Eye (2016) 30, 1110–1117

www.nature.com/eye

CLINICAL STUDY

Correlation between anterior chamber characteristics and laser flare photometry immediately after femtosecond laser treatment before phacoemulsification

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Received: 12 October 2015
Accepted in revised form: 15 April 2016
Published online: 27 May 2016

Abstract

Purpose **To assess the anterior chamber (AC) characteristics and its correlation to laser flare photometry immediately after femtosecond laser-assisted capsulotomy and photodisruption.**

Patients and methods **The study included 97 cataract eyes ($n=97$, mean age 68.6 years) undergoing femtosecond laser-assisted cataract surgery (FLACS). Three cohorts were analysed relating to the flare photometry directly post femtosecond laser treatment (flare <100 $n=28$, 69.6 ± 7 years; flare 100–249 $n=47$, 67.7 ± 8 years; flare >249 photon counts per ms cohort $n=22$, 68.5 ± 10 years). Flare photometry (KOWA FM-700), corneal topography (Oculus Pentacam, Germany: AC depth, volume, angle, pachymetry), axial length, pupil diameter, and endothelial cells were assessed before FLACS, immediately after femtosecond laser treatment and 1 day postoperative (LenSx Alcon, USA). Statistical data were analysed by SPSS v19.0, Inc.**

Results **The AC depth, AC volume, AC angle, central and thinnest corneal thickness showed a significant difference between flare <100 *vs* flare 100–249 10 min post femtosecond laser procedure ($P=0.002$, $P=0.023$, $P=0.007$, $P=0.003$, $P=0.011$, respectively). The AC depth, AC volume, and AC angle were significantly larger ($P=0.001$, $P=0.007$, $P=0.003$, respectively) in the flare <100 *vs* flare >249 cohort 10 min post femtosecond laser treatment.**

Conclusions **A flat AC, low AC volume, and a narrow AC angle were parameters associated with higher intraocular inflammation. These criteria could be used for patient selection in FLACS to reduce postoperative intraocular inflammation.**

Eye (2016) **30,** 1110–1117; doi:10.1038/eye.2016.110; published online 27 May 2016

Introduction

Femtosecond laser-assisted cataract surgery (FLACS) is the latest revolution in the long history of cataract surgery. In comparative studies, FLACS produced more precise and reproducible capsulotomies than manual procedures.[1–4] In addition, improved intraocular lens placement, capsule overlap, circularity of capsulotomy and centration of the intraocular lens were compared with manual procedures.[1–4] The corneal incision by the femtosecond laser was stable and did not significantly change the higher order aberrations.[5] Side effects including miosis, ocular inflammation, and alternated anterior chamber (AC) characteristics were experienced in few patients.[1–4,6] Another study demonstrated the impact of different pulse energy levels on the tissue outcome after capsulorhexis performance.[6] A soft contact lens interface with a pulse energy of 5 μJ resulted in fewer tags and bridges, smoother edges, and a more regular and thinner demarcation line on specimen edges with the femtosecond laser-performed capsulotomies versus a rigid and curved 15 μJ interface application using light and scanning electron microscopy.[6] Thus, energy levels interacted differently with tissue and influenced the ocular inflammation reaction.

Cells in the AC and flare were two parameters that were used to detect a blood–aqueous border break.[7] Flare was graded by the intensity of light reflected by those proteins as it passed through aqueous humour.[7] Cells were still calculated by the slit lamp examination.[8] In the 1980s, the KOWA Company (Tokyo, Japan) developed techniques to quantify the amount of proteins in the AC noninvasively using a scanning laser.[9] The laser flare photometry provided an accurate, reproducible and non-invasive assessment of aqueous flare that could prove valuable in research and clinical decisions.[10]

The aim of this study was to assess the AC characteristics and its correlation to the laser flare photometry immediately after femtosecond laser-assisted capsulotomy and photodisruption; the idea was to identify structural changes that were likely to lead to corneal reactions and increases in intraocular inflammation in some patients, while most patients did not suffer from side effects.

Materials and methods

Data from 97 normal cataract patients (97 eyes, mean age 68.6 years) were included in this prospective pilot study from June 2014 to January 2015 according to the Declaration of Helsinki Principle.

