

PATTERN OF SURGICAL PROCEDURES PERFORMED FOR VITREO-RETINAL DISEASES AT LAHORE GENERAL HOSPITAL

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ABSTRACT

Objective: Analysis of the pattern of vitreo-retinal procedures performed at Lahore General Hospital according to the disease.

Methods: It was cross sectional study conducted at Lahore General Hospital, Lahore from January 2017 to January 2018. A complete pre-operative examination was performed including visual acuity, slit lamp examination, dilated fundus examination and B scan of the orbit if required. Plan for surgical procedure was according to the clinical findings. All vitrectomies were done using 23 G instruments. scleral buckling procedures were done under general anesthesia. Data regarding the surgical procedure and its steps was documented on a performa. All patients with incomplete data were excluded from the study.

Results: There were 619 patients included in the study out of which 422 were males and 197 were females. There were 321 patients having Rhegmatogenous retinal detachment out of which 47 (14%) underwent buckling, 121 (38%) underwent PPV and 153 (48%) underwent PPV combined with buckling. There were 94 patients with vitreous hemorrhage all of whom underwent PPV except for one who also had buckling. There were 31 patients with macular hole, 116 patients with tractional retinal detachment, 12 with intraocular foreign body, 15 with nuclear fragment or IOL drop, 14 with endophthalmitis, 9 with subhyaloid hemorrhage and 8 with Epiretinal membrane. Silicone oil was used in 60% of the cases, SF6 gas was used in 5.7% cases, air in 7.9% cases and fluid in 26.2% cases.

Conclusion: Rhegmatogenous retinal detachment is the commonest surgical disease and pars plana vitrectomy is the most commonly used procedures for various vitreoretinal diseases.

Key Words: Retinal Detachment, Vitreous Hemorrhage, Macular Hole, Intraocular Foreign body.

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INTRODUCTION

Vitreo-retinal diseases are the main source of childhood blindness worldwide.¹ Studies have found vitreo-retinal diseases to be prevalent in 8.56% of the population.^{2,3} Diabetic eye disease ranks fifth in the global causes of partial and complete loss of vision. It is a rapidly growing disease in the emerging economies of the world and maximum number of adults in their working age go blind because of it.⁴ Ninety percent of the blind patients across the world are from the developing countries and diseases of the retina rank second after cataract as the cause of blindness in these countries.⁵

It has been predicted that by 2030 more than 50% of the diabetic patients of the world will be living in Asia.⁶ The 2nd Pakistan National blindness and visual impairment survey (2002-04) reported retinal disorders to be one of least causes of blindness in the country.⁷ A recent study from a public hospital in Karachi showed Corresponding Author: Dr. Arooj Amjad, Assistant Professor Ophthalmology, PGMI/AMC, Lahore. Email: arooj.amjad@gmail.com that 13% of their outdoor patients had retinal diseases.⁸

There are a lot of retinal diseases which require intervention. The most common include Rhegmatogenous retinal detachment which is a sight threatening retinal emergency which if left untreated can result in complete blindness of the effected eye. The treatment consists of scleral buckling or vitrectomy, or a combination of the two with silicone oil, gas or blanced salt solution temponade. Anatomical success rates are in the range of 85% to 90% using endolaser or cryotherapy for sealing of breaks.⁹ Similarly; vitreous hemorrhage, proliferative vitreo-retinopathy, intraocular foreign

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bodies (IOFBs) are also very important causes of visual loss and their surgical treatment mainly relies upon pars plana vitrectomy. Macular hole has been reported in 3 out of 1000 cases above 55 years as cause of central visual loss.¹⁰ Its recommended treatment ranges from simple observation to pars plana vitrectomy with ILM peel so as to release the causative vitreomacular traction followed by gas tamponade. Posterior dislocation of the whole nucleus or its small pieces into the posterior segment is one of the most dreaded complications of cataract surgery and an immediate pars plana vitrectomy to remove the dropped nucleus is the treatment of choice.¹¹

Surgical trends around the World are changing and vitreo-retinal surgeons have shifted from scleral buckling to pars plana vitrectomy as the main surgical procedure for retinal detachment. Moreover, smaller gauge (23, 25 and 27 G) vitrectomies have replaced 20 G vitrectomies. This has significantly reduced the surgical time with sutureless procedures.¹¹ The rationale of our study was to find the surgical trend in our department for the management of various retinal diseases. The purpose of the study was to analyse the pattern of vitreo-retinal procedures done at Lahore General Hospital according to the disease and the procedure performed.

