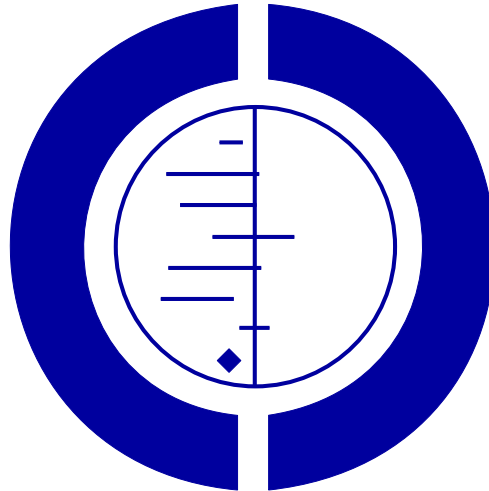


# Day care versus in-patient surgery for age-related cataract (Review)

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## ABSTRACT

### Background

Age-related cataract accounts for more than 40% of cases of blindness in the world with the majority of people who are blind from cataract found in the developing world. With the increased number of people with cataract there is an urgent need for cataract surgery to be made available as a day care procedure.

### Objectives

To provide reliable evidence regarding the safety, feasibility, effectiveness and cost-effectiveness of cataract extraction performed as day care versus in-patient procedure.

### Search strategy

We searched the Cochrane Central Register of Controlled Trials - CENTRAL (which contains the Cochrane Eyes and Vision Group Trials Register) on *The Cochrane Library* (Issue 3 2004), MEDLINE (1966 to July 2004), EMBASE (1980 to August 2004) and LILACS (July 2004).

### Selection criteria

This review includes randomised controlled trials comparing day care and in-patient surgery for age-related cataract. The primary outcome was the achievement of a satisfactory visual acuity six weeks after the operation.

### Data collection and analysis

Although two trials are included in the review, adequate data were available for only one trial and therefore pooling of data from studies was not attempted. A descriptive summary is presented.

### Main results

Two trials, involving a total of 1284 people, are included in this review. One trial reported statistically significant differences in early postoperative complication rates in the day care group, with an increased risk of increased intraocular pressure, which had no clinical relevance to visual outcomes four months postoperatively. The mean change in visual acuity (Snellen lines) of the operated eye four months postoperatively was 4.1 (standard deviation (SD) 2.3) for the day care group and 4.1 (SD 2.2) for the in-patient group and not statistically significant. The four-month postoperative mean change in quality of life score measured using the VF14 showed minimal differences between the two groups. Costs were 20% more for the in-patient group and this was attributed to higher costs for overnight stay. One study only reported hotel costs for the non-hospitalised participants making aggregation of data on costs impossible.

### Authors' conclusions

This review provides some evidence that there is a cost saving but no significant difference in outcome or risk of postoperative complications between day care and in-patient cataract surgery. This is based on one detailed and methodologically sound trial conducted in the developed world. The success, safety and cost-effectiveness of cataract surgery as a day care procedure appear to be acceptable but additional well-designed trials are required to confirm these perceptions.

## SYNOPSIS

Day surgery may be as effective as overnight stay for cataract extraction

The lens in eyes can become cloudy with age, leading to blurry vision or total vision loss. Cataracts can be surgically removed, with an artificial lens implanted to restore vision. Phacoemulsification is a recently developed cataract surgery method. It reduces the length of the procedure and leads to quicker recovery, making day surgery a possibility. The review of trials found that in developed countries at least, there is some evidence that day surgery for this type of cataract extraction may be cheaper but just as effective as hospitalisation.

## BACKGROUND

### Epidemiology

Age-related cataract accounts for more than 40% of cases of blindness throughout the world with the majority of people blind from cataract found in the developing world (Snellings 2002). With the development of prevention of blindness programmes in many countries, an increasing number of cataract patients are gaining access to surgical treatment for their ailment (Kupfer 1994). Nevertheless, the number of people blind as a result of cataract is increasing due to changes in the demographic structure of populations, the most important of which is increased life expectancy (Minassian 1990; Limburg 1996; Thylefors 1998).

### Presentation and diagnosis

People with cataract can present with one or more of the following symptoms: gradual diminution of visual acuity, glare, frequent change in glasses prescription and change in colour appreciation. The condition may be discovered by a general practitioner or optometrist, followed by referral to an ophthalmic surgeon for confirmation of the diagnosis and management. Many people with treatable visual impairment from cataract do not access health services, mainly due to socioeconomic considerations (Desai 1999).

