Combined 20 G with 23 G Transconjunctival Vitrectomy For Complicated Vitreoretinal Cases

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Abstract: Purpose: Suturless posterior segment surgery has the advantages of faster wound healing, minimal surgical trauma, and reduced postoperative astigmatism; however, it is still difficult to deal with cases of advanced PVR where peripheral vitreous dissection and silicone oil injection are needed. We combined 23 – gauge and 20 – gauge vitrectomy to improve the outcome of vitreoretinal surgery. **Settings**: Accurus 800 (Alcon) vitrectomy machine, Alcon disposable 23- G trocar and cannula set, normal 20- G vitrectomy surgical set. **Patients and Methods**: The study included 20 cases of combined 20 and 23 G pars plana vitrectomies. The indications for surgery included proliferative vitreoretinopathy (PVR) grade C and proliferative diabetic retinopathy (PDR) with tractional retinal detachment. Eyes being injected with silicone oil had 1000 cs silicone oil injected manually through the 20 G port. At the end of the surgery, the single 20 G opening was sutured with 7-0 vicryl. **Results:** 20 Cases were operated upon, 10 had PVR grade C, and 10 had PDR with tractional retinal detachment. 7 cases with PVR needed single operation while the other 3 cases needed second interference. 8 Cases with PDR with tractional retinal detachment needed single operation and the other 2 cases needed re-interference. **Conclusion:** Combination of 20-G with 23-G vitrectomy appears to be an efficient technique in dealing with complicated vitreoretinal cases. Besides, being viable from the economical point of view.

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1. Introduction

The 23 – gauge (23-G) suturless vitrectomy technique is becoming increasingly popular because of the decreased surgical trauma, faster wound healing and improved postoperative comfort associated with this technique (1-5). Small gauge suturless vitrectomy offer several advantages over 20-gauge vitrectomy, including improved operative efficiency, faster visual rehabilitation, decreased convalescence period reduced postoperative astigmatism, reduced operative time and finer instrumentation for working close to retinal surface (6,7).

Still yet, the access to using instruments with 20 G vitrectomy is faster in gel removal, more efficient in peripheral vitreous dissection and easier in silicone oil injection (6,7).

In this study, a combined 20 G and 23 G transconjunctival vitrectomy was performed on complicated cases undergoing proliferative vitreoretinopathy (Grade C) and proliferative diabetic retinopathy with tractional retinal detachment.

2. Patients and Methods:

After obtaining the approval of Ethical Committee in the Research Institute of Ophthalmology, all patients were given detailed explanations of the procedure and its potential benefits and risks and an informed consent was obtained from them.

The prospective study was conducted on 20 eyes of 20 patients allocated in two groups, 10 patients in each group.

Group I (PVR group) included 10 patients with PVR, Grade C; group II (PDR group) included 10 patients with PDR with tractional retinal detachment. All surgeries were performed with an Accurus 800 (Alcon) vitrectomy machine and Alcon disposable 23-G trocar and cannula set. All surgeries were performed by a single surgeon between January 2010 and July 2010. Each patient had a complete preoperative ophthalmic examination which included measurement of best corrected visual acuity (BCVA), slit–lamp examination, intraocular pressure (IOP) measurement and fundus examination

Exclusion criteria included: patients with significant cataract which required combined surgery, glaucoma patients and those with corneal disorders.

Surgical Technique

All patients received preoperative sedation and local anesthesia consisting of a peribulbar injection of 10 ml of a 80: 20 mixture of O.5% bupivacaine and 2% lidocaine 100 units of hyaluronidase was added to the mixture.

Two 23-G transconjunctival sclerotomy ports were created for infusion and illumination (Alcon laboratories Inc, Fort Worth, TX, USA), and a third 20 G sclerotomy port was created for introducing the vitrectomy probe. For the 23- G opening, the

