

The Sight Restoration Rate (SRR): Metric for Assessing the Effect of Cataract Surgery on the Patient's Vision

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Abstract

Aim: Study Sight restoration rate (SRR), Useful indicator to measure impact of cataract surgery.

Methods: This prospective study was carried out in the Department of ophthalmology, Jawaharlal Nehru medical college and hospital, Bhagalpur, Bihar, India, for 12 months. Medical records of patients who did Cataract Surgery either SICS or Phacoemulsification, best corrected visual acuity (BCVA) was conducted using the Snellen chart and a pinhole. All of the eye examinations were performed by the same operator. Pre- and post-BCVA were categorized into four categories according to WHO classification. The categories are 6/6-6/18, 6/18-6/60, 6/60-3/60, and 3/60-No Light Perception. Out of all data we excluded patient who did not follow up and all patients with comorbidities which may influence post-operative outcome remaining data considered for analyses.

Results: Our cohort included 1100 eyes; 100 had comorbidities in form of corneal opacities, optic nerve atrophy, retinal detachment, congenital anomalies and were excluded from the final sample. The SRR of the surgery in our study 50%. SRR is an indicator to determine the impact of conducting cataract surgeries on people's productivity. In measuring SRR, the best visual acuity of either eye in a patient before the surgery is used. If the best visual acuity of either eye is already more than 3/60, then the cataract surgery is not considered as having an effect on people's productivity. This is the key difference which differentiates SRR from other indicators which are used to determine the success of cataract surgery. Visual outcome <3/60 in 10 eyes (1%)

Conclusion: SRR of the surgery in this research is 50%, while our poor surgical outcome is 5%. High SRR means that a lot of these patients can return to work, while poor surgical outcome means that the surgeries have very good standard. This will optimize "peoples right for sight" as was suggested with Vision 2020 motto.

Keywords: SRR, sight, vision, cataract

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Introduction:

Cataract has been documented to be the most significant cause of bilateral blindness in India where vision < 20/200 in the better eye on presentation is defined as blindness.[1,6] In India cataract has been reported to be responsible for 50-80% of the bilaterally blind in the country.[1,6] Global agencies for the elimination of avoidable blindness have pledged support to operationalizing strategies to reduce the burden of cataract blindness by the “Vision 2020: The right to sight” initiative.[7] Coordinated national efforts were supplemented by a world bank-assisted cataract blindness control project which was launched in seven states of India in 1994.[8] From around 1.2 million cataract surgeries per year in the 1980s[9] the cataract surgical output increased to 3.9 million per year by 2003.[10] Recent data from the World Health Organization (WHO) shows that there is a 25% decrease in blindness prevalence in India.[11] This could be due to the increased cataract surgeries in the country. At the same time the proportion of the aged has also increased significantly in the country. The 60+ population which stood at 56 million in 1991 will double by 2016.[12] This increase in population means that the population ‘at-risk’ of blinding cataract will also increase tremendously. India is committed to the goal of elimination of avoidable blindness by 2020 in line with the Global Vision 2020: the right to sight initiative. We used existing surveys, cataract surgical output, and population data, to determine whether India can meet the Vision 2020: the right to sight cataract blindness goals.

Material and methods

This prospective study was carried out in the Department of ophthalmology, Jawaharlal Nehru medical college and hospital, Bhagalpur, Bihar, India, for 12 months. Medical records of patients who did Cataract Surgery either SICS or Phacoemulsification, best corrected visual acuity (BCVA) was conducted using the Snellen chart and a pinhole. All of the eye examinations were performed by the same operator. Pre- and post-BCVA were categorized into four categories according to WHO classification. The categories are 6/6-6/18, 6/18-6/60, 6/60-3/60, and 3/60-No Light Perception. Out of all data we excluded patient who did not follow up and all patients with comorbidities which may influence post-operative outcome remaining data considered for analyses.

