Feasibility of Same-Day Postoperative Evaluation Following Phacoemulsification With Intraocular Lens Implantation at a Veterans Health Administration Teaching Hospital

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This retrospective analysis discusses the difference between same-day evaluation and next-day evaluation of postoperative patients who received cataract surgery.

Postoperative care for patients who undergo cataract surgery is typically 3 postoperative visits within the first month following surgery with the first visit 1 to 2 days after surgery.[1,2] At Edward Hines, Jr. VA Hospital, postoperative examinations following phacoemulsification with intraocular lens (IOL) implantation are typically performed at postoperative day 1, postoperative week 1, and postoperative month 1 to monitor the patient for development of secondary complications. Using this strategy, clinicians have patients return to the eye clinic within 1 day following surgery. Recently, the standard postoperative schedule has been challenged.[1-5] Given the large catchment area for many VA hospitals, many patients live a considerable distance from the hospital. Also, for many elderly and disabled patients, consecutive days of travel carry a large financial burden as well as pose a potential risk of injury with increased travel time. Offering same-day postoperative evaluation would substantially minimize these encumbrances. The physicians performed a retrospective analysis comparing same-day (3h-7h) initial postoperative evaluation with the standardized next-day postoperative evaluation on cataract outcome measures on patients undergoing phacoemulsification with IOL implantation using the Snellen chart for visual acuity (VA) as the primary outcome measure.

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METHODS

The protocols were approved by the Edward Hines, Jr. VA Hospital Institutional Review Board. Cataract cases performed at Edward Hines, Jr. VA Hospital by both staff and senior resident surgeons from February 2008 through October 2008 were analyzed. Hines hospital is a resident teaching hospital, and the majority of cataract surgeries are handled by residents as the primary surgeon with direct attending supervision. During the study period, only 9.8% of all cases had an attending as primary surgeon.

Fifty-two age-matched males with pseudophakic eyes were divided into 2 (26 eyes per group) initial postoperative evaluation groups. The same-day group had an average age of 72.3 ± 9.0 years; the next-day group's average age was 73.4 ± 9.3 years. A postoperative time of 3 to 7 hours was identified as an appropriate time frame in which to evaluate patients for an intraocular pressure (IOP) spike based on previously reported findings.[4] Same-day evaluations would be undertaken only if examinations were performed before 6:00 PM the same day. Follow-up evaluations performed on postoperative week 1 and on postoperative month 1 remained unaltered. All patients in each group received the same IOL implant (Bausch and Lomb SoFlex). Patients began topical therapy with moxifloxacin 0.5%, prednisolone acetate 1%, and ketorolac 0.5% 4 times a day following their initial visit.

The primary outcome measure quantified was pre- and postoperative VA. Other commonly observed sequelae of cataract surgery include, but are not limited to, increased IOP, anterior chamber inflammation, and corneal edema.[6-8] Hence, secondary outcome measures that were quantified included IOP, corneal edema, and anterior chamber inflammation. The focus of the study was to determine whether there would be any observed differences in primary

and secondary outcome measures at 1 month between same-day and next-day postoperative groups.

Patients had their VA (using the Snellen acuity format), IOP (mm Hg), corneal edema, and anterior chamber inflammation determined at each visit: at initial visit (same day or next day), at 1 week, and at 1 month following surgery. Intraocular pressure was measured by Goldmann applanation tonometry. The presence and severity of corneal edema and anterior chamber inflammation was determined by using a 5-point scoring scale (0 = none; 1 = minimal; 2 = mild; 3 = modest; 4 = severe). As a retrospective study, bias in subjective measurements of corneal edema or anterior chamber inflammation is minimized. All patients were Seidel negative at each postoperative visit.

Inclusion criteria applied in this study included documented evidence of a visually significant cataract before surgery (VA not correctable to at least 20/25 by manifest refraction), documented evidence of potential for visual improvement following cataract surgery (via pinhole acuity potential testing), and documented evidence of a patient's electing to proceed with surgery with the primary goal of improving vision. All surgeries were performed under monitored anesthesia care with topical anesthesia. Exclusion criteria included those with visual limitations concomitant with anterior or posterior pathology, such as those with advanced glaucoma (ie, exhibiting maximally tolerated medical therapy) or with a history of incisional filtering surgery. Patients demonstrating visual limitations associated with age-related macular degeneration (ARMD) were also excluded from the study.

Nearly half of the patients were excluded due to advanced ocular disease (eg, glaucoma, ARMD) and the desire to simplify the results based on the most uncomplicated cases. We tested the null hypothesis that there would be no observed differences in primary outcome measures at 1 month between same-day and next-day postoperative groups.