For each patient an ophthalmologic examination with medical history, best-corrected visual acuity, slit lamp examination, and fundoscopy was performed. Furthermore, corneal topography (Oculus Pentacam, Oculus Inc., Wetzlar, Germany) and flare analysis (Laser flare photometry, FM-700 Kowa, Japan) were carried out. The results of the flare photometry were split in three groups according to the flare values 10 min post femtosecond laser treatment; flare <100 photon counts per ms cohort ($n=28$, 69.6 ± 7.6 years), flare 100–249 photon counts per ms cohort ($n=47$, 67.7 ± 8.5 years) and flare >249 photon counts per ms cohort ($n=22$, 68.5 ± 10.0years). Parameters of different AC characteristics were analysed between the three flare cohorts. The borders of the flare photometry were chosen according to the results from Shah *et al*[11] regarding *in vitro* and *in vivo* flare analysis in manual phacoemulsification.

The following AC characteristics were observed: AC depth, AC volume, AC angle, central corneal thickness and thinnest corneal thickness, axial length, white-to-white distance, pupil diameter, and number of endothelial cells. All data were conducted preoperatively and within maximum 20 min after femtosecond laser treatment before manual phacoemulsification and 1 day after surgery. The intraocular lens calculation was provided by the IOL Master (Zeiss, Meditec AG, Jena, Germany).

Inclusion criteria were a nuclear density score LOCS II, no other surgery <3 months and a systemic disease in a stable condition (diabetes Hba1c maximum 7% without any accompanying disease and hypertensive blood pressure in cataract patients). Exclusion criteria were LOCS I, III, or IV, uncontrolled systemic disease (diabetes, hypertensive blood pressure), autoimmune disease, uveitis, keratitis, hazy optic media, and a very shallow AC (limit of laser flare photometry).

Surgery technique

The femtosecond laser procedures were performed using the LenSx laser (Alcon Laboratories, Inc., Fort Worth, TX, USA) under topical anaesthesia with Conjucain EDO (oxybuprocainhydrochloride, 4.0 mg/ml, Dr. Mann Pharma GmbH, Berlin, Germany) by the same surgeon (TP). The procedure was performed in the operating suite. The LenSx laser is a 50 kHz femtosecond infrared laser with a pulse width of 600–800 fs, a central laser wavelength of 1030 nm and maximum pulse energy of 15 μJ. The laser pulse energy setting for performing the anterior capsulotomy was 4.8 and 8.9 μJ for the nucleus (offset up 200 μm, down 250 μm). The depth and coordinates of the capsulotomies were determined by the laser system's optical coherence tomography (OCT, Figure 1). The diameter of the capsulotomy was set to 5 mm.

The interface was built as an extended suction skirt and an additional soft contact lens between the applanation lens and the cornea, which allowed a decrease of laser pulse energy while maintaining the ability to perform capsulotomies.

After docking, the cornea was applanated and suction was activated. Undocking was performed after laser treatment, and the interface with the contact lens was removed. After the measurements (maximum time period 20 min), phacoemulsification was performed with the Alcon Infiniti Vision System. The corneal wound was created by blade so that the intraocular space was still enclosed during the examinations and thus minimised the infection risk as much as possible. Due to the soft interface and the low laser energy settings, no miosis was observed and thus none of the patients needed a pupil dilation between procedures. Postoperative treatment was comprised of a topical combination of steroids and antibiotics that were reduced over 4 weeks following the intervention. Before and during the examinations no topical or systemic medications were used.

Flaremeter KOWA FM-700

In principle, laser flare photometry uses a laser beam that scans a measurement window projected into the AC. Here, the KOWA FM-700 (Kowa Company, Ltd., ELECTRONICS AND OPTICS DIVISion, Tokyo, Japan) used a semiconductor diode laser (640 nm). The He–Ne

