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ARTICLE

Trial-based cost-effectiveness analysis of toric versus monofocal intraocular lenses in cataract patients with bilateral corneal astigmatism in the Netherlands

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Purpose: To evaluate the cost-effectiveness of toric versus monofocal intraocular lens (IOL) implantation in cataract patients with bilateral corneal astigmatism.

Setting: Two ophthalmology clinics in the Netherlands.

Design: Prospective cost-effectiveness analysis.

Methods: Resource-use data were collected over a 6-month postoperative period. Consecutive patients with bilateral age-related cataract and 1.25 diopters or more of corneal astigmatism were included in the economic evaluation. Patients were randomized to phacoemulsification with bilateral toric or monofocal IOL implantation. All relevant resources were included in the cost analysis. The base-case analysis was performed from a societal perspective based on quality-adjusted life years (QALYs). The main outcome was the incremental cost-effectiveness ratio.

Results: The analysis comprised 77 consecutive patients (33 toric IOL; 44 monofocal IOL). Societal costs were higher in the toric IOL group (€3203 [$3864]) than in the monofocal IOL group (€2796 [US$3373]). QALYs were slightly lower in the toric IOL group (0.30 versus 0.31; $P = .75$). Toric IOLs were therefore inferior to monofocal IOLs from a cost-effectiveness perspective. The cost-effectiveness probability ranged from 1% to 15%, assuming a ceiling ratio for the incremental cost-effectiveness ratio of €2500 to €20 000 per QALY.

Conclusions: From a societal perspective, bilateral toric IOL implantation in cataract patients with corneal astigmatism was not cost-effective compared with monofocal IOL implantation. Copayment by patients should therefore be considered.

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Compared to standard monofocal IOL implantation, implantation of toric intraocular lenses (IOLs) during cataract surgery improves uncorrected distance visual acuity (UDVA) and distance spectacle independence in cataract patients with corneal astigmatism.[1–6] Toric IOL implantation in eyes with astigmatism as low as 0.75 to 1.50 diopters (D) results in significantly better postoperative UDVA than monofocal IOL implantation.[2,3] Spectacle independence after cataract surgery is associated with better patient satisfaction and vision-related quality of life and lower long-term spectacle costs.[5–10] However, toric IOLs are more costly than monofocal IOLs and implantation of toric IOLs requires more surgery time. This increases short-term healthcare costs.[7] Considering the vast number of patients eligible for toric IOLs and the potential impact on national healthcare budgets, a

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cost-effectiveness analysis is required to aid health policymakers in making evidence-based decisions on the allocation of scarce healthcare resources.

Quality-adjusted life years (QALYs) are the preferred measure for assessing the benefit of health interventions in economic evaluations because they can be applied in all fields of healthcare to compare different types of healthcare interventions in different populations. Using the cost per QALY, health policymakers can allocate limited healthcare resources based on a predefined willingness to pay per QALY. Calculation of QALYs is based on the measurement of generic health-related quality of life (HRQL) over a predefined period.[11]

Previous cost-effectiveness analyses of toric IOLs have been reported. Pineda et al.[7] developed a decision analytic model and found that lifetime cost savings were US$349 per QALY gained. However, QALYs were not determined according to standard methods.[11] This presumably led to significant overestimation of the effectiveness of toric IOLs. In a similar study, Laurendeau et al.[10] found that lifetime cost savings from a societal perspective ranged from €308 to €694 per patient. However, cataract surgery costs were based on diagnosis-related group prices, which were identical for surgery with toric IOL implantation and monofocal IOL implantation. This led to an underestimation of incremental costs of toric IOLs. QALYs were not taken into account.

Previously, we reported the results of a randomized clinical trial (RCT) of distance spectacle independence and quality of vision after bilateral toric IOL versus monofocal IOL implantation in cataract patients with bilateral corneal astigmatism.[4] In the present study, we performed a cost-effectiveness analysis of toric IOLs versus monofocal IOLs from a societal and healthcare perspective using the same patient cohort.

