INTRODUCTION
In 1971, Machemer et al. described the use of a 17-gauge vitreous cutter, with a diameter of 1.5 mm through a 2.3 mm scleral incision. The approach was modified in 1974, with the introduction of a 20-gauge vitrector (0.9 mm diameter) by O’Malley and Heintz (O’Malley C, Heintz RM, 1975). This was the origin of the three port, pars plana sclerotomy system that became the gold standard in vitreoretinal surgery. It involved the creation of three access ports with a 1.4 mm linear sclerotomy. This was undertaken with a micro-vitreoretinal (MVR) blade. One port had an infusion line sewn into place, while the remaining two were utilized for introduction of a light source and a vitreous instrument such as a cutter. De Juan and Hickingbotham devised and introduced a range of 20-gauge instruments in 1980 for use through conventional sclerotomies (De Juan and Hickingbotham, 1990). However, it was only in 2002, with the advent of the microcannulae array, that the 25 gauge transconjunctival sutureless vitrectomy (TSV) system was introduced by Fujii et al. (Fujii et al, 2002)1

This was followed by the introduction of a 23-gauge system by Eckardt in 2005. Initially, both 23- and 25-gauge systems were available with a limited gamut of intraocular instruments. However, as the techniques rapidly became widely utilized, almost all intraocular instruments have been developed and made available for sutureless vitrectomy system (Eckardt, 2005).1

By reducing the diameter of instruments (figure 1), MIVS procedure allowed wounds to self seal without suturing.

Fig.1 showing Comparison of vitrectomy sizes and designs.

AIMS AND OBJECTIVE
1) To determine visual acuity following 25-Gauge sutureless vitrectomy.
2) To determine incidence of postoperative hypotony and postoperative infection.
3) To determine success rate of achieving the goal of vitrectomy.

MATERIAL AND METHOD
The medical records of 50 eyes that had undergone 25-gauge vitrectomy for cases like Vitreous haemorrhage, retinal detachment, subluxated cataract or IOL, Macular hole or PDR from 2016 to 2018 at Tertiary centre were included in the study. Intra- and post-operative complications were analyzed. The postoperative best corrected visual acuity (BCVA) was evaluated and recorded at the end of 6 months.

RESULT
Mean age of distribution are 42.92 years in 25 gauge vitrectomy. Among 50 cases 35 are males and 15 are females. There is significant difference in BCVA between preoperatively and postoperatively. P value for pre operative to post operative vision in 25 -gauge vitrectomy is <0.05 i.e. there is definite improvement in vision.

CONCLUSION
25-gauge micro incision vitrectomy surgery (MIVS) is an effective sutureless pars plana vitrectomy surgery which has good visual outcome in various retinal condition with minimum manageable complications.

REFERENCES
**EXCLUSION CRITERIA:**
- Had undergone prior sclera buckling and pars plana
- Previous vitrectomy
- High myopia >6D
- Severe grade 3 cataract
- Combined pars plana vitrectomy and scleral buckling surgery done.

After taking proper informed consent of the patient, they were examined as follows.

Whether any history of trauma, significant family history or any known systemic illnesses were asked. Whether any history of using spectacles, any treatment taken for other ocular problems was noted. A brief history of symptoms was taken and following details were noted. The name, age (number of completed years) and sex of the patient. The presenting complaint of decreased vision, diplopia documented. Preoperative and post-operative intraocular pressure is measured with non-contact tonometer. Preoperative and post-operative astigmatism was measured with Autorecto, keratometer value is measured. Preoperative and post-operative fundus examination done by indirect ophthalmoscopy. B-scan ultrasound was done for posterior segment evaluation if the fundus was not visible. All patients were referred to physician to look for any syndromes or systemic associations. In patients in whom surgery was indicated, sac syringing was done. Blood investigations like hemoglobin, complete blood counts, liver function test, renal function test, serum electrolytes and blood sugar were done. Urine sample was tested for Homocysteine. ECG was done and cardiac referral was done when indicated. Patients were admitted in In patient department for atleast 3 days, preoperative day, operative day and post operative day 1. Preoperative oral antibiotics and preoperative systemic steroids were given to all patients irrespective of group.

