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IOLEs Design and Material influence in ND: Yag laser rates for a large series of MICS IOL implantations

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Disclosures:

Gilles Lesieur is consultant for Carl Zeiss Meditec and has Royalties for BVI and Rumex instrumentation

Paul Dupeyre has no financial interest in any of the mentioned products or methods

Introduction

Posterior capsular opacification (PCO) is the most common complication resulting from cataract surgery

The use of **Nd: Yag Laser** is effective, but it may also induce several risks

Biocompatibility of intraocular lenses (IOLs) can be categorized into two aspects

- **Uveal** biocompatibility → Better with **hydrophilic** IOL
- **Capsular** biocompatibility → Better with **hydrophobic** IOL

So we should expect less PCO with hydrophobic IOL

What is the best IOL for the patient to avoid PCO , in terms of design and material ?



Purpose & Methods

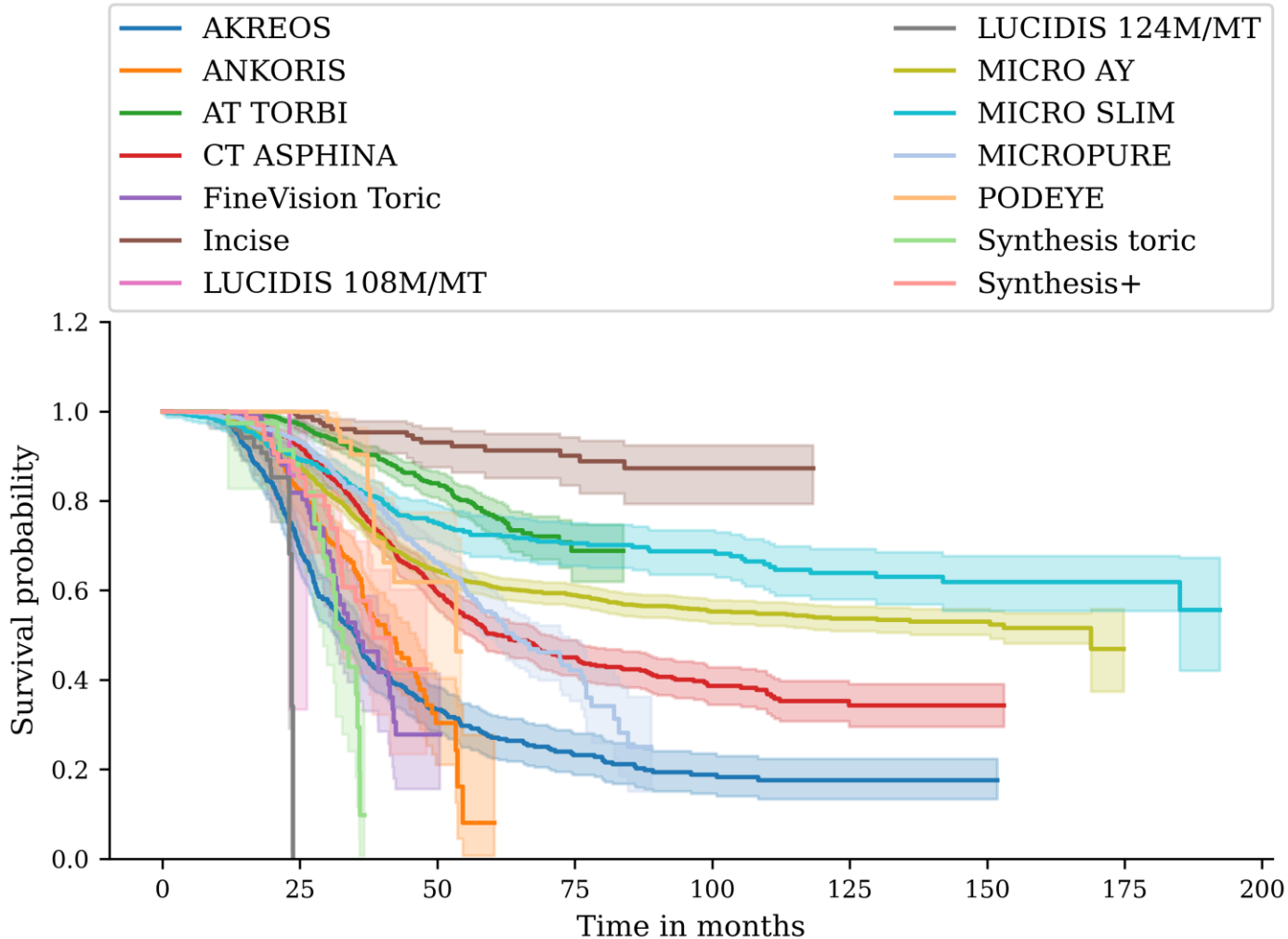
- To analyze the rate of **posterior** Nd: YAG laser capsulotomy after **10850** implantations of **12 hydrophilic** acrylic IOLs and **2 hydrophobic** IOLs of different design.
- To analyze the rate of **anterior** Nd: YAG laser capsulotomy performed after anterior capsular contraction syndrome (ACCS).
- All surgeries were performed by **the same surgeon** (G.L) with our own follow up at Center Iridis
- Kaplan-Meier **survival analysis** and propensity score were performed on all data.

