

# Shifting Paradigm: From General Anesthesia to Local Anesthesia in Posterior Segment Surgeries

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## ABSTRACT

**Purpose:** To evaluate the type and methods of anesthesia used in posterior segment ocular surgeries.

**Study Design:** Cross sectional survey.

**Place and Duration of Study:** Akhtar Saeed Medical College, from April 2017 to May 2019.

**Material and Methods:** Two hundred and three patients who underwent posterior segment surgeries were selected by convenient sampling technique. Average surgery time was 45 minutes under local anesthesia (LA) but all patients whose surgery was performed in general anesthesia (GA), had at least 6 hours hospital stay and four hour nothing by mouth before and after procedure, under observation of doctor/anesthetist and nursing staff. Patient age, gender, indication for surgery, type of surgery performed and type of anesthesia were noted. Data was analyzed by using SPSS 25.

**Results:** Total 203 patients were included in study, 122 (60.1%) male and 81 (39.9%) females. General anesthesia (GA) was used in 18.2% surgeries and local anesthesia (LA) was opted in 81.8%. Mean age of patients who underwent GA was 30.62 years and 51.71 years for LA. Three major indications for LA were retinal attachment surgery 64 (38.6%), vitreous hemorrhage 20 (12%) and endophthalmitis in 12 (7.2%) patients. Indications for surgery under GA were surgery for retinal detachment in 23 (62.2%), endophthalmitis 6 (16.2%) and removal of silicon oil 2 (5.4%). PPV was done in 64.5% patients under LA and 9.8% in GA but all combined procedures (PPV and scleral buckling) were done under GA.

**Conclusion:** The local anesthesia is favorable for posterior segment ocular surgeries in term of less hospital stay, no need of NPO, fast recovery and cost effectiveness.

**Key Words:** Local anesthesia (LA), General anesthesia (GA), Scleral buckling, Retinal detachment (RD), Pars plan vitrectomy (PPV).

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## INTRODUCTION

History of anesthesia dates back to 3400 BC<sup>1,2</sup>. There is a deep desire inside human, since ancient times that they want to be pain free. First evidence of use of term anesthesia came in 1846, coined by Oliver Wendell

Holmes<sup>3</sup>. Alcohol is oldest known sedative<sup>4</sup>. An ideal anesthetic agent is good analgesic, cost effective, long acting and free of side effects. Over the last two decades vitreoretinal surgeries have increased and new techniques, instruments and modalities have been introduced for pars plana vitrectomies (PPV)<sup>5-7</sup>. Initially the trend was towards general anesthesia and nearly all pars plana vitrectomies, sclera buckling and retinopexies were performed under general anesthesia. For last one decade there is increased frequency of posterior segment surgeries under local anesthesia with or without intravenous sedation. Local anesthesia

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has many advantages over general anesthesia including less hospital stay, ambulatory surgery, no need of specialized theatre facilities, early recovery and cost effectiveness. Pakistan is a developing country and delayed presentation of retinal detachment added with fewer resources like unavailability of retinal surgeon and special operation theaters are major factors leading to poor visual outcomes after surgery. The ability and facility to perform ocular posterior segment surgeries under local anesthesia significantly decreases recovery time and cost.

Rationale of this study was to find out the feasibility of posterior segment surgeries under local anesthesia by evaluating the type and methods of anesthesia used in posterior segment ocular surgeries.

## MATERIAL AND METHODS

Over the last two years, from April 2017 to May 2019, all patients who underwent posterior segment ocular surgeries were included in study. Informed consent was taken by all patients and patient fitness for general anesthesia was checked by consultant anesthetist. Before surgery blood pressure, serum sugar, hepatitis B and C tests were checked by anesthetist in all patients and ECG for selected patients and intravenous access was secured. The technique for local anesthesia was peri-bulbar and facial block, performed by ophthalmologist himself, using lignocaine injection 2% and bupivacaine 0.5%. Nearly 3cc of combined lignocaine and bupivacaine was injected in peri-bulbar area of the eye to be operated and also in pre-auricular area of ipsilateral side. Anesthetist was available for monitoring of vitals and to counteract any unforeseen events. The main drugs used by the anesthetist for sedation were Propofol, Ketamine and Midazolam in general anesthesia with endotracheal intubation. Average surgery time was 40 minutes but all patients whose surgery was performed in general anesthesia, had at least 6 hour hospital stay and 4 hour nothing by mouth after procedure, under the observation of doctor/anesthetist and nursing staff. Patient age, gender, indication for surgery, type of surgery performed and type of anesthesia were noted. Data was analyzed by SPSS version 25.

