Abstract

Objective: To study the common causes leading to postponement of cataract surgery in a peripheral eye hospital.

Design: Retrospective secondary data analysis of patients who underwent cataract surgery from 1 January 2015 to 31 December 2017.

Method: All adult patients diagnosed with cataract and posted for cataract surgery from 1 January 2015 to 31 December 2017 and were cancelled on the day or 24 hours before the intended procedure were included in the study. The causes for cancellation were retrieved from the patient files. Pareto analysis was done to find out the most common causes for the cancellation.

Results: 14113 patients were posted for cataract surgery from 1st January 2015 to 31st December 2017, of which 13265 patient underwent cataract surgery while 848 patients were cancelled within 24 hours of scheduled start time due to different causes. The cancellation rate for on the day cancellation of cataract surgery for a peripheral eye hospital is found to be 6%.

Conclusion: Systemic illnesses especially uncontrolled diabetes and hypertension are the most common causes for on the day cancellation of cataract surgery in a peripheral eye hospital.

Keywords: Cataract Cancellation, Eye Hospital

Introduction

Ophthalmology surgeries in the periphery of a developing nation are unique that they are usually performed as ‘Camp’ surgeries where a group of patients are screened and brought to the operating centre for surgical procedure. Few patients usually travel from far off regions for their surgery due to unavailability of services close-by. Cancellation of the procedure on the day of surgery is a universal phenomenon and has been reported by all surgical specialities. Cancellation of non-cataract surgeries on the day of procedure has been variedly documented by different studies with the rate ranging from 1.96% to 30.3%. Cancellation has a direct implication not only on the hospital surgical outcomes but also causes physical, economical and psychological trauma to the patients leading to loss in daily wages and frustration of not meeting the expectations. Surgical cancellations causes over-consumption of time and resources from frequent revisits and repetitions of pre-operative preparations. Operation theatres which form the backbone for any hospital need optimum patient flow to be economically efficient.
viable and function well. Any delays and cancellations in elective surgeries would lead to under-utilization of the hospital resources and mismanagement of services.

Cancellation of elective surgeries also represents the quality of patient care as well as the quality of management system for the organization. Implementations of quality improvement strategies have been shown to decrease the cancellation rates. The reasons for cancellation vary from one organization to another. Authors have traditionally divided on the day cancellation to either ‘avoidable’ or ‘unavoidable’ causes. These include patient factors such as financial problems, systemic illness, change of mind about surgery or hospital factors like non-availability of beds, OTs, sterile equipment’s or surgeons.

Cataract has been found as the leading cause for blindness. Although cataract surgery is one of the most cost-effective interventions, its delivery in developing countries has many issues and challenges. Most of the studies calculating cancellation rates have been performed in a multi-speciality setting with no emphasis for the ophthalmological units. We performed this analysis to highlight the uniqueness of the peripheral ophthalmological operating units of a developing country and to highlight the factors for cancellation. Understanding of such factors may help the ophthalmologists to plan their surgeries without cancellation.

Method

Study Design and settings

The study was conducted in a 55 bedded eye hospital acting as a peripheral unit for a main tertiary care hospital in North India. The peripheral unit is fed by seven vision centres located within twenty-five kilometres of the peripheral hospital. The unit has two operating rooms with one table each. The hospital caters mainly to cataract surgeries but also has facility for specialities such as Oculoplasty, Cornea and Glaucoma. Speciality surgeries are allotted OTs on specific days of the month. There is no separate OT designated for emergencies in the hospital. Emergency cases are taken as and when required in between or after the scheduled cases. For elective cases the OT functions six days a week with Sunday and other yearly festival offs. The surgeons perform phacoemulsification, small incision cataract surgery (SICS), and extra capsular cataract surgery (ECCE) for cataract, with the bulk of surgeries being SICS.

Patients are scrutinized either from the out-patient department (OPD) or from the vision centres or from the regular peripheral camps held to pick up cataract cases. The Vision centres are peripheral independent units manned by Vision technician (VTs) trained for performing refractions and slit lamp examinations. The VTs are proficient to pick up and refer patient with significant cataract to the base hospital. The vision technician notes down patient’s history for visual problem followed by assessment for uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), syringing and tonometry. Cases with refractive errors corrected by glasses are prescribed glasses by the VTs and sent back. Patients requiring surgery or an ophthalmologist opinion are referred and transported to the main hospital on a specified day for re-evaluation and surgery. Maximum percentage of patients in the OT list are either from camps or from the Vision centres.