### Treatment options

Surgical removal of the cataract is currently the only treatment option once the lens has opacified. This is usually accompanied by implantation of an intraocular lens (IOL) to replace the focusing power of the natural lens.

Modern cataract surgery and IOL implantation allow accurate prediction of postoperative visual acuity. Several refinements have been made in surgical techniques in order to offer better postoperative clinical outcomes. The most notable revolution in cataract surgery in the last two decades was the change from the large 10 mm incision extracapsular cataract extraction procedure to the small 3 to 4 mm incision operation known as phacoemulsification. Phacoemulsification involves fragmenting the cataractous lens inside the eye prior to its aspiration via a wide bore needle. This change is generally perceived to offer greater predictability of refractive outcomes, a shorter convalescence and faster recovery of full visual function. A Cochrane systematic review comparing different surgical approaches for treatment of age-related cataract is published in *The Cochrane Library* (Snellings 2002).

With the advent of phacoemulsification in the early 1990s and the increasing use of local anaesthesia in cataract extraction, a trend has developed towards management of cataract patients as day cases. Such a trend was initially driven by the necessity of cost containment, the need to shorten waiting list times and to significantly increase the capacity of health care providers in performing more surgeries per unit of time. With increasing demand, 'stand alone' day care centres arose both in the national and private sectors. Classically these centres offer diagnostic and treatment facilities for cataract patients including day case cataract extraction operations usually performed under local anaesthesia (Cresswell 1996).

Concerns about the quality of service provided by day care units and purpose-built centres delayed the wider spread of day care surgery. Most notable were concerns about whether this treatment modality has the same clinical outcome as the classic in-patient procedure and whether it carries a higher risk of intra and/or post-operative complications. An equally important aspect was the patient's perspective of such an experience i.e. would patients prefer to undergo surgery done in such day care units or alternatively with full in-patient admission.

### Rational for a systematic review

Several studies have compared the clinical outcome and cost-effectiveness of cataract extraction performed in day care units with those done as in-patients. Very few of these studies have addressed the issue of patient satisfaction and subsequent effect on the patient's quality of life. Differing results obtained from these studies emphasise the requirement for a systematic review of the evidence regarding the safety, feasibility and effectiveness of day care cataract surgery. This research will provide an objective evaluation and comparison between two different concepts in health care planning and management. In addition it could serve as a stimulus for a major change in treatment modalities driven and supported by evidence-based patient choice.

## OBJECTIVES

The objective of this review is to provide reliable evidence regarding the safety, feasibility, effectiveness and cost-effectiveness of day case cataract extraction by comparing clinical outcomes, cost-effectiveness and/or patient satisfaction in cataract operations performed in day care versus in-patient units.

## CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

### Types of studies

We considered randomised controlled trials in this review.

### Types of participants

We considered trials in which participants were people with age-related cataract. No restrictions were made on race, gender or ocular co-morbidity.

### Types of intervention

We included trials in which cataract extraction and intraocular lens implantation done as day cases were compared to in-patient cases.

### Types of outcome measures

The primary outcome for this review was the achievement of a satisfactory visual acuity six weeks after the operation. Satisfactory visual acuity is defined here as best corrected visual acuity of 6/18 or better in the operated eye.

We also included the following secondary outcomes for this review.

- (1) Adverse effects.
- (2) Intraoperative complications including the proportion of participants with posterior capsular rupture with or without vitreous loss, misplaced intraocular lenses and anaesthesia related complications.
- (3) Postoperative complications including the proportion of participants with wound leakage and other suture related problems, corneal oedema and/or decompensation, secondary glaucoma and postoperative endophthalmitis.
- (4) Quality of life measures - Patient reported outcomes using any of the validated tools to assess quality of life and visual function e.g. VF 14, SF 36. Subjective assessment of patient satisfaction of the procedure will also be considered.
- (5) Economic data - Cost-effectiveness of the procedures carried out as day case and in-patient.

## SEARCH STRATEGY FOR IDENTIFICATION OF STUDIES

See: Eyes and Vision Group search strategy

### Electronic searches

Trials were identified from the Cochrane Central Register of Controlled Trials - CENTRAL (which contains the Cochrane Eyes and Vision Group Trials Register) on *The Cochrane Library*, MEDLINE, EMBASE and LILACS (Latin American and Caribbean Literature on Health Sciences). There were no language or date restrictions in the electronic searches.

