



**Università degli Studi di Catania**

*Dipartimento di Chirurgia e Specialità Medico-Chirurgiche*

*Sezione di Oftalmologia*

*Dir: Prof . T. Avitabile*

Tavola rotonda

**Il timing del glaucoma:**

**siamo sempre adeguati al paziente e alla malattia?**

**Quando la parachirurgia**



*Antonio Longo*

# Glaucoma cronico

Terapia medica: due concetti fondamentali

Compliance / aderenza / persistenza

Pressione target

## 3.4 - ADHERENCE, COMPLIANCE AND PERSISTENCE IN GLAUCOMA

Glaucoma is a chronic progressive disease that requires continuous long-term cooperation of the patient with the glaucoma management proposed by the doctor.

### 3.4.2 Measured Adherence

Despite easier medication schemes (for example drugs which require application once-daily) and more information for the patients about the disease, the rate of non-adherence has remained almost the same over the last 25 years; between 30%-70%. It is important to mention that the patients themselves overestimate their adherence and persistence rate (GAPS)<sup>132</sup>.

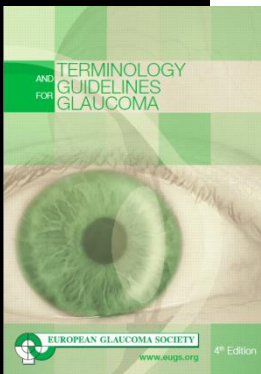
### 3.4.3 Factors Associated with Non-Adherence

Four groups of factors encountered as common obstacles to glaucoma medication adherence have been described<sup>133</sup>:

- Situational / environmental (for example a major event in the patients life, unsteady life-style with many travels)
- Medication (for example costs of the drugs, side effects, complicated dosing regimen)
- Patients (for example comorbidity, poor understanding of the disease)
- Provider (for example lacking communication with the doctor)

Other influencing factors:

- Gender (men are more likely to be non adherent)
- Stage of the disease (patients with a less advanced disease tend to be less adherent)



**Mancata aderenza alla terapia (misurata):**

**30-70% dei pazienti**

**Il paziente tende a**

**sopravvalutare la sua aderenza alla terapia**

**(crede di aderire bene alla terapia prescritta)**

### 3.4.4 Types of Non-Adherence

Every patient is different and there are several types of non-adherence<sup>134</sup>.

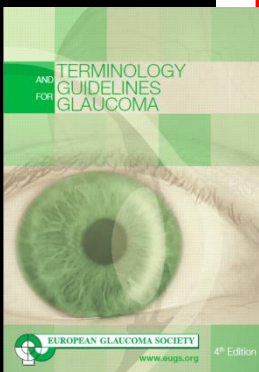
- Failure to take the medication as prescribed (including under- and overdosing, inadequate doses and wrong timing of dosages)
- Failure to use the correct medication (including the application of the wrong medication or the self administration of not prescribed drugs)
- Failure to apply the medication correctly (including incorrect self administration of the medication)
- Failure to continue applying the medication (including problems with side-effects, issue of costs and missed refills)

### 3.4.5 Improving Adherence

There are different ways for improving the adherence of patients. The most important measures are informing the patient about his/her disease and finding a therapeutic regimen which fits into the patient's life-style<sup>135</sup> [I,D].

Other factors which should improve adherence [I,D]:

- The therapy should be simple i.e. not more than two bottles and an application not more than twice a day
- The patient should be instructed how to apply the drops correctly. If necessary, hints reminders should be given like a daily routine which the patient can connect to the application of the drops. If a patient has physical problems applying the drops as arthritis of the fingers, the therapy should be adjusted accordingly or switched to laser/surgery
- The doctor should inquire at every visit if the patient has side effects of the medication and switch if necessary. A patient who complains about side effects is usually not adherent to therapy.