At the base hospital all patients were reassessed by an ophthalmologist under dilation and posted for surgery for next day or postponed if requiring speciality opinion. Grading of cataract was done depending on the nuclear sclerosis and then posted for ECCE, SICS or phacoemulcification with posterior chamber intra-ocular lens (PCIOL) for the next day. A-scan biometry is done by application method followed by syringing both eyes under all aseptic conditions. Patient posted for surgery under local anaesthesia (LA) undergoes blood pressure, random Blood Sugar and ECG (if age ≥50 years) as routine investigations as per the hospital protocol. All cases are then assessed by the visiting physician in the evening for their fitness for cataract surgery. Patient are considered fit for LA if, Blood Pressure (BP) ≤ 160/90 mm Hg; Blood sugar (Random) ≤ 200mg%; (Fasting) ≤ 140mg%; (Post pradinal) ≤ 200mg%. Any coexisting medical condition optimized. Blood thinners are not stopped for cataract surgery.

Patients who are unfit medically are reassessed by the visiting physician and changes in their systemic medical treatment are made. Depending upon the physician opinion such cases are posted for the surgery the next day.

The study comprised of elective day care and inpatient cataract surgery performed between 1st January 2015 and 31st December 2017 under local or topical anaesthesia. Emergency cases were not included for analysis in the study. Elective cases were defined as cases posted for surgery and enlisted in the OT list by the end of the day on the day preceding the surgery. No elective cases were added to the list on the day of the surgery. Cancellation on day of surgery were defined as cases being cancelled on the day of surgery as well one day preceding the surgery after the patient has presented to the hospital.

All adult patients of the age 18 years and above scrutinized in a peripheral eye camp or vision centres or in the hospital’s OPDs and scheduled for cataract surgery were included in the study. The hospital did not have facility for general anaesthesia, only cases done under local and topical anaesthesia were included. Data for daily surgeries was captured prospectively for each patient both in the patient file and the OT register. Data about procedure types, patient information, surgeon name, and intended procedure,
estimated duration of each procedure, systemic illness and cause of cancellation was prospectively entered in the hospital records. This data was retrieved for analysis in the study. OT starting time was taken as 8.00 AM for all days from Monday to Saturday except for Sundays and public holidays.

Retrospective analysis of the data was done to study the causes for the postponement of cataract surgery on the day or one-day prior before the procedure was scheduled. Cancelled cases were recorded in real time and then retrospectively reviewed. Monthly data about the total cases performed and cancelled along with the reasons are presented in the hospital meetings. Cancellation were divided into patient and hospital related causes.

**Results**

A total of 14113 patients were posted for cataract surgery from 1st January 2015 to 31st December 2017. Out of which 13265 patient underwent cataract surgery while 848 patients were cancelled within 24 hours of scheduled start time due to different causes. It resulted in a cumulative cancellation rate of 6% for the three-year period. The yearly distribution of cases between SICS and phacoemulsification and their cancellation is given in table 1.

| Year | Total surgeries posted | Total surgeries performed | Total cancellations | Percentage cancellation |
|------|------------------------|---------------------------|---------------------|-------------------------|
| 2015 | 4319                   | 3965                      | 354                 | 8.19                    |
| 2016 | 5076                   | 4840                      | 236                 | 4.64                    |
| 2017 | 4718                   | 4460                      | 258                 | 5.46                    |

The monthly breakup of cases performed with distribution of cases between phacoemulsification and small incision cataract surgery is given in Table 2.

| Year | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 | Jul-15 | Aug-15 | Sep-15 | Oct-15 | Nov-15 | Dec-15 | Total |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Cataract surgery | 328 | 336 | 273 | 228 | 246 | 357 | 183 | 394 | 408 | 360 | 345 | 506 | 3965 |
| SICS | 311 | 314 | 246 | 188 | 208 | 316 | 144 | 317 | 327 | 273 | 265 | 397 | 3306 |
| Phaco | 17 | 22 | 27 | 40 | 38 | 41 | 39 | 77 | 82 | 87 | 80 | 109 | 659 |

| Year | Jan-16 | Feb-16 | Mar-16 | Apr-16 | May-16 | Jun-16 | Jul-16 | Aug-16 | Sep-16 | Oct-16 | Nov-16 | Dec-16 | Total |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Cataract surgery | 317 | 351 | 371 | 359 | 360 | 457 | 273 | 347 | 924 | 414 | 330 | 337 | 4840 |
| SICS | 287 | 262 | 287 | 290 | 309 | 392 | 218 | 310 | 860 | 362 | 260 | 265 | 4102 |
| Phaco | 30 | 89 | 84 | 69 | 51 | 65 | 55 | 37 | 64 | 52 | 70 | 72 | 738 |

