

# Follow-Up After Cataract Surgery – Comparison of the Practice in Two Institutions with the Aim of Optimize the Routine

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**Purpose:** To evaluate the number of postoperative visits after cataract surgery in two institutions with different routines.

**Patients and Methods:** A population-based prospective, observational, cohort study was conducted at two institutions in northern Sweden. All cataract surgery cases during a 1-year period were included. The study group was 1249 cases, who followed the standard routine at the Sunderby clinic, ie, no planned postoperative visit for patients without comorbidity who had uncomplicated surgery. All cases (n=1162) having surgery during the same 1-year period at the Umeå clinic were selected as the control group. The routine in Umeå was a planned postoperative visit for all patients after first eye surgery, and on second eye surgery patients with other ocular comorbidity.

**Results:** A postoperative visit was planned in 44% (555/1249) of the study group and in 83% of all control group cases (966/1162). Significantly less patients in the study group (9% vs 16%;  $p=0.000036$ ) initiated an unplanned contact. Patients with a distance to the hospital of 70 km or longer were less inclined to seek unplanned care ( $p=0.016$ ). There was no difference in postoperative outcomes between the patients who initiated contact and those who did not in the study and control hospitals.

**Conclusion:** Without compromising patient safety, it is possible to reduce the burden of postoperative visits in cases with uncomplicated cataract surgery. A reduction in the number of visits is obtained only if the standard routine is no planned postoperative visits in uncomplicated cases without ocular comorbidity for both first and second eye surgery.

**Keywords:** cataract surgery, postoperative visits, patient-initiated contact, observational cohort study, safety aspects

## Introduction

One of the most commonly performed surgical procedures worldwide is cataract surgery.<sup>1</sup> In Sweden, almost 120 000 operations were performed in 2016, of which 41% were second eye surgery.<sup>2</sup> The increasing number of cataract surgeries performed and the following postoperative visits constitute a huge workload for surgical clinics. The need and timing of postoperative visits have been discussed several decades.<sup>3,4</sup> All parts in the cataract surgery process must be appropriate and cost-effective.<sup>5</sup> The safety aspects of reducing the number of postoperative visits have been evaluated in Sweden. It has been found safe to refrain from postoperative visits in cataract surgery cases without ocular comorbidity or perioperative complications.<sup>6</sup> A published study from Finland also concluded that 1-month

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routine postoperative check-up by ophthalmologists is unnecessary.<sup>7</sup> Postoperative refraction and visual acuity (VA) can be obtained from opticians or other health care professionals such as ophthalmic nurses.

The purpose of this population-based study was to compare the number of postoperative visits and patient contacts between two institutions with different postoperative standard routines after cataract surgery. The difference in workload was analysed and a comparison with Sweden as a whole was made.

## Patients and Methods

### Study Population and Controls

All cataract surgery cases at two clinics in northern Sweden were prospectively registered during a 1-year period, June 1st 2010 to May 31st 2011. The study was population-based as there are no other surgical clinics in the admitting area for the 2 clinics. In the study group, Sunderby hospital, Luleå, Sweden, 1249 senile and pre-senile cataract surgery cases were included. These patients followed the standard procedure, which at this clinic was no planned postoperative visit in cases without other ocular comorbidity.

The control group consisted of all cataract surgery cases during the same 1-year period at Umeå University Hospital (n=1162). The standard follow-up at this clinic was a planned postoperative visit for all first eye surgery patients, ie, also in patients without comorbidity or surgical complications. Second eye surgery patients without comorbidity or surgical complications had no planned postoperative visit.

The admitting area represents 1.8% (study group) and 1.3% (control group) of the population in Sweden. Northern Sweden is sparsely populated with long distances to travel to the eye clinic for many patients. In the control group, most patients live in the vicinity of Umeå city. The most common reasons for planning a postoperative appointment for both the study and control group patients were glaucoma, wet AMD and/or diabetic retinopathy. The patients were also scheduled for a postoperative visit if there was any complication at surgery.

More than 99% of the patients were Caucasians and patients with cataract surgery combined with other surgical procedures were excluded. Same day phacoemulsification on both eyes was performed on 13 patients in the study group and 3 patients in the control group.

Outcome measures were; any postoperative visit planned or initiated after contact by the patient, any

surgical complication and/or adverse event, and postoperative VA. Postoperative data including VA were collected from the records, 1 month as well as 2 years after cataract surgery. Regarding the patients who had no planned appointment at the clinic postoperatively, VA and refractive results were obtained from the optician or optometrist the patient visited 4–6 weeks after surgery. The records at the 2 clinics were computerized and standardized.