10850
implantations

Survival Rates over time

Group (Nb IOL)	1 year	1,5 years	2 years	3 years	5 years	6 years	9 years	11 years
Akreos Mics	97,6%	86,7%	74,1%	48,5%	27,0%	23,8%	18,2%	17,5%
CT Asphina	99,0%	96,3%	93,0%	77,4%	49,9%	44,7%	37,5%	33,7%
Micro AY	98,2%	93,8%	89,2%	75,1%	60,1%	58,6%	54,2%	52,6%
Microslim	96,9%	93,7%	89,7%	82,2%	71,4%	69,9%	64,8%	61,4%
Incise	100%	100%	100%	95,4%	91,3%	91,3%	87,3%	
Micropure	98,8%	96,0%	94,0%	81,2%	53,2%	44,9%		
AT TORBI	99,9%	99,2%	97,5%	90,8%	76,0%	70,5%		
Ankoris	99,4%	94,1%	83,5%	62,6%	(7,0%)			
FineVision Toric	100%	98,2%	81,8%	48,6%				
Podeye	100%	100%	100%	90,3%				
Synthesis+	100%	97,0%	87,1%	57,7%				
Synthesis TORIC	97,4%	97,4%	88,3%	(9,8%)				
Lucidis 108M/MT	100%	100%	85,7%					
Lucidis 124M/MT	98,7%	90,7%						

Survival Rates over time



IOLs followed over a long period

- Akreos Mics vs CT Asphina vs Micro Ay vs Micro Slim
- * $p < 0,05$ between all groups at 11 years of follow-up