| Year | Jan-17 | Feb-17 | Mar-17 | Apr-17 | May-17 | Jun-17 | Jul-17 | Aug-17 | Sep-17 | Oct-17 | Nov-17 | Dec-17 | Total |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Cataract surgery | 414 | 330 | 337 | 258 | 247 | 330 | 360 | 290 | 397 | 373 | 647 | 477 | 4460 |
| SICS | 334 | 238 | 213 | 194 | 204 | 303 | 332 | 268 | 356 | 307 | 502 | 359 | 3610 |
| Phaco | 80 | 92 | 124 | 64 | 43 | 27 | 28 | 22 | 41 | 66 | 145 | 118 | 850 |

Figure 1 shows the month-wise cancellation of cases. The distribution was not statistically significant over the months.
Cancellations because of systemic illness/medical condition (n=251, 29.5%) was the most common factor for on the day cancellation of cases. Patient refusal to get operated (n=234, 27.5%) was the second most common cause for on the day surgery cancellation in our study. The most common hospital associated cause for cancellation was the deferment of surgery because of non-availability of a specialist and the patient requiring a second opinion (n=40, 4.7%). This was followed by postponement because of non-availability of a senior consultant to do complicated cases (n=30, 3.5%). A sizable number of patients postponed because of systemic illnesses were operated on the next day after stabilization of their systemic parameter by the hospital physician. Our study failed to capture the data for it. For uniformity sake we have taken all cases not done on the scheduled day as cancelled in our study. Table 4 shows the causes for cancellation from January 2015 to December 2018. Pareto analysis has been performed to know the 80% cause for cancellation.

Discussion

Cancellation within 24 hours of the scheduled start time of surgery is a common problem faced by many surgical organisations. Studies performed at multi-specialty hospitals have shown the rate ranging from as less as 1.96% to as high as 30.3%. Cancellations have been poorly investigated in the field of ophthalmology in general and in developing countries in particular. In our study the most common cause for cancellation was uncontrolled systemic illnesses followed by patient decision for not getting operated on that day. Bamashmus et al reported a cancellation rate of 12% in ophthalmology, with high blood pressure being the most common factor for cancellation followed by patient’s decision to cancel the surgery.

Uncontrolled systemic illnesses

27.2% (n=251) of our patients had cancellations because of uncontrolled systemic illnesses. Most cataracts are age-related and therefore are performed on older individuals with correspondingly high systemic and ocular comorbidities. Magri et al documented that clinical causes accounted for 86.90% of the total cataract surgery cancellation in Brazilian public system. Bamashmus et al reported the rate of cataract cancellation because of hypertension as 33%. It is a known fact that high blood pressure (BP) along with atherosclerotic vessels are associated with a rare but dreadful per-operative complication of suprachoroidal haemorrhage, not many surgeons would like to take this risk. Handerson et al in their study found that more than 50% cancellations were due to patient being unfit for surgery due to systemic reasons. A pre-operative control of blood pressure becomes more important in a peripheral setting where anaesthesia and retina back up are not easily available and the surgeon is left alone to manage any complications. A higher rate of cancellation in these setting can be attributed to this as well but will need further research. Rodrigo et al found that the hypertensive patients with good BP control and without other major comorbidities present a larger incidence of preoperative rise in BP than normotensive individuals. Good long term BP control should protect the patient from the risk of last minute cancellation because of high BP.

Patient with diabetes mellitus have an impaired wound healing triggered by hyperglycemia, chronic inflammation, micro and macro-circulatory dysfunction, hypoxia, autonomic and sensory neuropathy and impaired neuropeptide signaling. In their retrospective analysis Fernandez-Rubio et al found that diabetics have a significantly higher prevalence of Staphylococcus aureus, Enterococci, certain Streptococci, and Klebsiella sp. than non-diabetics. Diabetic especially those with uncontrolled blood sugar levels are thus predisposed to both intra and post-operative complications associated with wound
healing and infection. Our institute have a cut off value of 200mg/dl for random blood sugar for the patient to be fit for cataract surgery. Post-surgery as well the patient is asked to maintain his blood sugar levels within the normal range. Planning of the pre-operative examinations should start at the camp sites where patient’s BP should be noted along with the ocular examination. Records of all medications that the patient is taking should be maintained and patient should be asked to carry it along. Patients with a known history of hypertension or diabetes should be encouraged to discuss the problem with the physician during the pre-anaesthetic examination. If such cases are posted for elective surgery, then they should be planned with a shorter possible interval between the primary care visit and the surgery.

