Original Research Article

Outcomes of Sutured 20-Gauge Transconjunctival Vitrectomy.

Short Title: 20-G Transconjunctival Vitrectomy.

Abstract

Background: Several investigators tried to modify the technique of 20-gauge vitrectomy to preserve the conjunctiva aiming to decrease surgical trauma and time.

Aim: To was to evaluate the efficacy and safety of 20-gauge trans-conjunctival vitrectomy for various surgical indications.

Setting & Design: A a retrospective review of an interventional case series.

Methods: This study included 59 eyes of 58 patients who underwent 20-gauge transconjunctival vitrectomy for variable surgical indications using trocar system with suturing of the sclerotomies at the end of surgery. Postoperative follow up records were reviewed and data collected included best corrected visual acuity (BCVA), intraocular pressure, intraoperative and postoperative complications for 6 months of follow up.

Results: The most common intraoperative complication was slippage of the cannula, occurred in 8 cases (14%); followed by

trauma to the lens, seen in 4 cases (7%) and lastly retina incarcerated in the cannula in only 2 cases (3.5%). The post-operative IOP was high in only 6 cases (10%). The most common postoperative complication was inferior RD; seen in 12 (21%)cases (21%), followed by vitreous hemorrhage; seen in 4 (7%) cases (7%) and lastly ERM seen in only 2 (3%)cases (3%).

Conclusion: The 20-gauge transconjunctival vitrectomy technique seems to be effective procedure with acceptable results with the use of conventional 20-G instruments and less cost.

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Keywords: 20-Gauge, Transconjunctival, Vitrectomy.

Introduction:

In During the last two decades of the 20th century, the 20-guage gouge pars plana vitrectomy (20-G PPV) surgery was the golden standard for management of vitreoretinal surgical pathologydisorders. Several investigators tried to modify the technique of 20-G PPV to preserve the conjunctiva aiming to decrease surgical trauma and time. In 1996, chen et al. introduced the use of 20-G through a self-sealing scleral pocket aiming to avoid the use of sutures and better control of intraoperative ocular pressure (1).

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Conjunctival diathermy with two step sclerotomies (oblique and then perpendicular) was described by Gotzaridis et al, but they did not utilize trocar system (2).

Lafeta et al. described the use of 20-G trocar system utilizing the principles of micro-incision transconjunctival sutureless vitrectomy (TSV). The trocars allowed rapid access for the instruments and contained valves to control the fluid flow during surgery. The sclerotomies were tunneled and did not require sutures at the end of surgery. By this technique, the same instruments of conventional 20-G PPV can be used with some of the benefits of TSV (3).

The cost of vitrectomy surgery is an important issue in most of health care centers. The microincision TSV cost was calculated to be 3.4 times higher than that of sutured 20-G PPV (4).

The aim of this study was to evaluate the efficacy and safety of 20-gauge trans-conjunctival vitrectomy for various surgical indications.

Patients and Methods

This study was **is** a retrospective review of interventional uncontrolled case series. We retrospectively reviewed a consecutive series of 59 eyes of 58 patients who underwent 20-gauge transconjunctival vitrectomy, from September 2013 to May 2014. Patients were considered eligible for this study if they underwent primary vitrectomy by 20-G transconjunctival trocar system, with a minimum follow-up period of 6 months. The surgical indication was defined as the dominant cause of visual loss. Any case with previous vitrectomy in the studied eye or follow up period less than 6 months was excluded from the study.

Institutional review board approval and complete informed consent was obtained for all patients. Patients medical records

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were reviewed, and the collected data included preoperative data, surgical details and postoperative follow up data.

The collected preoperative data included; Patient age, gender, complaint and previous ocular surgery. Data recorded from the preoperative ophthalmic examination of the studied eye included; Preoperative best corrected visual acuity (BCVA), intraocular pressure (IOP), slit lamp examination of the anterior segment, fundus examination by indirect ophthalmoscope and slit lamp biomicroscopy with reference of the indication for surgery.

All patients underwent local monitored anaesthesia care and received retrobulbar anaesthesia.

The periocular skin was prepared with 10% povidone iodine solution. The conjunctival sac was irrigated by 5% povidone iodine solution, and then irrigated by balanced salt solution (BSS). The eye was prepared and draped in a standard fashion, and a lid speculum was placed.

