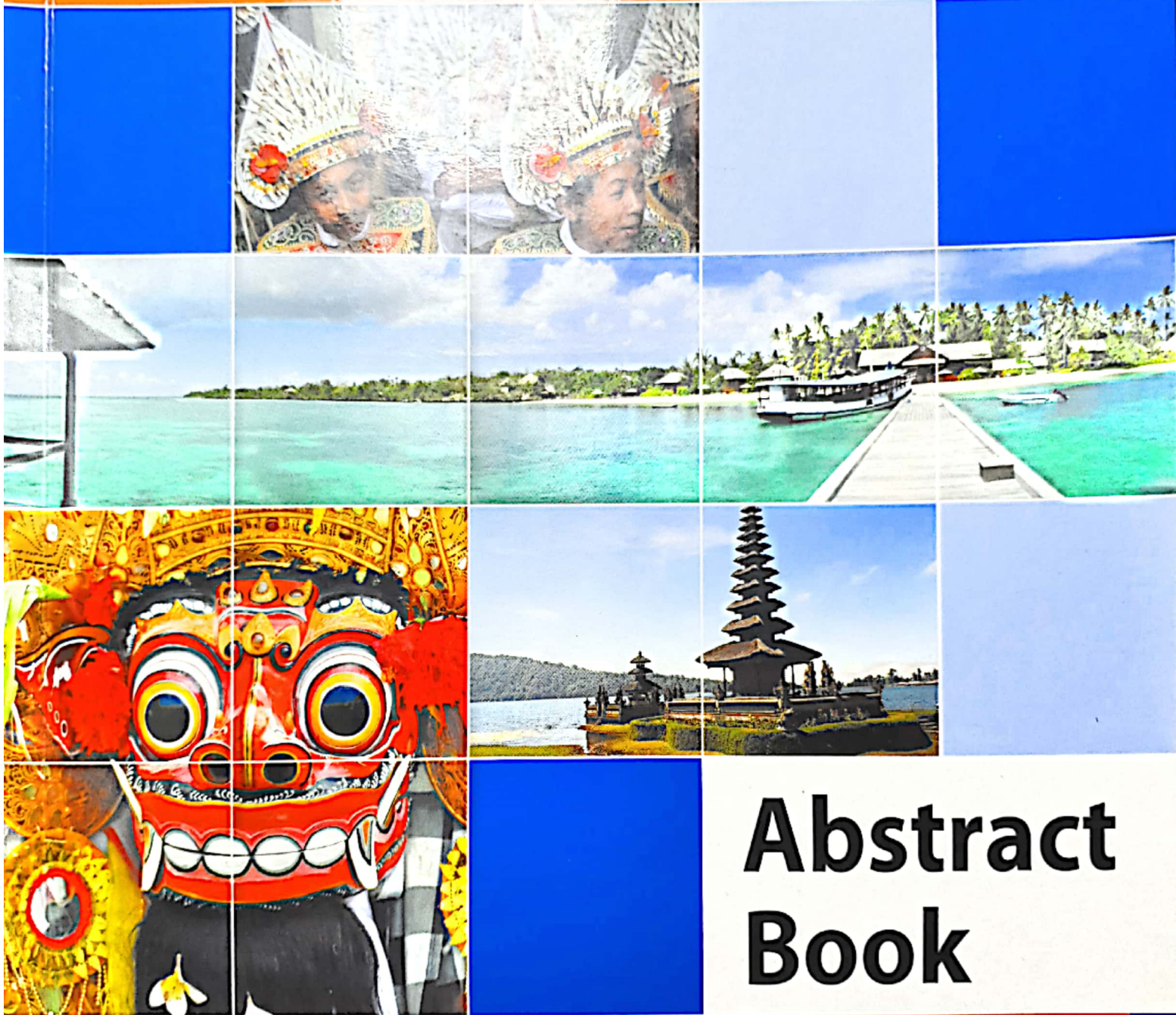


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Abstract Book

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Orchid

09:00 - 10:30

The configuration of idiopathic macular hole: its correlated preoperative factors and predictability for anatomical outcome