Statistical

All records exported from electronic medical records to excel sheet and analyzed with SPSS 25.0. Frequency calculated using descriptive analyses. The frequency of each BCVA categories is taken into accounts. After that we consider frequency and proportion of co-morbidities of the patients. Sight Restoration Rate is calculated using the standard formula.[13]

Results

Our cohort included 1100 eyes; 100 had comorbidities in form of corneal opacities, optic nerve atrophy, retinal detachment, congenital anomalies and were excluded from the final sample. The SRR of the

surgery in our study 50%. SRR is an indicator to determine the impact of conducting cataract surgeries on people's productivity. In measuring SRR, the best visual acuity of either eye in a patient before the surgery is used. If the best visual acuity of either eye is already more than 3/60, then the cataract

surgery is not considered as having an effect on people's productivity. This is the key difference which differentiates SRR from other indicators which are used to determine the success of cataract surgery. Visual outcome <3/60 in 10 eyes (1%)

Table 1: gender distribution of patients

Gender	Number of eyes (N=1000)	%
Male	600	60
Female	400	40

Table 2: SRR rate

SRR rate	50%
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Discussion

A study in the United States showed cataract surgery not only restores the patients' life quality but also has a very high return on investment (ROI) up to 4567% 13 years after the surgery.[14] Another study stated cataract surgery is one of the most effective health interventions which will reduce the cost of rehabilitating the patient with a disability with an estimated reduction of 2040\$/year/people.[15] It happens because blindness has a huge correlation with economic productivity of its victim and the caretakers for a very long time if it is not cured.[16] One of the indicators of the success of the cataract surgeries is the Sight Restoration Rate (SRR)[15] SRR shows the percentage of patients whose sight restored after the surgery. The weakness of using SRR is this measure can be influenced by selectively removing patients whose sights failed to be restored. However, all patients who were operated during the study period are also included to minimize the bias.

Performing eyes surgery with BCVA more than 3/60 are not the goal of Vision. 2020. The eyes surgery's main goal is not only to reduce the numbers of blindness but also to increase patients' life quality.[14] The SRR

of the eyes surgery in this study is 50%. This number is higher than other surgeries performed by Eye camps (39%), Ludhiana (35%), and Ludhiana'94 (28%)[13] The better way to selectively choose those who would gain the most benefit from the surgery is needed. Hence, some patients who have a bad prognosis still need the surgery to prevent the later complications (e.g. hyper-mature cataract which can lead to capsular fibrosis, phacolytic- Phacoanaphylactic reaction, or zonula dialysis). Developing countries have a high number of blindness because some residences are far from health facilities. Timely and more targeted screening is essential in resolving this problem.[16,19] Another important factor in handling this problem is to empower the communities to socialize the benefit of cataract surgery.

A study showed 2/3 of patients are convinced to have the surgery due to the encouragement from family or close relatives.[19]

Another factor which can be used to determine the success of cataract surgery is the proportion of patients with the poor surgical outcome (i.e. BCVA <3/70).¹³ The proportion of BCVA <3/60 of the eyes surgery in this study is 1%. This number is

lower than the criteria from WHO for poor outcome, which is 5%.[20] The main cause of poor outcome is uncorrected refraction problem, comorbidities, and surgical complications. The quality of cataract surgery can be improved by retraining the operator, improving the health system, facilities, and surgical equipment, and establishing a better monitoring system.[21] (Unfortunately, the lack of human resources is still the main problem in developing countries. There must be a balance between intervention costs and its results when conducting cataract surgery in resource-limited settings.[17]

Conclusion

SRR of the surgery in this research is 50%, while our poor surgical outcome is 5%. High SRR means that a lot of these patients can return to work, while poor surgical outcome means that the surgeries have very good standard. This will optimize “peoples right for sight” as was suggested with Vision 2020 motto.

