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IMPACT OF FELLOWSHIP TRAINING ON SURGICAL PRODUCTIVITY IN OPHTHALMOLOGY

Ophthalmology

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ABSTRACT

Objectives: To assess whether Surgical productivity is affected by fellowship training by comparing differences in Visual acuity and complication rates at 3 month and 1 year of fellowship training. **Design:** Retrospective case series. **Settings:** Sankara Eye Hospital Ludhiana, Panjab, India. **Methods:** Cataract operations performed by a single fellow doctor from March 2021 through March 2022 at Sankara Eye Hospital, Ludhiana formed the basis for this investigation. In a random fashion, 40 subjects who had undergone manual Small incision cataract surgery (MSICS) were selected and divided into 2 groups. Group 1 was operated at 3rd month (March-April 2021) of fellowship training and Group 2 was operated after 1 year (March-April 2022) of training. Cataract surgeries were analyzed for risk factors, comorbidities, and intraoperative and postoperative complications. The main outcome measures were postoperative Best corrected distance visual acuity (BCVA), which were correlated with preoperative demographics. **Results:** The mean visual acuity improved significantly after surgery in all patients (P < .001) compared to baseline. 16(80%) patients in Group 1 and 18(90%) of Group 2 achieved a postoperative CDVA of 20/40 or better (P < .001). Visual outcome was comparable in both groups. The mean postoperative visual acuity did not vary by trainee year and the rate PC tear(5%) during surgery declined as fellow resident progressed in training (P < .05). **Conclusion:** Despite more complicated cataracts and advanced comorbidities, fellow-performed cataract surgery in a tertiary-care county hospital system achieved comparable visual outcomes similar to those found at start.

KEYWORDS

INTRODUCTION

The advent of novel surgical techniques and rapidly accumulating clinical knowledge has changed the field of surgical ophthalmology. Subspecialty training in ophthalmology has become increasingly common over the past 2 decades. Residents who sought subspecialty training had on average a greater desire to acquire special skills, to enter a prestigious field, and to be concerned with a favorable market. Consequently, it is not surprising that these training programmes are increasingly incorporated into fellowship training. Nonetheless, recent surveys have suggested that most ophthalmology residents (1,2) do not feel they have adequate surgical training to begin their careers. While the patient expectations and demands from surgery have increased tremendously in the past few years, sadly, the surgical training of residents has not kept pace with the rapid advances in the techniques of cataract surgery.

Lack of human resources in eye care delivery is a global problem. At present, there are not enough ophthalmologists capable of performing high-quality cataract surgery to meet the need, which is growing due to expansion and aging of the global population [3,4]. The burden of unoperated cataract is unfairly borne by populations of low and middle-income countries (LMICs), where the lack of trained ophthalmologists is most acute [5]. Among existing ophthalmologists in low-resource settings, many do not operate at all, or have low surgical output [6]. Additionally, visual outcomes of cataract surgery in many LMICs fail to meet the World Health Organization's (WHO) recommended standards [7] . India is home to a quarter of the world's blind population.[8] In India, more than 51% of blindness is attributed to cataract.[9] Over the last several decades, the Government of India has taken robust steps in combating this disease, with India being the first country to adopt the National Prevention of Control of Blindness (NPCB)[10] and has formulated actionable plans to increase cataract surgical rates (CSR) and reduce the prevailing blindness. Cataract surgery is by far the most commonly performed surgery in ophthalmology, and it is imperative that all residents should be reasonably proficient in this surgery at the end of their training. Several authors have suggested an urgent need to improve ophthalmology residency training in medical colleges of India. (11,12,13)

While the western residency programs have moved towards 'appraisal based approach', the countries of Asian subcontinent still follow the traditional apprenticeship model.[14) Also, lack of integration of International Council of Ophthalmology (ICO) curriculums and core competencies described by Accreditation Council for Graduate Medical Education (ACGME) in South Asian programs, has called for education reforms, especially in India.[15) In addition to providing technical skills, fellowship programmes offer trainees further structured opportunities for conducting research and overall development of their competency.

The aim of this study was to investigate the impact of the introduction of IOL fellowship training on the success rates for operations performed by single trainee over one year. The study utilized cataract surgery data from the institute database. We reviewed the improvement in surgical efficiency by comparing differences in Visual acuity outcome at 3 month and after1 year of training.

MATERIALS AND METHODS

This Study was conducted at Sankara's super specialty eye care facility in Ludhiana. All data were recorded on the Healthgraph electronic record system (Healthgraph , India https://ehr.healthgraph.in) which mandates the recording of post-operative complications. Cataract operations performed from March 2021 through March 2022 at Hospital formed the basis for this investigation. In a retrospective random fashion, 40 control subjects who had undergone manual Small incision cataract surgery (msics) were divided into 2 groups- 1 and 2; of 20 subjects each.

Group 1 had undergone SICS in march-april 2021 and group 2 underwent surgery in march - april 2022 period respectively. Comparison was done in terms of visual outcome of patient, at postoperative 1 month of surgery, respectively in both groups. Both groups selected were operated by a single trainee over one year under expert faculty guidance to address intraoperative complication in each group.

The inclusion criteria included all cataract surgeries undergoing SICS. Cases with inadequate preoperative or postoperative medical documentation, patients lost to follow-up within the first postoperative month, or cataract cases that were combined with a glaucoma, corneal, or retinal procedure were excluded. All patients were seen in the clinic at least 1 month after the procedure for follow-up and manifest refraction.