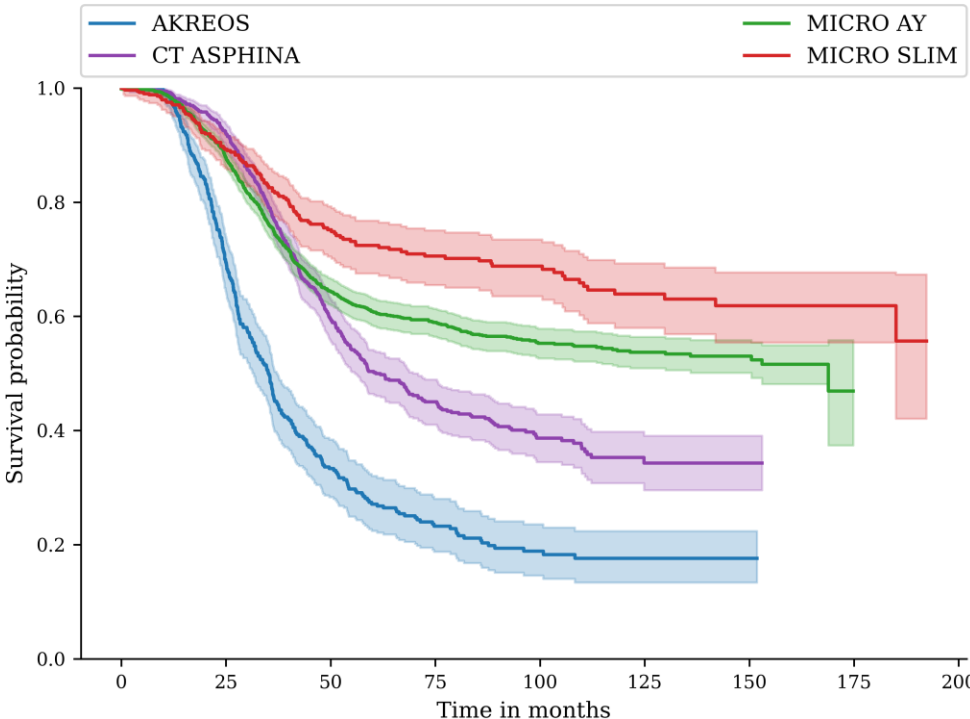
Akreos Mics



Micro Ay & Micro Slim



CT Asphina



Micro Slim → Hydrophilic 25%

Micro AY → Hydrophilic 25%

CT Asphina → Hydrophilic 25% with hydrophobic surface properties

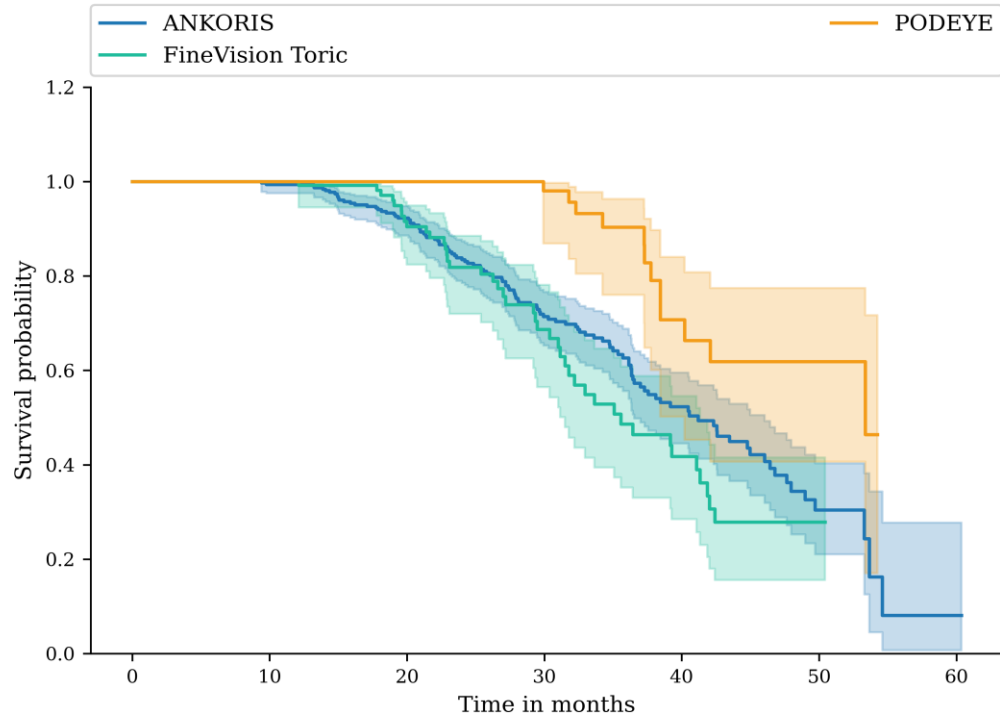
Akreos Mics → Hydrophilic 26%

Design influence?



Same design but different material or industrial process

- Ankoris vs POD Eye vs Finevision Toric (PhysIOL-BVI)
- * $p < 0,05$ at 5 years of follow-up