PATIENTS AND METHODS

This economic evaluation was performed alongside a multicenter RCT that was performed between February 1, 2010, and March 31, 2012, at 3 study centers in the Netherlands. Two study centers (Maastricht University Medical Centre+, Zuyderland Medical Centre Heerlen) participated in the economic evaluation. The study was approved by the institutional review boards of the participating centers. All patients gave written informed consent. The study was performed in accordance with the tenets of the Declaration of Helsinki and good clinical practice guidelines and was registered in a clinical trial register.[A]

Study Procedures

Study procedures have been described in detail.[4] In brief, consecutive patients with bilateral age-related cataract and bilateral regular corneal astigmatism of 1.25 D or more were recruited. Furthermore, inclusion in the economic evaluation was based on completion of at least 1 HRQL questionnaire during follow-up. The questionnaire was to be filled in preoperatively and 3 and 6 months postoperatively. Patients who did not complete the questionnaire at either of the postoperative timepoints were excluded from the economic evaluation. Patients were randomized to bilateral implantation of aspheric toric IOLs (Acrysof IQ SN6AT3-T9) or bilateral aspheric monofocal IOLs (Acrysof IQ SN60WF) (both Alcon Laboratories, Inc.). Treatment allocation was concealed until the last follow-up visit. The sample-size calculation was based on distance spectacle independence.

Cost Analysis

The economic evaluation was performed in accordance with Dutch guidelines.[B] Resource-use data were collected over a 6-month period (starting with the day of surgery), both from societal and healthcare perspectives. Costs were calculated by multiplying volumes of resource use with the unit cost price including sales taxes. Costs were converted to 2012 Euros (€) using the Dutch consumer price index.[C] Costs were also converted to United States dollars using the 2012 purchasing power parity (PPP) for gross domestic product (GDP) ($1.00 = €0.829).[D]

Resource-use data were obtained through hospital registries and self-administered patient questionnaires, which were filled out 3 and 6 months postoperatively. Relevant resources included operating room time, IOL type, hospital daycare admissions, outpatient visits, complications, medication use, general practitioner visits, homecare, spectacles, travel, informal care, and productivity losses. Operating room time was valued using integral cost prices provided by Maastricht University Medical Centre+ and included personnel, materials, and overhead costs. Two costs drivers were applicable, one for general operating room costs (price per minute spent in the operating room) and one for ophthalmology costs (price per minute spent in surgery). Intraocular lenses were valued using actual cost prices. Standardized prices provided by the Dutch guidelines for cost analysis were used to value day-care admissions, outpatient visits, general practitioner visits, homecare, travel, informal care, and productivity loss.[B] Costs of spectacles (excluding frames) were obtained through the opticians who provided them. Costs of medication were based on reimbursement prices.[E] Complications were treated with medication or surgical procedures and were valued accordingly.

Effectiveness

Effectiveness was based on HRQL (societal perspective) and clinical outcomes (healthcare perspective). HRQL was determined with the Health Utilities Index Mark 3 (HUI3, Health Utilities Inc.). The HUI3 is a well-validated questionnaire assessing 8 dimensions of health (vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain and discomfort). Using a multiplicative multi-attribute utility function, an overall utility score can be derived that ranges from −0.36 (health state worse than death) to 1.00 (perfect health).[12] Utilities were used to calculate QALYs by determining the area under the curve of subsequent utility measurements, assuming linear changes in utilities over time.

Clinical outcomes included distance spectacle independence, binocular UDVA, and binocular corrected distance visual acuity (CDVA). Distance spectacle independence was assessed using a questionnaire on spectacle use. Patients who reported never using spectacles for distance vision 6 months after surgery were classified as spectacle independent. Binocular UDVA and CDVA were determined according to previously described methods and expressed in logarithm of the minimum angle of resolution (logMAR) notation.[4]

All data were collected during the preoperative visit and 3 months and 6 months after surgery on the first eye.

Statistical Analysis

Outcomes were analyzed according to the intention-to-treat principle. Incomplete cost and effectiveness data were assumed to be missing at random and imputed using multiple imputation with predictive mean matching (SPSS Statistics, version 22.0 for Windows, IBM Corp.). The linear regression imputation model included treatment group, age, sex, and study center as covariates.