In Sweden, most clinics participate in the National Cataract Register. During the month of March every year, a registration of the outcome is performed in most cataract surgery operating clinics. All patients having surgery this month have a planned postoperative visit at their operating clinic, in order to evaluate VA and refractive results to estimate the surgical quality.

A survey was mailed to all clinics in Sweden performing cataract surgery, in order to elucidate their standard routine for postoperative visits after cataract surgery. The study was approved by the local ethics committee at Umeå University and complied with the tenets of the Declaration of Helsinki. All patients had provided oral informed consent.

### Preoperative Evaluation

There was no difference in preoperative evaluation in the study and control group.

Preoperative examination for cataract surgery was performed by an ophthalmologist who sometimes, but not always, was a cataract surgeon. In the study group at the preoperative examination, the ophthalmologist scheduled the patient for surgery, evaluated type and severity of any ocular comorbidity, and if there was need for a postoperative visit. The timing of the postoperative visit was decided, and if the visit was to the surgeon or to the doctor/team treating the comorbidity. Patients with retinal vein occlusions (RVO) or diabetic retinopathy (DRP), have the risk of worsening in their comorbidity and might need additional treatment with laser and/or anti-Vascular Endothelial Growth Factor (VEGF). These patients had a postoperative visit scheduled to an ophthalmic nurse for retinal photography or to a medical retina specialist for evaluation. All patients with age-related macular degeneration (AMD) were assessed regarding type and risk for worsening of their AMD after cataract surgery, and were planned for a postoperative visit accordingly.

In the control group, all patients with retinal diseases were evaluated by an ophthalmologist the first day after

surgery, and any additional visit was planned for each patient, individually.

Most glaucoma patients in the study group were preoperatively planned for measurement of the intraocular pressure (IOP) on the first postoperative day, by an ophthalmic nurse, as postoperative pressure spikes can be harmful. In the control group, all glaucoma patients had a planned postoperative visit to an ophthalmologist, in most cases the surgeon.

## Standard Surgical Procedure

At both clinics, the surgical procedure was standardized with clear corneal incision phacoemulsification under topical and intracameral anaesthesia and was in all cases performed by experienced surgeons.

## Postoperative Routine

After surgery before leaving the clinic, a nurse gave the patients both oral and written information on which symptoms are normal in the postoperative period and also information of rare but severe postoperative complications such as endophthalmitis, retinal detachments, etc. As previously mentioned, postoperative visits in the study group were planned individually depending on ocular comorbidity, preoperative examination results and estimation of risk for surgical complications. Patients with complicated surgery had a postoperative visit scheduled, the timing depending on the type and severity of the intraoperative complication.

The above-mentioned routine was also valid for the control group, but all first eye surgery patients were always scheduled to an ophthalmologist for a postoperative visit day 1.

## Statistical Methods

Mean age was compared with independent samples *t*-test. Chi-square tests corrected for continuity were used to

analyse the two by two tables. Mann–Whitney *U*-tests were used to check for differences in VA (logMAR). P-values <0.05 were considered statistically significant. Statistical analysis was performed using SPSS for MS Windows software (version 24 SPSS Inc.).

## Results

### Surgical Outcome and Demographics

There were no differences in age, sex, first eye surgery, or cases with vitreous loss between the study group and the control group, [Table 1](#). The most frequent reason for planning a postoperative visit in both the study and the control group was ocular comorbidity. [Table 2](#) shows the frequency of the most common ocular comorbidities and the frequency of planned postoperative visits in relation to each comorbidity in the study and control group, respectively.

In the study group, 18% (127/701) of patients without ocular comorbidity had a planned postoperative visit. Significant somatic comorbidity, complications during first eye surgery, patient anxiety or unknown were the main reasons.

In the control group (555/697; 80%) of the cases without ocular comorbidity had a planned postoperative visit. The remaining 20% of the cases had no postoperative visit mostly because it was second eye surgery without complications or any ocular comorbidity. All these postoperative visits were eventless without any complication detected.