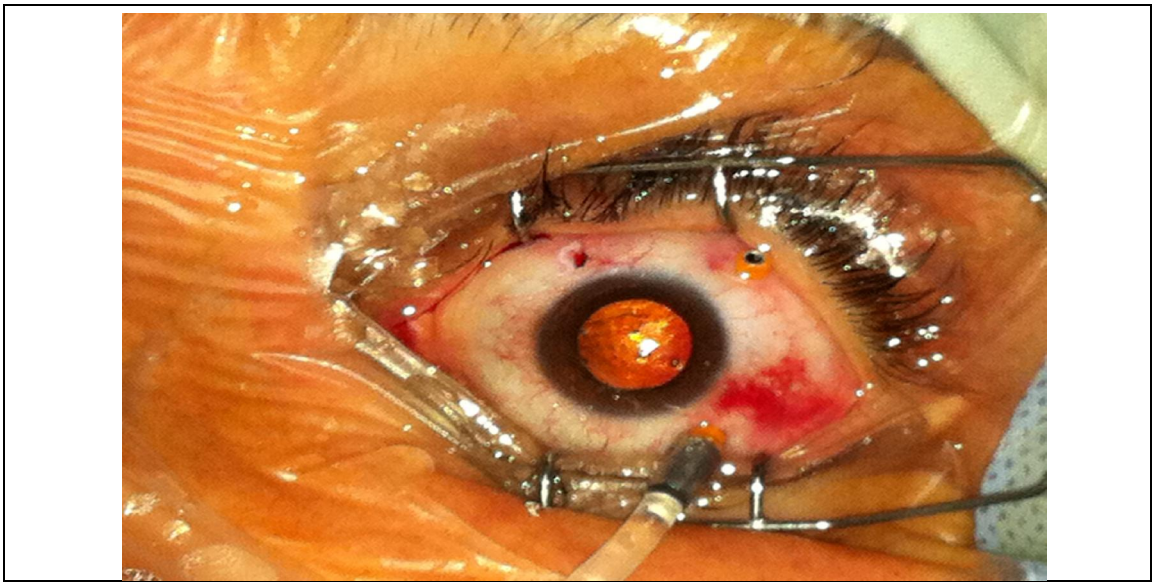
conjunctiva was displaced by approximately 1-3mm with a pressure plate. A 23-G trocar– cannula was first inserted through the conjunctiva and sclera, parallel and 3.5 mm posterior to the limbus, and then at an angle of approximately 5^{o} until it just passed the end of the bevel. At that point, the handle was raised slightly to an angle of approximately 30^{o} and the cannula was then inserted into The hub. The trocar was removed while the cannula was stabilized with forceps. Another similar port was made for the illumination probe. The third port was created via a localized periotomy and sclerotomy with a 20-G microvitreoretinal blade. Infusion bottle height during surgery was 60 cms to avoid hypotony and the suction settings were from 80-100 mm Hg. **(Fig.1)**

Eyes being injected with silicone oil had 1000 cs silicone oil injected manually through the 20-G port. At the end of the surgery, the IOP was fine tuned through injection of silicone oil through 23-G infusion cannula and the single 20 opening was sutured with 7-0 vicryl, the overlying conjunctiva was closed by bipolar cauterization. Complete ophthalmic examinations including BCVA measurement, slit- lamp examination, tonometry and fundus examination were performed one day, one week, one month, three months, and six months after the operation.

3. Results:

The above surgical procedure was performed on 20 eyes of 20 patients in the 2 groups.Demographic data showed no statistical significance between the 2 groups (Table 1). The preoperative and postoperative data are summarized in (Tables 2, 3).

The ten patients in group I (PVR, Grade C), underwent parsplana vitrectomy using the combined 20-G and 23-G technique, where 8 patients out of the 10 needed the usage of 20-G vitreoretinal forceps to remove the star folds and epiretinal membranes. Two patients out of the ten needed the usage of curved 20-G scissor to perform relaxing retinotomies to overcome the problem of shortened retinae.



(Fig.1) Showing the combined technique: two openings for the 23 gauge and the 20 gauge opening which is closed by a stitch.

Table 1: Demographic data. Values are mean (SD)

	Group I PVR Grade C	**Group II PDR with retinal detachment**
Sex (M/F)	**7/3**	**2/8**
Age (years)	**48 (4.8)**	**52(5.3)**

Table 2: The measurement of Best Corrected Visual Acuity (BCVA) in both groups throughout the time of the study.