**DAY OF SURGERY:**
Mydriasis was achieved by using a combination of eyedrops tropicamide (0.8%) and phenylephrine (5%) every ten minutes one hour before surgery. Surgery was performed under local or general anesthesia. Under all aseptic precautions, cleaning and draping was done. Lid speculum was applied. All patients underwent PPV with 25-gauge, standard 3-port approach. View of the posterior segment was achieved with binocular wide-field viewing system or contact A core vitrectomy was performed. First described by Fujii et al', in 2002, this system utilizes a microcannula array to introduce a wide range of vitreoretinal instruments. The TSV, revolves around microcannula with insertion trocars, an infusion cannula, and cannula plugs. The microcannula is a thin walled polyamide tube of 3.6 mm in length with an external collar which can be grasped with forceps. Insertion is accomplished by first displacing the conjunctiva laterally by approximately 2 mm. An initial incision is made parallel to the limbus through the conjunctiva and sclera, thus, creating a self-sealing wound. The trocar, when inserted into the cannula forms a continuous bevel, can then be withdrawn. The port is then in place for insertion of the desired instrument, with plugs available if required to maintain a closed system. This system ensures misalignment between the conjunctival and scleral entry site. The infusion cannula is composed of a 5 mm metallic tube, which fits through the microcannula array. These include vitrectomy cutters, light pipe, micro vertical scissors, extendable curved pick, tissue manipulator, aspirating pick, aspirator, laser probe, and diathermy probe. At the completion of surgery, the microcannulae are simply removed by grasping the collar and withdrawing, with assessment of IOP and wound sites for any possible leak.

**OBSERVATION AND RESULT:**
Amongst 50 cases 35 are males (70%) and 15 are females (30%) with male:female ratio of 2.33:1. Mean age of distribution is 49.92 in 25-gauge group with p value of 0.828 which is statistically insignificant.

Out of total 50 patients, 13 patients of Retinal detachments, 12 patients of subluxated/dislocated lens or IOL, 6 patients of macular hole, 2 patients of ERM, 17 cases from Vitreous haemorrhage with multiple causes like Diabetic retinopathy, CNVM, Traumatic vitreous haemorrhage. P value is 0.748 which is statistically insignificant.

Table 1 and graph 1 showing P value for preoperative to postoperative vision in 25-gauge is <0.05 i.e. there is definite improvement in vision.

**Table 2 showing pre-op and post-op IOP in 25-G Group.**

<table>
<thead>
<tr>
<th>Vision</th>
<th>Pre-op Tension</th>
<th>Post-op Tension</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/6 - 6/12</td>
<td>15.66</td>
<td>13.22</td>
<td>50</td>
<td>4.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph 1 showing P value for preoperative to postoperative vision in 25-gauge is <0.05 i.e. there is definite improvement in vision.

Mean preoperative intraocular tension is 15.66 mm of hg and Mean postoperative intraocular tension is 13.22 mm of hg in 25-gauge of vitrectomy group. P value <0.01 signifies that definite change in preoperative to postoperative intraocular tension (Table 2).

**Table 3 showing preoperative and postoperative Surgical induced astigmatism.**

<table>
<thead>
<tr>
<th>Vision</th>
<th>Pre-op Astigmatism</th>
<th>Post-op Astigmatism</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-G Group</td>
<td>50</td>
<td>-0.13</td>
<td>-0.13</td>
<td>1.88</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was no significant difference in the degree of Surgical induced astigmatism preoperatively and the postoperatively in the present study. As preoperative and postoperative P value is 0.081 which is not statistically significant. (Table 3)

**DISCUSSION:**
The present study is concerned with use of 25-gauge vitrectomy for cases like Vitreous haemorrhage, retinal detachment, subluxated cataract or IOL, Macular hole or PDR.
There are very few studies measuring visual outcome in 25-gauge vitrectomy. Since the introduction of vitrectomy in the early 1970s, numerous retinal conditions related to retinal detachment, macular hole and diabetic retinopathy are managed surgically. Recently, the procedure has undergone a series of revisions, allowing for smaller angled incisions that do not require suture support and are self-sealing, thus, potentially laying the groundwork for a more efficient and patient friendly procedure. Besides 20 gauge systems, today 25-gauge systems are marketed by ophthalmic device makers. Simplicity of entry is desirable, and that’s why a one-step angled incision was made in 25-gauge series with self-retaining cannula. This technique 25-gauge required stabilizing the eye on entry into the globe.