Reference

1. Thulasiraj RD, Nirmalan PK, Ramakrishnan R, Krishandas R, Manimekalai TK, Baburajan NP, *et al.* Blindness and Vision Impairment in a Rural South Indian Population: The Aravind Comprehensive Eye Survey. *Ophthalmology* 2003;110:1491-8.
2. Thulasiraj RD, Rahamathulla R, Saraswati A, Selvaraj S, Ellwein LB. The Sivaganga eye survey: I, Blindness and cataract surgery. *Ophthal Epidemiol* 2002;9:299-312.
3. Nirmalan PK, Thulasiraj RD, Maneksha V, Rahmathullah R, Ramakrishnan R, Padmavathi A, *et al.* A population based eye survey of older adults in Tirunelveli district of south India: Blindness, cataract surgery and visual outcomes. *Br J Ophthalmol* 2002;86:505-12.
4. Murthy GV, Gupta S, Ellwein LB, Munoz SR, Bachani D, Dada VK. A Population-based Eye Survey of Older Adults in a Rural District of Rajasthan: I, Central Vision Impairment, Blindness and Cataract Surgery. *Ophthalmology* 2001;108:679-85.
5. Mohan M. National Survey of Blindness-India. NPCB-WHO Report. New Delhi: Ministry of Health and Family Welfare, Government of India; 1989
6. Mohan M. Collaborative Study on Blindness (1971-1974): A report. New Delhi, India: Indian Council of Medical Research; 1987. p. 1-65.
7. Foster A. Cataract and “Vision 2020 - the right to sight” initiative. *British Journal Ophthalmology* 2001;85:635-639
8. Jose R, Bachani D. World bank assisted cataract blindness control project. *Indian J Ophthalmol* 1995;43:35-43.
9. Minassian DC, Mehra V. 3.8 Million blinded by cataract each year: Projections from the first epidemiological study of incidence of cataract blindness in India. *Br J Ophthalmol* 1990;74:341-3.
10. Jose R, Bachani D. Performance of cataract surgery between April 2002 and March 2003. *NPCB-India* 2003;2:2.
11. Resnikoff S, Pascolini D, Etyaale D, Kocur I, Pararajasegaram R, Pokharel GP, *et al.* Global data on visual impairment in the year 2002. *Bull WHO* 2004;82:844-51.
12. Kumar S. Alarm sounded over ‘Greying’ of India’s population. *Lancet* 1997;350:271
13. Chan E, Mahroo OA, Spalton DJ. Complications of cataract surgery. *Clin Exp Optom.* 2010; 93:379- 89.
14. Limburg H, Kumar R, Bachani D. Monitoring and evaluating cataract intervention in India. *The British Journal of Ophthalmology.* 1996; 80(11):951-5.
15. Murthy G, Gupta SK, John N, Vashist P. Current status of cataract blindness and

- Vision 2020: The right to sight initiative in India. *Indian J Ophthalmol.* 2008; 56:489- 94.
16. Wang W, Yan W, Fotis K, Prasad NM, Lansingh VC, Taylor HR, et al. Cataract surgical rate and socioeconomics: A global study. *Investigative Ophthalmology and Visual Science.* 2016; 57(14):5872- 5881
17. Khandekar R, May W, Alasbali T. Indicators for monitoring cataract surgery outcomes; evolution and importance. *Nepalese Journal of Ophthalmology.* 2015; 7(1):3.
18. Khandekar R, Sudhan A, Jain B, Deshpande M, Dole K, Shah M, Shah S. Impact of cataract surgery in reducing visual impairment: A review.
19. Mahalingam K. Evaluation of cataract surgical service delivery to the visually impaired. *The Indian Journal of Social Work.* 2005; 66(3):280-309.
20. Malik AR. Cataract Surgery Visual Outcomes and Associated Risk Factors in Secondary Level Eye Care Centers of L V Prasad Eye Institute. *British Journal of Ophthalmology.* 2016; 20(1):1-11.
21. Isawumi ES, Adeoti AO, Adeoye COA. (2009). Evaluation of Cataract Surgery Outcome in Western Nigeria. *Ghana Med J.* Retrieved, 2009. from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2956>