METHODS

All patients operated for various vitreo-retinal conditions at Lahore General Hospital, Lahore from January 2017 to January 2018 were included in the study. Approval was taken from the hospital ethical committee for the study. All patients with incomplete data were excluded from the study. A complete pre-operative examination was performed including visual acuity, slit lamp examination, dilated fundus examination and B-scan of the orbit if required. Plan for surgical procedure was according to the clinical

findings. All scleral buckling procedures (simple or combined with vitrectomy) were done under general anesthesia. Pars plana vitrectomy was done using 23 G instruments with suturing of the ports at the end of the procedure. Patients requiring silicone oil were injected with 5000 cs oil using the 23 G port. Endolaser was done for retinal breaks and vascular retinal diseases. Cryotherapy was used in scleral buckling and vitrectomy to seal breaks per operatively. Perflourocarbon was used in patients with retinal detachment along with air exchange for internal drainage of subretinal fluid. Brilliant peel was used to stain internal limiting membrane for internal limiting membrane peel. SF6 gas or air was used in patients with macular hole. Patients underwent post operative fillin argon laser when when required. Silicone oil was removed in most of the cases between 3-6 months. Data regarding the surgical procedure and its steps was documented on a performa. Data analysis was done using SPSS version 20.

RESULTS

There were 619 patients included in the study out of which 422 were male and 197 female patients. The results show that Rhegmatogenous retinal detachment was the commonest vitreoretinal disease treated at our institution. Moreover pars plana vitrectomy was the commonest procedure performed. It was combined with different procedures such as ILM peel for macular hole, delamination for tractional retinal detachment, phaco fragmentation for dropped lens and intravitreal antibiotics for endophthalmitis. Scleral buckling was either performed alone or in combination with pars plana vitrectomy. The results are shown in table 1 and Figure 1. Silicone oil was used in 60% of the cases, SF6 gas was used in 5.7% cases, air in 7.9% cases and fluid in 26.2% cases.

Table 1. Distribution of cases according to the procedures performed.

Disease (Procedure)	Oil	Gas	Air	Fluid	Total
Rheg. Retinal Detachment					
Buckling	0 (0 %)	0 (0 %)	0 (0%)	47 (100 %)	47 (14%)
PPV	98 (81%)	10 (8.3%)	2 (1.7%)	11 (9.1%)	121 (38%)
PPV + Buckling	133 (6.9%)	3 (2 %)	2 (1.3%)	15 (9.8%)	153 (48%)
				Total	321
Vitreous Hemorrhage					
PPV	47 (50.5%)	7 (7.5%)	8 (8.6%)	31 (33.3%)	93 (99%)
PPV + Buckling	1 (100%)	0	0	0	1 (1%)
				Total	94
Macular Hole					
PPV + ILM Peel	1 (3.2%)	12 (38.7%)	18 (58.1%)	0	31

Tractional Retinal Detachment					
PPV	74 (63.8%)	2 (1.7%)	15 (12.9%)	25 (21.8 %)	116
Intraocular Foreign Body					
PPV	5 (41.7%)	0	0	7 (58.3%)	12
IOL / Lens drop					
PPV	2 (13.3%)	0	0	13(86.7%)	15
Endophthalmitis					
PPV	5 (35.7 %)	0	0	9 (64.3%)	14
Subhyaloid Hemorrhage					
PPV	5 (55.6 %)	0	1 (11.1%)	3 (33.3%)	9
ERM/VMT					
PPV	0	1 (14.3%)	3 (42.9%)	3 (42.9%)	7
Total	373 (60.3%)	35 (5.7%)	49 (7.9%)	162 (26.2%)	619