First Author: Wu LIU

Co-Author(s): Bin MO, Qian LI

Purpose: To study the correlations between the configuration of idiopathic macular hole (IMH) and preoperative factors, and anatomical outcome of the surgery. **Method:** Data of 31 eyes of 30 patients with IMH underwent vitrectomy was reviewed. Hole configuration (HC) was described using minimum diameter (MD), macular hole index (MHI) and hole form factor (HFF). Pearson correlation and one-way ANOVA were used to study the correlations among patient-age, symptom-duration, preoperative-VA, hole-stage and HC. **Results:** Significant correlations existed between MD and MHI ($R=-0.66$, $p=0.000<0.01$), MD and HFF ($R=-0.493$, $p=0.005<0.01$), and MHI and HFF ($R=0.722$, $p=0.000<0.01$). No significant differences existed between HC and patient-age with different hole-stage ($p>0.05$). No significant correlations existed between patient-age and HC ($p>0.05$), HC and preoperative-VA ($p>0.05$), hole-stage and symptom-duration ($p>0.05$), symptom-duration and HC ($p>0.05$). Two eyes with $MHI<-0.38$ and $HFF<-0.69$ failed anatomically after surgery. **Conclusion:** HC may not correlate with preoperative factors of patient-age, symptom-duration, preoperative-VA and hole-stage. MHI and HFF may be predictive for anatomical outcome. hole-size alone may not be suitable for predictability.

Orchid

09:00 - 10:30

Transconjunctival self sealing 20g vitrectomy

First Author: Gilbert SIMANJUNTAK

Co-Author(s): Jannes TAN, H.H.B. MAILANGKAY, Helario HASIBUAN, Jusuf WIJAYA

Purpose: To report surgical technique and outcome of sutureless 20G vitrectomy. **Method:** Interventional study of surgical management in vitrectomy. Sclerotomy done after severe conjunctival diathermy, with long beveled tunnel. No additional surgical instruments used. **Results:** There were 21 patients (23 eyes) with age 34-82 years. Self sealing achieved in 19 eyes. Three cases with non-self sealing port due to repeated insertion of surgical instruments in PDR, 1 port in each failed cases. Fluid tamponade used in 3 cases, air tamponade in 5 cases, SF6 20% in 14 case and one cases with silicone oil. No sign of hypotony seen

after surgery on operating table and postoperative. One week after surgery, conjunctiva wound appears without inflammation. Follow up various weeks. **Conclusion:** Improvement in surgical outcome achieved without any additional instrument with sealing 20g vitrectomy.

Orchid

09:00 - 10:30

Ultrasound-mediated microbubble delivery of PEDF gene into retina inhibits choroidal neovascularization

First Author: Xi-yuan ZHOU

Purpose: This study was designed to investigate whether ultrasound-mediated microbubble destruction could effectively deliver therapeutic plasmid into retina of rat, and whether gene transfer of pericyte-derived factor (PEDF) could inhibit choroidal neovascularization (CNV). **Method:** For in vivo experiments, human retinal pigment epithelial cells were divided into three. For in vivo animal experiments, sixty Long-Evans rats with argon laser-induced CNV were randomly divided into five groups. **Results:** In vitro and in vivo both demonstrated that microbubble destruction significantly enhanced PEDF gene delivery as compared with microbubbles or ultrasound alone. We also showed that with the administration of ultrasound-mediated microbubbles destruction of CNV of rats was inhibited effectively. **Conclusion:** Ultrasound-microbubble technique greatly increased PEDF gene transfer to rats' retina and choroid, subsequently leads to a significant inhibition of development of CNV.