The following strategy was used to search CENTRAL on *The Cochrane Library* Issue 3, 2004:

#1 AMBULATORY SURGICAL PROCEDURES  
#2 AMBULATORY CARE  
#3 OUTPATIENT CLINICS HOSPITAL  
#4 day\*:ti  
#5 day\*:ab  
#6 (car\* or case\* or surg\*:ti)  
#7 (car\* or case\* or surg\*:ab)  
#8 (#4 or #5)  
#9 (#6 or #7)  
#10 (#8 and #9)  
#11 (outpatient\* or out-patient\* or (out next patient\*))  
#12 (#1 or #2 or #3 or #10 or #11)  
#13 HOSPITALIZATION  
#14 (inpatient\* or in-patient\*)  
#15 hospital\*  
#16 (overnight\* or over-night\* or (over next night\*))  
#17 (#13 or #14 or #15 or #16)  
#18 (#12 and #17)  
#19 CATARACT  
#20 cataract\*  
#21 (#19 or #20)  
#22 (#18 and #21)

The following strategy was used to search MEDLINE on SilverPlatter to July 2004:

#1 "AMBULATORY-SURGICAL-PROCEDURES"/ all subheadings  
#2 "AMBULATORY-CARE"/ all subheadings  
#3 "OUTPATIENT-CLINICS-HOSPITAL"/ all subheadings  
#4 day near3 (care or case\* or surgery)  
#5 outpatient\*  
#6 #1 or #2 or #3 or #4 or #5  
#7 explode "HOSPITALIZATION"/ all subheadings  
#8 (in?patient\* or hospital\* or over?night or "over night") in TI, AB  
#9 #7 or #8  
#10 #6 and #9  
#11 cataract\*  
#12 #10 and #11

The following strategy was used to search EMBASE on SilverPlatter to August 2004:

#1 "AMBULATORY-SURGERY"/ all subheadings  
#2 "OUTPATIENT-CARE"/ all subheadings  
#3 day near3 (care or case\* or surgery)  
#4 outpatient\*  
#5 #1 or #2 or #3 or #4  
#6 "HOSPITALIZATION"/ all subheadings  
#7 (in?patient\* or hospital\* or over?night or "over night") in TI, AB  
#8 #6 or #7  
#9 #5 and #8  
#10 cataract\*  
#11 #9 and #10

Neither the MEDLINE nor EMBASE search strategies were combined with search strategies that specifically identified trials.

LILACS was searched in July 2004 using the terms inpatient, outpatient, 'day care', 'day case', 'day surgery' and hospital\$. These terms were then combined with the term cataract\$.

#### Manual searches

We searched the reference lists of relevant articles and the reviewers' personal database of trial reports. We contacted investigators of included studies by electronic mail to ask for details of additional published and unpublished trials. No handsearching of journals or conference proceedings was done.

## METHODS OF THE REVIEW

#### Assessment of search results

Two reviewers assessed independently the abstracts of studies resulting from the searches. Each reviewer graded the abstracts according to the grading system described in the Cochrane Reviewers' Handbook 4.2.2 (Alderson 2004). The gradings were compared and any inconsistencies in the interpretation of inclusion criteria and their significance to the selected abstracts were discussed and resolved. Full copies of all relevant and potentially relevant studies were obtained.

#### Assessment of methodological quality

Each selected study was independently assessed by two reviewers using a simple contingency form which used the criterion grading listed below. Discrepancies were settled by discussion and mutual agreement. We assessed three parameters of methodological quality:

- 1) Selection bias - whether the way in which individuals are accepted into a group or the way that interventions are assigned may affect the outcomes.
- 2) Detection bias - whether persons assessing the outcome of care were aware of which treatment the participant received. More simply, whether the outcomes evaluators were masked to the treatment provided.
- 3) Attrition bias - whether there was a substantial difference between the two groups regarding loss of participants from the study over the follow up period.

Each criterion was graded A if the criterion was met, B if it was unclear or C if the criterion had not been met. We attempted to obtain any missing information from investigators.

#### Data collection

Study details from randomised controlled trials meeting the inclusion criteria were entered into the 'Characteristics of included studies table' in RevMan 4.2.2 by each reviewer separately and cross checked. The following details were extracted.

1) Study methods: method of allocation, masking of participants and outcomes, exclusion of participants after randomisation and proportion of follow up losses.

2) Participants: country of origin, sample size, age, sex, inclusion and exclusion criteria.

