times less than in 20 G vitrectomy⁶. There is a problem with silicone oil and perfluorocarbon liquids use through 0.5 mm diameter in case of necessity.

Conclusion

Sutureless transconjunctival pars plana vitrectomy with the use of 25 gauge instruments can be the method of choice for less complicated vitreoretinal disorders. Surgical procedures that require minimal eye manipulations are ideal for this type of vitrectomy. Total operating time is shortened and postoperative recovery is fastened.

References

1. CHEN JC. Sutureless pars plana vitrectomy through self-sealing incisions. *Arch Ophthalmol* 1996;114:1273-5.
2. MILBAKT, SUVEGES I. Complications of sutureless pars plana vitrectomy through self-sealing sclerotomies. *Arch Ophthalmol* 1998;116:119.
3. KWOK AK, THAM CC, LAM DS. Modified sutureless sclerotomies in pars plana vitrectomy. *Am J Ophthalmol* 1999;127:731-3.
4. FUJII GY, De JUAN E Jr, HUMAYUN MS. A new 25 G instrument system for transconjunctival sutureless vitrectomy surgery. *Ophthalmology* 2002;109:1807-12.
5. FUJI GY, De JUAN E Jr, HUMAYUN MS. Initial experience using the transconjunctival sutureless vitrectomy system for vitreoretinal surgery. *Ophthalmology* 2002;109:1814-20.
6. LAKHANPAL RR, HUMAYUN MS, De JUAN E Jr. Outcomes of 140 consecutive cases of 25 G transconjunctival surgery for posterior segment disease. *Ophthalmology* 2005;112: 817-24.
7. LAM DS, CHUA JK, LEUNG AT. Sutureless pars plana anterior vitrectomy through self sealing sclerotomies in children. *Arch Ophthalmol* 2000;118:850-1.
8. JACKSON T. Modified sutureless sclerotomies in pars plana vitrectomy. *Am J Ophthalmol* 2000;129:116-7.
9. CHUNG CP, HSU SY, WU WC. Cataract formation after pars plana vitrectomy. *Kaohsiung J Med Sci* 2001;17:84-9.
10. MELBERG NS, THOMAS MA. Nuclear sclerotic cataract after vitrectomy in patients younger than 50 years of age. *Ophthalmology* 1995;102:1466-71.
11. CHENG L, AZEN SP, El-BRADEY MH. Duration of vitrectomy and postoperative cataract in the vitrectomy for macular hole surgery. *Am J Ophthalmol* 2001;132:881-7.

Sažetak

NAŠA ISKUSTVA S 25 G TRANSKONJUNKTIVALNOM BEŠAVNOM VITREKTOMIJOM

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S otkrićem 25 G minimalno invazivne vitreoretinalne kirurgije (Fujii i sur.) omogućeno je izvođenje zahvata na stražnjem segmentu oka kroz spojnicu i rezove na bjeloočnici od 0,55 mm. Prednosti ove operacije su manja upalna reakcija, veći komfor za bolesnika te skraćeno vrijeme zahvata. Cilj rada je prikazati prve slučajeve transkonjunktivalne 25 G bešavne vitrektomije (25 G TSV) u Hrvatskoj te vrednovati prednosti ove metode. Daje se prikaz četvero bolesnika s bolestima stražnjega očnog segmenta koji su podvrgnuti pars plana vitrektomiji sustavom 25 G Accurus 800 (Alcon). Nova tehnika se sastoji od transkonjunktivalnog i skleralnog postavljanja kanila malog promjera (0,5) mm. Srednja poslijeoperacijska vidna oštrina po Snellenu je bila 0,6, poslijeoperacijski očni tlak 14 mm Hg, a srednje vrijeme trajanja vitrektomije 15 min. Poslijeoperacijsko praćenje bilo je 3 mjeseca. Intraoperacijski su zabilježena dva konjunktivalna krvarenja. Poslijeoperacijske komplikacije uključivale su rupturu mrežnice bez odignuća. Zaključuje se kako je 25 G vitreoretinalna operacija dobar izbor za manje složene slučajeve poremećaja staklovine i mrežnice, jer pojednostavljuje tijek operacijskog zahvata uz ubrzan oporavak bolesnika.

Ključne riječi: *transkonjunktivalna vitrektomija, pars plana*