POD Eye → Hydrophobic

Ankoris → Hydrophilic 26%

Finevision Toric → Hydrophilic 26%

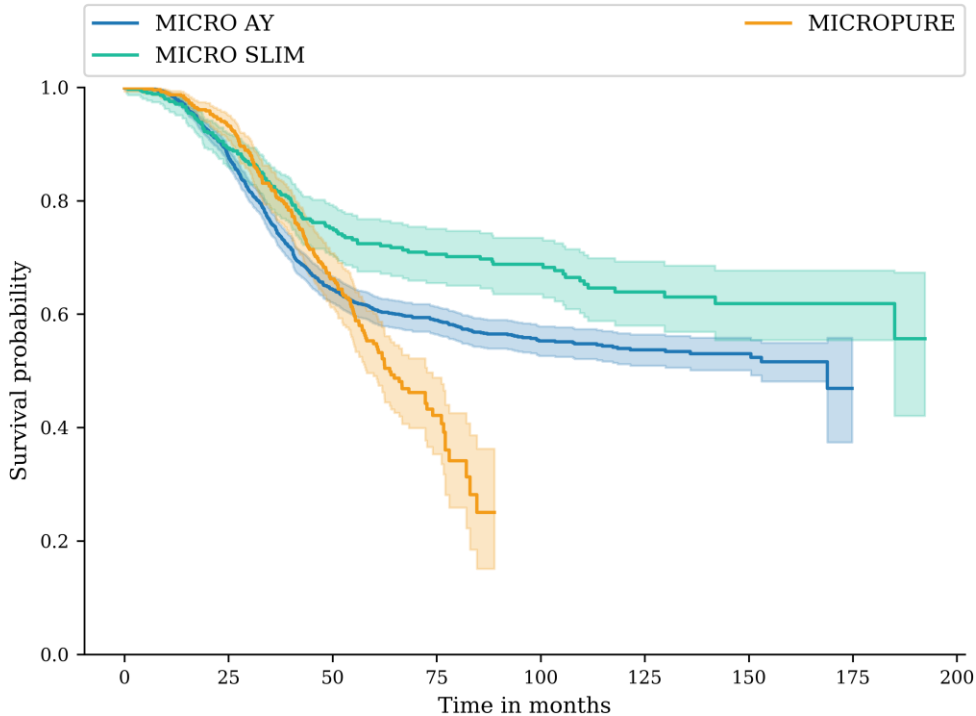
Is the hydrophobic lens better?



Same design but different material or industrial process

• Micro AY vs Micro Slim vs MicroPure (PhysIOL)

* $p < 0,05$ between Micro Slim group and two others groups at 7 years of follow-up



**Micro Slim → Hydrophilic
(turned at room temperature)**

**Micro AY → Hydrophilic
(turned at refrigerated temperature)**

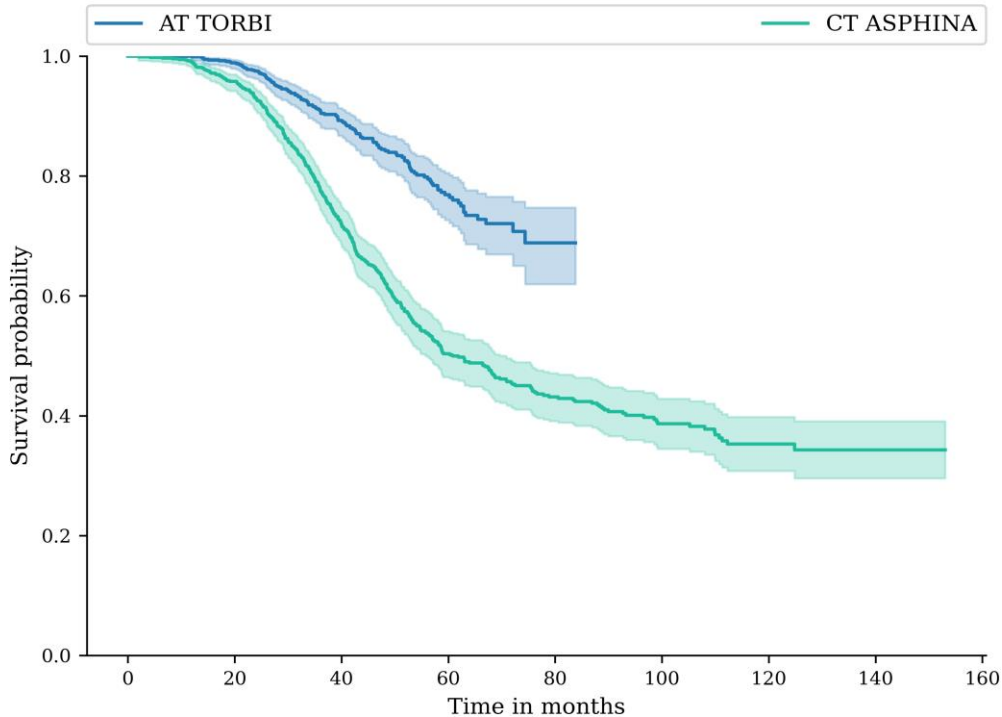
MicroPure → Hydrophobic

**Is the hydrophilic lens
better?**



Same design but different material or industrial process

- AT TORBI vs CT Asphina (Carl Zeiss Meditec)
- * $p < 0,05$ at 6 years of follow-up