Patient number	Preoperative BCVA	Postop BCVA (1day)	Postop BCVA (1week)	Postop BCVA (1month)	Postop BCVA (3months)	Postop BCVA (6months)
*1	HM	HM	C.F (30cm)	0.05	0.1	0.1
*2	CF (10cm)	HM	C.F (20cm)	0.1	0.1	0.2
β *3	HM	HM	HM	HM	HM	HM
*4	HM	C.F (20cm)	C.F (1meter)	C.F (2meters)	0.05	0.05
*5	CF (20cm)	C.F (20cm)	0.05	0.3	0.3	0.3
β *6	HM	HM	HM	PL	PL	PL
*7	HM	HM	0.1	0.1	0.2	0.2
β *8	HM	HM	HM	HM	HM	HM
*9	CF (10cm)	HM	HM	0.05	0.1	0.1
*10	CF (10cm)	HM	HM	0.05	0.2	0.2
ε 11	CF (30cm)	HM	0.05	0.05	0.1	0.2
ε 12	HM	C.F (20cm)	0.05	0.05	0.1	0.1
β ε 13	CF (10cm)	HM	HM	HM	HM	HM
ε 14	HM	HM	C.F (50cm)	0.05	0.05	0.1
ε 15	HM	C.F (20cm)	C.F (50cm)	0.05	0.1	0.2
β ε 16	CF (30cm)	HM	HM	HM	HM	HM
ε 17	HM	C.F (30cm)	C.F (80cm)	C.F (1 meter)	0.1	0.2
ε 18	CF (40cm)	C.F (1 meter)	0.1	0.1	0.2	0.3
ε 19	CF (10cm)	C.F (30cm)	0.05	0.1	0.2	0.2
ε 20	HM	HM	C.F (40cm)	C.F (1meter)	0.05	0.1

* Group I PVR Grade C

ε Group II PDR with tractional detachment

β Patients who needed re-interference

HM = hand movement
CF = counting fingers
PL = perception of light

Table 3: The measurement of Intraocular Pressure (IOP) in both groups throughout the time of the study

Patient number	Preoperative IOP	Postop IOP (1day)	Postop IOP (1week)	Postop IOP (1month)	Postop IOP (3months)	Postop IOP (6months)
*1	5	24	18	18	19	18
*2	6	22	19	19	18	18
β *3	5	11	6	23	16	16
*4	9	16	15	15	16	16
*5	8	14	13	14	14	16
β *6	5	24	21	17	16	16
*7	8	19	17	17	18	19
β *8	7	21	20	20	19	20
*9	9	27	22	20	18	19
*10	11	30	24	21	18	17
ε 11	10	22	19	18	16	16
ε 12	6	13	12	12	13	15
β ε 13	8	15	14	14	14	15
ε 14	7	18	17	17	16	18
ε 15	8	16	16	15	19	18
β ε 16	5	8	6	6	29	24
ε 17	9	15	13	13	14	14
ε 18	8	12	12	13	12	12
ε 19	6	11	12	11	11	12
ε 20	6	19	17	16	17	17

*Group I PVR Grade C

ε Group II PDR with tractional detachment

β Patients who needed re-interference IOP measured in mm Hg

Postoperatively, 3 patients out of the ten needed second interference to flatten the retina.

The ten patients in group II (PDR with retinal detachment) underwent parsplana vitrectomy using the combined 20- G and 23- G technique, where 6 patients out of the ten needed the usage of 20- G vitreoretinal forceps to remove adherent membranes to the retina while the other 4 patients needed the usage of 20 G different types of scissors (Vertical, horizontal and curved) to dissect tightly adherent vitreoretinal membranes. Postoperatively, two patients needed second interference to manage complications that happened intraoperatively in the form of subretinal haemorrhage.

Visual Acuity outcome:

In group I (PVR Grade C group n = 10), the visual acuity initially worsened at first day postoperatively compared with baseline in three patients, remained the same in six patients and improved in one patient.

In group II (PDR with tractional retinal detachment group n = 10) , the visual acuity initially worsened at first day postoperatively compared with the baseline in three patients, remained the same in two patients and improved in five patients.

But vision in both groups gradually improved through each of the remaining time points. Improvement in visual acuity at 3 months in both groups was obvious. At 6 months, in group I, the visual acuity compared with baseline was improved in seven patients, remained the same in two patients and worsened in one patient, and in group II, the visual acuity compared with baseline was improved in eight patients and worsened in two patients.