3) Intervention: type of operation performed and average duration of hospital stay.

4) Outcomes: primary and secondary outcomes mentioned in the section of outcome measures.

This information was used to help us assess heterogeneity and external validity of the trials.

Outcome data were collected using a form designed for this purpose. Extracted data were entered into Review Manager (RevMan) 4.2 by each reviewer sequentially and automatically checked for differences.

#### Data synthesis

We planned to assess heterogeneity by looking at the characteristics of the studies, the forest plot of the results and the chi squared test. We planned to present relative risks for visual acuity outcomes and odds ratios for adverse effect outcomes. Since only one study provided adequate data, no statistical summary was performed.

#### Sensitivity analysis

We planned to conduct a sensitivity analysis to assess the robustness of our review results by repeating the analysis with the following adjustments: exclusion of studies of lower methodological quality and unpublished studies.

## DESCRIPTION OF STUDIES

#### Finding the trials

The initial electronic searches identified 226 references. After review all but six papers were excluded from the review. Full text copies of these papers were obtained for further assessment. One paper described a systematic review (Castells 2000). One trial (Rose 1999) was rejected as the study compared day stay in a peripheral clinic with a main eye hospital and all participants were treated as day stay. Ingram 1980 was rejected as no intraocular lens implantation was carried out and the technique used (intracapsular cataract extraction) is now considered obsolete and the study cannot be relied on in comparison with the current technique of extracapsular cataract extraction. We were unsuccessful in obtaining additional data from the authors of Percival 1992 and were unable to make an assessment of its quality and thus this trial was excluded. Lowe 1992 was discarded as the study only considered suitability for day case cataract surgery and did not include a comparison of in-patient or day care for cataract surgery (*see* 'Characteristics of excluded studies'). Two trials (Castells 2001; Galin 1981) met the inclusion criteria and are included in the review.

The updated electronic searches identified a further 85 references but no new trials were found.

### Summary of trial details

The Castells 2001 study was an unmasked randomised clinical trial of patients undergoing cataract surgery in three public hospitals in Barcelona (Spain) in which 1034 participants were randomly assigned to one of two groups: out-patient hospital and in-patient hospital. Patients were eligible if they were scheduled for cataract surgery that did not include any other ophthalmological procedure and if they met certain inclusion criteria for ambulatory surgery. A total of 464 out-patients and 471 in-patients completed the trial. For the majority of participants the planned procedure was extracapsular cataract extraction with intraocular lens implantation. Of these participants, 17.5% out-patients and 16.6% in-patients underwent phacoemulsification.

The primary outcomes were postoperative complications within 24 hours of surgery; postoperative complications between 24 hours and 4 months after surgery; visual acuity of the operated and the better eye 4 months after surgery; change in visual acuity pre and postoperatively. Secondary outcomes focused on the evaluation of self-reported outcomes which were administered by trained interviewers by telephone in the preoperative and 4 month postoperative period. Visual function was assessed using the VF 14 Index. The Cataract Symptom Score was used to measure the degree of difficulty caused by five symptoms common to cataractous patients. Additionally the Sickness Impact Profile was used to assess participants perceived health status and sickness related dysfunction. Economic data relating to direct costs associated with the surgery, in-patient stay and four-month follow up were estimated and calculated per participant.

In the Galin 1981 study 273 patients who needed cataract surgery were asked to participate and 250 were randomised into three age-matched groups. Cataract extraction was performed either with or without a Sputnik intraocular lens. After completion of surgery participants stayed in a hospital or a hotel or went home. Details regarding postoperative outcomes were very sparse. The study provided some detail on the cost of hotel stay but there was no information available on direct costs incurred as a result of the surgical procedure.

Further details of these trials can be found in the table 'Characteristics of included studies'.

### METHODOLOGICAL QUALITY

The two included studies were of moderate quality.

In Castells 2001 the participants were randomised by computerised simple random number software performed centrally by the research unit. Thus the authors are deemed to have taken adequate measures to conceal allocation. Their report included a trial randomisation flowchart which gave a comprehensive breakdown of the management of study dropouts including those who did not undergo surgery, died or refused to be interviewed and those

who did not receive the intervention to which they were allocated. Patients lost to follow up (attrition analysis) were accounted for and there were no differences in attrition in both groups either in the distribution of reasons for withdrawal or in their clinical characteristics. This study did not specifically mention any masking of outcomes assessment.

