Clinical outcomes of toric ICL for the correction of myopic astigmatism in eyes with keratoconus

Prof. & Chair. Dept. of Ophthalmol. Kitasato Univ., JAPAN
Kimiya Shimizu

Corneal astigmatism: Keratoconic eyes

Correlation between Ant. and Post.

Benefits of ICL in keratoconus

1. Surgery is easy
2. ICL calculation is easy

Methods

- Design
  - Retrospective study
- Post operative 1 week, 1, 3, 6 months
- Subjects
  - Visual acuity (UDVA x CDVA)
  - Safety (Safety index = Post. CDVA / Pre. CDVA)
  - Efficacy (Efficacy index = Post. UDVA / Pre CDVA)
  - Predictability (within ±0.5, 1.0 D)
  - Stability
  - Complication

Correlation between Ant. and Post.

Benefits of ICL in keratoconus

1. Surgery is easy
2. ICL calculation is easy

Methods

- Design
  - Retrospective study
- Post operative 1 week, 1, 3, 6 months
- Subjects
  - Visual acuity (UDVA x CDVA)
  - Safety (Safety index = Post. CDVA / Pre. CDVA)
  - Efficacy (Efficacy index = Post. UDVA / Pre CDVA)
  - Predictability (within ±0.5, 1.0 D)
  - Stability
  - Complication
- Visian toric ICL™ (STAAR surgical)
- 27 eyes of 17 patients
  Age: 37.4 ± 7.0 y.o. (30~51y.o.)
- Sex: Male 10 eyes, Female 17 eyes
- Pre SE : -10.11 ± 2.46 D
- Pre astigmatism : -3.03 ± 1.58 D

Inclusion Criteria
  – Amsler-Krumeich : Stage 1 or 2

Kameya K, Shimizu K, et al :

Safety

Safety index 1.12 ± 0.18

Changes in Snellen Lines of CDVA

Efficacy

Efficacy index 1.01 ± 0.28

% of Eyes

Postoperative Time Period

Predictability

Achieved correction (D)

±0.5D 85%
±1.0D 96%

Spherical Equivalent

Manifest Spherical Equivalent (D)

0.11 0.13 0.20 0.10

0.11 10.11

Time after surgery

**Astigmatism: Vector Analysis**

**Correction Index**

N=27

-4  -3  -2  -1  0  1  2  3  4
J0 (dipters)

J45 (diopters)

-4  -3  -2  -1  0  1  2  3  4

before surgery
after surgery

**Contrast Sensitivity (Photopic)**

Pre
Post
N=16

log contrast sensitivity
log spatial frequency (cycles / degree)

**Contrast Sensitivity (Mesopic)**

Pre
Post
N=16

log contrast sensitivity
log spatial frequency (cycles / degree)

**Complication**

- Endothelial cell density
  - Pre: 2734 ± 482 cells/mm²
  - Post: 2587 ± 407 cells/mm²
- Cataract: 0%
- Axis misalignment: 0%

**Summary**

- In view of the corneal posterior astigmatism, astigmatic correction of toric ICL might be more effectively.

- Toric ICL was beneficial in all measures. (UDVA, CDVA stability & predictability)

- Toric ICL is suitable for keratoconus, because keratoconic eye has deep ACD.

**Good combination**