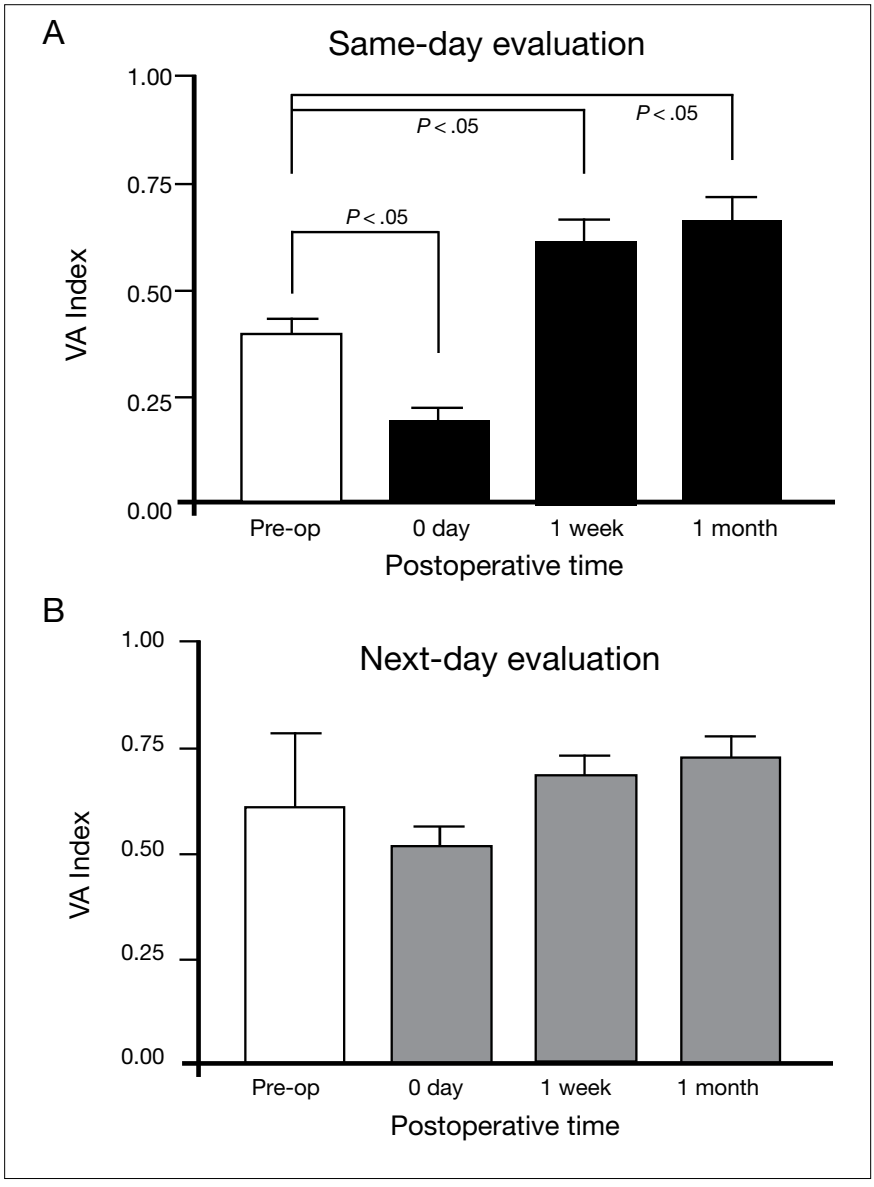

Figure 1. Time-dependent changes in patient VA indexes following phacoemulsification with IOL as a function of postoperative evaluation times. Statistical analysis performed by one-way repeated measures of analysis of variance with Bonferroni post hoc multiple comparison analysis.

A, Same-day evaluation. B, Next-day evaluation.
IOL = intraocular lens; VA = visual acuity.

A 2-tailed *t* test was used to analyze any possible differences between preoperative VAs in both groups. A two-way statistical comparison was

used to analyze differences in VA between the 2 groups at postoperative day 1.

RESULTS

A total of 121 charts were reviewed, 59 from the same-day group and 62 from the next-day group. Of these, a total of 69 charts did not meet our inclusion criteria and were excluded from the study (33 from the same-day group and 36 from the next-day group). A total of 19 such glaucoma patients were excluded, 11 from the same-day group and 8 from the next-day group. A total of 16 such ARMD patients were excluded, 7 from the same-day group and 9 from the next-day group. One patient from each group had an intraoperative posterior capsular tear with anterior vitrectomy and sulcus IOL placement, and each of these patients was excluded from the study. Thirty-two patients were excluded where visual improvement was not the primary postoperative goal (eg, phacomorphic glaucoma, dense cataracts limiting visualization, and evaluation of the retina and optic nerve).