patients with endophthalmitis. **Method:** Interventional series of all patients with endophthalmitis undergoing vitrectomy over 1 year period at a major tertiary referral centre in Sydney, Australia. **Results:** 23 Gauge vitrectomy was performed on 7 patients with endophthalmitis. Mean pre-op acuity was 2.35 logMAR. Mean post-op acuity was 1.27 logMAR. The improvement in acuity was significant ($P < 0.001$). Overall BCVA improved in all patients. The mean change in IOP was -4.8 mmHg compared to preoperative IOP. There was one instance of postoperative hypotony, which was complicated by repeat vitreal detachment. **Conclusion:** 23 Gauge vitrectomy is a useful and appropriate technique for treating endophthalmitis. The sturdy 23 Gauge instruments, allow thorough clearance of the vitreous base. Our series demonstrated excellent outcomes in terms of visual acuity and supports the use of early vitrectomy in severe or slowly resolving endophthalmitis.

Poster No.: EN1-081
Panel No.: 81

Early vitrectomy for vitreous hemorrhage in avastin era

First Author: Gilbert SIMANJUNTAK

Co-Author(s): Jannes TAN, H.H.B. MAILANGKAY, Helario HASIBUAN, Jusuf WIJAYA

Purpose: Vitreous hemorrhage has many etiology. We report the surgical management and its outcome in avastin era. **Method:** Retrospective study of vitreous hemorrhage and surgical treatment. B-scan revealed the retina attached without confirm etiology. **Results:** There were 8 patients (8 eyes) with age 18-79 years, 5 were male and 3 were female. The duration of hemorrhage varies between 3 -5 days. All cases were managed with vitrectomy, endolaser and avastin injection when needed. Two cases of Terson syndrome were found, three of blood vessels occlusion and three of active macular degeneration. Short term evaluation gave better result. **Conclusion:** Early case findings and management gave better result.

Poster No.: EN1-082

Panel No.: 82

Combined scleral bucking and intravitreal gas injection for management of rhegmatogenous retinal detachment following pars plana vitrectomy

First Author: Sumeet KHANDUJA

Co-Author(s): Naginder VASHISHT, Prashant NAITHANI, Sunil CHAUDHARY, Pradeep VENKATESH, Satpal GARG

Purpose: To describe alternative technique for management of retinal detachment following pars plana vitrectomy using combined retinal cryocoagulation, scleral bucking and intravitreal gas tamponade. **Method:** 7 eyes with retinal detachment within 2 weeks following vitrectomy (vitreous hemorrhage-4 & nucleus drop-3 eyes) with active port-site dialysis or superior breaks were included. These underwent cryocoagulation around break, scleral bucking, intravitreal injection of pure SF_6 gas and postoperative positioning. Main outcome measures: anatomic success after initial intervention, visual outcome and complications.

Results: There were 5 males & 2 females. Minimum follow-up period: 6 months (range: 9-12). The mean best corrected visual acuity at 6 months was 20/200 as compared to hand motions close to face preoperatively. Retina was reattached successfully in all 7 eyes. The most common postoperative complication was ocular hypertonia in 2 eyes, managed successfully.

Conclusion: Combined scleral bucking & intravitreal gas tamponade provides useful and effective alternative to vitreo-retinal surgery with silicone oil injection for management of rhegmatogenous retinal detachment following pars plana vitrectomy.

Poster No.: EN1-083

Panel No.: 83

Study of the expression of peroxiredoxin 6 in the experimental diabetic rat's retina

First Author: Yazhen WU

Co-Author(s): Hui QI

Purpose: We studied the changes in Prx6 expression in different period diabetic rats and its correlation with the progression of diabetic retinopathy. **Method:** Diabetes was induced in rats by an intraperitoneal injection of streptozotocin (STZ). Rats were killed at 4, 8, and 12 weeks after the injection of STZ, and Prx6 expression in the retina from both control and STZ-induced diabetic rats was measured by reverse transcription polymerase chain reaction, and immunohistochemistry. **Results:** The result of immunohistochemistry showed that Prx6 was observed in normal rat. Intense Prx6 staining was present in 4 weeks of diabetic rats. The retina of 8 and 12 weeks after STZ administration revealed lack of staining ($F = 22967.63$ $P < 0.05$). The result of RT-PCR was similar to that of immunohistochemistry. **Conclusion:** It is conceivable that normal maintenance of Prx6 expression may be important to prevent diabetic retinopathy.