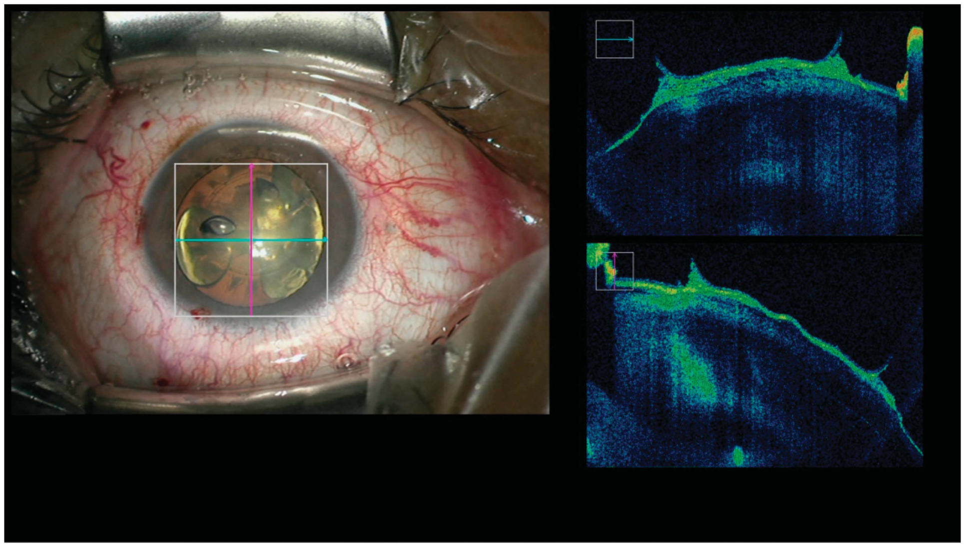

Figure 1 Clinical picture of the photodisruption and capsulotomy after femto laser procedure (left site); Edges of the capsulotomy shown on the intraoperative OCT after femtosecond laser photodisruption (right site).

beam had a power of 35 μW. The beam was projected into the AC, and scattering of the beam within the sampling window was detected by the photomultiplier.

The measurement mode was the protein concentration setting. The laser beam was scanned vertically covering the sampling window. Scattering of this beam was measured when it passed through this window. Measurements were also taken when the beam passed above and below the sampling window to assess the background signal (BG1 and BG2). The flare value in photon counts/ms was calculated by subtracting the mean of the two background counts from the signal value.

The measurement range was 1–500 photon counts/ms. The slit width was 0–11 mm and was continuously available.[9,10]

OCULUS Pentacam (Oculus, Inc.) images were obtained under pupil dilatation with 1% tropicamide. To reduce operator-dependent variables, Pentacam's automatic release mode was used. In this mode, the instrument automatically determined when correct focus and alignment with the corneal apex had been achieved and then performed a scan. In <2 s, the rotating camera captures up to 50 slit images of the anterior segment.[12]

The Pentacam Scheimpflug densitometric method using numerically graded blue light-scattering of the lens layers, was used to measure the nuclear density in the Lens Opacities Classification System (LOCS).[12]

Pupillometry was measured by the Colvard Pupillometer (OASIS Medical, Glendora, CA, USA). This precision instrument measures pupillary dilation in low levels of illumination. The Colvard Pupillometer is analogous to a direct ophthalmoscope. A lithium energy source operated the instrument.

Statistical analysis

We used SPSS to assess statistical data (SPSS version 19.0, SPSS, Inc., Armonk, NY, USA). Linear regression analysis and descriptive statistics (mean ± SD) were processed. Preoperative and postoperative values were compared with the paired Wilcoxon test. The Wilcoxon Test was used to compare two related samples or repeated measurements on a single sample. To test for general significant differences ANOVA was used for parametric variables and Kruskal–Wallis Test for non-parametric data. In addition, each of the flare cohorts *vs* the other two groups were separately analysed using the Mann–Whitney *U*-test as a *post hoc* analysis for numerical variables that were not normally distributed. For testing normality of our sample the Kolmogorov–Smirnov test was applied. A *P*-value of <0.05 indicated a statistically significant difference.

Results

Data of three cohorts were analysed; flare <100 photon counts per ms cohort ($n=28$, 69.6 ± 7.6 years), flare 100–249 photon counts per ms cohort ($n=47$, 67.7 ± 8.5 years) and flare >249 photon counts per ms cohort ($n=22$, 68.5 ± 10.0 years). A comparison of the AC and cornea characteristics in the three study cohorts were shown in Tables 1 and 2.

Table 1 Descriptive statistics (mean ± standard deviation, minimum, maximum, *n* = number) and *P*-value of different anterior chamber (AC) and cornea characteristics (AC depth, AC volume, AC angle, corneal thickness (CT), central corneal thickness (CCT), endothelial cell (CD)) in the complete study population according to three measuring times—preoperatively, 10 min post femtosecond laser treatment and 1 day follow up