### Patient-Initiated Postoperative Contacts/Visits

The Figure shows a flow-chart on patient-initiated contacts for the study and control group, respectively. In the study group, only 117 patients (9.4%; 117/1249) initiated a postoperative contact (telephone call or visit to the clinic) by themselves. Of patients initiating contact 26% (30/117) already had a planned visit. Two-thirds (68%; 79/

**Table 1** Demographics, Mean Age, Sex, First Eye Surgery and Cases of Vitreous Loss Between Study and Control Group, Respectively

Variables	Study Group (n = 1249)	Control Group (n = 1162)	p-value
Mean age (SD) min-max	74.1 (9.6) 22–96	74.0 (10.1) 50–92	0.80
Sex (% males)	40.6	40.4	0.91
First eye surgery (%)	63.3	63.2	0.97
Cases with vitreous loss cases (%)	19 (1.5)	14 (1.2)	0.50

**Table 2** Frequency of Ocular Comorbidities in the Study and Control Group, Respectively, and Frequency of Planned Postoperative Visits

Ocular Comorbidity	All Eyes Study Group (No)	All Eyes Control Group (No)	p-value	Study Group Postop Visits No (%)	Control group Postop Visits No (%)	p-value
AMD	199	139	0.015	98(49)	116 (83)	.002
Diabetes	68	81	0.014	49 (72)	56 (69)	0.87
Glaucoma	229	202	0.61	192 (84)	200 (99)	0.23
Corneal problems	19	24	0.32	9 (47)	20 (83)	0.26
Retinal vein occlusions	13	8	0.36	6 (46)	8 (100)	0.26
Previous retinal detachment	7	11	0.27	5 (71)	11 (100)	0.64
Other (Uveitis/strabismus)	13	0		11/13 (85)	0	
Total number of eyes with comorbidity	548	465	0.22	370/548 (68)	411/465 (88)	.004
No ocular comorbidity	701	697	0.32	182/701 (26)	555/697 (80)	.00
Total number of eyes	1249	1162		552 (44)	966 (83)	.00

**Table 3** A Comparison of Planned Postoperative Visits, Patient-Initiated Contacts and Postoperative Visual Acuity (VA) Between the Study Group and the Control Group, Respectively

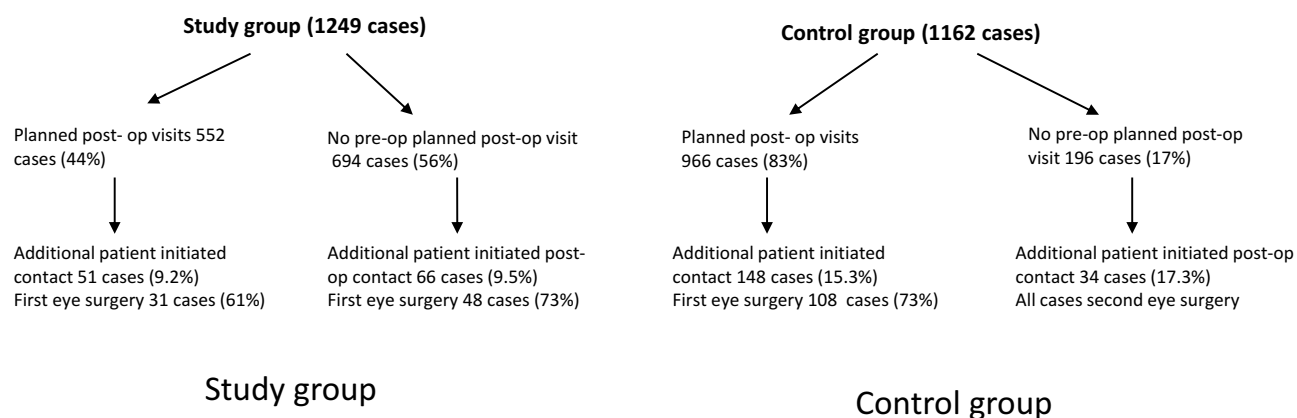
Total Number of Eyes	Study Group (n=1249)	Control Group (n=1162)	p-value
Planned postoperative visits, no (%)	555 (44)	966 (83)	.000
Total postoperative patient initiated contact, no (%).	117 (9.4)	182 (15.7)	.000036
Postoperative patient initiated contacts, in patients who had a previously planned visit, no (%).	51/552 (9.2%)	148/966 (15.3%)	0.007
Postoperative patient initiated contacts, in patients without a planned visit, no (%).	66/694 (9.5%)	34/196 (17.3%)	0.002
Eyes with documented postoperative visual acuity and refraction, no (%)	1018 (82)	943 (81)	0.94
Postoperative VA (logMAR), median mean (SD) (Snellen median VA)	0.1 0.19 (0.35) (20/25)	0.1 0.21 (0.39) (20/25)	0.23

117) of the patients initiating contact had first eye surgery and 32% had second eye surgery. In the control group, 182 patients (182/1162; 15.7%) initiated a postoperative contact (telephone call or visit to the clinic) [Table 3](#).