For continuous variables, differences between treatment groups were analyzed with independent samples *t* tests, while differences between preoperative and postoperative measurements were analyzed with paired-sample *t* tests. Similarly, the Pearson chi-square and McNemar tests were used for discrete variables. A *P* value less than 0.05 was considered statistically significant.

Cost-effectiveness was estimated by calculating the incremental cost-effectiveness ratio, which expresses the additional costs for each additional unit of the health effect. Bootstrapping with 1000 replications was performed to estimate uncertainty in incremental costs and effects (Excel software, 2010 for Windows, Microsoft Corp.). The results of the bootstrap were plotted in cost-effectiveness planes. In addition, cost-effectiveness acceptability curves were constructed to estimate the probability that either treatment was cost-effective based on a range of ceiling ratios for the incremental cost-effectiveness ratio. These ceiling ratios represent the maximum amount of money health policymakers are willing to pay for an additional unit of the health effect. In the Netherlands, the ceiling ratio for conditions with limited burden of disease, such as spectacle dependence, is €20 000 ($24 125) per QALY.[F]

Cost-Effectiveness Analyses

In the base-case analysis, cost-effectiveness was determined using QALYs and costs from a societal perspective over the 6-month follow-up. In a sensitivity analysis, the base-case analysis was repeated with a correction for the imbalance in baseline utility. This correction was performed by adding the mean difference in baseline utility between treatment groups to all utility measurements in the treatment group with the lower baseline.

Secondary analyses were performed using alternative (clinical) effectiveness measures and costs from a healthcare perspective. These measures included distance spectacle independence and a binocular UDVA of 0.10 logMAR or better ($\geq$20/25 Snellen). Another secondary analysis assessed the expected long-term effect of lower spectacle costs in the toric IOL group. QALYs and costs from a societal perspective were extrapolated to a lifetime time horizon. Life expectancy was determined for each patient based on demographic data.[G] It was assumed that QALYs remained constant and that spectacle costs were the only recurring costs. Furthermore, spectacles were assumed to be replaced every 4 years in accordance with Dutch market research.[H] A scenario analysis was performed to assess the effect of replacing spectacles biannually. All costs incurred more than 1 year after surgery were annually discounted at a rate of 4.0%, while QALYs were discounted at a rate of 1.5%.[B]

RESULTS

Two participating centers recruited 82 patients eligible for inclusion in the economic evaluation. Five patients (6%) did not complete any HRQL questionnaire postoperatively and were excluded from the economic evaluation. Reasons for not completing questionnaires were death unrelated to the intervention, loss to follow-up after surgery on the first eye, refusal (2 patients), or unknown. As a result, 154 eyes of 77 patients were included in the economic evaluation with 33 patients randomized to the toric IOL group and 44 patients to the monofocal IOL group.

The mean patient age was 73.8 years $\pm$ 10.2 (SD) in the monofocal IOL group and 74.2 $\pm$ 7.7 years in the toric IOL group. The mean preoperative corneal astigmatism was 1.98 $\pm$ 0.83 D (range 0.57 to 5.54 D) group and 2.03 $\pm$ 0.98 D (range 0.71 to 6.15 D), respectively, and the mean postoperative corneal astigmatism was 1.98 $\pm$ 0.85 D (range 0.28 to 4.97 D) and 2.04 $\pm$ 0.96 D (range 0.43 to 5.81 D), respectively. The mean preoperative refractive astigmatism was -2.25 ± 1.21 D (range -6.00 to 0.00 D) in the monofocal IOL group and -2.28 ± 1.19 D (range -7.00 to -0.50 D) in the toric IOL group, and the mean postoperative refractive astigmatism was -1.85 ± 0.97 D (range -4.50 to 0.00) and -0.75 ± 0.54 D (range -2.00 to 0.00), respectively. The following cost and effectiveness data were missing and imputed: HUI3 6.3%, distance spectacle use 2.2%, visual acuity 3.0%, costs 8.7%.

Costs

Table 1 shows the mean resource use and costs per patient. The total costs of bilateral cataract surgery from a societal perspective were €407 ($491) higher in the toric IOL group (€3203 [$3864]) than in the monofocal IOL group (€2796 [$3373]). From a healthcare perspective, total costs were €635 ($766) higher in the toric IOL group. The resources that contributed most to these differences were operating room costs (€154 [$186] higher), price of IOLs (€414 [$499] higher), and spectacle costs (€179 [$216] lower).