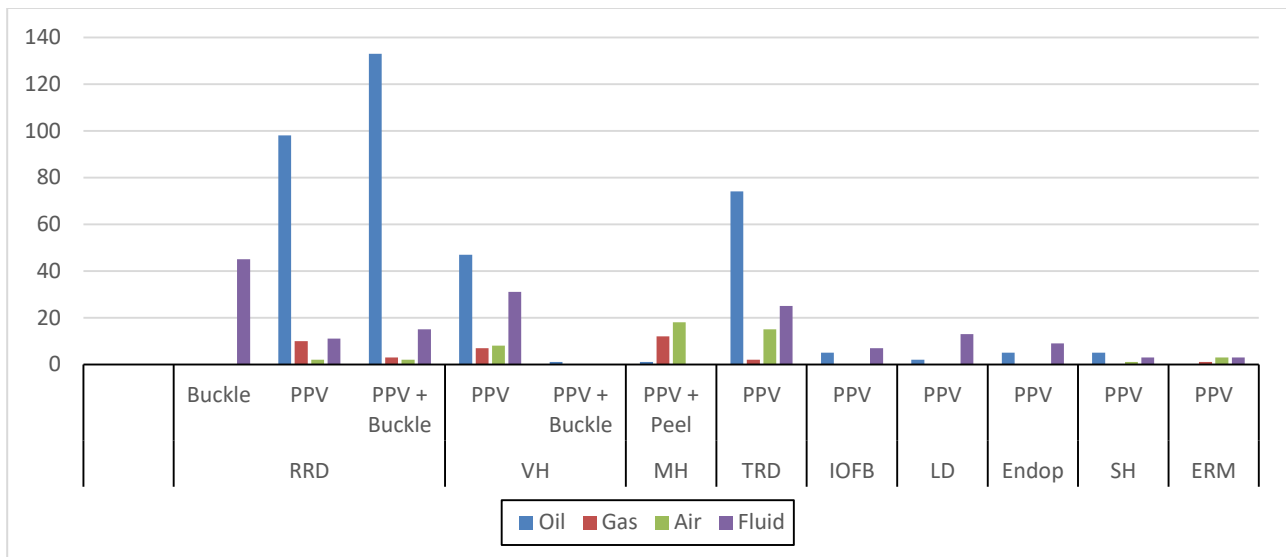


Figure 1. Graphical distribution of cases

Abbreviations: RRD: Rhegmatogenous Retinal Detachment, VH: Vitreous Hemorrhage, MH: Macular Hemorrhage, TRD: Tractional Retinal Detachment, IOFBL Intraocular foreign body, LD: Lens/IOL drop, Endop: Endophthalmitis, SH: Subhyaloid hemorrhage, ERM: Epiretinal membrane

DISCUSSION

Vitreo-retinal diseases have witnessed a substantial surge around the world. Prevalence of vitreo-retinal diseases has been estimated to range from 10.4% to 21.02% in patients aged 40 years and above with an average of 8.56% according to some population based studies. In developing countries where 90% of the blind patients live, retinal disorders are the among the common causes of visual loss after cataract.¹² There are many medical treatments available for a variety of vitreo-retinal diseases like laser photocoagulation, intra-vitreous Anti-VEGF Injections, intraocular tissue plasminogen activator injections, intra-vitreous steroid injection, photodynamic therapy, pneumatic retinopathy

etc. but in our study we will discuss surgical treatment of these diseases.

Machemer in 1970 started pars plana vitrectomy (PPV) for limited indications. However, now vitrectomy is one of the most common vitreo-retinal surgery performed across the globe and its indications have increased manifold. In UK, around 20,000 pars plana vitrectomies are performed each year. PPV is nowadays performed for several conditions like diabetic retinopathy, retinal detachments, vitreous hemorrhage, macular hole, trauma, infections and inflammations of the vitreo-retina.¹³

Primary PPV has become the now become the norm for the treatment of retinal detachment using

endolaser and internal tamponade with gas due to its safety and efficacy. Literature shows that the visual and anatomic success rates of this procedure are equally as good as pneumatic retinopexy, scleral buckling and PPV combined with scleral buckling. Different types of internal tamponades may be used such as oil tamponade using silicone oil or gas tamponade using air, SF₆ or C₃F₈ gas. The Silicone oil study compared the visual and anatomic results of silicone oil versus SF₆ after 1 year and found that silicone oil had significantly better results while a comparison of silicone oil with C₃F₈ gas showed that both of them were equally effective.¹⁴ The surgeon's decision to choose the agent for internal tamponade is dependent upon the location of the break, travel commitments of the patients and health of the patient to comply with posturing postoperatively and other factors. Silicone oil is used as choice in children and mentally handicapped patients who cannot perform posturing after the procedure, patients who need to travel by air post-operatively and patients with only seeing eye who need to be rehabilitated early.

Scleral buckling used to be the procedure of choice for retinal detachment in earlier times and it involves the placement of either a silicone sponge or a solid silicone band sutured to the sclera circumferentially around the equator of the eye. It has a steep learning curve but it is a very reliable procedure that augments the success rate of primary vitrectomy in patients with retinal detachments having inferior breaks. According to a study that compared PPV to PPV with scleral Buckling for simple primary rhegmatogenous retinal detachment no significant differences were found in anatomical success in a single procedure and final visual acuity of the patients.¹⁵ Another study concluded that primary pars plana vitrectomy or combined PPV with scleral buckling for primary simple pseudophakic retinal detachment had similar anatomic and visual results.¹⁶ In our study, out of the total 619 patients, only Scleral Buckling was performed in 47 patients and PPV was performed in 387 patients. PPV with Buckling was performed in 154 patients and the results of PPV with and without Scleral Buckling were comparable.