TRANSCONJUNCTIVAL SELF SEALING 20G VITRECTOMY

Gilbert WS Simanjuntak, Jannes F Tan, HHB Mailangkay,
Helario Hasibuan, Jusuf Wijaya

Cikini Eye Institute/Cikini Hospital, Jakarta
Department of Ophthalmology FK-UKI, Jakarta

Purpose: To report surgical technique and outcome of sutureless 20G vitrectomy.

Method: Interventional study of surgical management in vitrectomy. Sclerotomy done after severe conjunctival diathermy, with long beveled tunnel. No additional surgical instruments used.

Result: There were 21 patients (23 eyes) with age 34-82 years. Self sealing achieved in 19 eyes. Three cases with non-self sealing port due to repeated insertion of surgical instruments in PDR, 1 port in each failed cases. Fluid tamponade used in 3 cases, air tamponade in 5 cases, SF6 20% in 14 case and one cases with silicone oil. No sign of hipotony seen after surgery on operating table and postoperatively. One week after surgery, conjunctiva wound healing appears without inflammation. Follow up varies 4-8 weeks.

Conclusion: Improvement in surgical outcome achieved without any additional instrument with self sealing 20g vitrectomy.

Key Words: sutureless, vitrectomy, 20G, learning curve

Introduction

Pars plana vitrectomy was the only choice to many clinical entity, involving vitreous opacity, retinal detachment, retinal vessels disease, macular disease and retinal children disorders. Since Machemer invented a closed intraocular microsurgery on 1971[1], the practice of PPV using 20-gauge vitrectomy instruments through the sclera, following reflection of the conjunctiva, was become the standard for decades. However, there are numbers of problems with 20-gauge vitrectomy were identified, including iatrogenic retinal breaks, particularly those associated with the sclerotomies and long duration surgery. Therefore, the development of transconjunctiva sutureless (TCS) vitrectomy was developed toward several advantages such as less postoperative inflammation and less operative corneal change.[2-4]

Fujii et al introduced 25-gauge TCS vitrectomy, which allowed smaller sclerotomies that were thought to reduce surgically induced trauma.[5-6] Eckardt then developed the 23-gauge TCS vitrectomy to combine the minimally invasive TCS with the benefits of sturdier, larger instruments for more complex maneuvers.[7] Moreover, recently developed 27-Gauge TCS by Oshima[8] promised more safety from wound leakage and

endophthalmitis. Despite the advantages, these small gauge instruments have many disadvantages include increased flexibility of smaller instruments, breaking of fragile instruments, small vitrector port size, and the initial learning curve in wound construction. These inventions also involved cost in purchasing these new hand pieces on 23-gauge, 25-gauge and 27-gauge, since these methods require additional specially designed intraocular instruments other than standard 20-gauge

A 20-gauge transconjunctival technique using standard instrumentation without wound sutures has recently been introduced with promising results.[9-10] This technique has advantages of small port TCS system without the needed of new instrumentation other than the 20-gauge standard. This technique also has other 20-gauge advantages including efficient surgery time and the instrument rigidity. However, using 20-gauge system required learning curve since this technique has different approach comparing with ordinary 23 or 25 gauge that commercially available.

In this study, we report surgical technique of 20-gauge TCS in order to assess the efficiency and reliability of this surgical technique.