Preoperative Evaluation

Before surgery, VA between patients in the same-day (20/51; 0.40 ± 0.20, n = 26) and next-day (20/32; 0.62 ± 0.90, n = 26) groups were statistically indistinguishable ($P = .21$, 2-tailed t test). Preoperative IOPs within each group (same day, 15.6 ± 2.8 mm Hg; next day, 16.1 ± 2.3 mm Hg) were within normal limits. There was no evidence of corneal edema or anterior chamber inflammation in either patient group before surgery.

Postoperative Evaluation

Patients in the same-day evaluation group were seen within the recommended time frame with an average time from end of surgery to initial evaluation of 4.2 hours.[4] Patients in the next-day evaluation group were seen with an average time from end of surgery to initial evaluation of 22.9 hours.

Following phacoemulsification with IOL implantation, patients in the same-day evaluation group showed significantly ($P < .05$) marked impairment of VA compared with preoperative values (Figure 1A). However, by postoperative week 1, patients in the same-day group experienced improved VA, which remained stable through postoperative month 1 (Figure 1A). A significant elevation of IOP was observed at the initial evaluation in the same-day patient group following surgery (Table 1). Elevated IOP in these patients was transient, returning to preoperative levels by postoperative week 1 and remained stable through postoperative month 1 (Table 1).

The initial postoperative VA of patients in the next-day group was statistically indistinguishable from that of preoperative values and remained unchanged at postoperative week 1 and postoperative month 1 (Figure 1B). A two-way statistical comparison between patients in the same-day evaluation group with those in the next-day evaluation group shows marked improvement in VA by postoperative day 1. Although neither group achieved 20/20 (1.0) VA for the duration studied, VA of patients between groups was statistically indistinguishable by postoperative week 1 with no further improvement in this outcome measure by postoperative month 1 (Figure 1). The initial evaluation of the next-day patient group also showed the presence of significantly elevated IOP compared with preoperative values (Table 1). Similar to the same-day evaluation group, this surgically associated elevation of IOP was transient, returning to preoperative levels by postoperative week 1 and remained stable through postoperative month 1.

Postoperative Complications

To determine whether evaluating patients within the first 3 to 7 postoperative hours affected clinical management of frequently encountered secondary ocular complications, we quantified outcome measures of corneal edema and anterior chamber inflammation. Initial evaluation of patients within the same-day evaluation group showed minimal to mild edema or inflammation, which was nearly resolved by postoperative week 1 (Table 2). By comparison, patients evaluated the next day postsurgery exhibited about 50% less corneal edema. As a corollary issue, 7 of the 26 patients (26.9%) in the same-day evaluation group were instructed to treat their corneal edema with a corticosteroid drop more frequently than 4 times a day. Conversely, only 2 of the 26 (7.7%) patients in the next-day evaluation group were managed with a corticosteroid drop frequency > 4 times a day. By postoperative month 1, corneal edema had resolved in all patients (Table 2).

At their initial postoperative evaluation, patients in the same-day and next-day evaluation groups exhibited minimal-to-mild anterior chamber inflammation. There were no statistical differences, however, in qualitative measures of anterior chamber inflammation between patient groups during the initial postsurgical evaluation period. In both groups of patients, anterior chamber inflammation was nearly absent by postoperative week 1 and was completely resolved by postoperative month 1 (Table 3).

Table 1. Effect of postoperative evaluation times on intraocular pressure (IOP)

Patient group	Preoperative	Initial	1 week	1 month
Same day (n = 26)	15.6 ± 2.8	29.6 ± 11.1[a]	14.7 ± 3.6	14.2 ± 4.7
Next day (n = 26)	16.1 ± 2.3	21.1 ± 7.7[b]	16.4 ± 4.3	14.7 ± 2.5

IOP, expressed in mm Hg, was measured before and following phacoemulsification with IOP implantation on the indicated postoperative days.
[a] $P < .001$, [b] $P < .01$ one-way analysis of variance with Bonferroni post hoc multiple comparison analysis.
IOP = intraocular pressure.

Table 2. Effect of postoperative evaluation times on corneal edema

Patient group	Preoperative	Initial	1 week	1 month
Same day (n = 26)	0.00 ± 0.00	1.36 ± 0.78	0.46 ± 0.57	0.00 ± 0.00
Next day (n = 26)	0.00 ± 0.00	0.61 ± 0.73	0.61 ± 0.62	0.00 ± 0.00

Corneal edema, qualitatively evaluated using a 5-point scoring scale (0 = none; 1 = minimal; 2 = mild; 3 = modest; 4 = severe), was determined before and following phacoemulsification with IOL implantation on the indicated postoperative days.
IOL = intraocular lens.

