

East African Medical Journal Vol. 91 No. 3 March 2014

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ABSTRACT

Background: Ophthalmic surgical procedures are performed under anaesthesia to enhance comfort and cooperation of patient.

Objective: To review factors influencing the choice of anaesthesia for ophthalmic surgical procedures.

Design: Restrospective descriptive study

Setting: Eye unit of a tertiary hospital.

Subjects: All patients who had ophthalmic surgeries in the operating theatre from January 2002 to December 2009.

Results: Two hundred and ninety ophthalmic surgeries were carried out during the study period. Age range was 1-95 years and mean of 61.0 ± 1.9 ; most (55%) were elderly while 4.8% were children. One hundred and forty seven (50.7%) were males, 143(49.3%) females; male:female of 1.03:1. Local anaesthesia was the more commonly (92.1%) employed while general anaesthesia was used in 23(7.9%) patients. General anaesthesia was used more frequently (71.4%) in children compared to other age groups; the mean age and standard error of means for patients who had general anaesthesia (27.2 /5.4 years) is smaller compared to 63.9/0.93 years for patients who had local anaesthesia ($p < 0.0001$). Regional anaesthesia was the most frequently used for all types of procedures except for eye wall repairs in which general anaesthesia was used for 71.4% of patients ($p < 0.0001$). General anaesthesia was indicated in seven (41.2%) of emergency ophthalmic surgical procedures as compared to 16 (5.9%) of elective ophthalmic procedures $P < 0.0001$.

Conclusion: General anaesthesia was more commonly employed in children, eye wall repairs and emergency ophthalmic surgical procedures.

INTRODUCTION

Ophthalmic surgical procedures are performed under anaesthesia for the comfort and cooperation. Regional anaesthesia in form of retro-bulbar block, peri-bulbar block, sub-conjunctival block, sub-tenon anaesthesia as well as topical anaesthesia has become the most popular form of anaesthesia employed globally for ophthalmic surgical procedures (1-7). Regional anaesthetic techniques eliminate the need for some routine investigations like chest X-ray, ECG, as well as risk associated with general anaesthesia (8) they are more tolerable for elderly patients, ill patients, they are cheaper and generally more useful for ambulatory procedures as need for recovery from general anaesthesia is eliminated (3-9).

Over the years, with improvement in ophthalmic

surgical equipment and skills, the different methods of regional anaesthesia provide varying ranges of globe/lid akinesia, anaesthesia as well as intraocular hypotonia in awake patients during ophthalmic surgery. General anaesthetic procedures on the other hand, provide globe/lid akinesia, anaesthesia and varying degree of intraocular pressure changes depending on the agent used in patients who are asleep during the surgery (2,10). In spite of the global trend of preferred use of regional anaesthesia judging from its advantages, some ophthalmic procedures are carried out under general anaesthesia. The choice of anaesthesia for surgical procedure is influenced by the type of surgery intended, patient related factors as well as surgeon's preference (4,5,7). General anaesthesia use in an ophthalmic theatre would require specialist anaesthetist coverage, anaesthetic

machines and different sets of medications in comparison with regional anaesthesia; a study of the indications for such anaesthesia will assist in proper planning, personnel mobilisation as well as optimal scheduling of operating time.

This study reviewed the anaesthetic techniques employed for ophthalmic surgical procedures in the eye unit of a tertiary hospital to determine factors related to the use of general anaesthesia as compared with regional anaesthesia.

MATERIALS AND METHODS

This is a retrospective analytical study of ophthalmic surgical procedures at the operating theatre of the Wesley Guild Hospital, Ilesa Nigeria between January 2002 and December 2009. The ophthalmic surgical space in the theatre for elective procedures was one day in a week for most of the study period although the theatre was available for emergency ophthalmic procedures throughout the week. The work adhered to the Declaration of Helsinki.

The age, sex, indication for surgery as well as the nature of surgery were extracted from the theatre record and imputed into a predesigned study proforma. The types of ophthalmic surgery performed as well as the anaesthetic technique used were also included. The patients were grouped by age into children (0-15 years), young adults (16-44 years), middle aged (45-64 years) and elderly (65 years and above). The nature of surgery was grouped into elective if the patient had the surgery scheduled on the published operating list for the ophthalmic surgical operating day. Patients who had surgeries awake under facial nerve block, retro-bulbar block, peri-bulbar block, sub-conjunctival block, infiltration anaesthesia or topical anaesthesia were grouped as regional anaesthetic technique while those who had their surgery while asleep were grouped under general anaesthesia. Regional anaesthesia for ophthalmic procedure in the study centre is given by ophthalmologists or ophthalmologists in training while general anaesthesia is administered by anaesthetists. A Consultant anaesthetist is routinely on the eye list and theatre to cover if there is a need to convert regional to general anaesthesia. Two percent xylocaine in adrenaline was used for regional anaesthetic procedures while for general anaesthesia, the protocol was to achieve induction with 4mg/kg body weight of sodium thiopentone and facilitate endotracheal intubation with 1-2mg/kg of suxamethonium. Anaesthesia maintenance was with 6l/minute of oxygen and 0.5-1% halothane. Pentazocine 0.5 mg/kg provided analgesia and muscle relaxation was provided with pancuronium 0.08 mg/kg. Intra-operative pulse oximetry and non invasive blood pressure monitoring was used. Residual neuromuscular blockage was antagonised

post-operatively using neostigmine 0.04 mg/kg and 0.02mg/kg atropine. The protocol is slightly modified for patients with open globe injury, a modified rapid sequence induction is achieved with thiopentone after a dose of pancuronium or atracurium following which tracheal intubation can be achieved without use of suxamethonium. The anaesthetic machine name and resuscitation drugs were present within the eye theatre.