Methods

The study was done at the Department of Ophthalmology, Christian University of Indonesia/Cikini Church Hospital, Jakarta, Indonesia. Informed consent was obtained from the study participants, and conducted following the tenets of the Declaration of Helsinki. The Christian University of Indonesia Institutional Review Board granted approval for this study. The study design was descriptive study. The inclusion criteria were vitrectomized patients with transconjunctival sutureless 20G technique. Patients with opened and sutured conjunctiva (patient with encircling band, etc) were excluded from the study. Sutureless transconjunctival 20 g vitrectomy was performed in all patients; intra and postoperative complications were documented.

Surgical Technique

Surgical technique was modified as previously described in details by Gotzaridis.[10] The technique begins with heavy diathermy of the conjunctiva using a 'short neck' wide tip diathermy probe over the areas of the side ports. The diathermy of the conjunctiva was broad and intense as to prevent leakage of intra ocular fluid into subconjunctiva. The probe presses and stretches the conjunctiva over the sclera. The conjunctiva becomes thin or very thin and some times creates an opening with gradually thinning rim that is sealed with the underlying sclera. The visible end point of the conjunctival burn is a white circle the size of which must be large enough (4-5 mm diameter).

A 20G MVR blade was introduced beveled, slowly, parallel with the limbus, creating conjunctivo-scleral tunnel incision as long as possible. The blade then directed vertically toward optic nerve as the surgeon felt no resistance, to create a better wound sealing at the end of the operation. A 6 mm cannula was used in this port without a suture. Superotemporal and superonasal conjunctivo-sclerostomies were then made with similar

technique. Since our chandelier light pipe (DORC[®]) was easier to penetrate through the port, it was introduced first through cutter port, just to open the wound, to facilitate introducing the cutter intraocular.

Unnecessary exchange of the instrument through the sclera tunnels was avoided, to prevent enlargement of the ports and unnecessary wound leakage. The vitrectomy procedures were performed for all spectrums of retinal cases. All vitreous tamponades were used as per indication. At the end of the operation intraocular pressure was normalized by tamponade injection if low or aspiration if too high. Immediate massage with a cotton tip over the port will allow sealing of the wound. To ensure no leakage, especially in air/gas filled eye, fluid was dropped on the wound to check the air bubble. In cases where hypotony was noticed additional SF6 20% gas or fluid were injected through pars plana with a 26 gauge needle followed by oral pressure reducer medication postoperatively.

Whenever the surgeon was not sure with for the sealing of the port, the wound was sutured with 8-0 Vicryl. Subconjunctival injections of antibiotics and corticosteroids were used at the end of the procedure.

Automated-keratometry (Tomey[®]) was done pre-operatively (K1) and day 7 postoperatively (K2). Intraocular pressure was measured preoperatively; and day 1, day 3 postoperatively. Surgical time was counted after the placement of the speculum and the grasping of the conjunctiva in the beginning of surgery (T1); and while closing the wound (T2), after the whole intraocular procedure was performed. Sum of T1 and T2 was Total Time (T3). Healing/ inflammation were evaluated at 3 weeks postoperatively. Patients were followed up for at least 6 months. All subjects divided in 3 groups (10 or more subjects per group) in order to see any difference between learning curve. SPSS version 13.0 (SPSS, Inc., Chicago, IL) was used for all statistical analysis, and $P < 0.05$ was considered significant.

Results

The study consisted of 32 eyes from 32 consecutive patients who underwent pars plana vitrectomy performed by single surgeon (GWSS). Surgery was performed under local anesthesia with 2 ml lidocaine 2% and 3 ml bupivacaine. Conjunctival diathermy performed until the conjunctiva appears attached on the sclera below. The attached conjunctiva seen as marked white area and subtle blood vessel seen. In case of thick Tenon seen, it required longer time to diathermy until conjunctiva attached on sclera. Conjunctivo-scleral tunnel was done simply by puncturing at the diathermized conjunctiva, making tunnel as long as possible, directed parallel with the limbus. Some patient had thinner sclera than others and sclera tunnel was performed easier. Since the direction was parallel with the limbus, forcing too much could possibly cause double penetration; therefore insertion was performed slowly and the blade was directed toward optic nerve once we believed that the blade was intraocular.

