

POSTERIOR CAPSULE OPACIFICATION AFTER CATARACT EXTRACTION AND RELATED HEALTHCARE COSTS IN GERMANY

A claims data analysis on the impact of the implanted type of intraocular lenses

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Background and Objective

Cataract extraction is the most frequent operative procedure worldwide. The clouded natural lens is replaced by an artificial intraocular lens (IOL) implant, in most cases a hydrophobic or hydrophilic acrylic IOL. The most common long-term complication after cataract surgery is the development of a posterior capsule opacifications (PCO) which is treated by Nd:YAG laser capsulotomy. The aim of this study was to assess real world data on the impact of different IOL material types on the incidence of post-operative PCO treatment as well as associated follow-up costs from a Statutory Health Insurance (SHI) perspective in Germany.

Methodological Approach

Approach

- Retrospective analysis
- 4-year follow-up
- Assessing the impact of two different IOL material types (hydrophobic and hydrophilic acrylic)

Measurement Overview

- Incidence of PCO measured by incidence of Nd:YAG laser capsulotomy after cataract extraction in relation to hydrophobic and hydrophilic acrylic IOL implantation in current German practice
- Associated costs of Nd:YAG laser capsulotomy due to PCO after cataract extraction from a SHI perspective

Data

- Anonymized claims data from the Institut für angewandte Gesundheitsforschung (InGef)
- Covers approximately 6.7 million insured persons from different German SHIs
- Representative for the German population with regard to age and sex
- Includes demographic information, diagnoses, utilization of ambulatory services, hospitalizations, reimbursed drugs, remedies and aids on a patient individual level

Methods

- Including patients who underwent cataract extraction and implantation of either an acrylic hydrophobic or hydrophilic IOL in 2010
- Assessing clinical outcomes and comparing direct costs in a 4-year follow-up period after cataract surgery

Sample

Study Population and Subgroup Comparison

- Total 3,025 patients included
- 2,078 patients obtained a hydrophobic IOL (study population A: Hydrophobic IOL) and 947 patients got a hydrophilic implant (study population B: Hydrophilic IOL)

| | Study population A Hydrophobic IOL | | Study population B Hydrophilic IOL | | p value* |
|-----------------------------|------------------------------------|------------|------------------------------------|------------|----------|
| | Total | Percentage | Total | Percentage | |
| Age, Mean (SD) | 72.79 | (8.41) | 73.64 | (8.44) | 0.0099 |
| Females | 1233 | 59.34 | 543 | 57.34 | 0.3009 |
| Retinal detachment and tear | 41 | 1.97% | 17 | 1.80% | 0.8864 |
| Glaucoma | 376 | 18.09% | 183 | 19.32% | 0.4194 |
| Diabetes mellitus | 615 | 29.60% | 305 | 32.21% | 0.1477 |
| Hypertension | 1,536 | 73.92% | 701 | 74.02% | 0.9644 |
| Charlson index, Mean (SD) | 2.00 (1.96) | | 2.03 (1.99) | | 0.6947 |
| Cytostatic | 21 | 1.01% | 6 | 0.63% | 0.4054 |
| SSRI | 109 | 5.25% | 38 | 4.01% | 0.1711 |
| Cortisone | 1,129 | 54.33% | 471 | 49.74% | 0.0205 |

*Fischer's exact test; gender, comorbidity and medication, Welch's test: Age and Charlson Index, Local significance level $\alpha = 0.005$ after Bonferroni correction