Effectiveness

Table 2 shows the health-related utilities, spectacle independence, and binocular visual acuity at baseline and 6 months postoperatively. The difference in QALYs was not statistically significant between the toric IOL group and monofocal IOL group ($P = .75$). Spectacle independence increased significantly more in the toric IOL group than in the monofocal IOL group ($P < .01$).

Cost-Effectiveness

Table 3 shows the results of the cost-effectiveness analyses. In the base-case analysis, toric IOL implantation resulted in slightly fewer QALYs and higher costs than monofocal IOL implantation. Toric IOL implantation was therefore inferior to monofocal IOL implantation. The cost-effectiveness plane shows that most bootstrapped estimates of incremental costs and QALYs were located in the upper west quadrant (ie, more costly, less effective) (Figure 1). The probability that toric IOLs were cost-effective ranged from 1% to 15%, assuming the maximum acceptable incremental cost-effectiveness ratio ranged from €2500 ($3016) to €20 000 ($24 125) per QALY (Figure 2).

From a healthcare perspective, the incremental cost-effectiveness ratios were €1310 ($1580) per spectacle independent patient and €2758 ($3327) per patient with binocular UDVA 0.10 logMAR or better ($\geq$20/25 Snellen). The secondary analysis involving extrapolation of societal costs and QALYs to a lifetime time horizon resulted in higher costs and lower QALYs in the toric IOL group (ie, inferiority).

The sensitivity and scenario analyses did not show contrasting results.

DISCUSSION

This trial-based economic evaluation assessed the cost-effectiveness of bilateral toric IOL implantation versus monofocal IOL implantation in cataract patients with bilateral corneal astigmatism. In the base-case analysis from a

Table 1. Mean resource use and costs (in 2012 €) from a societal perspective.

Variable	Cost per Unit (€)	Mean ± SE Resource Use Monofocal IOL	Mean ± SE Resource Use Toric IOL	Mean ± SE Costs (€) Monofocal	Mean ± SE Costs (€) Toric
Healthcare sector					
Operating room					
General operating room costs	11.73/min	90.5 ± 2.68	101.1 ± 3.67	1061 ± 31.4	1185 ± 43.1
Ophthalmology costs	3.49/min	31.6 ± 1.06	40.2 ± 1.22	110 ± 3.7	140 ± 4.2
Intraocular lens					
Monofocal	96.22/IOL	2.0	—	192	—
Toric	303.02/IOL	—	2.0	—	606
Day-care admission	266.54/day	2.0	2.0	533	525
Outpatient visits	136.99/visit	1.6 ± 0.33	2.0 ± 0.62	220 ± 45.6	271 ± 84.5
Complications	Variable	Variable		7 ± 2.4	63 ± 31.7*
Medication	Variable	Variable		84 ± 4.3	81 ± 2.4
General practitioner visits	29.73/visit	0.7 ± 0.25	0.4 ± 0.17	20 ± 7.3	11 ± 5.0
Home care	37.17/hr	1.7 ± 1.04	1.2 ± 0.72	63 ± 38.7	45 ± 26.8
Subtotal	—	—	—	2292 ± 69.7	2927 ± 104.2
Patient and family costs					
Spectacles	Variable	Variable		349 ± 42.6	179 ± 41.4
Travel costs	Variable	Variable		16 ± 5.6	11 ± 3.8
Informal care	13.27/hr	4.1 ± 1.03	2.3 ± 0.78	55 ± 13.7	30 ± 10.3
Subtotal	—	—	—	420 ± 49.3	220 ± 44.0
Other sectors					
Productivity costs	Variable	Variable		84 ± 59.1	55 ± 51.8
Total costs from societal perspective	—	—	—	2796 ± 108.3	3203 ± 148.5

IOL = intraocular lens; SE = standard error of the mean
*One patient had toric IOL repositioning because of IOL rotation

societal perspective, toric IOL implantation was deemed inferior to monofocal IOL implantation (ie, more costly, fewer QALYs). In contrast, patients who received toric IOLs had better postoperative binocular UDVA and were more often distance spectacle independent. However, health policymakers have not defined incremental cost-effectiveness ratio threshold values when alternative effectiveness measures are used.[F]

Table 2. Health-related utilities, spectacle independence, and binocular UDVA and CDVA at baseline and 6 months postoperatively.