Data collected included patient demographic information, medical history, current medications, cataract type and density, intraoperative and postoperative events, and preoperative and postoperative visual acuities. Cataract density was determined based on visual acuity, with a CDVA better than 20/50 classified as mild, between 20/50 to 20/400 as moderate, and worse than 20/400 as dense.(16)

Statistical Analysis

The Kruskal-Wallis one-way analysis of variance or Student t test was used for comparison of continuous variables. Threshold for statistical significance was set at $p < 0.05$, effectively rejecting the null hypothesis. Microsoft Excel (Redmond, WA) and "IBM-SPSS" statistical software, (Statistical Package for the Social Sciences Statistics 28.0.1) were used for statistical calculation.

RESULTS

Of the randomly selected 70 patients with a cataract procedure during

the 1-year study period, 26 patients were excluded and 44 patients met the inclusion criteria. All cases underwent Manual Small incision cataract surgery. Approximately 4 of the 44 patients were subsequently lost to follow-up after the procedure, resulting in 40 cases analyzed for postoperative events with 20 patients in each group.

Preoperative Characteristics

Table 1 shows the demographics and preoperative comorbidities of the patient population. Almost 10% were classified as overweight or obese. The majority of patients had diabetes, hypertension, or both.

Table 1. Preoperative Patient Demographics

Parameter	Cases, n (%)
Medical comorbidity	
Hypertension	9(22.5%)
Diabetes	10(25%)
Obesity (BMI >-30)	2(5%)
Overweight (BMI 25–30)	2(5%)
Anticoagulant use	1(2.5%)
a-antagonist use*	1(2.5%)

BMI = body mass index
*Includes aspirin, clopidogrel, prasugrel, warfarin, heparin, enoxaparin, lepirudin, xaban, abciximab, argotroban, dabigatran, cilostazol † Includes tamsulosin, phenoxybenzamine, phentolamine, et al

Cataract Characteristics

Table 2 shows the types of cataracts removed. Nuclear sclerotic cataracts were the most prevalent type, with nearly two thirds graded as moderate and a quarter as dense. At presentation, 15% were classified as white or brunescent, reflecting the complexity of these cases. 10 surgical cases required use of trypan blue staining.

Table 2. Cataract Types

Parameter	Cases, n (%)
Cataract type	
Nuclear sclerotic	28(70%)
Mild	4
Moderate	12
Dense	12
Posterior subcapsular	6(15%)
Mild	2
Moderate	3
Dense	1
Cortical	6(15%)
White	4
Brunescent	2

Intraoperative and Postoperative Events

Of the 40 eyes analyzed, 4(10%) had an intraoperative or postoperative event (Table 3). Posterior capsule tear was the most prevalent surgical complication followed by vitreous loss and anterior capsule tear. The most common postoperative complication was rebound inflammation, defined as persistent anterior chamber inflammation 1 month postoperatively after a standard steroid and nonsteroidal anti-inflammatory drop taper.

All intraoperative and postoperative complications were present in group 1 operated in March-April 2021. No intraoperative or postoperative complication was found in group 2.

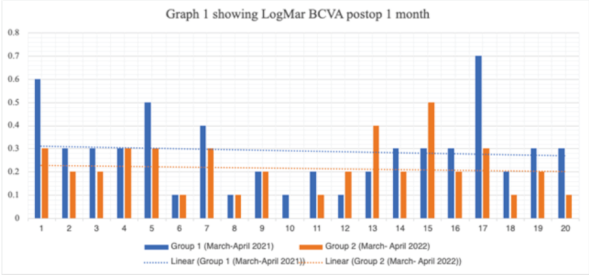
Table 3. Prevalence Of Intraoperative Events And Postoperative Complications.

Complication	Cases, n (%)
Intraoperative	
Anterior capsule tear	1(2.5%)
Vitreous loss	1(2.5%)
Posterior capsule tear	2(5%)
Postoperative	
Corneal edema	1(2.5%)
Rebound inflammation	2(5%)

Postoperative Refractive Outcomes

Graph 1 shows the logarithm of the minimum angle of resolution (log MAR) and Snellen equivalent visual acuities at the 1-month postoperative visit. Comparing all cases, the mean CDVA improved significantly in Group 2 (March-April 2022) compared to Group 1 (March-april 2021) (P = .001).

16(80%) patients in Group 1 and 18(90%) of 40 patients achieved a postoperative CDVA of 20/40 or better (P < .001). Final Visual acuity was comparable in both groups. Patients with preexisting ocular comorbidities were significantly more likely to have a postoperative CDVA worse than 20/80 than patients without comorbidities (P < .05).



DISCUSSION

Ophthalmology has been blessed with the rapid development of new technological advances. The constant improvement of surgical instrumentation has changed our old operations into new ones, providing a sort of "brush-up" for almost all procedures.

Our most common operative procedure— cataract extraction—is no longer focused only on the extraction of cataracts. It is now focused on what comes later—the refractive aspect of cataract surgery. We now have intraocular lenses that are multifocal and can give a patient reading vision and distant vision without the need for glasses. Many modern surgeons include the elimination of astigmatism as part of the cataract operation. Patients can now expect the kind of vision that they want after cataract procedures. Ophthalmology Residents seek such fellowship training to increase competency with such novel surgical techniques and augment their fund of knowledge.

During this time of global medical emergency, when there are talks of huge investment in medical technologies and as we expect global health policies to be rewritten in the coming years, we should not forget the importance of investing in training doctors as well. National and global efforts are required where doctors, including ophthalmologists, receive standardized training platforms, so that we do not have a shortfall of skilled personnel. Our hospital 20:80 program is one such example of how partnership model between paying and Non-Paying patients can go hand in hand for training and skill development of doctors contributing to patient care across societies. It also brings a novel concept of pre training assessment, standardized course curriculum with post course follow-up support, which can be replicated all over the country and may be other countries as well will ensure that the learning from the program is furthered and is practiced for a long time to come.

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