Galín 1981 randomised participants using tables of coded random numbers. Allocation concealment (described as "the surgeon did not know preoperatively in which category a patient belonged") was considered adequate. Only the number of people that refused or changed their minds was included in the report. The remaining data were sparse and included generalisations about the postoperative period and the two year follow up. Additionally there was no analysis of 'intention to treat' and no mention of masking of the outcomes assessment.

### RESULTS

The marked heterogeneity in the two included studies did not support undertaking any statistical analysis. A descriptive summary of results is presented. All data are from Castells 2001 unless stated otherwise.

#### Primary outcomes

We had originally proposed to report on primary outcomes six weeks postoperatively but neither of the included studies reported outcomes for this time period. Thus we report on best corrected visual acuity 6/18 or better in the operated eye four months postoperatively.

#### Visual Acuity (see Additional Table 01)

The mean of change in visual acuity (in Snellen lines) of the operated eye four months postoperatively was 4.1 (standard deviation (SD) 2.3) day care and 4.1 (SD 2.2) in-patient and not statistically significant ( $p = 0.74$ ).

#### Secondary outcomes

Intraoperative complications - No data were available from either study on intraoperative complications.

Postoperative complications - Castells 2001 reported statistically significant differences in early postoperative complication rates (Additional Table 02) with an increased risk of increased intraocular pressure (IOP) in the day care group which appeared to have no clinical relevance to visual outcomes four months postoperatively (Additional Table 03). Although the four-month postoperative outcomes were similar between both groups there were nevertheless two patients with endophthalmitis in the day care group versus none in the in-patient group. Galín 1981 stated that there were no infections or severe hyphemas.

Quality of life measures - At four months postoperative VF 14 scores were higher for the day care group (92.8 versus 87.6) and the mean of change VF 14 scores showed minimal differences between the

two groups, day care 25.2 (standard deviation (SD) 21.2) and in-patient 23.5 (SD 25.7)  $p = 0.30$  (Additional Table 04). Additional data provided were the Cataract Symptom Score to assess cataract related symptoms and the Sickness Impact Profile Score which assesses the overall perceived health status by measuring sickness related dysfunction and confirmed that the perceived health outcomes were similar in both groups. The mean Cataract Symptom Score (range = 0 to 15) 4 months after surgery was 0.6 (1.2) for the day care group and 0.8 (1.7) for the in-patient group. The Mean Sickness Impact Profile score (range = 0 to 100) four months after surgery was 8.4 (8.9) for the day care group and 8.8 (8.8) for the in-patient group. Further subjective assessment of patient satisfaction was provided by Galin 1981 who noted that participants preferred to recuperate at home, were more comfortable in their familiar surroundings and enjoyed the family support that they received at home.

*Economic data* - Direct costs including a four-month follow up reported by Castells 2001 were 20% more for in-patient versus day care and attributed to higher costs for overnight stay (Additional Table 05). Galin 1981 only reported hotel costs for the nonhospitalised participants making aggregation of data on costs impossible.

## DISCUSSION

The lack of first-rate quality trials to synthesise was disappointing as the significance of this review in supporting a shift in methodology from in-patient to day care surgery can at present only be assessed by subjective means. However, it is readily apparent that this shift has already taken place, seemingly validated by experientially-based opinion. The data that we reviewed produced no surprises and appears to provide confirmatory evidence of the safety, effectiveness and cost-effectiveness of day care cataract surgery. By way of further confirmation of the results, the Castells 2001 study showed similar mean changes in visual acuity between the two groups, which compared favourably with those found in the US National Study of Surgery Outcomes (Steinberg 1994). It was apparent from this study that the effectiveness of cataract surgery performed as a day case procedure, assessed by visual acuity, equals that of the corresponding in-patient procedure providing clinicians with a certain degree of confidence in selecting the day care approach.

Although there were statistically significant differences in immediate postoperative complications between the two groups, these did not appear to have a marked effect on the overall postoperative complications which should further minimise any unease with day care cataract surgery. The more subjective quality of life measures and visual function results provided further corroborative evidence of the effectiveness of day care surgery as a preferred modality. Additionally in this era of soaring health costs and cost contain-

ment there is a perception that day care surgery should provide a more cost-effective approach in the treatment of cataract surgery, a premise which the two included studies appear to confirm. However care should be taken in examining the balance sheet as there are hidden community costs that need to be included in the day care surgery equation, costs which may in the end support the change solely as a cost-shifting economic exercise.