The surgeon observed no difficulties while performing vitrectomy and all surgical maneuvers were similarly done as with conventional 20G vitrectomy. There was no need for additional instruments during the transition to the sutureless technique and/or during

vitrectomy procedures. There was an only small difficulty while introducing the instruments initially through the tunnels.

Of the 32 consecutive patients who underwent vitrectomy with the described technique, the duration of surgery was measured with video recording for the first 2 cases, and the rest measured while surgery. The study started since the third case using the technique, and the first recorded two cases was included to avoid bias of learning curve. Distribution between sexes was equal between male and female. The procedure was done to all spectrums of retinal surgical surgery. Demographics of the patients is shown in Table 1.

As far as the induced astigmatism is concerned, there was no significant difference between early learning curve (group 1 consisted of 10 patient) with other groups. Similarly there was no difference when comparing the time to make sclerotomy (T1) and closing sclerotomy (sutureless [T2]). The only significant difference was total time (sum of T1 + T2) between group 1 with group 2, 0.97 minutes [Table 2], and there was no difference between group 2 and 3. It was shown that clinically, the true learning curve were the first three patient as seen in group 1, and the rest cases need almost similar Total Time [Figure 1] [Figure 2].

There were 3 cases where the scleral port had to be sutured; 1 port in each case, 3 of 32 cases (9.3 %) or 3 of 96 ports (2.9 %). The first 2 sutured ports (case # 6 and 10) occurred during the early cases (group 1) and the last (case # 25) occurred probably due to the frequent in- out instrument while doing membrane peeling which induce irregular lips of sclerotomy.

There was one case with ballooning conjunctiva during vitrectomy, which obscured the port. In that case conjunctiva was then incised and drained but at the end of surgery, the port was self sealing. The intraocular pressure of the eyes at the end of the operation was either normal or slightly low. No choroidal detachment, hypotony, hypotonic maculopathy, endophthalmitis, or other complications were observed during the postoperative period caused by hypotony or by wound leakage from the scleral port. There was no compromised illumination, and cutting was convenient as in conventional 20g vitrectomy.

Discussion

The recent years sutureless vitrectomy is becoming more and more popular to vitreoretinal surgeons. The advantages of sutureless surgery include minimization of ocular trauma and suture-induced astigmatism as well as the fact that postoperative inflammation is less in the operated eyes. However, small gauge sutureless vitrectomy systems may sometimes not be suitable, especially for complex cases. Disadvantages of 23 and 25g vitrectomy is the prolonged surgical time as well as the increased flexibility of smaller instruments that may be a disadvantage in more demanding cases.[9-11]

Additionally, slow vitreous removal and dim illumination are problems with 25 or 23 gauge technology at present, addressed by new vitrectomy machine, but with high cost. Small gauge vitrectomy may require new modified instruments not always available. Therefore, using 20 G sutureless system may be an interesting alternative, combining the advantages of sutureless vitrectomy on the one hand and on the other, the advantages of 20g instruments such as reducing the surgical time and the need for new and more expensive instruments.

The transition from conventional 20g to 20g sutureless vitrectomy includes a learning curve to achieve maximum efficiency. However, in our results, the curve was short enough for the adaptable surgeon. Despite the significant difference between early learning curve to the next group, but clinically time difference 0.97 minute of group 1 and two means less for the whole surgery time of vitrectomy [Table 2]. The only difference of the sutureless technique comparing to vitrectomy with conventional port, is while structuring and closing the sclerotomy. The vitrectomy procedure is similar without need for a technique modification or transition time for the surgeon. There is also no compromise in the intraoperative illumination, and cutting is faster, in comparison to smaller gauge vitrectomy in the technique with similar machine's feature.

For the surgeon, accustomed to performing 20-gauge vitrectomy, the transition is easy. Rigidity of instrument, flow and aspiration of the vitreous cutter is comfortable. The construction of the incision must be meticulous using tunnel or angled incision to reduce postoperative hypotony.

