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ORIGINAL ARTICLE

# The effect of staying at home or in a container city on early postoperative findings after cataract Surgery

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## Abstract

**Background:** Chronic exposure to toxic pollutants present in air, water, and soil can cause various damages to the external tissues of the eye. During an earthquake, hazardous materials such as asbestos, lead, and other toxic substances can be released into the environment. Staying in a house or a container city after cataract surgery can lead to different levels of exposure to these substances.

**Methods:** Patients who underwent cataract surgery between May 2023 and May 2024 were retrospectively analyzed. The patients were divided into two groups based on whether they stayed at home or in a container city. The best-corrected visual acuity (BCVA), corneal edema, central corneal thickness (CCT) assessed by pachymetry, and intraocular pressure (IOP) were recorded and preoperatively, early findings at the 1st week and 1st month postoperatively compared between the two groups.

**Results:** When comparing the groups that stayed at home and those that stayed in a container city after cataract surgery, no significant differences were observed in BCVA, corneal edema, CCT, and IOP at the 1st week and 1st month. When evaluating other postoperative complications, no cases of endophthalmitis, cystoid macular edema, retinal detachment, or corneal decompensation were reported in either group.Top of Form.

**Conclusions:** We observed that staying at home or in a container city had no significant impact on surgical and visual early outcomes after cataract surgery. The limitations of the study included its retrospective nature and small sample size.

**Key words:** Cataract, Phacoemulsification, Postoperative Care, Earthquake.

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## INTRODUCTION

According to a review of population-based studies on the prevalence of blindness and low vision from 55 countries by the World Health Organization, cataract is among the leading causes of visual impairment worldwide (1).

Cataract surgery is one of the most frequently performed surgeries in the developed world, with approximately 20-25 million cataract surgeries conducted each year (1). This surgery has a very high success rate, with some studies reporting up to a 90% improvement in visual function and visual acuity following the procedure (2,3).

Chronic exposure to toxic pollutants in air, water, and soil can cause various damages to the external tissues of the eye, such as the cornea and conjunctiva. Environmental pollutants, airborne toxins, and poorly ventilated buildings have been shown to cause various toxic effects on the surface of the human eye (4-6).

Due to the recent earthquakes centered in Kahramanmaraş, Turkey, many people in these regions affected by the earthquake are residing in tent or container cities. Compared to houses, living in these structures may increase exposure to various toxic factors.

The impact of the living environment on postoperative outcomes after cataract surgery has not been adequately discussed in the literature. In our study, we aimed to investigate whether the living environment during the postoperative period has an effect on postoperative outcomes in patients residing in the earthquake region after cataract surgery.

## MATERIALS AND METHODS

***Study Design and Patients***

Patients who underwent cataract surgery at the Ophthalmology Clinic of XXXX State Hospital were retrospectively evaluated. The study was conducted in accordance with the Declaration of Helsinki. Approval for this study was obtained from the Local Ethics Committee of Hatay Mustafa Kemal University Faculty of Medicine University (Dated: 21.05.2024; Approval Number: 27).

To identify suitable patients for the sample, electronic patient records at XXXX State Hospital were retrospectively reviewed, and patients who had undergone cataract surgery between May 2023 and May 2024 were identified. We included patients over the age of 50 who had complete examination findings recorded before the surgery and at postoperative week 1 and month 1. Patients with conditions that could hinder the improvement of visual acuity after cataract surgery, such as corneal disorders, diabetic retinopathy, glaucoma, macular degeneration, and uveitis, were excluded. Patients who developed complications before, during, or after the surgery were excluded.

Patients were divided into two groups based on whether they were staying in a home or a container city. The best-corrected visual acuity (BCVA), corneal edema, central corneal thickness (CCT) assessed by pachymetry, and intraocular pressure (IOP) were recorded for both preoperative and postoperative results. Corneal edema was subjectively evaluated based on its severity as none, mild, moderate, or severe (Grade 0, 1, 2, 3). In this study, the preoperative and early postoperative (week 1 and month 1) findings of both groups were compared.

***Statistical Analysis***

The correlation analysis of the data was performed using the IBM SPSS 25.0 package program. Mixed design ANOVA and Independent Sample T Test were used for the comparison of repeated measurements between the two groups. Results were considered statistically significant for $p<0.05$.