The electronic searches identified a Spanish systematic review (Castells 2000) which included the trials that we assessed in our review. We arranged to have the Spanish review translated into English. In the translated copy the authors indicated that the quality assessment of their included studies followed the guidelines of the Evidence-Based Medicine Working Group and the Consort Statement which they further added; evaluate primary criteria (randomisation of assigned treatment, attrition and intention to treat analyses) and secondary criteria (masking). We reviewed all the included studies and found ourselves unable to concur with all of the quality assessments made by the authors of some of these studies and additionally noted that this Spanish systematic review was not referenced in the Database of Abstracts of Reviews of Effectiveness (DARE) in *The Cochrane Library*.

The comprehensive Castells trial which forms a significant component of our review was predated by the development and issue of the SIGN 53 clinical guideline 'Day Case Cataract Surgery' (SIGN 2001). This clinical guideline informs that current evidence does not suggest differences in surgical complication rates or outcome between day case and in-patient cataract surgery but refers to a number of studies, including Lowe 1992 which we excluded from our review.

## AUTHORS' CONCLUSIONS

### Implications for practice

This review based on one detailed and methodologically sound trial conducted in the developed world provides some evidence that there is a cost saving but no significant difference in outcome or risk of postoperative complications between day care and in-patient cataract surgery. Evidence regarding patients preferences for day case cataract surgery versus in-patient admission was inconclusive.

In the developed world the resolution of some of the questions about the safety and cost-effectiveness of cataract surgery in day care centres should enable healthcare planners to make better use of resources, by selecting day case surgery unless there are agreed clinical and social indications for in-patient care. This could result in the freeing up of hospital beds and staff that would normally be required for in-patient cataract surgery. Although the review specifically considered economic data related to cost-effectiveness some reference should be made to the possibility of any total cost

saving in the change from day care to in-patient cataract surgery. There is some unease with the cost saving premise in that the move to day case cataract surgery may be seen solely as a cost-shifting exercise, shifting the cost burden on to the community whilst removing it from the health service with possibly no total cost saving.

In the developing world with its funding and resource difficulties, consideration of the results of this review may encourage health policy planners to evaluate a possible wider adoption of 'cataract camps'. Although these programmes have been available since the early 1990s there have been reservations expressed about the quality of care and possible postoperative complications. There are tangible benefits with improved access to care for medically underserved regions if fully equipped mobile units can visit out-reach clinics and provide quality day care cataract surgery equivalent to that of in-patient care.

### Implications for research

The sparse number of randomised trials on this topic indicate that the progression from in-patient to day care as the primary treatment modality has already taken place a shift driven by necessity, cost, a simplification of the procedure and other dynamics.

In the developed world there does not appear to be any debate about the safety and outcomes of day care cataract surgery so future research could explore the issue of cost shifting or the issue of case selection to identify which combinations of patient factors indicate a need for in-patient care. In the absence of additional randomised controlled trials essential evidence could be provided by the use of high quality clinical databases.

Future research in the developing world could well continue to focus on safety, outcomes, type of surgical procedure, as well as costs, all of which may help confirm the universal applicability of the findings from the developed world. It is important that additional trials pay greater attention to detail in their design and reporting and consider using the CONSORT statement to ensure

that important factors such as random allocation sequence, masked assessment and dealing with withdrawals are included.

Finally we note that the design of the Castells 2001 study provides a sound template for measuring the benefits of surgery. It includes the use of patient assessed visual function via visual quality of life measures and moves away from a sole reliance on visual acuity with its widely acknowledged ability to capture only a limited aspect of visual function. More consideration should also be given to a greater role for these patient assessed visual function and visual quality of life instruments and specifically in the measurement of need for, and benefits from surgery.

## POTENTIAL CONFLICT OF INTEREST

None known.

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The Cochrane Eyes and Vision Group developed and executed the electronic searches for this review. We would like to acknowledge Anupa Shah, Henry Ejere and Katherine Henshaw for their guidance throughout this review. The reviewers appreciate the contribution of Wael Wagih Hamed in first registering the title for this review and the help he provided with the development of the protocol. We thank Suad Al-Khalifa, Head Librarian at the Arabian Gulf University for her ongoing help.