The control group had a statistically significant higher percentage of postoperative patient-initiated contact compared with the study group ( $p=0.000036$ ), [Table 3](#). This was regardless if the patients had a planned visit or not. A majority of the study group patients (628/1115, 56%)

had no planned postoperative or otherwise scheduled review after surgery (694–66=628), [Figure 1](#). No report of adverse events that could have been detected with a postoperative visit was found in the evaluation of medical records 2 years after surgery. In a similar evaluation of records, no adverse events were found among the 196 patients in the control group with no postoperative visits.

The different reasons/symptoms for patient-initiated contacts are shown in [Table 4](#). In both groups most of



**Figure 1** Flowcharts showing patient-initiated postoperative contact in the study group and the control group, respectively.

these contacts resulted in appointment with an ophthalmologist ((64 patients of 117 (55%) study group) and 127 patients of 182 (70%) control group). Visual disturbance was the most common cause, most often caused by transient corneal oedema (Table 4).

Advice over the telephone or in a few cases visit to an ophthalmic nurse solved the problem for the remaining patients. In the patients who had advice over the telephone only, there were no late adverse events.

There was a low threshold for offering ophthalmologists' care. All contacts initiated by patients with symptoms needing care or change in medication were referred.

## Distance to the Hospital

Patients in the study group with a distance to ophthalmic care of 70 km or longer did seek significantly less postoperative advice or care compared with patients

who had less than 70 km to the hospital ( $p=0.016$ ), Table 5. There was no significant difference if the patient had a previously planned postoperative visit or not, patients with less than 70 km distance to the hospital ( $p=0.76$ ) and ( $p=0.58$ , patients with 70 km to the hospital or more), data not shown.

In the control group, there was no significant difference in needing unplanned ophthalmic advice depending on distance to the hospital ( $p=0.41$ ) Table 5.

## Postoperative Routines in Sweden During the Study Period

Eighty-three percent (50/60) of the operating clinics in Sweden answered the mailed survey on the standard routine for postoperative visits after cataract surgery. The most common routine was a planned postoperative visit for all patients 68% (34 clinics).

**Table 4** Reasons for Patient-Initiated Postoperative Contacts, and the Level of the Ophthalmic Care Necessary

Reason/Symptom for Patient-Initiated Contact	Study Group No (%)	Control Group No (%)	p-value
Visual disturbance	59 (50)	69 (38)	0.18
Redness and/or chafing	33 (28)	56 (31)	0.72
Pain	16 (14)	42 (23)	0.09
Anxiety	9 (8)	5 (3)	0.06
Miscellaneous	0	10 (5)	
Total	117 (100)	182 (100)	0.2
Visit to ophthalmologist	64 (55)	120 (66)	0.33
Visit to ophthalmic nurse	2 (2)	3 (2)	0.97
Telephone advice	51 (43)	48 (26)	0.06

**Table 5** Patient-Initiated Postoperative Visits in Relation to Distance to the Hospital

		Total No of Patients	No of Patients Initiated Contact (%)	p-value	Planned Postop Visit	No of Patient Initiated Contact with a Planned Postop Visit (%)	No Planned Postop Visit	No of Patient Initiated Contact with No Planned Postop Visit (%)
Study group	<70 km	847	92 (10.9)	0.016	251	26 (10.4)	596	66 (11.1)
	≥70 km	402	25 (6.3)		116	6 (5.2)	286	19 (6.8)
Control group	<70 km	1123	178 (15.9)	0.41	933	148 (15.3)	190	34 (17.3)
	≥70 km	39	4 (10.2)		33	4 (100)	6	0

Postoperative visits for first eye surgery only was the standard routine at 7 clinics (14%) and no planned visits in 18% (9 clinics).