AT TORBI → Aspheric & Bitoric

CT Asphina → Aspheric

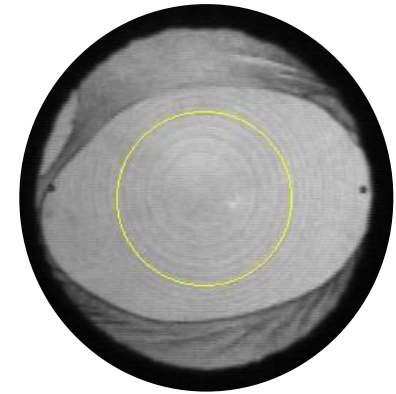
Is there a thickness difference ?



Additional analysis

- Rate of anterior Nd: YAG laser capsulotomy performed after anterior capsular contraction syndrome (ACCS).

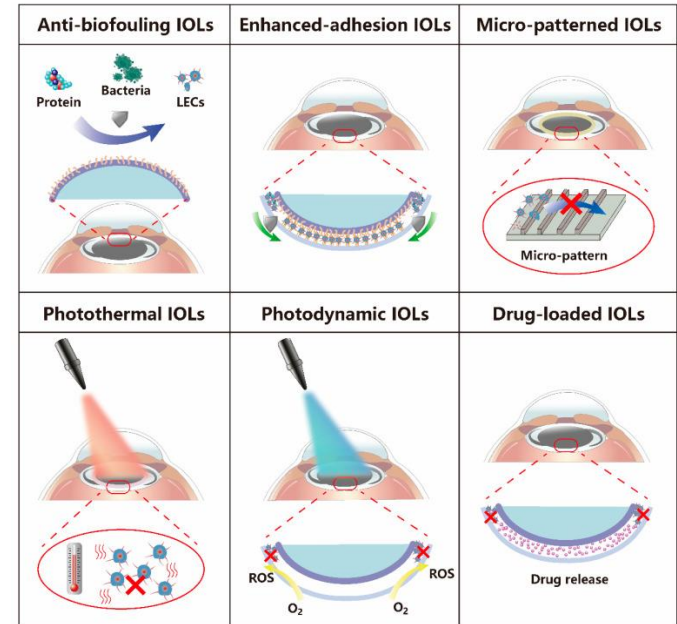
Group	Refend YAG
POD EYE, CT ASPHINA	0%
MICRO SLIM	0.15%
MICRO AY	0.17%
AT TORBI	0.4%
SYNTHESIS TORIC	0.78%
AKREOS MICS	0.8%
ANKORIS	0.9%
LUCIDIS 108M	1.14%
MICROPURE	1.2%
SYNTHESIS	1.56%
LUCIDIS 124M	2.34%
INCISE	3.06%



We reduced the laser rate from 3.74% to 1.56% by widening the rhexis from 5.2mm to 5.5mm for LUCIDIS IOL

Conclusion

- This analysis shows that IOL material and design cannot be the only predominant factors in reducing the Nd:YAG laser rate.
- **Surface treatment** and other **manufacturing process** seem to have more impactful effects, as listed in the article by Zhang et al.*
- Uveal, capsular **biocompatibility** (UB / CB) and IOL should be further investigated to reduce PCO complications (Hydrophilic IOL better UB and Hydrophobic IOL better CB)
- It is essential to continue this study to analyze the tolerance and side effects in the long term
- **So what is the best IOL for the patient ?**
Lots of questions but few answers...for the moment



*Yidong Zhang, Chengshou Zhang, Silong Chen, Jianghua Hu, Lifang Shen, Yibo Yu. Research Progress Concerning a Novel Intraocular Lens for the Prevention of Posterior Capsular Opacification. *Pharmaceutics*. 2022 Jul; 14: 1343.

Thank you for your attention