## SOURCES OF SUPPORT

### External sources of support

- No sources of support supplied

### Internal sources of support

- No sources of support supplied

## REFERENCES

### References to studies included in this review

#### Castells 2001 *{published data only}*

Castells X, Alonso J, Castilla M, Ribo C, Cots F, Anto J. Outcomes and costs of outpatient and inpatient cataract surgery: a randomised clinical trial. *Journal of Clinical Epidemiology* 2001;**54**(1):23–9.

#### Galin 1981 *{published data only}*

Galin MA, Boniuk V, Obstbaum SA, Barasch KR, Baras I. Hospitalization and cataract surgery. *Annals of Ophthalmology* 1981;**13**(3):365–7.

### References to studies excluded from this review

#### Ingram 1980

Ingram RM, Banerjee D, Traynar MJ, Thompson RK. Day-case cataract surgery. *Transactions of the Ophthalmological Societies of the UK* 1980;**100**(Pt 1):205–9.

#### Lowe 1992

Lowe KJ, Gregory DA, Jeffery RI, Easty DL. Suitability for day case cataract surgery. *Eye* 1992;**6**(Pt 5):506–9.

**Percival 1992**

Percival SP, Setty SS. Prospective audit comparing ambulatory day surgery with inpatient surgery for treating cataracts. *Quality in Health Care* 1992;**1**(1):38–42.

**Rose 1999**

Rose K, Waterman H, Toon L, McLeod D, Tullo A. Management of day-surgery patients with cataract attending a peripheral ophthalmic clinic. *Eye* 1999;**13**(Pt 1):71–5.

**Additional references****Alderson 2004**

Alderson P, Green S, Higgins JPT, editors. Cochrane Reviewers' Handbook 4.2.2 [updated March 2004]. *The Cochrane Library, Issue 1, 2004*. Chichester, UK: John Wiley & Sons, Ltd, 2004.

**Castells 2000**

Castells X, Alonso J, Castilla M, Comas M. Efficacy and cost of ambulatory cataract surgery: a systematic review. *Medicina Clinica* 2000;**114** Suppl 2:40–7.

**Cresswell 1996**

Cresswell PA, Allen ED, Tomkinson J, Chapman FM, Pickering S, Donaldson LJ. Cost effectiveness of a single-function treatment center for cataract surgery. *Journal of Cataract and Refractive Surgery* 1996;**22**(7):940–6.

**Desai 1999**

Desai P, Minassian DC, Reidy A. National cataract surgery survey 1997–8: a report of the results of the clinical outcomes. *British Journal of Ophthalmology* 1999;**83**(12):1336–40.

**Kupfer 1994**

Kupfer C. The International Agency for the Prevention of Blindness. *American Journal of Ophthalmology* 1994;**7**(2):253–7.

**Limburg 1996**

Limburg H, Kumar R, Bachani D. Monitoring and evaluating cataract intervention in India. *British Journal of Ophthalmology* 1996;**80**(11):951–5.

**Minassian 1990**

Minassian DC, Mehra V. 3.8 million blinded by cataract each year: projections from the first epidemiological study of the incidence of cataract blindness in India. *British Journal of Ophthalmology* 1990;**74**(6):341–3.

**SIGN 2001**

. Day Case Cataract Surgery 53. Scottish Intercollegiate Guidelines Network 2001.

**Snellingen 2002**

Snellingen T, Evans JR, Ravilla T, Foster A. Surgical interventions for age-related cataract. In: *The Cochrane Database of Systematic Reviews*, 2, 2002. Art. No.: CD001323. DOI: 10.1002/14651858.CD001323. Chichester, UK: John Wiley & Sons, Ltd.

**Steinberg 1994**

Steinberg EP, Tielsch JM, Schein OD, Javitt JC, Sharkey P, Cassard SD, et al. National study of cataract surgery outcomes. Variation in 4-month postoperative outcomes as reflected in multiple outcome measures. *Ophthalmology* 1994 Jun;**101**(6):1131–40.

**Thylefors 1998**

Thylefors B. A global initiative for the elimination of avoidable blindness. *American Journal of Ophthalmology* 1998;**125**(1):90–3.

\* Indicates the major publication for the study

**T A B L E S****Characteristics of included studies**

Study	Castells 2001
Methods	Prospective unmasked randomised clinical trial. Randomisation generated by computerised simple random number software. Allocation one month prior to surgery, concealment not specified.
Participants	Cataract patients from three public hospitals in Barcelona (Spain). N = 1,162. After randomisation N = 1,034 (out-patients n = 518, in-patients n = 516). Withdrawals: 99. Completed trial: out-patients 464 (89.6%), in-patients 471 (91.3%). Mean age (SD) out-patients 71.6 (10.7), in-patients 71.4 (9.7). Gender (female) out-patients: 270 (58.2%), in-patients: 278 (59%).
Interventions	Extracapsular cataract extraction with intraocular lens implantation performed as day-care and extracapsular cataract extraction with intraocular lens implantation performed in hospital.
Outcomes	Postoperative surgical complications (24 hour postoperative). Late postoperative surgical complications (between 24 hours and 4 months).