## RESULTS

Thirty patients who stayed at home and thirty patients who stayed in container cities after cataract surgery were examined. In the group that stayed at home (Group 1), 50% were female and 50% were male. In the group that stayed in container cities (Group 2), 56.6% were female and 43.4% were male. The average age was 67.03±4.76 years in Group 1 and 67.67±4.99 years in Group 2 ($p>0.05$). No significant differences in age or gender were found between the patient groups living in container cities and those living at home.

The preoperative best-corrected visual acuity (BCVA) for patients staying at home was 0.71 LogMar, 0.2 at postoperative week 1, and 0.09 at postoperative month 1. Postoperative BCVA values at week 1 and month 1 were significantly improved compared to preoperative values ($p<0.05$). Corneal edema values at week 1 (1.1) were significantly higher compared to preoperative values, while at month 1 (0.03), there was no significant difference compared to preoperative and postoperative week 1 values. The preoperative pachymetry value was 543±24.5

μm, 577±34 μm at postoperative week 1, and 545±24 μm at postoperative month 1. The pachymetry value at week 1 was significantly higher compared to the preoperative value. Intraocular pressure (IOP) was 14.67±2.74 mmHg preoperatively, 13.13±2.52 mmHg at postoperative week 1, and 11.93±2.46 mmHg at postoperative month 1. The IOP values at week 1 and month 1 were significantly lower than the preoperative values (p<0.05) (Table 1).

The preoperative BCVA for patients staying in container cities was 0.68 LogMar, 0.22 at postoperative week 1, and 0.08 at postoperative month 1. Postoperative BCVA values at week 1 and month 1 were significantly improved compared to preoperative values (p<0.05). Corneal edema values at week 1 (0.97) were significantly higher compared to preoperative values, while at month 1 (0.03), there was no significant difference compared

**Table 1. The values of the Home Group at preoperative, postoperative week 1, and postoperative month 1**

| | Preoperative | Postoperative 1st Week | Postoperative 1st Month |
|---|---|---|---|
| BCVA | 0.71±0,19 | 0.2±0.13 | 0.09±0.07 |
| Corneal Edema | 0 | 1.1±0.66 | 0.03±0.17 |
| CCT | 543±24.5 | 577±34 | 545±24 |
| IOP | 14.67±2.74 | 13.13±2.52 | 11.93±2.46 |

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

to preoperative and postoperative week 1 values. The preoperative pachymetry value was 544±24.09 μm, 580±35 μm at postoperative week 1, and 545±23 μm at postoperative month 1. The pachymetry value at week 1 was significantly higher compared to the preoperative value (p<0.05). IOP was 15.07±2.76 mmHg preoperatively, 13.30±2.57 mmHg at postoperative week 1, and 12.33±2.27 mmHg at postoperative month 1. The IOP values at week 1 and month 1 were significantly lower than the preoperative values (p<0.05) (Table 2).

**Table 2. The values of the Container City Group at preoperative, postoperative week 1, and postoperative month 1**

| | Preoperative | Postoperative 1st Week | Postoperative 1st Month |
|---|---|---|---|
| BCVA | 0.68±0.18 | 0.22±0.13 | 0.08±0.06 |
| Corneal Edema | 0 | 0.97±0.61 | 0.03±0.18 |
| CCT | 544±24.09 | 580±35 | 545±23 |
| IOP | 15.07±2.76 | 13.30±2.57 | 12.33±2.27 |

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

When comparing the home and container city groups at week 1 and month 1 after cataract surgery, no significant differences were found in terms of BCVA, corneal edema, CCT, and IOP (p>0.05) (Table 3, Table 4).