## Discussion

In June 2010, the standard postoperative routine at Sunderby Hospital eye Clinic, Luleå changed to no planned postoperative visit in cases with no other ocular comorbidity and no perioperative complications. Previously one postoperative visit had been scheduled from the surgical day to 10–14 days after surgery. In 2011, 92,501 cataract surgeries were performed in Sweden,<sup>8</sup> of these 69,195 (75%) took place in clinics which had as routine postoperative visits for all patients or for all first eye surgeries. If these clinics in Sweden adopted the routine with no postoperative visits for all uncomplicated cases without comorbidity, there would be no need for postoperative visits in approximately 50% of all cataract cases and the time for more than 30,000 doctors' appointments could be released for new patients.

This study was performed to evaluate the difference in number of postoperative visits between the new routine at the Sunderby clinic comparing with a routine of a postoperative visit for all first eye surgery patients' regardless of comorbidity or surgical complications. We found no statistically significant difference in postoperative VA or cases of vitreous loss between the patients in the study and the control group.

There were no differences in symptoms for patient-initiated contact between the two groups, but the patients in the control group initiated contact significantly more often than patients in the study group. An explanation for less patient-initiated contact when the standard routine is no postoperative visits for patients with uncomplicated surgery and no comorbidity is that preoperative information is very thorough for all these patients. Both oral and written information is given to the patient and the

information is repeated. The information concerning the symptoms when it is necessary that the patient must contact the eye clinic is especially emphasized. The study group patients may then be better informed which creates a feeling of safety and control and better knowledge of when it is important to contact the eye clinic for care, and also when waiting at home is enough. Second eye surgery patients also initiated contact to a large extent in both the study and control group. A previous surgical procedure does not make the patient an expert, and if proper information is not given at both first and second eye surgery, the patient may feel insecure and contact the eye clinic. Therefore, all written and oral information to the patients must be repeated also in second eye surgery. In 55% and 66% of all unplanned contacts an appointment with an ophthalmologist was needed in both the study and control groups. Therefore, the clinic must be prepared and have resources for patient-initiated postoperative visits. In a high degree, problems might be solved by advice from ophthalmic nurse after telephone contact.

As expected, the majority of preoperatively planned postoperative visits were on patients with ocular comorbidity. A plan for postoperative review and a thorough preoperative examination of the individual patient are crucial, in order to give correct information concerning postoperative expectations.<sup>9,10</sup> Patients with glaucoma are especially vulnerable and raised intraocular pressure (IOP) in the early postoperative phase can be devastating.<sup>11</sup> In this study, most glaucoma patients had a day-one postoperative visit with IOP control.

Both clinics are situated in the most northern part of Sweden and there are no differences in socioeconomic status or health between these two patient populations. There were no significant differences between the two clinics regarding diagnoses of ocular comorbidity except for the diagnosis of AMD. The significant difference in percentage of patients with AMD as comorbidity between



the two groups was caused by difference in criteria for diagnosing AMD. At the time of the study, there were no common standardized criteria at the two clinics. The new routine in the study group with no postoperative visits for patients without comorbidity, might also have influenced the ophthalmologist performing the preoperative evaluation to notice signs of comorbidity in a higher degree, as they were responsible for planning the postoperative visits.

Both counties are sparsely populated, and the people are concentrated to a few larger cities.

The patients in the study population had generally much longer distances to travel to the hospital compared with the patients in the control group. There are several municipalities with a distance to the eye clinic of more than 100 km in the study group county. The longest any patient in the control group had to travel was 100 km and only 3% of the cases had 70 km or more to the hospital. In the study group, there was a significant difference in patient-initiated postoperative contacts depending on distance to the clinic.

Those with less than 70 km to the eye clinic had significantly more contacts compared with those with more 70 km or longer,  $p=0.016$ . There were fewer patients with long distance to travel in the control group and these patients also sought patient-initiated postoperative care in a lesser degree, but this difference was not significant. Patients with a long distance to the hospital might hesitate to travel long distances, and both the patient and the ophthalmic staff might be inclined to let the patient wait at home if immediate care is not considered necessary.

Individualized assessment of need for postoperative follow-up after cataract surgery can safely reduce the number of postoperative visits and workload for eye clinics. A significant reduction in postoperative visits is only obtained if the standard routine is no planned postoperative visits in all uncomplicated cases with no other ocular comorbidity for both first and second eye surgery. To achieve this reduction, preoperative evaluation and consistent patient education is crucial. The present study shows that in at least 50% of cataract surgery cases, no postoperative visit is needed. In Sweden, adopting this can result in marked reduction of postoperative visits and free resources for other groups of eye patients.

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## Disclosure

The authors have no financial and proprietary interest in any product, method or material mentioned in this study.

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