### Characteristics of included studies (Continued)

	Visual acuity of the operated and better eye 4 months postoperative, change in visual acuity pre-postoperative.
Notes	Only 17.5% of the out-patients and 16% of the in-patients underwent phacoemulsification.
Allocation concealment	A
<b>Study</b>	<b>Galin 1981</b>
Methods	Prospective randomised controlled trial. Randomisation using tables of coded random numbers. Allocation concealment: "the surgeon did not know preoperatively in which category a patient belonged."
Participants	Country of Origin: USA. N = 273, 23 refused. n = 250 aged matched (50 - 79) cataract patients, inpatients: 82, out-patients: 168. No attritional losses over 2 year period.
Interventions	Cataract extraction with or without a Sputnik intraocular lens.
Outcomes	'Ocular results' not specified. Post operative complications not specified.
Notes	Data sparse largely narrative style.
Allocation concealment	A

### Characteristics of excluded studies

Ingram 1980	No intraocular lens implantation was carried out and the technique of ICCE which was used is considered obsolete. Thus the study cannot be relied on in a comparison with the current technique of ECCE.
Lowe 1992	This study only considered suitability for day-case cataract surgery and did not include a comparison of in-patient or day-case cataract surgery.
Percival 1992	Unable to assess trial quality and unable to obtain further information from authors.
Rose 1999	The study compared day stay patients in a peripheral clinic and a main eye hospital. All patients were treated as day stay.

## ADDITIONAL TABLES

**Table 01. Visual acuity 4 months postoperative (operated eye)**

Visual Acuity	Day-care (n = 464)	In-patient (n = 471)
>6/18 to 6/15	111 (24%)	128 (27.2%)
6/12 to 6/9	149 (32.1%)	161 (34.2%)
6/9	112 (24.1%)	98 (20.8%)
Mean change (SD)	4.1 (2.3)	4.1 (2.2)

**Table 02. Early (< 24 hour) postoperative complications**

	Day-care (n =464)	In-patient (n = 471)	Relative Risk (CI)
Wound leakage	5 (1.1%)	4 (0.8%)	1.27 (0.34 to 4.77)
Corneal oedema	49 (10.6%)	36 (7.6%)	1.42 (0.91 to 2.24)
Intraocular pressure>30mmHg	16 (3.4%)	5 (1.1%)	3.33 (1.21 to 9.16)

**Table 03. Late (< 4 months) postoperative complications**

	Day-care (n = 464)	In-patient (n= 471)	Relative Risk (CI)
Corneal oedema	32 (6.9%)	24 (5.1%)	1.38 (0.80, 2.38)
Wound leakage	4 (0.9%)	7 (1.5%)	0.76 (0.17, 1.98)
Intraocular pressure >30mmHg	3 (0.6%)	5 (1.1%)	0.61 (0.14, 2.55)
Endophthalmitis	2 (0.4%)	0 (0.0%)	--

**Table 04. VF14 scores 4 months postoperative**

	Day-care (n = 150)	In-patient (n = 155)
Mean (SD) range =0,100)	92.8 (12.2)	87.6 (20.3)
Change score pre-postop	25.2 (21.2)	23.5 (25.7)

**Table 05. Costs of cataract surgery**

	Day-care (n = 150)	In-patient (n = 155)
Total costs in Euros (SD)	1001.3 (251.4)	1218.0 (187.3)

## GRAPHS AND OTHER TABLES

This review has no graphs.

## INDEX TERMS

### Medical Subject Headings (MeSH)

Ambulatory Surgical Procedures; Cataract Extraction; Feasibility Studies; Hospitalization; Randomized Controlled Trials

### Medical MeSH check words

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## COVER SHEET

**Title** Day care versus in-patient surgery for age-related cataract

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 Coordinating the review: ZF  
 Data collection for the review: ZF  
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 Abstracting data from papers: ZF, PG  
 Writing to authors of papers for additional information: ZF  
 Providing additional data about papers: ZF  
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