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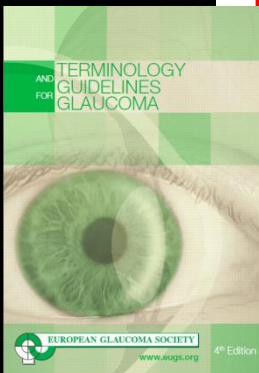
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# Terapia massimale

**Al massimo due flaconi**

**applicazione non più di due volte al giorno**

**Usare associazioni**

**$\beta$  bloccante + CAI topico /  $\beta$  bloccante +  $\alpha 2$  agonista**

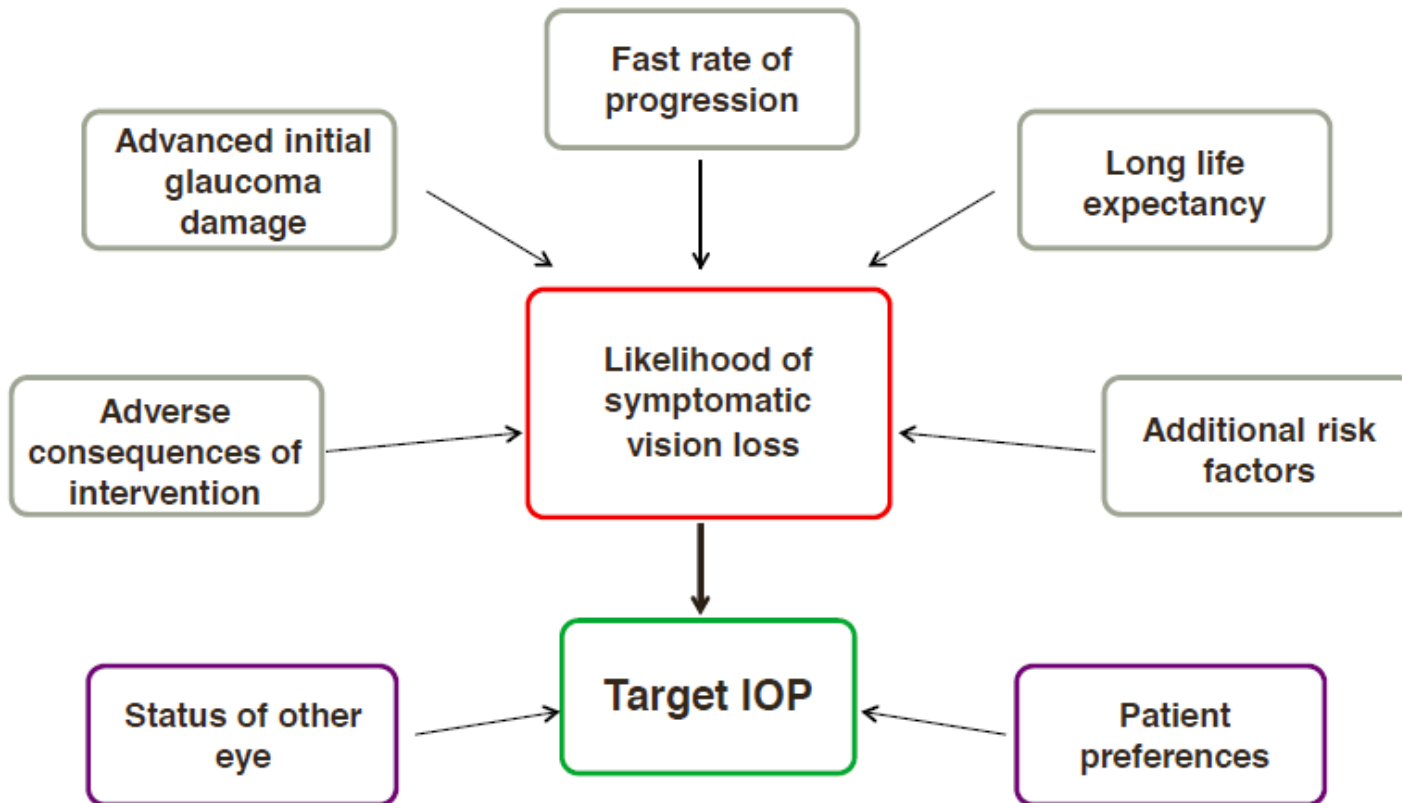
**Prostaglandina**

**(3 instillazioni in un giorno)**

# Che trattamento devo aggiungere? (parachirurgia?)

