

Long term follow up of PRK with Mitomycin-C

Dongho Lee MD, PhD
 Yonsei eye center, Seoul, South Korea

Purpose

- To evaluate the long term safety and efficacy of intraoperative Mitomycin-C during PRK for the prevention of corneal haze

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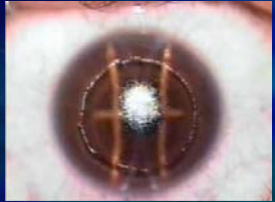
Patients and method

- 59 patients 115 eyes
- 8 men 51 women
- 8.0 +/- 2.91 D (-2.6 ~ -15)
- 64.8 months (58 ~72)

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Operation

Epithelial removal
 20% alcohol 20~30 sec
 NIDEK EC-5000
 BSS irrigation 2 ml
 Merocel sponge – ring shape
 Mitomycin – C 0.02%
 30sec ~ 2min application
 Cold BSS irrigation 30 ml
 Bandage contact lens



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MMC application time

Depth of ablation (um)	Time (seconds)
< 75	0
75 ~ 90	30
90 ~110	60
> 110	120

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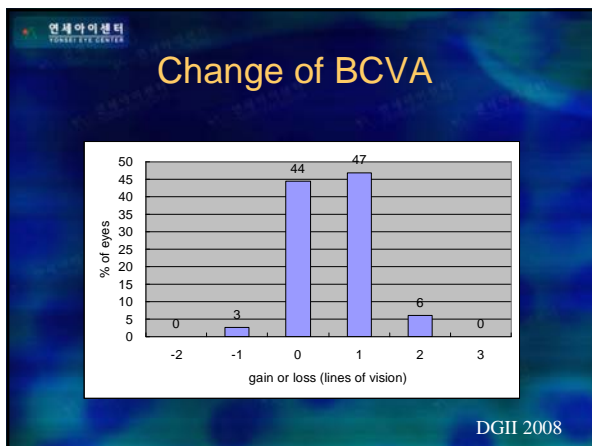
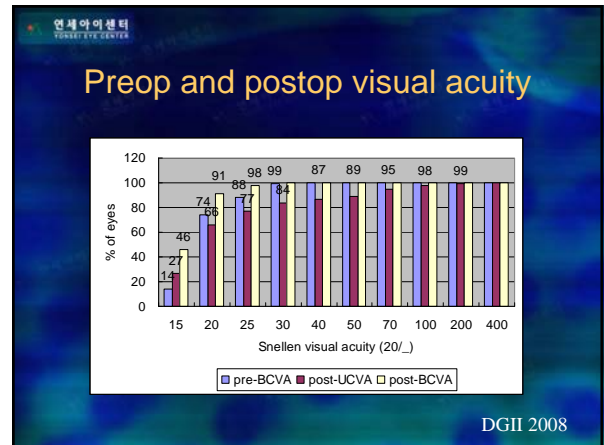
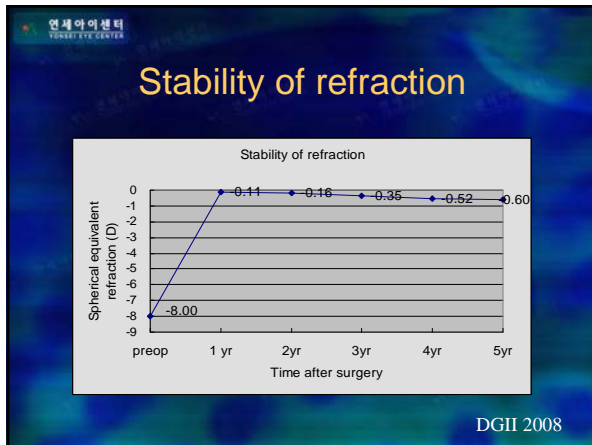
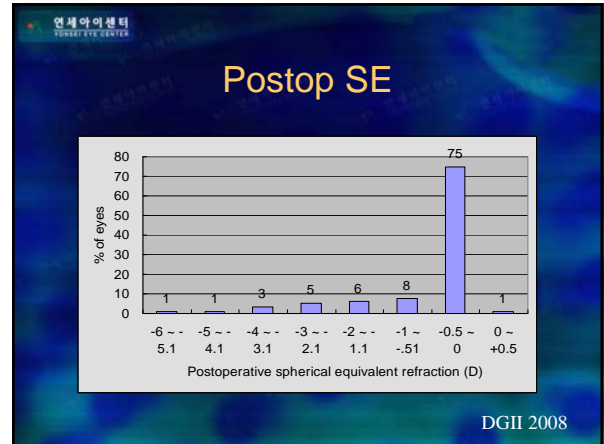
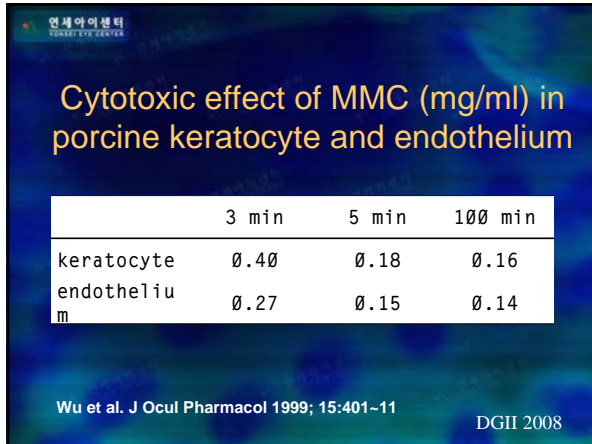
Cytotoxic effect of MMC (mg/ml) in human keratocyte (current treatment 0.2mg/ml)