Wound architecture is the most important aspect of this surgery, and the hardest thing for the surgeon to learn, which may cause hypotony and potentially increased endophthalmitis rate and hypotonic maculopathy. However, the learning curve is short enough for the adaptable surgeon. In conclusion, the 20-gauge transconjunctival vitrectomy through a single-step entry cannula system is a relatively safe procedure, allowing the use of stiff 20-gauge instruments that is particularly valuable in procedures requiring more tissue dissection and manipulation. Also, it offers an economic advantage for allowing surgeons to use some existing 20-gauge instrumentation. When suturing was required, a single transconjunctival absorbable stitch postoperatively was adequate. Our initial experience shows that, although approximately one third of sclerotomies were sutured, this system offers another option to vitreoretinal surgeons interested in a transconjunctival approach to vitrectomy. Further studies are required to confirm our findings and to investigate the differences between trocar and trocarless vitrectomy something that was not addressed in our study.

Figure 1. Time required to make sclerotomy.

Legend : — Sclerotomy_Time_1
 ----- Sclerotomy_Time_2
 - - - Sclerotomy_Time_3

Figure 2. Total surgical time in each group of learning curve.

References

1. Machemer, R., Buettner, H., Norton, E.W. & Parel, J.M. Vitrectomy: a pars plana approach. *Trans Am Acad Ophthalmol Otolaryngol* 1971;**75**, 813-20.
2. Kadonosono K, Yamakawa T, Uchio E, Yanagi Y, Tamaki Y, Araie M et al. Comparison of visual function after epiretinal membrane removal by 20-gauge and 25-gauge vitrectomy. *Am J Ophthalmol* 2006;**142**:513-515.
3. Yanyali A, Celik E, Horozoglu F, Oner S, Nohutcu AF. 25-gauge transconjunctival sutureless pars plana vitrectomy. *Eur J Ophthalmol* 2006;**16**: 141-147.
4. Yanyali A, Celik E, Horozoglu F, Nohutcu AF. Corneal topographic changes after transconjunctival (25-gauge) sutureless vitrectomy. *Am J Ophthalmol* 2005;**140**: 939-941.
5. Fujii GY, De Juan E Jr, Humayun MS, Pieramici DJ, Chang TS, Awh C, Ng E, Barnes A, Wu SL, Sommerville DN. A new 25-gauge instrument system for transconjunctival sutureless vitrectomy surgery. *Ophthalmology* 2002;**109**: 1807-12; discussion 1813
6. Fujii GY, De Juan E Jr, Humayun MS, Chang TS, Pieramici DJ, Barnes A, Kent D. Initial experience using the transconjunctival sutureless vitrectomy system for vitreoretinal surgery. *Ophthalmology* 2002;**109**: 1814-20.
7. Eckardt, C. Transconjunctival sutureless 23-gauge vitrectomy. *Retina* 2005;**25**: 208-11.
8. Oshima, Y., Wakabayashi, T., Sato, T., Ohji, M. & Tano, Y. A 27-gauge instrument system for transconjunctival sutureless microincision vitrectomy surgery. *Ophthalmology* 2010;**117**: 93-102 e2.
9. Lee, J.E., Kim, K.H., Kim, I.K., Jea, S.Y. & Kim, W.S. Comparison of 20-gauge transconjunctival sutureless vitrectomy with conventional vitrectomy. *Retina* 2010;**30**: 1496-504.
10. Gotzaridis, E.V. Sutureless Transconjunctival 20 Gauge pars plana Vitrectomy. *Semin. Ophthalmol.* 2007; **22**: 179-83.
11. Kim, J.E., Shah, S.N., Choi, D.L., Han, D.P. & Connor, T.B. Transconjunctival 20-gauge pars plana vitrectomy using a single entry cannulated sutureless system. *Retina* 2009;**29**:1294-8.