## Quale IOP target devo raggiungere?

### FC IX - Considerations on Target IOP

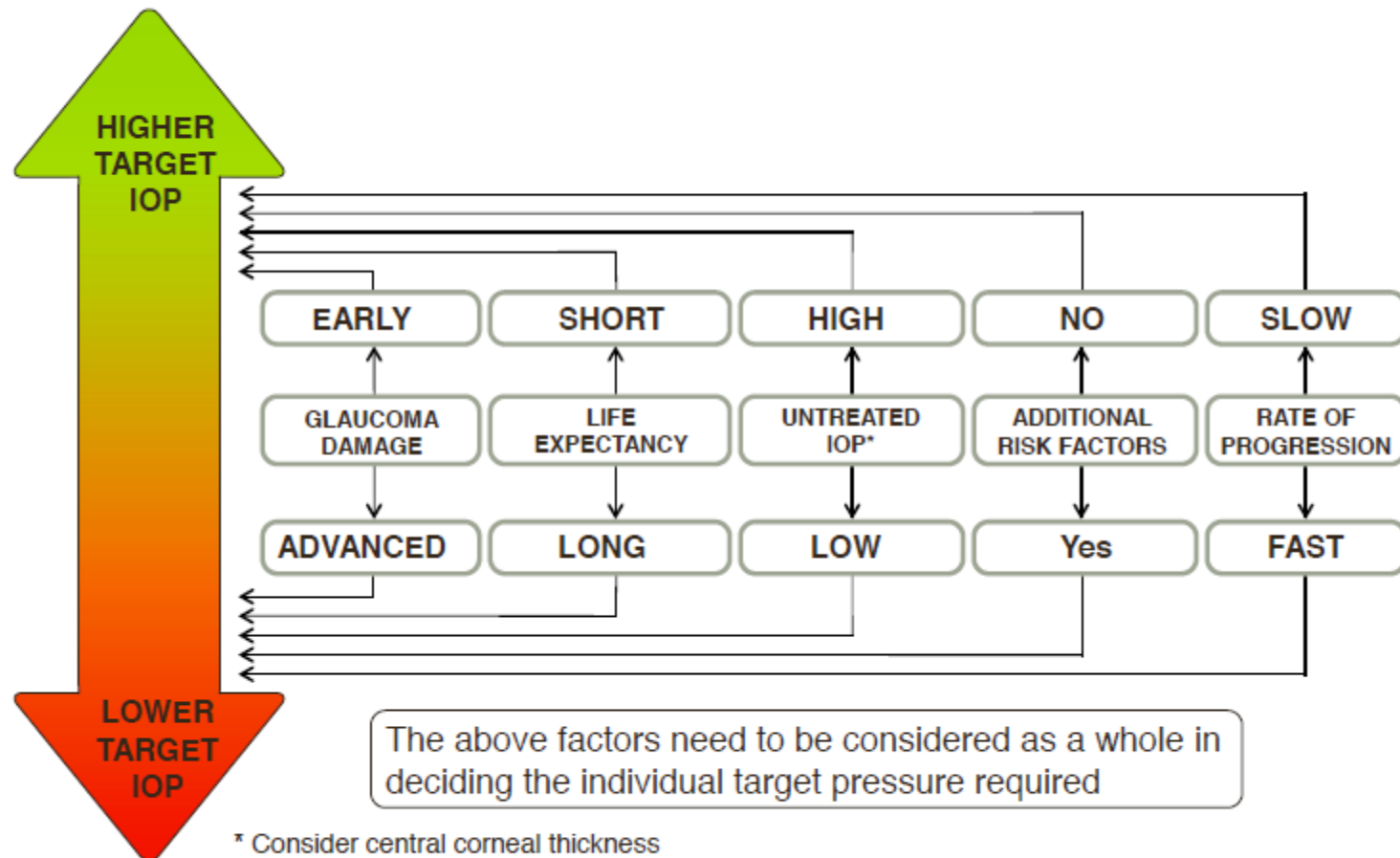


The treatment target is a compromise between reducing the risk of symptomatic vision loss and the consequences of therapy. Patient preferences should be taken into account.



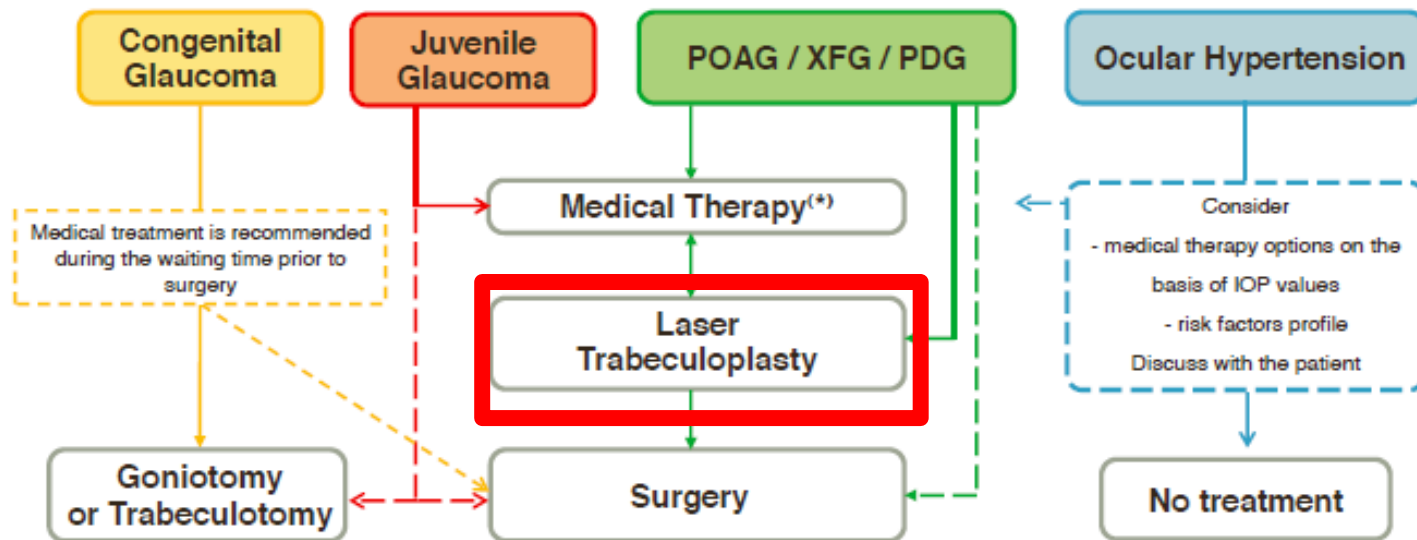
# Ché IOP target devo raggiungere?

## FC X - Setting the Target IOP



# Glaucoma ad angolo aperto

## FC VI - Treatment Options



If the above procedures not successful or feasible, consider repeat filtration surgery with anti-metabolites or long-tube drainage implant/cyclodestructive procedure

(\*) Up to 2-3 different drugs. Do not add a drug to a non-effective one; consider switching

POAG = primary open-angle glaucoma

XFG = exfoliative/pseudoexfoliative glaucoma

PDG = pigment dispersion glaucoma

# Efficacia della laser trabeculoplastica

## Effectiveness of laser trabeculoplasty:

ALT and SLT have the same efficacy<sup>153,158</sup>.