All operations were performed by the same surgeon using DORC (Dutch Ophthalmic Research Center, Scheijdelveweg, Netherlands) two step vitrectomy cannula System **(Dutch Ophthalmic Research Center, Scheijdelveweg, Netherlands)** and Geuder™ Megatron S4 phacoemulsifier and vitrectomy system (Geuder Ltd, Germany). The procedure is initiated using a 20-gauge microvitreoretinal (MVR) blade at a vertical angle through the conjunctiva, sclera and pars plana 3.5 mm from the corneo-scleral limbus to create a scleral tunnel incisions.

The trocars were then inserted through the conjunctival incision and into the scleral tunnel using the inserter. Three trocars

were inserted in the inferotemporal, superotemporal and superonasal quadrants. The infusion cannula was connected to the inferotemporal microcannula (which was the first to be inserted) and the infusion fluid was turned off till the beginning of vitrectomy procedure.

A cut rate of 1500 cuts/min and a vacuum level of 600 mmHg were used during vitrectomy. By 20-G vitreous cutter all vitreous was removed, starting by core vitrectomy and then separation and removal of the posterior hyaloid (if not already separated). Intravitreal injection of suspension triamcinolone acetonide (Kenacort) was injected for better visualization and complete removal of posterior cortical vitreous. Transvitreal diathermy was used to coagulate bleeding vessels. Peripheral shaving of vitreous base was then performed with indentation. The peripheral retina was checked at the same time for breaks or fibrovascular tissue. Endolaser was used with indentation for panretinal photocoagulation (PRP) and photocoagulation around retinal breaks, either iatrogenic, detected during peripheral internal search or in cases with tractional rhegmatogenous RD. Fluid-air exchange with or without silicone oil injection were done according to the case.

At the end of surgery the trocars were simply removed from the scleral tunnels and the conjunctiva and sclera were sutured by 7/0 Vicryle sutures. The infusion cannula was the last to be removed to maintain stability of the globe. Topical antibiotic ointment(what is the name of the antibiotic?) was administered, and the eye was patched and shielded. Any intraoperative complications and the methods of its management were recorded.

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Postoperative follow up records were reviewed and data collected included follow up data of the 1st and 5th postoperative days after surgery. Then, at least at 1, 3 and 6 months postoperatively. Each time the following data was recorded: BCVA (only at 1, 3 and 6 months postoperatively), IOP and a description of the slit-lamp biomicroscopy of the anterior segment and fundus examination with recording of any detected complications.

Statistical analysis

Data was analyzed using STATA intercooled version 12.1. Quantitative data was represented as mean, standard deviation, median and range. Data was analyzed using ANOVA for comparison of the means of three groups or more. Qualitative data was presented as number and percentage and compared using either Chi square test. Graphs were produced by using Excel program. P value was considered significant if it was less than 0.05.

Results

1) Preoperative Data

This study included 59 eyes of 58 patients with mean age ± standard deviation (SD) of 54±11 years, and a range from 25years-70years. **25 up to 70 years**. The male to female ratio was **nearly** 2:1. Table 1 summarizes the preoperative visual acuity and IOP.

2) Intraoperative complications

Table 2 summarizes the intraoperative complications which can be attributed to the 20-G transconjunctival trocar system. More than 75% of our cases did not develop any intraoperative complications. Complications occurred only in 14 cases; of these, the most common complication was slippage of the cannula, occurred in 8 cases (14%); followed by trauma to the lens, seen in 4 cases (7%) and lastly retina incarcerated in the cannula in only 2 cases (3.5%).

3) Postoperative IOP and complications

The post-operative IOP was normal in around 90% of cases, and high in only 6 cases (10%). The postoperative complications were seen in 18 cases (31%) of our cases. The most common postoperative complication was inferior RD; seen in 12 cases (21%), followed by vitreous hemorrhage; seen in 4 cases (7%) and lastly ERM seen in only 2 cases (3%). These results are summarized in Table 3.

4) Postoperative visual acuity

Postoperative visual acuity improved steadily from the first day to the first month, but then decreased mildly in the following follow up period. Table 4 showed significant improvement of visual acuity after operation compared to the preoperative visual acuity.

Discussion

With the development of the smaller gauge transconjunctival vitrectomies (25, 23 and 27-gauge), the interest in the 20-G PPV is

decreasing. But, these new techniques have its own financial limitations regarding the cost of instruments when compared with standard 20-gauge PPV (3). This is an important issue in some vitreoretinal centers where there is no enough financial support to shift from 20-G PPV to small gauge PPV. For this reason we decided to do this study in our center to get some of the benefits of the transconjunctival PPV (i.e. decreased surgical time, less surgical trauma to the conjunctiva and better control of IOP during surgery) using the same conventional 20-G instruments with the trocar system.

