

## Indovations in vitreoretinal surgery

Dear Editor:

I would like to congratulate you on your editorial "Indovation in ophthalmology - The potential power of frugal innovations".<sup>[1,2]</sup> It is a crisp and well-written article which has given me the impetus, courage and fillip to share my innovation in vitreoretinal surgery. I have been working in a tertiary referral multispecialty medical college for the last 20 years and have devised various "jugaad" innovations which i shall share briefly

1. Smartphone use for fundus and slit lamp imaging. I do not use any attachments but do it free hand with the iphone and a 20D lens for fundus and over the ocular of slitlamp after focusing the eye
2. Sonography machine of radiology department for dynamic B-scan using the 10-12 MHz probe for imaging vitreous hemorrhage and retinal detachment. The after movements echogenicity of membranes help in differentiation without an A-scan
3. Using the vitrectomy of the phacoemulsification machine (pneumatic vitrector) on anterior vitrectomy mode for three port pars plana vitrectomy with a 23 gauge pneumatic cutter at 500-700 cut rate. Hence, the need for a dedicated expensive vitrectomy machine is not mandatory and posterior segment surgery can be initiated in an anterior segment setup
4. Using an ENT or ophthalmic halogen or LED light source to which is connected to a 23 gauge disposable endoilluminator as a light source
5. Technique of 23 gauge snip suture vitrectomy which avoids the use of trocar cannula by using a 23 gauge hypodermic needle to create scleral tunnels for three port pars plana vitrectomy after snipping the overlying conjunctiva and diathermy to the sclera. A 4.5 mm flanged cannula is for irrigation which is self-retaining. 8/0 vicryl suture is used if any ports leak postoperatively
6. Using a simple Machemer irrigating contact lens set (-45 D and -90 D) for visualization during vitrectomy with scleral depression to aid in vitreous base excision or Landers lenses with prisms. These systems preclude the necessity of a wide angle costly systems like BIOM and Resight
7. Fish-tank air pump with a micropore filter and an IV set with controller for fluid air exchange after vitrectomy. A water bath created in a glass bottle is used to provide hydrated air which prevents drying of the posterior intraocular lens (IOL) and lens capsule during fluid air exchange (FGE).
8. Sleeveless phaco probe of the phaco-- machine is used for phaco -fragmentation of dropped nucleus in vitreous. The nucleus is lifted from the retina surface with suction mode followed by fragmentation in midvitreous using pulse energy. The phacotip is 18 G hence one port is enlarged
9. Microhooked 23 gauge needle (created by scraping the needle to the serrated forceps handle) for peeling epiretinal membrane (ERM) macula pucker and proliferative diabetic retinopathy (PDR), proliferative vitreoretinopathy (PVR) membranes. This is a cheap Rs 3 device which is extremely

useful along with end gripping forceps for membrane surgery

10. Silicon oil injection using a 2 cc Leuer lock syringe with a short 2 cms 20 gauge cannula (created from a needle) for silicon oil injection with minimum pressure (poiseuille's Law). This simple technique avoids the need for an automated silicone oil injector
11. In dropped very hard brown cataract using a 20 gauge needle to spear up the nucleus ad deliver it into through then pupil or use of per fluorocarbon liquids (PFCL) to float up the nucleus after a thorough vitrectomy
12. Vitreous cutter groove used for hooking up and lifting up the IOL haptic for dropped IOL after freeing the IOL from surrounding vitreous and delivering it in anterior chamber with vitreous forceps
13. Limbal three-port 23 gauge vitrectomy for soft dropped nuclear pieces through the capsulo-rhexis opening followed by foldable IOL implant oner the rhexis. Here, an AC maintainer is used with 23 g cutter and lightpipe
14. Speculum free technique of intravitreal injections using the left hand fingers to open the lids and injecting with right hand leading to minimum patient discomfort and pain. This is done in OT with povidone iodine proparacaine and sterile gloves
15. Disc onward dissection of PDR membranes using a micro hook needle/end gripping forceps for enblock dissection of membranes during vitrectomy. This procedure done with preop Avastin minimizes bleeding and surgical time
16. Dry anterior vitrectomy for vitreous loss with posterior capsule rupture during cataract surgery to prevent hydration and herniation of the vitreous into the anterior chamber. A viscoelastic is used instead of infusion to form the anterior chamber during vitrectomy
17. 23 gauge pars plana (4 mm from limbus) toilet vitrectomy in cases with shallow anterior chamber (glaucoma, nanophthalmos) to deepen it before cataract surgery. When the eye softens after vitrectomy viscoelastic is injected in the anterior chamber to push the iris lens diaphragm posterior to simplify phacoemulsification.

These above ideas came to me as a bolt from the blue when the OT sister told me that some vitreoretinal instruments on the trolley were missing or not working.

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### Conflicts of interest

There are no conflicts of interest.

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2. Ahuja A. Commentary: Frugal innovations - Path to eye care for all. Indian J Ophthalmol 2019;67:544-5.

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