Table 3. Effect of postoperative evaluation times on anterior chamber inflammation

Patient group	Preoperative	Initial	1 week	1 month
Same day (n = 26)	0.00 ± 0.00	1.61 ± 0.68	0.85 ± 0.77	0.04 ± 0.19
Next day (n = 26)	0.00 ± 0.00	1.61 ± 0.56	0.35 ± 0.55	0.00 ± 0.00

Anterior chamber inflammation, qualitatively evaluated using a 5-point scoring scale (0 = none; 1 = minimal; 2 = mild; 3 = modest; 4 = severe), was determined before and following phacoemulsification with IOL implantation on the indicated postoperative days.
IOL = intraocular lens.

DISCUSSION

The focus of the study was to determine whether there would be any observed differences in primary and secondary outcome measures at 1 month between same-day and next-day postoperative groups. The results demonstrate that no significant long-term differences occurred in VA (Figure 1), IOP (Table 1), corneal edema (Table 2), or anterior chamber inflammation (Table 3) when the initial postoperative evaluation is held on the day of surgery rather than the day following surgery. The marked visual impairment seen on the same day of surgery (ie, initial postoperative evaluation) in the same-day group was likely secondary to the increased corneal edema (Table 2) seen in the same-day group. Visually significant postoperative corneal edema is known to be more severe the closer the evaluation is conducted to the time of surgery, especially in a teaching hospital setting.

There were a few studies in the late 1990s that opened the discussion for changes to the perioperative evaluation of patients undergoing cataract surgery with phacoemulsification. Allan and colleagues demonstrated that routine clinical review after uncomplicated modern cataract surgery displayed a "low" clinical intervention rate, thus questioning the significance of next-day review on long-term morbidity.[2] Others showed an infrequent rate of complications after cataract surgery, low enough for nonmedical professionals to manage the patients, but not low enough to omit the initial postoperative evaluation.[3] It has been shown that any elevation in IOP could be effectively managed on the same day of surgery and, thus, could be resolved by postoperative day 4 in patients with and without glaucoma.[1] Another study demonstrated that the visual outcome at 4 months was not statistically different between next-day review and same-day discharge, further supporting the idea to omit next-day evaluation.[4] Tufail and colleagues showed that despite the expected yet infrequent complications,

such as raised IOP, corneal edema, and wound leak, visual outcomes were similar in day-case vs nonday-case surgery (ie, next-day evaluation vs same-day discharge with no next-day evaluation).[5] All of these studies coincide with the results of this study.

More severe potential early complications of cataract surgery include postoperative endophthalmitis[3] and toxic anterior segment syndrome (TASS).[3,9,10] None of our patients developed either of these complications. Postoperative occurrences of endophthalmitis are known to be infrequent, with the peak incidence in the Endophthalmitis Vitrectomy Study between 4 and 7 days after surgery with a mean of 6 days and a range of 1 to 63 days; same-day or next-day examination would not differ significantly in catching this.[11]

Toxic anterior segment syndrome is an acute postoperative inflammatory reaction in which a noninfectious substance enters the anterior segment and induces toxic damage to the intraocular tissues, for example, contaminated antiseptic cleaning solution.[10] Medical therapy for TASS includes topical corticosteroids and nonsteroidal antiinflammatory drugs. The hallmark of TASS is its rapid onset, usually within 12 to 48 hours, and it is conceivable that eliminating the 1-day postoperative visit might affect the ability to diagnose cases of TASS occurring within the first 24 to 32 hours. On the other hand, it is conceivable that the earlier institution of topical anti-inflammatory medications in the same-day group might be advantageous in ameliorating the onset of TASS. Postoperative occurrences of TASS are known to occur in clusters and have been on the decline since the establishment of preventive measures by the TASS task force.[9]

LIMITATIONS

As with any study, there are limitations. The retrospective nature of the study has the established disadvantages over a prospective study, such as recall bias, lack of or difficult access to available data, difficult to control bias, and other confounding variables.[12] The results may only be generalized to teaching hospitals, since a fair amount of study surgeries were conducted by resident surgeons rather than experienced surgeons. Because this study has limitations due to small sample size and a single hospital site for surgery, a larger study may allow for better affirmation of same-day postoperative evaluation over the standard 1 day.

CONCLUSION

The authors conclude that the results presented here suggest that there are no adverse consequences in long-term outcomes when employing a same-day postoperative visit. Further research is necessary to elucidate the viability of same-day postoperative evaluation after cataract surgery, including nonteaching hospitals and in nonveteran populations. A larger, prospective study would be desirable for its statistical superiority over retrospective studies.

These challenges also beg the question as to the necessity of same-day or next-day postoperative evaluations at all.[4] Establishing strong evidence for minimal change in long-term outcomes when initial postoperative evaluations are modified or removed will increase the viability of this proposition. The authors conclude that this study serves this purpose and, thus, justifies a larger study that will ameliorate the discrepancies and disadvantages that arose in this study.

Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

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