Parameters	*Normal cataract*		*P-value pre- to postoperative comparison*
	Mean ± SD	*Min–max, number*	
White to white	11.98 ± 0.36	(11.00–12.70, *n* = 97)	
Axial length	23.78 ± 1.76	(20.66–30.01, *n* = 97)	
Phaco time	0.91 ± 0.41	(0.40–2.30, *n* = 97)	
AC depth pre-op	2.59 ± 0.41	(1.59–3.29, *n* = 97)	
AC depth post-op	2.45 ± 0.44	(1.44–3.19, *n* = 97)	0.001
AC depth post-op 1 day	3.78 ± 0.59	(2.50–5.57, *n* = 95)	0.001
AC-Vol pre-op	140.87 ± 36.97	(73.00–230, *n* = 97)	
AC-Vol post-op	142.35 ± 35.86	(70.00–207.00, *n* = 97)	0.176
AC-Vol post-op day 1	147.02 ± 36.10	(69.00–231.00, *n* = 97)	0.376
AC angle pre-op	28.64 ± 8.22	(6.20–56.20, *n* = 97)	
AC angle post-op	31.81 ± 10.28	(6.10–56.70, *n* = 97)	0.014
AC angle post-op day 1	35.57 ± 8.00	(8.90–55.40, *n* = 97)	< 0.001
CCT pre-op	556.76 ± 29.19	(474.00–625.00, *n* = 97)	
CCT post-op	570.47 ± 28.53	(466.00–635.00, *n* = 97)	0.001
CCT post-op day 1	588.23 ± 37.73	(485.00–693.00, *n* = 97)	< 0.001
Thinnest CT pre-op	553.31 ± 30.06	(473.00–623.00, *n* = 97)	
Thinnest CT post-op	565.00 ± 30.16	(462.00–633.00, *n* = 97)	0.001
Thinnest CT post-op 1 day	583.87 ± 35.35	(484.00–655.00, *n* = 95)	< 0.001
Flare pre-op	12.31 ± 6.77	(4.00–35.70, *n* = 97)	
Flare post-op	169.93 ± 111.91	(25.90–500.00, *n* = 95)	0.001
Flare post-op 1 day	26.62 ± 32.84	(5.20–149.80, *n* = 95)	0.001
CD pre-op	2555.07 ± 271.72	(1788.00–3121.00, *n* = 97)	
CD post-op	2588.91 ± 324.09	(1732.00–3372.00, *n* = 96)	0.134
CD post-op 1 day	2539.80 ± 317.02	(1575.00–3259.00, *n* = 96)	0.558
Pupil pre-op	6.43 ± 0.70	(5.00–8.00, *n* = 97)	
Pupil post-op	5.76 ± 1.59	(2.00–9.00, *n* = 68)	0.001
Pupil post-op 1 day	6.19 ± 1.26	(3.00–8.00, *n* = 95)	0.051

Comparison of three different postoperative flare cohorts due to corneal and AC characteristics

Flare values did not significantly differ between the three cohorts pre-operatively ($P > 0.050$); flare < 100 cohort 11.68 ± 8.56 photon counts/ms, flare 100–249 cohort 11.95 ± 8.88 photon counts/ms and flare > 249 cohort 14.25 ± 7.58 photon counts/ms.

AC depth (Figure 2), AC volume and AC angle showed a significant difference between the flare < 100 and flare 100–249 groups 10 min post femtosecond laser treatment ($P = 0.002$, $P = 0.023$, $P = 0.007$ respectively, Table 2). The central and thinnest corneal thickness showed a significant difference between the flare < 100 and flare 100–249 groups 10 min post femtosecond laser ($P = 0.003$, $P = 0.011$, respectively, Figure 3 and Table 2).

The central and thinnest CT showed a significant difference between the flare 100–249 and flare > 249 cohorts 10 min post femtosecond laser treatment ($P = 0.046$, $P = 0.023$, Table 2 and Figure 3).

The AC depth ($P = 0.001$, Figure 2) and volume ($P = 0.007$) differed significantly between the flare < 100 and flare > 249 photon counts/ms cohorts 10 min post femtosecond laser treatment. In addition, the AC angle differed significantly 10 min post femtosecond laser ($P = 0.003$) and 1 day follow up ($P = 0.040$) between the flare < 100 and flare > 249 cohorts. Accessorily, the number of endothelial cells showed a significant difference between the flare < 100 and flare > 249 photon counts/ms cohorts at 1 day of follow up ($P = 0.038$, Table 2).