## RESULTS

Total 203 patients were included in the study, including 122 (60.1%) males and 81 (39.9%) females. General anesthesia was used in 37 (18.2%), out of

whom 25 (67.6%) were males and 12 (32.4%) were females. Local anesthesia was opted in majority of patients; 166 (81.8%) including 97 males (58.4%) and 69 females (41.6%). Age ranged from 2 years to 83 years and mean age of patients who underwent surgery in general anesthesia was 30.62 years and 51.71 years for local anesthesia patients (shown in table 1). Three top most indications for LA were retinal detachment (RD) in 64 (38.6%) patients, vitreous hemorrhage in 20 (12%) and endophthalmitis in 12 (7.2%) patients (Pie chart 1). Most common indication for surgery under GA were RD in 23 (62.2%), endophthalmitis in 6 (16.2%) and removal of silicone oil in 2 (5.4%) patients (Pie Chart 2). The common procedure for RD repair was PPV with or without scleral buckling. Out of 203 posterior segment ocular surgeries, 131 (64.5%) were performed under LA and 20 (9.8%) in GA. All patients of scleral buckling were operated in GA except 2 in whom LA with sedation.

**Table 1:**

Anesthesia	Eye		Age	Gender	
	Right	Left	Mean	Male	Female
LA	79	87	51.71%	97	69
GA	15	22	30.62%	25	12

was used. All combined procedures (PPV & scleral buckling) were done under GA.

## DISCUSSION

Vitreoretina has recently been recognized as a separate specialty and is flourishing in ophthalmology. New trends and techniques are being evolving.<sup>8-10</sup> Previously, almost every posterior segment surgery was performed under general anesthesia, but now more posterior segment surgeries are being performed under local anesthesia. General anesthesia is used only in selected cases, reserved for children, mentally handicapped patients, for scleral buckling and patients with complex or complicated medical history. Scleral buckling is traditionally performed under GA, but in our study out of total 10 patients, one patient was done under LA combined with IV sedation.

The painful steps during vitreoretinal surgery are sclerectomies (trocar cannula placement and withdrawal), application of endolaser, and scleral indentation for peripheral vitreous shaving.<sup>11-15</sup>

Anesthesia is required to make patient comfortable during these steps. Duration of vitreoretinal procedure is usually from 35 to 55 minutes.

Lignocaine 2% combined with bupivacaine 0.5% is safe, effective and acceptable anesthetic agent in ocular surgery providing anesthetic effect up to 60 minutes<sup>16,17</sup>. Lignocaine and bupivacaine combined mixture is better in analgesia and akinesia for longer duration than lignocaine alone. The retro-bulbar injection is safe in expert and trained hands with minimal side effects. Its complications are very rare but sight threatening. Retrobulbar block is rarely associated with complications like ocular perforation, brain stem infarction<sup>18</sup> as patient co-operation is very important during peri-bulbar or retro-bulbar injections and patient looking toward wrong direction can lead to undesirable effects. In our study we did not have any of these complications.

The different pharmacological agents, depending upon patient age, comorbid associations and anesthetist preference, used in GA are Propofol, Ketamine and Midazolam which have average duration of 10, 20 and 30 minutes respectively<sup>19,20,21</sup>.

An ideal anesthetic agent is of sufficient duration with least side effects so that patient and surgeon both are comfortable. LA has certain advantages over GA including less hospital stay, less cost, less surgical time, no NPO required, quick and early recovery. LA is usually given by eye surgeon and anesthetist monitors patient's vitals. GA is associated with more significant side effects in geriatric patients.

As we are living in a developing country and resources do matter; LA is cheaper than GA. Small gauge 23 G vitrectomies are also being done under topical anesthesia<sup>22</sup> as in report by Mahajan et al. but it also depends upon patient factors (threshold of pain varies from person to person) and surgeon expertise<sup>23</sup> (duration of surgery and skills). In a study by Gupta et al. in neighboring country India, intracameral preservative free lignocaine 2%, augmented with topical anesthesia with proparacaine 0.5% was found sufficient<sup>24</sup> for pars plana vitrectomy in 114 eyes (78 male, 36 females) but so far LA is much more effective and safe as compared to GA<sup>25</sup> for most cases of vitreoretinal surgeries.

The limitations of the study were the limited number of patients in private sector, surgeon preferences and surgical abilities of surgeon.

## CONCLUSION

The surgical practices change with time according to resources and prevalent conditions. Now there is a trend of performing anterior segment surgeries in topical anesthesia rather local anesthesia and posterior segment surgery under local anesthesia rather general anesthesia. The local anesthesia is favourable and beneficial for posterior segment ocular surgeries in terms of less hospital stay, no need of NPO, fast recovery and cost effectiveness especially in developing countries. The patient is also able to maintain required head positioning within hour after surgery, if it is performed under local anesthesia.

## Ethical Approval

The study was approved by the Institutional review board/Ethical review board.

## Conflict of Interest

Authors declared no conflict of interest.

## Authors' Designation and Contribution

Sidrah Riaz; Associate Professor: *Data collection, Data Analysis, Manuscript writing.*

Muhammad Tariq Khan; Associate Professor: *Primary Surgeon, final review.*

Munir Ahmad; Associate Professor: *Concept, final review.*

Nadeem Hafeez Butt; Professor: *Concept, Final review.*

Shabana Chaudhary; Assistant Professor: *Concept, Final review.*

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