**Table 3. Comparison of the values at postoperative week 1 between patients staying in a home and those staying in a container city**

| | Home | Container City | P Value |
|---|---|---|---|
| BCVA | 0.2±0,13 | 0.22±0,13 | 0.496 |
| Corneal Edema | 1.1±0,66 | 0.97±0,61 | 0.618 |
| CCT | 577±34 | 580±35 | 0.966 |
| IOP | 13.13±2,52 | 13.30±2,57 | 0.985 |

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

**Table 4. Comparison of the values at postoperative week 1 between patients staying in a home and those staying in a container city**

| | Home | Container City | P Value |
|---|---|---|---|
| BCVA | 0.09±0.07 | 0.08±0.06 | 0.575 |
| Corneal Edema | 0.03±0.17 | 0.03±0.18 | 0.998 |
| CCT | 545±24 | 545±23 | 0.815 |
| IOP | 11.93±2.46 | 12.33±2.27 | 0.712 |

BCVA: Best Corrected Visual Acuity, CCT: Central Corneal Thickness IOP: Intraocular Pressure

Regarding other postoperative complications, no cases of endophthalmitis, cystoid macular edema, retinal detachment or corneal decompensation were reported in either group.

## DISCUSSION

In this study, which retrospectively examined the postoperative outcomes of patients who underwent cataract surgery, the effect of the postoperative care environment on these outcomes was investigated.

It is well known that significant improvements in visual acuity are achieved after cataract surgery (3). In our study, the increase in visual acuity was similar between the two groups.

In a study by Ramya et al., it was observed that intraocular pressure decreased after cataract surgery (7). Similarly, other studies have also reported a decrease in intraocular pressure after cataract surgery in both glaucomatous and non-glaucomatous eyes(8,9,10). In our study, a similar decrease in postoperative intraocular pressure was observed in both the container city group and the home group. However, no significant difference was found between the two groups when compared.

Corneal edema is a common complication after cataract surgery (11). Corneal edema can develop due to damage to the corneal endothelium secondary to the ultrasonic power used during cataract surgery (12). In our study, an increase in corneal edema and pachymetry was observed in both groups at postoperative week 1, while no difference was observed compared to preoperative values at month 1. There was no significant difference between the two groups.

While the most common complications in the postoperative period after cataract surgery include increased intraocular pressure and corneal edema, less frequently, complications such as cystoid macular edema,

posterior capsule opacification, retinal detachment, and endophthalmitis can occur (13). Various intraoperative and postoperative complications have been shown to lead to worse surgical and visual outcomes (14,15,16). Comorbidities such as glaucoma, uveitis, diabetic retinopathy, and previous vitrectomy surgery can also affect surgical and visual outcomes (17,18). In our study, the complications observed were similar in both groups.

Environmental factors such as pollutants, temperature changes, ultraviolet rays, toxic gases, chemicals, bacteria, smoking, various medications, variable humidity, and cosmetics can affect various parts of the eye, such as the cornea and conjunctiva, leading to numerous eye conditions such as cataracts, conjunctivitis, glaucoma, and dry eye (19). Okawada et al. epidemiologically investigated the effects of photochemical air pollution on the human eye, and the results showed changes in human tear lysozyme (HTL) and tear pH due to eye irritation and corneal epithelialopathy (20).

Heilenbach et al. (21) demonstrated that environmental factors are associated with various ophthalmic conditions, including endophthalmitis. A recently published study suggested that environmental factors might contribute to the development of endophthalmitis and that proper hygiene and preventive measures could help prevent endophthalmitis (22). In our study, no cases of endophthalmitis were observed in either group.

Recent studies conducted in the earthquake region of Turkey have shown that hazardous materials such as asbestos, lead, and other toxic substances were released into the environment during the earthquake (23). Exposure to toxic pollutants in air, water, and soil may vary between staying in a home or a container city. In our study, this situation did not have an effect on the outcomes after cataract surgery.

Our country is rich in active fault lines and is therefore constantly at risk of earthquakes. The process of returning to routine after a natural disaster involves long and challenging phases. During this period, surgeons may face difficulties in deciding to accept elective cases due to potential complications. In our study, we found that there were no disadvantages to postoperative recovery in an environment recovering from an earthquake. Although the sample size and duration were limited, we believe this study will be informative.

We observed that the postoperative care environment, whether at home or in a container city, did not have a significant impact on surgical and visual outcomes after cataract surgery. Limitations of the study included its retrospective nature and the small sample size. There is a need for prospective studies with larger samples.

## Declarations

The authors received no financial support for the research and/or authorship of this article. There is no conflict of interest.

This study was approved by the Hatay Mustafa Kemal University Faculty of Medicine Ethics Committee (Dated: 21.05.2024; Approval Number: 27).

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