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Short Communication

Vitrectomy from VISC to MIVS

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Pars plana vitrectomy (PPV) is a technique in vitreoretinal surgery that enables access to the posterior segment through pars plana for various retinal entities in a controlled and closed system.

David Kasner in 1969 excised prolapsed vitreous as a complication of cataract surgery using scissors and forceps. He subsequently treated patient of vitreous opacification in amylodosis, was an open-sky technique (temporally removing cornea and performing extracapsular cataract extraction to gain access to vitreous) [1]. In January 1970 Robert Machemer did experiment in egg shell by making a small hole and using drill which was tightly encircled by cylinder and was able to extract egg whites, which he later used in human eye which was also an open sky technique [2]. This technique had significantly lesser inflammation than previous techniques. He further soldered the infusion tube outside of vitrectomy cutter to address the problem of collapsing globe. On April 20, 1970 he did vitrectomy with pars plana which avoided damage to the lens and the retina, approach of 1.7 mm diameter (17g), the first closed-system vitrectomy setup with enabled intraocular pressure called VISC (Vitreous Infusion Suction Cutter) in case of vitreous hemorrhage in diabetes without complication [3].

In 1974, Conor O'Malley and engineer Ralph Heintz developed cutter design with reciprocating movements driven by air pressure to cut and aspirate vitreous [4]. O'Malley used a separate entry port for infusion and another one for illumination, with the final "Vitritome" design having a 0.88 mm diameter (20-gauge). The modern-day 3-port vitrectomy system—with dedicated ports for vitrectomy cutter cut rate 50-300 cpm, aspiration of 40-420 mmHg, infusion of fluid to maintain IOP and illumination of the posterior segment—using 20-gauge instruments [4]. Trocar-cannula system for insertion of instruments were developed by Robert Machemer and Dyson Hickingbotham [5]. Steve Charles along with Carl Wang developed disposable pneumamatic axial cutter with higher cutting rate with faster aspiration fluidics [6]. Steve Charles also pioneered the fluid - air exchange. In 2001 Gildo Fujii and Eugene de Juan developed 25-g (0.5-mm diameter) that allowed transconjunctival sutureless technique (MIVS) [7]. The 25-g infusion cannula could not be used in conjunction with a standard 20-g vitreous cutter because of functional discrepancy between the infusion and aspiration rates of these 2 different systems, which could lead to hypotony. Early drawback of the 25-g instruments was their increased flexibility which could lead to significant instrument bending and possibly breaking when manipulating the eye [8]. Claus Eckhardt and Gholam Peyman in 2005 developed sutureless 23-gauge (0.6 mm) vitrectomy system which was sturdier and larger than 25g [9]. Yusuke Oshima and colleagues in 2010 developed 27-g (0.4-mm diameter) and also did trocar- less diagnostic vitrectomy [10].

Advantages of small-gauge vitrectomy

- Ability to use trocar-cannula entry systems which reduce retinal and vitreous incarceration, neovascularization at sclerotomy sites, iatrogenic breaks and dialyses at the vitreous base
- Increased patient comfort
- Decreased corneal astigmatism
- Decreased operative time
- Decreased conjunctival and scleral scaring.

Bibliography

1. Kasner D. "Vitrectomy: a new approach to management of vitreous". *Highlights Ophthalmology* 11 (1969): 304.

2. Machemer R., *et al*. "Vitrectomy: a pars plana approach". *Transactions - American Academy of Ophthalmology and Otolaryngology* 75.4 (1972): 813-820.

3. Machemer R., *et al*. "Vitrectomy: a pars plana approach—technical improvements and further results". *Transactions - American Academy of Ophthalmology and Otolaryngology* 76.2 (1972): 462-466.

4. O'Malley C and Heintz RM. "Vitrectomy with an alternative instrument system". *Annals of Ophthalmology* 7.4 (1975): 585-588.

5. Machemer R and Hickingbotham D. "The three-port microcannular system for closed vitrectomy". *American Journal of Ophthalmology* 100.4 (1985): 590-592.

6. Charles S. "The History of Vitrectomy: Innovation and Evolution". *Retina Today* (2008).

7. Fujii GY., *et al*. "A new 25-gauge instrument system for transconjunctival sutureless vitrectomy surgery". *Ophthalmology* 109.10 (2002): 1807-1813.

8. Fujii GY., *et al*. "Initial experience using the transconjunctival sutureless vitrectomy system for vitreoretinal surgery". *Ophthalmology* 109.10 (2002): 1814-1820.

9. Eckardt C. "Transconjunctival sutureless 23-gauge vitrectomy". *Retina* 25.2 (2002): 208-211.

10. Oshima Y., *et al*. "A 27-gauge instrument system for transconjunctival sutureless microincision vitrectomy surgery". *Ophthalmology* 117.1 (2010): 93-102.e2.