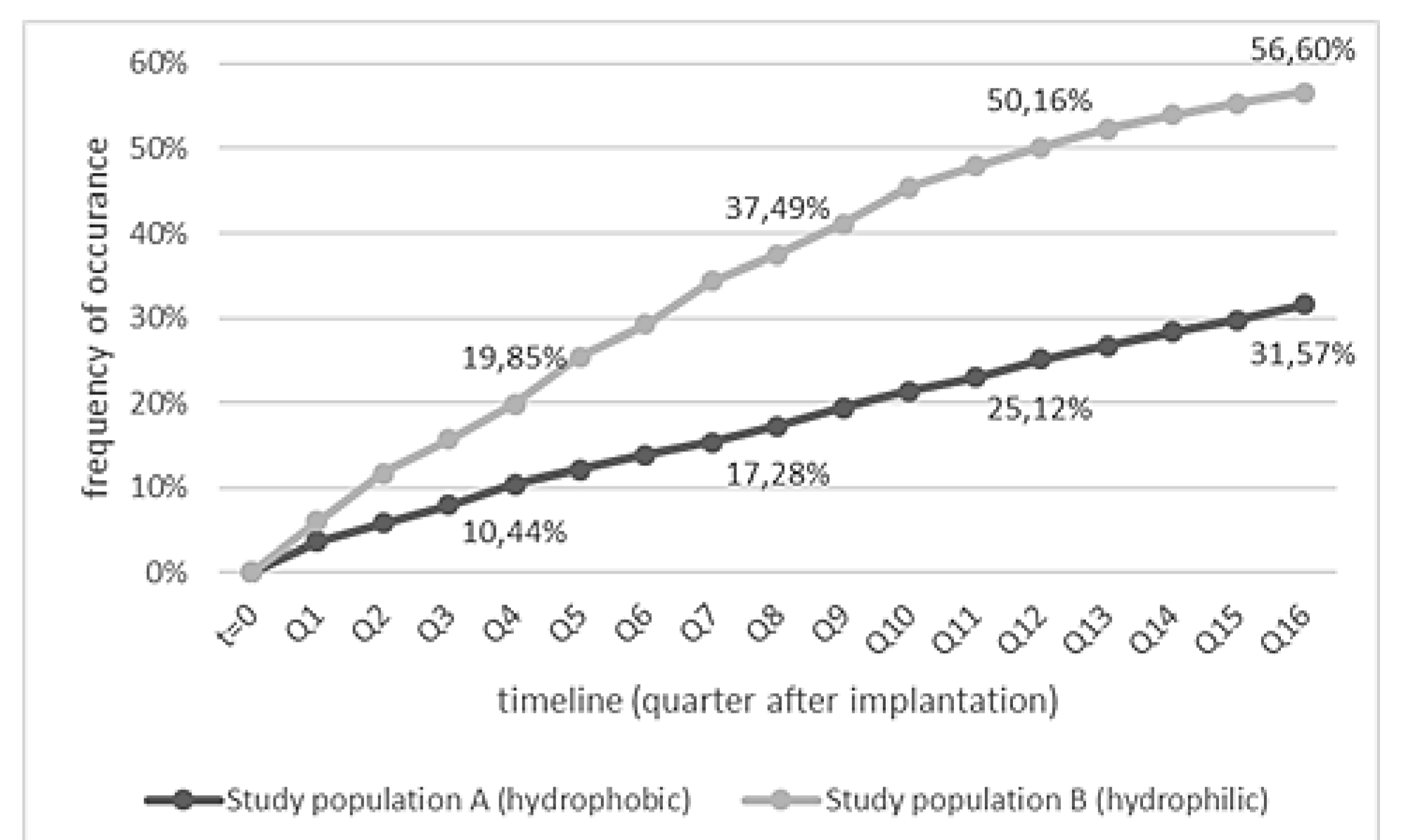
Using Bonferroni correction to adjust for multiple testing, no between-group differences in the preoperative characteristics was found

Results

Clinical Impact

Since PCO is the most frequent complication after IOL implantation, its incidence rate is a valid indicator of treatment quality

- Incidence of PCO was identified in patients who underwent Nd:YAG laser capsulotomy
- PCO treatment in 4-year follow-up period significantly ($p < 0.0001$) lower for patients with a hydrophobic IOL implant (study population A)



Economic Impact

The economic analysis compared direct costs over a period of 48 months after cataract surgery from an SHI payer perspective

| | Study population A Hydrophobic IOL | | Study population B Hydrophilic IOL | | |
|---|--|-------------|------------------------------------|-------------|---------|
| | Sum | Per patient | Sum | Per patient | |
| Total number of patients | 2078 | | 947 | | |
| Number of billed fee schedule positions | laser-surgical intervention of category W1 | 1058 | 0.51 | 849 | 0.90 |
| | postsurgical monitoring | 961 | 0.46 | 773 | 0.82 |
| | postoperative treatment (referral) | 83 | 0.04 | 41 | 0.04 |
| | postoperative treatment (surgeon) | 773 | 0.37 | 628 | 0.66 |
| Cumulative costs per treatment | laser-surgical intervention of category W1 (78.68 € per fee schedule position) | 83,243.44 € | 40.06 € | 66,799.32 € | 70.54 € |
| | postsurgical monitoring (14.69 € per fee schedule position) | 14,117.09 € | 6.79 € | 11,355.37 € | 11.99 € |
| | postoperative treatment (referral) (13.46 € per fee schedule position) | 1,117.18 € | 0.54 € | 551.86 € | 0.58 € |
| | postoperative treatment (surgeon) (7.09 € per fee schedule position) | 5,480.57 € | 2.64 € | 4,452.52 € | 4.70 € |
| Costs PCO treatment | 103,958.2 € | 50.03 € | 83,159.07 € | 87.81 € | |

- Follow-up capsulotomy after IOL implantation is usually performed in outpatient settings in Germany
- Costs are valued by means of the German National Ambulatory Evaluation Scheme of 2014
- Average postoperative costs due to PCO treatment for patients with hydrophilic IOL are about 75 % higher compared to patients with hydrophobic IOL implants

Discussion and Implications

Considering the high prevalence of cataract, the economic burden associated with treatment of long-term complications after cataract extraction is of great relevance for the German SHI. Implanting hydrophobic lenses seems to be superior regarding both medical and economic results.