Discussion

FLACS is currently assessed by multiple studies concerning reduction of energy levels, endothelial loss and refractive outcome to identify patient cohorts, who would benefit from this newly developed procedure.[1–4,6] Regarding safety features of the FLACS, studies have shown that the incidence of intraoperative complications such as suction breaks or anterior capsular tears decreased with experience and were < 2%.[1–3] Macular thickness did not differ between FLACS and traditional phacoemulsification.[1–3] Additionally, the Femtosecond laser-assisted anterior capsulotomy was a safe procedure for postoperative posterior capsule opacification rates due to better intraocular lens position.[13]

Table 2 Descriptive statistics and Mann Whitney *U* Test of different anterior chamber (AC) and cornea characteristics (AC depth, AC volume, AC angle, corneal thickness (CT), central corneal thickness (CCT)) in the three flare cohorts (<100, 100–249, >249 photon counts/ms) according to three measuring times—preoperatively, 10 min post femtosecond laser treatment and 1 day follow up

Anterior segment parameters	*Flare <100 mean ± SD*	P-*value flare <100 pre- to post-op*	P-*value flare <100 vs flare 100–249*	*Flare 100–249 mean ± SD*	P-*value flare 100–249 pre- to post-op*	P-*value flare 100–249 vs flare >249*	*Flare >249 mean ± SD*	P-*value flare >249 pre- to post-op*	P-*value flare <100 vs flare >249*
Age	69.6 ± 7.6		0.432	67.7 ± 8.5		0.615	68.5 ± 10.0		0.944
White to white	12.0 ± 0.3		0.982	11.9 ± 0.3		0.066	11.7 ± 0.3		0.107
Axial length	24.0 ± 1.0		0.030	23.5 ± 1.3		0.569	23.7 ± 1.7		0.070
Phaco time	0.98 ± 0.44		0.213	0.84 ± 0.35		0.872	0.85 ± 0.30		0.430
AC depth pre-op	2.79 ± 0.36		0.002	2.53 ± 0.34		0.011	2.23 ± 0.38		<0.001
AC depth post-op	2.63 ± 0.39	<0.001	0.002	2.37 ± 0.37	<0.001	0.058	2.12 ± 0.46	0.007	0.001
AC depth post 1 day	3.83 ± 0.41	0.001	0.182	3.69 ± 0.58	<0.001	0.571	3.56 ± 0.61	0.004	0.177
AC volume pre-op	158.21 ± 38.58		0.002	132.00 ± 27.82		0.058	116.76 ± 35.37		0.001
AC volume post-op	162.29 ± 51.42	0.864	0.023	139.43 ± 29.92	0.004	0.149	123.41 ± 40.52	0.162	0.007
AC volume post-op 1 day	154.53 ± 29.97	0.589	0.079	142.77 ± 37.05	0.120	0.787	134.82 ± 29.69	0.083	0.102
AC angle pre-op	29.05 ± 7.21		0.185	27.33 ± 6.98		0.277	27.24 ± 11.14		0.003
AC angle post-op	36.55 ± 10.07	<0.001	0.007	31.36 ± 10.74	0.033	0.221	27.66 ± 9.94	0.831	0.003
AC angle post-op 1 day	38.32 ± 5.81	<0.001	0.067	35.00 ± 6.56	<0.001	0.157	31.03 ± 11.43	0.929	0.040
Central CT pre-op	563.79 ± 26.70		0.026	549.55 ± 26.87		0.023	567.88 ± 32.66		0.433
Central CT post-op	581.18 ± 23.19	<0.001	0.003	563.98 ± 27.37	<0.001	0.046	580.82 ± 36.77	0.002	0.806
Central CT post-op 1 day	605.07 ± 40.28	0.002	0.090	582.34 ± 40.01	<0.001	0.252	602.82 ± 49.45	0.006	0.897
Thinnest CT pre-op	560.57 ± 27.22		0.039	546.49 ± 27.53		0.017	566.00 ± 33.44		0.393
Thinnest CT post-op	573.11 ± 22.79	<0.001	0.011	557.17 ± 28.531	<0.001	0.023	578.24 ± 36.81	0.005	0.393
Thinnest CT post-op 1 day	598.27 ± 34.93	0.002	0.057	576.69 ± 38.891	<0.001	0.142	601.82 ± 49.309	0.005	0.755
Endothelial cell pre-op	2454.64 ± 254.69		0.518	2480.04 ± 338.27		0.319	2585.65 ± 237.73		0.068
Endothelial cell post-op	2506.39 ± 338.41	0.150	0.913	2492.98 ± 372.72	0.608	0.294	2610.12 ± 270.22	0.723	0.190
Endothelial cell post-op 1 day	2392.17 ± 313.36	0.145	0.308	2456.45 ± 396.55	0.062	0.248	2594.69 ± 252.93	0.179	0.038
Pupil diameter pre-op	6.38 ± 0.68		0.708	6.43 ± 0.79		0.256	6.22 ± 0.52		0.458
Pupil diameter post-op	6.23 ± 1.28	0.688	0.201	5.72 ± 1.71	0.010	0.640	5.54 ± 1.31	0.059	0.077
Pupil diameter post-op 1 day	6.19 ± 1.14	0.329	0.254	6.26 ± 1.38	0.057	0.387	5.97 ± 1.03	0.108	0.098