**Patient refusal for surgery**

In our study the second most frequent cause for cancellation was patient refusal for a cataract surgery. This was due to various causes. The most common cause was the possibility of poor visual recovery even after a cataract surgery in view of multiple comorbidities present in patient eye causing loss of vision. In such a scenario most of the patients decided to wait for the cataract surgery than to get operated on the first date available. The postponement of surgery date, we think is also because of the easy availability of surgery dates in our organisation. Leung et al also concluded in their study that as the wait time for cataract surgery improves, patient choice plays a greater role in influencing the will to get operated.

**Cataract surgery cancellations versus general surgery**

Ophthalmology surgeries in the periphery of a developing nation are unique that they are usually performed as ‘Camp’ surgeries where a group of patients are screened and brought to the operating centre for surgical procedure. Few patients usually travel from far off regions for their surgery. Any cancellation or delay in the surgery can be a missed opportunity for these patients and they may lose their only chance to get operated. Most of the cases in our study were camp patients transported to the hospital one day prior to the surgery. Cancellation of these cases led to not only loss of daily wages for the patients or the attendants but also economic loss to the institution in transport, lodging and pre-operative assessment of the patient.

Literature review show that patients who have their pre-operative assessment done few days before the surgery have significantly lesser cancellations on the day of surgery, have better patient satisfaction and undergo significantly lesser unnecessary preoperative testing and consultations. This strategy may be helpful in a multispecialty hospital where surgery date is not given without patient pre-anaesthetic check-up. But would not work for ophthalmological camp surgeries where most patients are admitted and worked up just one day before the surgery.

**Financial problems**

Khanna et al after their literature review have stated that SICS is the most cost effective intervention for cataract surgery in developing nations. It takes lesser time and gives lesser postoperative astigmatism as compared to ECCE. Phacoemulsification has a steeper learning curve and is more expensive than SICS for camp surgeries. The hospital receives grants from various organisations and government schemes and thus provides free cataract surgeries along with lodging and transport for the poor patient. For patients wishing to have a premium package various lens options are available under different packages, keeping in mind the strata of population the hospital is catering to. SICS was the main surgery performed on camp patients. Only 7 patients in our study refused surgery because of non-availability of funds. This number represented the group of patients who wanted to get a paid package with a premium PCIOL, but wasn’t carrying money to get operated the same day. This patient got operated later. We would like to infer that having different packages for the same procedure can be a governing factor for decreasing cancellation as well.

**OT Utilization**

Talati et al in their study found that 4.1% of cases were absent on the day of the surgery, this in turn has a negative impact on the OT utilization as absence of first case has a ripple effect on the rest of the cases posted for that day. They also found that systemic conditions of the patient were the cause for OT cancellation in 8.2% of cases. Most of these factors were avoidable and can be prevented with proper planning. The NHS management executive recommends that hospitals should aim to use 90% of planned theatre time and that theatre utilisation should be used as a key performance indicator. The NHS study also shows that OT utilization is maximum when the OT lists overruns its schedule. This however have ethical and professional issues as they negatively affect the staff morale and cannot be made a routine. Our study failed to capture the impact of case cancellation on OT utilisation. An estimation of this figure would have help in better utilization of the OT hours and thus increased productivity. Most of our patients were day care patients having the main surgery performed on camp patients. Only 7 patients in our study refused surgery because of non-availability of funds. This number represented the group of patients wishing to have a premium package various lens options are available under different packages, keeping in mind the strata of population the hospital is catering to. SICS was the most cost effective intervention for cataract surgery in developing nations. SICS is the most cost effective intervention for cataract surgery in developing nations.
especially in patients with known illnesses. This would help to decrease the hospital load of cancellation as well prevent the unnecessary travel of the patients and attendant.

**Conclusion**

Patient refusal for surgery is the leading non-avoidable cause for on the day cancellation of cataract surgery in a peripheral eye hospital followed by patient systemic illnesses. None of the studies have been able to benchmark the acceptable figure for cancellation as the causes for cancellation varies not only from one hospital to another but also within the different specialities of the same hospital. The opportunities to get a cataract surgery and the resources for performing cataract surgery may be limited in a peripheral centre and a high postponement rate might further decrease the patient’s chance for a good vision. It would need further studies but for now if can be speculated that a thorough systemic examination and better patient selection can not only decrease the load of postponement but also save the patient from unnecessary hospital stay.

**Financial conflict of Interest disclosure**

The authors certify that they have no affiliation with or any involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

**Conflict of Interest:** None

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Date of Submission: 2018-08-10
Date of Acceptance: 2018-08-16