Variable	Monofocal IOL (n = 44)	Toric IOL (n = 33)	Mean Difference
Mean health-related utility ± SE			
Preoperative	0.56 ± 0.04	0.52 ± 0.05	−0.04 ± 0.07
Six months postoperative	0.65 ± 0.04	0.63 ± 0.04	−0.02 ± 0.06
Mean difference	0.09 ± 0.03*	0.11 ± 0.05†	0.02 ± 0.06
Mean QALYs ± SE	0.31 ± 0.02	0.30 ± 0.02	−0.01 ± 0.03
Spectacle independence, n (%)			
Preoperative	1 (3)	3 (9)	6
Six months postoperative	14 (32)	27 (80)	49‡
Mean difference	13 (29)*	24 (71)*	42‡
Mean binocular UDVA (logMAR) ± SE			
Preoperative	0.58 ± 0.09	0.54 ± 0.09	−0.04 ± 0.13
Six months postoperative	0.20 ± 0.03	0.09 ± 0.03	−0.11 ± 0.04‡
Mean difference	−0.38 ± 0.09*	−0.45 ± 0.08*	−0.07 ± 0.12
Mean binocular CDVA (logMAR) ± SE			
Preoperative	0.19 ± 0.02	0.23 ± 0.03	0.04 ± 0.04
Six months postoperative	−0.01 ± 0.02	0.02 ± 0.02	0.03 ± 0.03
Mean difference	−0.20 ± 0.02*	−0.21 ± 0.03*	−0.02 ± 0.04

CDVA = corrected distance visual acuity; IOL = intraocular lens; logMAR = logarithm of the minimum angle of resolution; QALYs = quality-adjusted life years; SE = standard error of the mean; UDVA = uncorrected distance visual acuity
*$P < .01$ for difference between preoperative and postoperative measurement
†$P < .05$ for difference between preoperative and postoperative measurement
‡$P < .01$ for difference between treatment groups

Table 3. Results of the cost-effectiveness analyses.

Parameter	Mean Costs (€)	Mean Effects	Incremental Cost-Effectiveness Ratio (€)	Probability Cost-Effective at Ceiling Ratio (%)			
				€2500	€5000	€10 000	€20 000
Base-case analysis							
QALYs and costs from societal perspective, 6-mo follow-up							
Monofocal IOL	2796	0.31	—	—	—	—	—
Toric IOL	3203	0.30	Inferior	1	3	7	15
Secondary analyses							
Spectacle independence and costs from healthcare perspective, 6-mo follow-up							
Monofocal IOL	2292	0.32	—	—	—	—	—
Toric IOL	2927	0.80	1310/pt	98	100	100	100
Binocular UDVA 0.10 logMAR or better and costs from healthcare perspective, 6-mo follow-up							
Monofocal IOL	2292	0.33		—	—	—	—
Toric IOL	2927	0.56	2758/pt	4	80	92	96
QALYs and costs from societal perspective, lifetime extrapolation*							
Monofocal IOL	3319	7.64	—	—	—	—	—
Toric IOL	3456	7.03	Inferior	25	27	28	28
Sensitivity analyses							
QALYs, corrected for baseline utility difference, and costs from societal perspective, 6-mo follow-up							
Monofocal IOL	2796	0.31	—	—	—	—	—
Toric IOL	3203	0.32	43 028/QALY	2	4	15	33
Scenario analysis							
QALYs and costs from societal perspective, lifetime extrapolation, spectacles replaced every 2 y							
Monofocal IOL	4191	7.64	—	—	—	—	—
Toric IOL	3889	7.03	497/QALY	34	32	31	30

IOL = intraocular lens; logMAR = logarithm of the minimum angle of resolution; pt = patient; QALYs = quality-adjusted life years; UDVA = uncorrected distance visual acuity