Intraocular pressure analysis (IOP):

All patients in the study in both groups showed an increase in IOP in the first postoperative day compared to baseline. Throughout the 6 months, in group I, six patients required the usage of anti-glaucoma treatment in order to adjust IOP, while in group II, only two patients needed the treatment.

4. Discussion

Proliferative diabetic retinopathy associated with tractional retinal detachment and proliferative vireoretinopathy grade C, are challenging cases.

Initial reports of such cases were associated with significant intraoperative and postoperative complications. 20- Gauge parsplana vitrectomy in these cases was discussed in literature (8). With the 23- G sutureless vitrectomy technique becoming increasingly popular because of the decreased surgical trauma, faster wound healing and improved postoperative comfort associated with it and decreased postoperative astigmatism, it was logical for vireoretinal surgeons to proceed with it (2).

A combination of 20 G and 23 – G also was introduced in many studies. A study done by Kongsap, used the combined technique for management of posteriorly dislocated lens (9). Suturless self-sealing pars plana vitrectomy was first described by Chen in 1996 (10).Combined 20-G and 23-G vitrectomy allows better vitreous base dissection in cases of PVR and the usage of complex instruments to relieve traction in cases of PDR (7). In our study, the advantages of the combined technique used over the pure 23-G technique were faster gel removal and better manipulation with the 20-G instruments. Moreover, the presence of two suturless ports allowed for less postoperative complications such as inflammation, conjunctival scarring and astigmatism. 20-G cutters are comparable to 23-G cutters in terms of fluidics, port distance and flow rates but the 20 G cutter has the upper hand over the 23 G cutter in peripheral vitreous dissection owing to the fact that it has a stiffer shaft (3).

In some studies, interchanging of hands and hence enlargement of the second superior port was required (7). This disadvantage was not applied in this study.

To summarize, the combined 20-G with 23-G vitrectomy technique could be used in various vitrectomy cases with the advantage of being economically viable for the surgeon. Further studies are recommended to use this combined technique for other various indications.

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Reference:

1) Wimpissinger B, Kellner L, Brannath W, et al. 23-Gauge versus 20 – gauge system for parsplana vitrectomy; a prospective randomized clinical trial. Br J Ophthalmol. 2008; 92 (11): 1483 – 1487.
2) Eckardt C. Transconjunctival suturless 23- gauge vitrectomy. Retina. 2005; 25 (2): 208-211.
3) Nagpal M, Wartikar S, Nagpal K. Comparison of clinical outcomes and wound dynamics of sclerotomy ports of 20, 25 and 23 gauge vitrectomy. Retina. 2009; 29 (2): 225-231.
4) Chieh JJ, Rogers AH, Wiegand TW, Baumal CR, Reichel E, Duker JS. Short- term safety of 23-gauge single – step transconjunctival vitrectomy surgery. Retina. 2009; 29 (10): 1486 – 1490.
5) Fine HF, Iranmanesh R, Iturralde D, Spaide RF. Outcomes of 77 cousecutive cases of 23- gauge transconjunctival vitrectomy surgery for posterior segment disease. Ophthalmology. 2007; 114(6): 1197-1200.
6) Spirn MJ. Comparison of 25, 23, and 20 – gauge vitrectomy. Curr Opin Opthalmol. 2009; 20: 195-199.
7) Kumar A, Kalkar A, Jindal S, Rajesh R. Combination 20 and 23- gauge transconjunctival vitrectomy: A new approach. Indian J Opthalmol. 2009 Nov- Dec; 57 (6): 459- 461.
8) Mason JO, Ynker JJ, Vail RS, et al. Incidence of endophthalmitis following 20 – gauge and 25-gauge vitrectomy. Retina 2008; 28: 1352 -4.
9) Kongsap P. Combined 20 – gauge and 23- gauge parsplana vitrectomy for the management of posteriorly dislocated lens: a case series. Clin Ophthalmol. 2010; 4: 625 – 628.
10) Chen JC. Suturless pars plana vitrectomy through self – sealing sclerotomies. Arch Ophthamol. 1996; 114: 1273-5.