A total of 50 patients with posterior segment disease were included in this study and result obtained using appropriate statistics. Amongst them 35 are males (70%) and 15 in 25-gauge are females (30%) with male: female ratio of 2.33:1.

This study shows males are more affected than females. Mean age of distribution is 49.92 in 25-gauge group with p value of 0.828 which is statistically insignificant. Out of total 50 patients, 13 patients of Retinal detachments, 12 patients of subluxated/dislocated lens or IOL, 6 patients of macular hole, 9 patients of ERM, 15 cases from Surgery, 17 cases from MIVS allows for sutureless wounds and less wound leakage. It was reported that Surgically Induced Astigmatism after 25-gauge vitrectomy was significantly less than that after 20G vitrectomy. According to study 25G TSV does not induce regular or irregular corneal astigmatism. As preoperative 25-G and postoperative 25-G has P value of 0.07 respectively which is not statistically significant. No entry site retinal tears were seen. Fine et al reported no intraoperative sclerotomy site tears in 77 patients undergoing 25-gauge vitrectomy. However, their study was only on 23-gauge technique and not 25-gauge. In comparison to 23-gauge, 25-gauge PPV is more advantageous in eyes with corneal or conjunctival diseases such as dry eye. Further studies with longer follow-ups are warranted to determine if procedures involving more versatile surgical access to the vitreous base, and surgical maneuvers can be performed in a greater range of motion.

Post-operative hypotony following 25-gauge sutureless vitrectomy has been reported as a concern in the literature. Mean pre operative intraocular tension is 15.86 mm of hg and Mean post operative intraocular tension is 13.22 mm of hg in 25-gauge of vitrectomy group. P value <0.01 signifies that definite change in preoperative to post operative intraocular tension. Out of all 25-gauge vitrectomy cases had IOF less than 8 on post operative day 1 which increases to normal within 3 to 4 days. None of these patients developed hypotony related complications like choroidal detachment. IOP returned to normal range within first 48–72 hours with no adverse outcome on visual acuity. Tomic et al published their comparative study between 23-gauge and 25-gauge PPV and reported a higher rate (41%) of transient hypotony in their 25-gauge series compared to 14% in 23-gauge group.

Out of all 50 cases of vitrectomy, all cases achieved desired effect, i.e. 100% success rate achieved with 25-gauge sutureless vitrectomy. However, the study period is very small to define further failure or need of re-surgery.

CONCLUSION

In summary, 25-gauge suture less vitrectomy is safe and minimally invasive. They enhance post-operative recovery. For 25-gauge vitrectomy, we need to select vitreo-retinal conditions requiring minimal tissue manipulations and dissection. Overall, procedures induce minimal ocular trauma, decrease inflammatory response and allows faster patient and visual recovery. Numerous studies have shown that sutureless small-incision cataract surgery reduces the postoperative inflammatory response. Similarly, it has been proposed that there is a reduced postoperative inflammatory response and fast haemorrhage and haemorrhage when compared with conventional PPV. There is no limbal stem cell damage due to conjunctival dissection, so it may be advantageous in eyes with corneal or conjunctival diseases such as dry eye. Further studies with longer follow-ups are warranted to determine if procedures involving more extensive vascular proliferation should be performed especially with 25-gauge instruments. Small gauge vitrectomy systems are gaining popularity among vitreoretinal surgeons owing to a decreased operation time, faster visual recovery and less patient discomfort.

The advantages in vitrectomy cutters, illuminating probes and accessory instruments allow the surgeon for an easier access to the vitreous base, and surgical maneuvers can be performed in a greater range of motion. The 25-gauge vitrectomy surgery is feasible, effective, safe, and practical procedure for a variety of vitreoretinal disorders. The TSV system has been observed to be less-injected on the first postoperative day when compared with conventional PPV. There is no limbal stem cell damage due to conjunctival dissection, so it may be advantageous in eyes with corneal or conjunctival diseases such as dry eye. Further studies with longer follow-ups are warranted to determine if procedures involving more extensive vascular proliferation should be performed especially with 25-gauge instruments. Small gauge vitrectomy systems are gaining popularity among vitreoretinal surgeons owing to a decreased operation time, faster visual recovery and less patient discomfort.

DISCLOSURE

The authors report no conflicts of interest in this work.

REFERENCES