*Life expectancy determined for each patient individually; spectacles replaced every 4 years; costs discounted at a rate of 4%; QALYs discounted at a rate of 1.5%

Previous studies[5,6,8,9] have found improvements in vision-related quality of life and patient satisfaction after toric IOL implantation. Nonetheless, QALYs are the preferred measure of effectiveness in economic evaluations. In the current study, these were calculated based on a well-validated generic HRQL questionnaire; however, no significant difference between treatment groups was found. At the time of inclusion, patients could already obtain toric IOLs through copayment. As a result, patients with a strong preference for toric IOLs, who likely would have had a larger gain in HRQL, might have refused participation in the randomized trial. More important, although the HUI3 is 1 of few HRQL questionnaires that include questions on vision, it might not be responsive enough to detect minor improvements in quality of life resulting from distance spectacle independence.[13] This limitation is inherent to the use of generic HRQL instruments. Although vision-specific questionnaires might be more responsive to these improvements, they cannot be used to calculate QALYs and are therefore considered unsuitable to support decisions on healthcare resource allocation.

Several study limitations might have influenced the accuracy of the estimated costs. First, because of the study's RCT design, all patients had the same preoperative and postoperative procedures, which reduced the normal variation in resource use between treatment groups. This presumably led to underestimation of incremental costs of toric IOLs. For instance, in a real-life setting, patients having toric IOL implantation would require additional preoperative measurements and more preoperative counseling than patients having monofocal IOL implantation.

Second, the time horizon of the study was only 6 months while the effect of toric IOL implantation on quality of life and costs lasts a lifetime. For this reason, costs and QALYs were extrapolated based on several assumptions, which increased uncertainty about the long-term cost-effectiveness

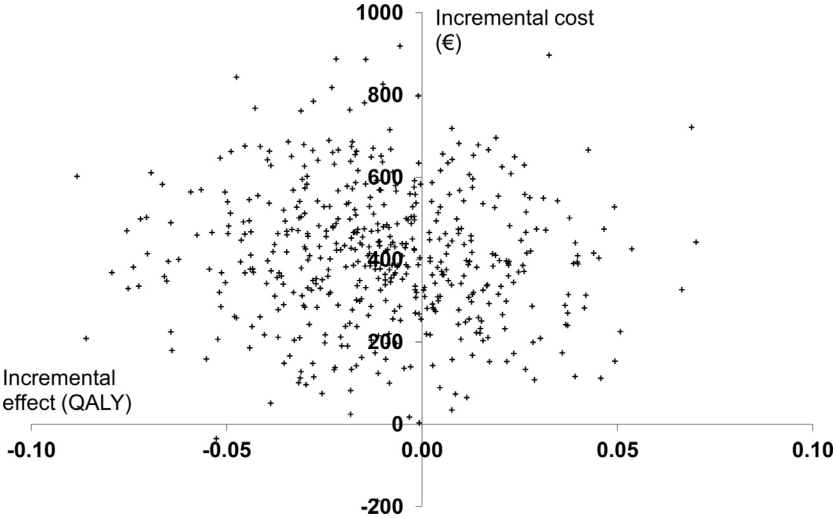

Figure 1. Cost-effectiveness plane showing the incremental costs from a societal perspective and incremental QALYs of treatment with toric IOLs compared with monofocal IOLs within a timeframe of 6 months after cataract surgery. Each datapoint represents 1 bootstrapped estimate of incremental costs and QALYs (IOLs = intraocular lenses; QALY = quality-adjusted life year).

estimate. Moreover, long-term cost-effectiveness is highly dependent on patient age. Younger patients with a higher remaining life expectancy benefit more from toric IOLs in terms of future cost savings. In the current study, the mean age was 73.8 years in the monofocal IOL group and 74.2 years and toric IOL group. This is comparable to the mean age at which patients have cataract surgery in the Netherlands (73.7 in 2012) and Sweden (74.5 in 2012).[14]

Third, the cataract surgeries in this study took place between 2010 and 2012. In recent years, multiple innovations have occurred that might affect costs in both treatment groups in different ways. For instance, the introduction of digital marking systems for toric IOL alignment might reduce surgical times and enhance the alignment accuracy of toric IOL implantation, thus reducing the number of toric IOL repositioning procedures.[15]