As far as management of Full Thickness Macular Hole is concerned, PPV with ILM peel is the recommended procedure currently.¹⁷ The steps involved in a routine macular hole vitrectomy are induction of posterior vitreous detachment followed by ILM peel using tissue dyes and internal tamponade with long acting gas in the end. Air, SF₆ (Sulfur hexafluoride) or C₃F₈ (perfluoro propane) are generally employed for this purpose. According to a Chinese study it was found that when air is used for internal tamponade the results are comparable to C₃F₈ with less complications.¹⁸

However, in our study, PPV with ILM peel was done in 31 patients that presented with macular hole and internal tamponade was done using either air in 58.1% cases and SF₆ in 38.7% cases.

Dense vitreous hemorrhages that obscure the fundus details are often associated with retinal tears and detachments and occur during posterior vitreous detachment as a prequel. In such cases early surgical intervention with vitrectomy is recommended so as to view the fundus and treat the underlying pathology especially in patients who have had retinal detachment in the other eye.¹⁹ In our study, 94 patients with vitreous hemorrhage underwent pars plana vitrectomy mostly due to diabetes or Eale's disease except for one who also had buckling for retinal break.

For the treatment of PVR, pars plana vitrectomy is done as the first step followed by the removal of the epi-retinal membranes (ERMs). Internal tamponade with long duration gases and silicone oil in patients with PVR have improved the surgical success in these cases but recurrence with re-detachment can be a problem if the ERM is not completely removed during the initial procedure.²⁰ In our study, 7 patients with ERM underwent PPV with subsequent procedures as per requirement.

Ocular trauma and open globe injuries are often associated with intraocular foreign bodies (IOFB) that need to be removed on emergency basis if potentially threatening the vision and/or causing inflammation and toxicity. With the introduction of advanced vitreo-retinal surgical methods and instrumentation there has been significant improvement in management of these complicated cases.²¹ In the past, ferrous foreign bodies were removed from the eye with an external magnet but it led to an uncontrolled extraction leading to iatrogenic breaks and retinal detachment. Metallic IOFB used to be managed by magnet removal in the earlier times. Currently pars plana vitrectomy is the procedure of choice as the foreign body can be precisely visualized along with any associated retinal breaks after the removal of the vitreous which may or may not be opaque due to hemorrhage or vitritis. This is followed by sealing of any breaks with endolaser.²² Stanly Chang introduced perfluorocarbon liquid (PFCL) to vitreoretinal surgery as a short term tamponade. It has been shown in a recent experimental study that when PFCL is used during removal of IOFB it can protect the macula from the impact of dropped metallic IOFB by changing its path during the fall on the retina at the PFCL-balanced salt solution (BSS) interface.²³ In our study 12 patients underwent PPV and IOFB removal with per-operative use of PFCL.

Endophthalmitis being the most serious post-traumatic or postoperative complication may lead to visual loss and/or anatomical loss of the affected eye if not treated promptly. In case of failure of comprehensive antibiotic treatment, immediate pars plana vitrectomy (PPV) is indicated. Many studies including Endophthalmitis Vitrectomy study recommend PPV and injection of silicone oil in eyes with Endophthalmitis even without detachment of the retina.²⁴ Treatment of endophthalmitis has significantly improved after introduction of PPV as it helps to take sufficient vitreous sample for culture after clearing the opaque vitreous full of pathogens, toxins and debris. It is also combined with intravitreal antibiotics which have better results once the vitreous is cleared. Moreover, removal of membranes prevents retinal detachment later. In our study 14 patients with Endophthalmitis underwent PPV for treatment with and without silicone oil injection.

Dropped nuclear fragments can occur as a dreaded complication during a cataract surgery if a posterior capsular rupture occurs. Once a nuclear fragment has dropped, early PPV is recommended to prevent secondary glaucoma and secondary uveitis. According to a Pakistani study, immediate PPV is recommended in this case, when available²⁵. Also, attempted placement of intraocular lens (IOL) in cases with posterior capsular rupture and zonular dialysis can occasionally lead to dislocation of IOL into the vitreous cavity. Management of these cases is with pars plana vitrectomy (PPV) with nucleus, lens or IOL removal and placement of IOL implantation in the same sitting or as a secondary procedure depending on the expertise of the surgeon. In our study 15 patients underwent PPV for removal of dropped lens/IOL

Limitation of our study was that it involved a single center with limited number of patients. Moreover, it was a cross sectional study to find out the frequency of various procedures being done in the department. Therefore, visual outcomes were not included in the study.

CONCLUSION

Rhegmatogenous retinal detachment is the commonest surgical disease and pars plana vitrectomy is the most commonly used procedures for various vitreo-retinal diseases in our department

ETHICAL APPROVAL:

The study was approved from Ethical Review Committee of Postgraduate Medical Institute, Lahore, Pakistan.

AUTHORS' CONTRIBUTION:

MM: Study design, statistical & critical analysis

MAB: Data collection, statistical design

AA: Manuscript writing

FM, LS: Data collection

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