Suturless vitrectomies carry an increased risk of leakage from the sclerotomy site. Such excessive leakage can raise the risk of infection and hypotony (5). So, in our study we used 20-G transconjunctival trocar system with suturing of the conjunctiva and sclera by one suture for each sclerotomy to avoid the risk of leakage and its complications.

In our study more than 75% of cases did not develop any intraoperative complications. Complications occurred only in 14 cases; of these, the most common complication was slippage of the cannula, occurred in 8 cases (14%); followed by trauma to the lens, seen in 4 cases (7%) and lastly retina incarcerated in the cannula in only 2 cases (3.5%).

This was similar to study done by Spierer et al., as in their study intraoperative complications included premature dislodging of the cannulas in two sclerotomies. The cannulas were reinserted with a trocar through the same opening without any additional complications (6).

Retinal incarceration in the trocar system was reported in our study (2 cases) and can be attributed to the malfunction of the trocar valve leading to rapid flow of fluids through the trocar at the time of instruments exchange. As we were re-sterilizing the trocar system several times by flash autoclave, the valve system became loose and not effective. So, we concluded from this point that re-sterilized trocar should not be used if the valves are loose.

In our study, the postoperative IOP was normal in around 90% of cases, and high in only 6 cases (10%). We did not report any case of hypotony at any point of the follow up period, even in the 1st postoperative day. Similar results were reported by Mohamed et al, who evaluated the results of 20-G TSV with air-filled and silicone-filled eyes and did not report any case of hypotony in the postoperative follow up period (7). Gotzaridis reported hypotony in some cases of sutureless 20-G TCV on the 1st postoperative day (2). Stanescu-Segall et al. reported the results of 181 series of 20-G TSV in which 7 eyes (1.32%) had hypotony on the 1st postoperative day which were normalized by postoperative day 7 (8). Hypotony was not reported in our cases because all sclerotomies were sutured.

We found that the postoperative complications in our cases were seen in 18 cases (31%). The most common postoperative complication was inferior RD; seen in 12 cases (21%), followed by vitreous hemorrhage; seen in 4 cases (7%) and lastly ERM seen in only 2 cases (3%). All these complications can't be attributed to the transconjunctival trocar system and mostly related to the underling pathology.

In this study we found that postoperative visual acuity improved steadily from the first day to the first month, but then decreased mildly in the following follow up period. There was significant improvement of visual acuity after operation compared to the preoperative visual acuity.

The study of Lee et al. reported favorable functional results, as the mean visual acuity increased from 0.71 logMAR preoperatively to 0.37 logMAR postoperatively. This increase was statistically significant (9) . Spierer et al and Dassie-Ajdid et al have also found that the mean visual acuity increases after the operation in a statistically significant way (6,10).

The 20-gauge transconjunctival vitrectomy technique seems to be effective procedure with acceptable results. This technique carries some of the advantages of the micro-incision TSV with the use of conventional 20-G instruments and less cost.

Why is your conclusion

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Table 1. Preoperative data of studied population

Variable	Summary statistics
Visual acuity	
1\60	14 (24.14%)
2\60	2 (3.45%)
Hand motion	42 (72.41%)
I.O.P.	
Normal	42 (72.41%)
Low	4 (6.90%)
High	12 (20.69%)

Table 2. Intraoperative complications of studied population

Intraoperative complications	Incidence
Non	44 (75.86%)
Slippage of the cannula	8 (13.79%)
Retina incarcerated in the cannula	2 (3.45%)
Trauma to the lens	4 (6.9%)

Table 3. Postoperative data of studied population

Postoperative data	Statistics
I.O.P.	
Normal	52 (89.66%)
High	6 (10.34%)
Fundus examination	

Retina on	40 (68.97%)
Inferior RD	12 (20.69%)
Vitreous hemorrhage	4 (6.90%)
CME with ERM	2 (3.45%)

Table 4. Relation between preoperative and last recorded postoperative visual acuity

Preoperative Visual Acuity	Last recorded postoperative visual acuity						
	1\60	2\60	3\60	6\60	Hand motion	Total	P value
1\60	6 (42.86%)	0	6 (42.86%)	2 (14.29%)	0	14 (100%)	0.01
2\60	0	2 (100%)	0	0	0	2 (100%)	
Hand motion	14 (33.33%)	10 (23.81%)	6 (14.29%)	2 (4.76%)	10 (23.81%)	42 (100%)	
Total	20 (34.48%)	12 (20.69%)	12 (20.69%)	4 (6.90%)	10 (17.24%)	58 (100%)	