Last, this study used a 1.25 D corneal astigmatism cutoff for inclusion. When this study was designed, we were aware of only 1 previously published randomized trial that compared toric and monofocal IOLs[2]; the study found that toric IOLs resulted in significantly better UDVA than monofocal IOLs, also in a subgroup analysis of patients with low astigmatism (0.75 to <1.5 D). Other studies[3,4,9] also found that toric IOLs are effective in achieving better UDVA and lower spectacle dependency compared with monofocal IOLs in patients with astigmatism as low as 0.75 to 1.25 D. Nonetheless, a higher corneal astigmatism cutoff for inclusion in the study might have favored postoperative outcomes, including economic outcomes, in the toric IOL group compared with the monofocal IOL group.

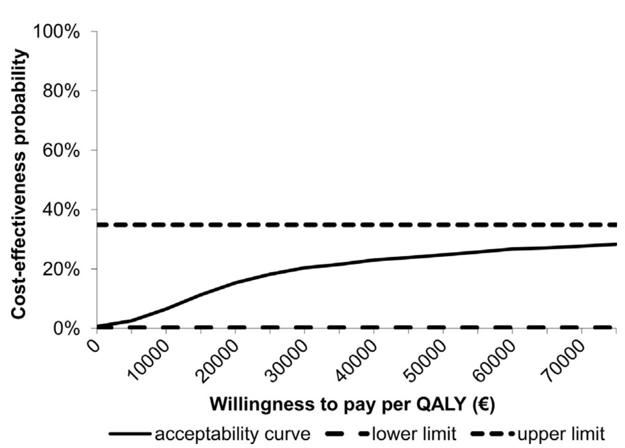

Figure 2. Cost-effectiveness acceptability curve for the incremental costs per QALY gained (from a societal perspective) within a timeframe of 6 months after cataract surgery and treatment with bilateral toric IOLs versus monofocal IOLs (IOLs = intraocular lenses; QALY = quality-adjusted life year).

A common problem in trial-based cost-effectiveness analyses, including the current study, is that sample sizes are commonly based on clinical outcomes rather than cost-effectiveness outcomes. Because there is often considerable variability in resource use and costs, cost-effectiveness analyses typically require significantly larger samples to allow for traditional hypothesis testing. Large samples for the purpose of a cost-effectiveness study might be subject to financial and ethical objections. To overcome these issues, it is now common practice to present results as a cost-effectiveness acceptability curve, which shows the probability of the intervention being cost-effective for a range of ceiling ratios for the incremental cost-effectiveness ratio.[16,17] Therefore, this study focused on estimating the probability that toric IOLs were cost-effective rather than testing a statistical hypothesis.

The results of an economic evaluation in 1 healthcare system usually cannot be readily translated to another healthcare system. To facilitate transferability of the results, volumes of resource use were reported when possible to enable calculation of costs using local unit prices. Furthermore, the PPP for GDP can be used to convert currencies and adjust for differences in price levels between countries.[D]

Based on the results of this short-term cost-effectiveness analysis, it can be concluded that cataract surgery with toric IOL implantation is not cost-effective compared with cataract surgery with monofocal IOL implantation. The aim of economic evaluations is to support health policymakers in allocating limited healthcare resources and not to deny individual patients access to an effective treatment. Indeed, patients in the toric IOL group had better binocular UDVA and were more often spectacle independent, which can be of significant value to some individuals. Therefore, copayment should be considered an alternative means of financing toric IOLs so as not to burden national healthcare budgets.

WHAT WAS KNOWN

- Compared with monofocal IOL implantation, toric IOL implantation during cataract surgery improves UDVA and spectacle independence in patients with corneal astigmatism. This in turn improves patient satisfaction and vision-related quality of life.
- Toric IOLs are also associated with increased healthcare costs.

WHAT THIS PAPER ADDS

- Although this study confirmed that toric IOLs improve UDVA and spectacle independence compared with monofocal IOLs, no improvement in generic health-related quality of life was found. Furthermore, toric IOLs increased healthcare and societal costs in the short-term.
- Compared with monofocal IOLs, toric IOLs were not cost-effective from a societal perspective.

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