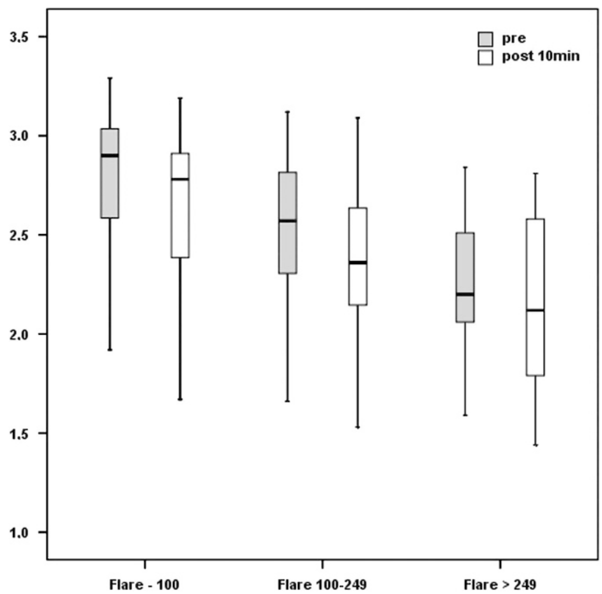

Figure 2 Boxplot analysis of the anterior chamber depth preoperatively and 10 min post femtosecond laser in the three flare analysis cohorts.

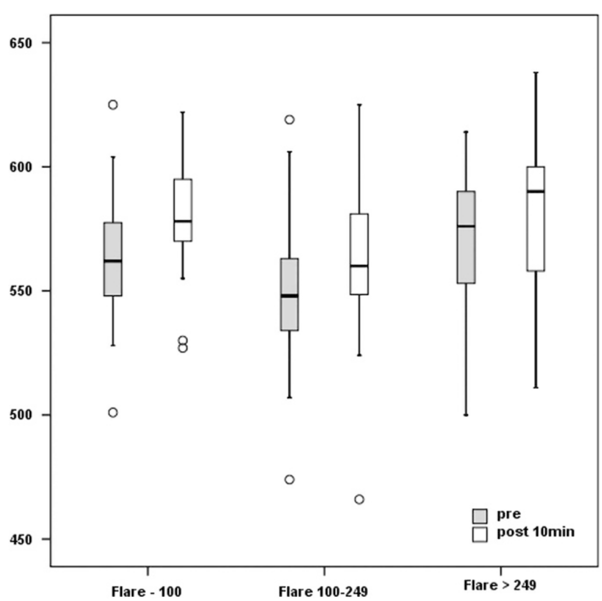

Figure 3 Boxplot analysis of the central cornea thickness preoperatively and 10 min post femtosecond laser in the three flare analysis cohorts.

Basic goal of this study was to analyse the AC characteristics altered by the procedure of femtosecond laser-assisted capsulorhexis and photodisruption. Our findings may allow identifying variations in patient' outcomes.

Laser flare photometry is the golden standard to measure AC inflammation.[10,14] Damage to the blood–aqueous barrier immediately after cataract surgery was related to the type of surgery, systemic diseases, incision size, bubble formation, and the mechanical trauma to the uveal tissues.[2,15–18] Abell *et al*[19] demonstrated that lower anterior segment inflammation was observed in FLACS versus manual surgery. Oshika *et al*[16] have found an increase in flare photometry with age and corresponding higher preoperative flare value in older patients.[14] In our study, no significant correlation of the factor age could be shown.