	5 min	1 hour
ID 50 *	0.038	0.0048
LD 50**	0.50	0.28

* median inhibitory dose
 ** median lethal dose

(Sadeghi et al, J Refract Surg. 1988 Sep-Oct;14:534~40)

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- ### Corneal haze
- 6 eyes (5%)
 - Grade 1 – 5
 - Grade 2 – 1
 - Associated with myopic regression
 - -2.45 +/- 1.52 D
 - 4 eyes were enhanced
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Potential Toxicity of MMC

- Delayed epithelial healing
- Corneo-scleral necrosis and melt after pterygium surgery
- Bleb perforation after glaucoma filtration
- Loss of ciliary body epithelium
- Endothelial damage

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Potential Toxicity of MMC

- Little known about corneal status after application of MMC on central cornea in vivo
- Confocal microscope can evaluate the cornea in vivo
- NIDEK Confoscan 3



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Patients and Method

- Comparative retrospective study
- Cross sectional study at 1 yr postop
- Group 1 : normal volunteers (7 eyes of 6 pt)
- Group 2 : PRK only (16 eyes of 12 pt)
- Group 3 : PRK with Mitomycin-C (40 eyes of 33 pt)

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Endothelium (cells/mm²)

Group	Endothelial Cell Count
Control	2821 ± 186
PRK	2927 ± 307
M-PRK	2967 ± 321
p value (ANOVA)	0.55

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Keratocyte (cells/mm²)

Group	Deep	Middle	Superficial
Control	688 ± 50	788 ± 133	810 ± 147
PRK	664 ± 119	688 ± 117	652 ± 95
M-PRK	646 ± 99	680 ± 121	664 ± 124
p 1	0.89	0.13	< 0.01
p 2 (group 1 Vs. 2)			< 0.05
p 2 (group 1 Vs. 3)			< 0.05
p 2 (group 2 Vs. 3)			0.88
p 1 : ANOVA			
p 2 : Wilcoxon Signed Rank Test			

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Serial confocal examination

- Follow up examination of the same area of cornea at 5 years
- Endothelial cell counts - no change

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Keratocyte density decrease

% of keratocyte density decrease compared to normal control at 1 year , 5 year

Postop year	Post	Middle	Anterior
1	2.3	9.8	16.2
5	17.7	29.5	37.4

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What cause keratocyte density decrease ?

Due to Mitomycin C ?

Or

Refractive surgery itself ?

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Keratocyte decrease in PRK and LASIK (%)

	Postop	Post	Middle	Anterior
PRK	6 month	0		39
	5 year	20 ~24		47
LASIK	6 month	0	18	22
	5 year	22	43	37

• Jay C Erie, William M Bourne, et al
 - (Am J Ophthalmol 2006;141:799-809)

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Keratocyte decrease at 5 year

	Post	Middle	Anterior
M-PRK	17.7	29.5	37.4
PRK*	20~24		47
LASIK*	22	43	22

• * Jay C Erie, William M Bourne, et al
 - (Am J Ophthalmol 2006;141:799-809)

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Summary

- There was no complication related to Mitomycin-C toxicity
- Upto 1 year
 - Endothelial cell counts were not different between preop and postop
 - Keratocyte decreased in superficial stroma compared to control upto 1 year
 - No difference in mid and deep stroma
 - No differences between PRK and M-PRK in endothelium and keratocyte density

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Summary

- Upto 5 year
 - Endothelial cell count did not decrease
 - Keratocyte decreased significantly 17.7, 29.5, 37.4 % at posterior, middle, anterior stroma
 - The keratocyte decrease was compatible to PRK and LASIK
 - Mitomycin-C did not add severe risk for keratocyte decrease

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Conclusion

- PRK with intraoperative MMC is safe method to prevent corneal haze
- There was no complication after 5 years follow up

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