Why learn manual small-incision cataract surgery?

Cataract blindness continues to be one of the greatest public health challenges, accounting for a distance vision impairment of <6/18 in 94 million people worldwide.[1] In the 74th world health assembly, while setting targets for 2030, a 30% increase in cataract surgery coverage was proposed to deal with an estimated 100 million people suffering from moderate-severe distance impairment or blindness because of cataract.[2] Besides increasing the cataract surgical rates, good surgical outcomes are a major concern in developing countries.

The two popularly performed modern-day cataract surgeries are manual small-incision cataract surgery (MSICS) and phaco-emulsification (PE). Although PE is the predominant cataract surgery in developed nations, costly machinery and consumables, a permanent and reliable source of electricity, regular maintenance, and trained surgeons with support staff limit its employment in developing countries.[3] The potential to cause serious complications in extremely dense cataracts, commonly encountered in developing nations, adds to the discredit of PE.[4]

The reproducibility and successful outcome of MSICS depends upon the acquisition of surgical skills and not on the possession of an expensive phaco-emulsification machine. In consequence, MSICS, despite being practiced in large numbers pan India for the past 2 decades, lacked promotion by machine manufacturers and was resisted by stakeholders. It was however realized that mastering MSICS eased the learning curve of PE. In India, trainees are commonly taught MSICS prior to PE. Even in developed countries such as the United States, MSICS is being incorporated in the residency programs through teaching by experienced colleagues, wet labs, and surgical simulators.[5]

It was nearly 2 decades post introduction of PE in 1967[6] that MSICS entered the arena of cataract surgery.[7] An initial phase of repudiation was followed by experimentation with new methods of nucleus extraction globally. In a short span of time, anterior chamber maintainer, phaco-fragmentation, visco-expression, nuclear fragmentation in the tunnel, microvectis technique, sandwich technique, modified fishhook technique, irrigating cannula, nucleus trisection, nuclear snare technique, double nylon loop, modified Blumenthal technique, and Sinskey hook techniques evolved with reproducible safety.[8-11]

Published literature studies have established comparable visual outcomes and complication rates of MSICS and PE. The short turnover time for MSICS ranging from less than 4 minutes to 15.5 minutes and a cost of less than $ 16/case proved its suitability for high-volume surgery.[12,13]

Reports indicate successful outcomes of MSICS in difficult situations such as escaped capsulorhexis, white cataracts, black cataracts, extensive corneal opacity, pseudo-exfoliation, Fuch heterochromic iridocyclitis, subluxated cataracts, and iridofundal coloboma.[14,15] The safety of MSICS has also been demonstrated when combined with Descemet stripping and endothelial keratoplasty (DSEK) and trabeculectomy.[16] Mansoori *et al*.[17] showed comparable intra-ocular pressure reduction in a mean follow-up of 18.6 ± 7.7 months, with PE (13.9 ± 2.98 mmHg) and MSICS (14.1 ± 4.12 mmHg) combined with Mitomycin C-augmented trabeculectomy.

The aspects where PE scored over MSICS were the ease in topical anesthesia, posterior capsular opacification (PCO) rates, and surgically induced astigmatism (SIA). Experienced MSICS surgeons started shifting from peribulbar blocks to topical, anterior subtenon and subconjunctival anesthesia. The recent use of square edge polymethylmethacrylate intra-ocular lens in MSICS has shown considerable reduction in PCO rates.[18] In order to decrease the SIA and improve the uncorrected visual acuity, a wound size of <6 mm and the temporal location of incisions are being increasingly adopted.[11] At the same time, the potential to induce greater SIA in MSICS is being used as an advantage to correct pre-existing astigmatism by on-axis placement of incision.

Health care has been recognized as a large contributor to greenhouse gas emissions (GHGs), known to adversely affect the environment and human health.[19] The extensive use of paper, plastic, and energy by PE machines results in carbon footprints of a single PE surgery close to a typical person's life for a week.[20] MSICS is thus a more environment-friendly surgery.

In the present era, the role of MSICS has changed from a 'poor' to a 'powerful' cousin. Mastering MSICS lays the foundation for tackling all kinds of cataracts with confidence. It is the preferred technique over PE in hard brown cataracts. It promotes self-reliance in ophthalmologists with limited resources, acts as a savior during machine failure, and is instrumental in tackling the cataract backlog in developing countries.

Krishan Pal Singh Malik, Ruchi Goel[1]

The Eye Clinic, New Delhi, [1]Department of Ophthalmology, Guru Nanak Eye Centre and Maulana Azad Medical College, New Delhi, India.
E-mail: gruchi1@rediffmail.com

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About the Author

Prof. Krishan Pal Singh Malik

Prof. Krishan Pal Singh Malik served as Additional Director General, Ministry of Health and Family welfare. He headed the Department of Ophthalmology, Vardhman Medical College and later worked at Subharti Medical College, Meerut and AIIMS Rishikesh. He co-authored he "Manual of SICS" with focus on difficult situations and complications (2011) and CME series on SICS by All India Ophthalmological Society (AIOS). He has been instrumental in nation-wide dissemination of art the and science of small-incision cataract surgery through instruction courses, live surgeries and publications. He is a Life-time achievement awardee of AIOS and Delhi Ophthalmic Society (DOS). He served as chairman Academic and Research Committee of AIOS, President of AIOS, Secretary of DOS and President of DOS.

Prof. Ruchi Goel

Prof. Ruchi Goel is a Professor at the Guru Nanak Eye Centre, Maulana Azad Medical College, New Delhi. She is a volunteer faculty at ORBIS International and examiner of Royal College of Ophthalmologists, London. She has authored the book "Manual of Oculoplasty" in 2019 and has co-authored "Manual of SICS" with focus on difficult situations and complications in 2011. She has contributed over 100 articles in journals, 40 book chapters and three CME series by AIOS. She is the recipient of Dr. V.P. Chadha Memorial University Gold Medal (Delhi University), Smt. Rukmani Gopala Krishnan Memorial Gold Medal (Delhi University), AIOS-APAO-Honavar Award for the Best Paper in the lacrimal session, AIOS-IJO Silver Award and the Outstanding Paper by the International College of Surgeons.