Data analysis with SPSS version 11 examined simple frequencies as well comparison between anaesthetic technique with age, nature of surgery, diagnosis and type of surgery using Fisher's Exact, Chi square and ANNOVA as appropriate; statistical significance was assumed at $p < 0.05$.

RESULTS

Two hundred and ninety ophthalmic surgical procedures were carried out in the operating theatre of the institution during the study period. The patients' age ranged from 1 to 95 years with mean \pm standard deviation and mode of 61.0 ± 1.9 years and 70 years respectively. Most of the surgeries (55%) were performed in the elderly age group while 14 (4.8%) were performed in children. One hundred and forty-seven (50.7%) were males, 143 (49.3%) females giving a male:female of 1.03:1

Cataract 188 (64.8%), Glaucomas 50 (20.3%) and 16 Pterygium (5.5%) were the leading indications for surgery during the study period. Surgery was indicated for eye injury in 14 (4.8%) patients. Cataract extractions (65%), trabeculectomy (19.3%) and pterygium excision (5.5%) were the most common ophthalmic surgical procedures performed. (Table 2) One hundred and sixty-three (86.7%) of the patients operated with cataract had age related type, pre-senile 14 (7.5%), childhood four (2.1%), post-traumatic three (1.6%), post-uveitic three (1.6%) and one (0.5%) was a dislocated cataract. Glaucomatous disorders for which surgeries were carried out included 55 (93.2%) primary open angle glaucoma, one (1.7%) primary angle closure glaucoma and three (5.1%) secondary angle closure glaucomas.

Local anaesthesia techniques were the more commonly (92.1%) employed for the ophthalmic procedures while general anaesthesia was employed in 23 (7.9%) patients. General anaesthesia for ophthalmic procedures was used more frequently (71.4%) in children compared with other age groups. The mean age and standard error of means for patients who had general anaesthesia (27.2 ± 5.4 years) is smaller compared with 63.9 ± 0.93 years for patients who had local anaesthesia. ($p < 0.0001$) The number of patients who had general anaesthesia consistently reduced with increasing age group.

All types of ophthalmic surgical procedures were carried out more commonly under regional

anaesthesia with the exception of eye wall repairs; in this group of procedures, general anaesthesia was required for 71.4% of patients. General anaesthesia was indicated in seven (41.2%) of ophthalmic surgical procedures carried out on emergency basis compared with 16 (5.9%) of elective ophthalmic procedures $P < 0.0001$.

Patients with traumatic eye injury necessitating ophthalmic surgical procedures were more likely to require general anaesthesia than other indications for ophthalmic surgical procedures.

DISCUSSION

The most common ophthalmic surgical procedure in this study was cataract extraction. Cataract surgery remains the most commonly performed ophthalmic surgery in Nigeria and other countries (11-13). This dominance is reflective of cataract being the most common eye disease presenting in the study centre (14).

The ideal anaesthetic technique for eye surgery should be one that is effective and does not harm the eye or the patient (15). Most (92.1%) of the surgeries in this study were carried out under regional anaesthesia. Imanrengiaye *et al* in their study of ophthalmic surgical procedures in Benin City, Nigeria, reported similar high preference for local anaesthesia (7). Local anaesthetic procedures for eye surgeries are safe and have economic benefits (16). Most patients presenting for ophthalmic surgery are elderly and have pre-existing medical problems; thus regional anaesthesia remains the technique of choice except when contraindicated (1-7,17). In such instances, general anaesthetic procedures will be indicated.

In our study, general anaesthesia was required in younger age group for childhood ophthalmic procedures. Younger children have short attention span and cannot maintain the required head position for eye surgery. General anaesthesia in paediatric ophthalmic surgical procedures allows complete access to the eye as well as control of the head position throughout the surgery and hence remains the ideal as well as preferred technique of choice in this age group (18). Eye wall repair following open globe injury was the predominant surgically correctable eye disorder requiring general anaesthesia in this study. General anaesthesia will enhance meticulous surgical repairs the ocular wall as against local anaesthetic procedures which will increase the intraorbital as well as intraocular pressures leading to further extrusion of intraocular content thus worsening the injury. Efficient general anaesthetic procedure must ensure that there is no attendant increase in intraocular pressure during the procedure by avoiding the use of pressure raising agents like suxamethonium (19). General anaesthetic procedures were more commonly

employed for emergency eye surgeries in this study compared with elective procedures; this is probably a reflection of the nature of emergencies handled which were more commonly open globe injuries - by nature requiring surgical repair under general anaesthesia. In addition to children and open globe injuries, general anaesthesia may be recommended in major orbitotomies, patients receiving bilateral surgeries, complex or lengthy procedures especially vitreoretinal procedures, patients allergic to local anaesthetic agents and apprehensive patients opting for general anaesthesia. The eye unit of the study centre catered for general ophthalmic surgical procedures only during the study period and as such orbitotomies as well as other complex/lengthy procedures were not carried out in the centre.

In this study, we conclude that though most ophthalmic surgeries in the eye unit providing general ophthalmic care are carried out under local anaesthesia, personnel and materials for general anaesthetic procedure should be made available for children and emergency eye surgeries especially ocular wall repairs.

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