Shah *et al*[11] summarised the flare analysis outcome: Flare counts after cataract surgery in normal eyes ranged from 30 to 250 immediately after surgery and between 96 ± 65.3 on the first postoperative day. Flare counts in acutely inflamed uveitic eyes usually were 50–400; the highest counts were 800–1000 in eyes with fibrinous exudates and hypopyon.[11] Schauersberger *et al*[20] assessed the long-term disorders of the blood–aqueous barrier after small-incision cataract surgery and found a mean difference of 2.12 photon counts/ms between preoperative and 2 year results ($P < 0.001$). According to Shah *et al*[11] findings, three different flare photometry cohorts were analysed considering the photometry measurements 10 min post femtosecond treatment. In line with the chosen time point of the cohort classification, we looked for significant differences in preoperative values of the AC parameters between the three flare cohorts to identify risk factors of increased intraocular inflammation in patients undergoing cataract surgery, without existing flare differences preoperatively (Table 2). AC depth, AC volume, AC angle, and corneal thickness showed significant differences between the three cohorts preoperatively, indicating a deeper AC in the flare < 100 cohort and thus demonstrating a reduced intraocular inflammation in patients with a deep AC morphology (Table 2).

In addition, the AC depth, AC volume, and AC angle were significantly larger in the flare < 100 group compared to the flare 100–249 cohort 10 min post femtosecond laser treatment ($P = 0.002$, $P = 0.023$, $P = 0.007$). The central and thinnest corneal thickness was significantly increased in the higher flare cohorts (100–249 + > 249 photon counts/ms) 10 min post femtosecond laser treatment (Table 2); the increase of the corneal thickness was observed in studies of active AC inflammation due to the amount of inflammation and could be confirmed by our study results.[21,22]

Similar findings were demonstrated in the flare < 100 cohort compared to the flare cohort > 249; AC depth, AC volume and AC angle were significantly deeper in the flare < 100 cohort 10 min post femtosecond laser treatment ($P = 0.001$, $P = 0.007$, $P = 0.003$). Our findings regarding the AC depth, volume and angle were confirmed by Otsuki *et al*.[23] Indeed, changes in AC depth are the most sensitive indicator of inflammatory activity in patients with anterior uveitis due to ciliary oedema.[23] Summarizing our findings, a flat AC, low AC volume and a narrow AC angle were associated with blood barrier breakdown and thus higher intraocular inflammation. This is the first study to verify these characteristics in patients to enable surgeons to classify their patients before surgery.

Considering the meaning of endothelial cells, Kacerovská *et al*[24] demonstrated that the first day postoperative showed an average decrease in the number of endothelial cells by 1.1% in the femtosecond laser group; the conventional phacoemulsification group had a decrease of 3.8%. We found a loss of 0.36% in the normal cataract cohort at 1 day of follow up. Following manual phacoemulsification, an average of 8.5% cell loss was reported in the literature 12 months postoperatively.[25]

This study is limited by missing features of the AC morphology that were not included in this study design. Schultz *et al*[26] noted a significantly higher level of prostaglandins in the aqueous humour of patients immediately after femtosecond laser treatment. No correlation was noted between age or cataract density and prostaglandin E2 level or between corneal incision, suction time or laser time in the femtosecond laser group and prostaglandin E2 level.[26] A further limitation of this study was the missing manual phacoemulsification control group. In addition, our study was limited by preoperative axial length differences between the flare <100 (24.0 ± 1.0 mm) and flare 100–249 cohorts (23.5 ± 1.3 mm, $P=0.030$), which should be corrected in future study designs.

In conclusion, this study was the first to compare the alterations of the AC characteristics due to femtosecond laser-assisted capsulorhexis and photodisruption related to flare photometry. A flat AC, low AC volume, and narrow AC angle were parameters associated with higher intraocular inflammation. These criteria could be used for patient selection to reduce or prevent unexpected postoperative intraocular inflammation reaction in FLACS.

Summary

What was known before

- Studies relating to femtosecond laser-assisted cataract surgery (FLACS) evaluated the phacoemulsification time, the intraocular lens placement, the capsule overlap, the circularity of capsulotomy, the centration of the intraocular lens and the central cornea thickness, but not the impact on different anterior segment parameters due to the laser energy.
- Reduction of ultrasound energy in FLACS compared with manual procedure.

What this study adds

- Flat anterior chamber, low anterior chamber volume and narrow anterior chamber angle are parameters associated with higher intraocular inflammation.
- Criteria can be used for patient selection to reduce or prevent unexpected postoperative intraocular inflammation reaction in FLACS.

Conflict of interest

The authors declare no conflict of interest.

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