

Technical Parameters and Patient's Characteristics Influence on the Main Outcomes of Phacoemulsification Cataract Surgery: Results from a Tertiary Healthcare Center

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Abstract

Objectives: To assess the influence of technical parameters (such as phaco time and ultrasound energy) and patient's characteristics (associated diseases, endothelial cell density (CD), intra-ocular pressure (IOP)) on visual acuity outcomes in individuals undergoing phacoemulsification surgery with intraocular lens implantation.

Methodology: This cross-sectional, retrospective study involved 122 eyes divided into 4 groups using the LOCS III system classification: Grade 1 (25 eyes), Grade 2 (21 eyes), Grade 3 (30 eyes) and Grade 4 (46 eyes). Specular microscopy was performed pre- and postoperatively, while the ultrasound energy consumption and the effective phaco time were observed intraoperatively.

Results: A progressive decrease of cell density (CD) was observed in all groups at end of the 1st week postoperatively, with a mean endothelial cell loss of about 700 cell/mm². The postoperative intraocular pressure (IOP) dropped significantly in Grade 4 cataract group from a mean value of 21.3 ± 10.06 to 17.43 ± 3.81 mmHg, accompanied by higher ultrasound energy consumption. A progressive improvement of visual acuity was observed, from the 1st day post-surgical visit to the 1st week follow-up evaluation in all the groups. Visual acuity improvement was maintained significant after 1st week only when comparing groups 1 and 4. The multiple regression analysis identified cataracts Grade 3 and 4 along with the preoperative visual acuity as strong predictors for the final visual acuity outcomes, while gender, age, IOL type, comorbidities, phaco time (EPT), ultrasound energy (U/S), preoperative intraocular pressure and cell density were not independently associated with visual acuity outcomes.

Conclusion: Our results indicated that 95.9% of the patients evaluated 1 day postoperative had visual acuity better than 6/18, while 4.1% had borderline visual acuity in the range of 6/18-6/60, being in line with the World Health Organization (WHO) standards for cataract surgery outcomes.

Keywords: phacoemulsification, cataract, visual acuity outcome, cell density, intraocular pressure, central corneal thickness