Laser trabeculoplasty is initially effective in 80 to 85% of treated eyes with a mean IOP reduction of 20 to 25% (of 6 to 9 mmHg). The effect wears off over time, for both ALT and SLT<sup>159</sup>.

*LT versus medication:* In the Glaucoma Laser Trial, after 7 years of follow-up, patients with ALT had lower IOP (1.2 mmHg) than patients on medical treatment, and no difference in progression of glaucoma<sup>160</sup>. SLT has shown to decrease IOP to a degree similar to that of prostaglandin analogues after 9 to 12 months follow-up<sup>161</sup> and appears to be repeatable (30,31).

## Predictors of efficacy:

Higher baseline IOP is associated with greater IOP reduction after SLT and ALT<sup>162,163</sup>.

The effectiveness of ALT is influenced by the treating surgeon, and success is better when surgeons have more experience in ALT<sup>163,164</sup>.

Pigmentation of the trabecular meshwork (TM) is important. ALT is less successful in eyes with no pigmentation of TM. SLT seems to be independent of the pigmentation of TM. Younger subjects (less than 40 years old) usually respond less to ALT<sup>165</sup>.

**Riduzione IOP 20-25%**

**Effetto si perde nel tempo (SLT ripetibile)**

## Indicazioni

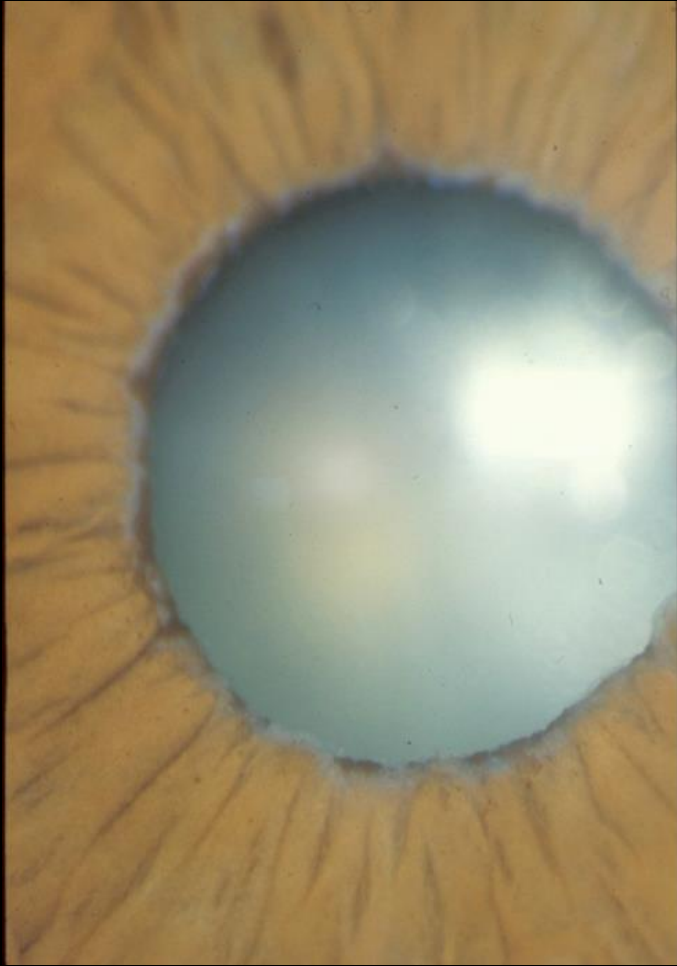


**Paziente non giovane**  
**Danno non avanzato**  
**IOP non molto elevata**

**Volontà del paziente (rifiuto intervento)**

**illustrare evoluzione danno**

# **Glaucoma pseudoesfoliativo**



**Buona riduzione IOP**

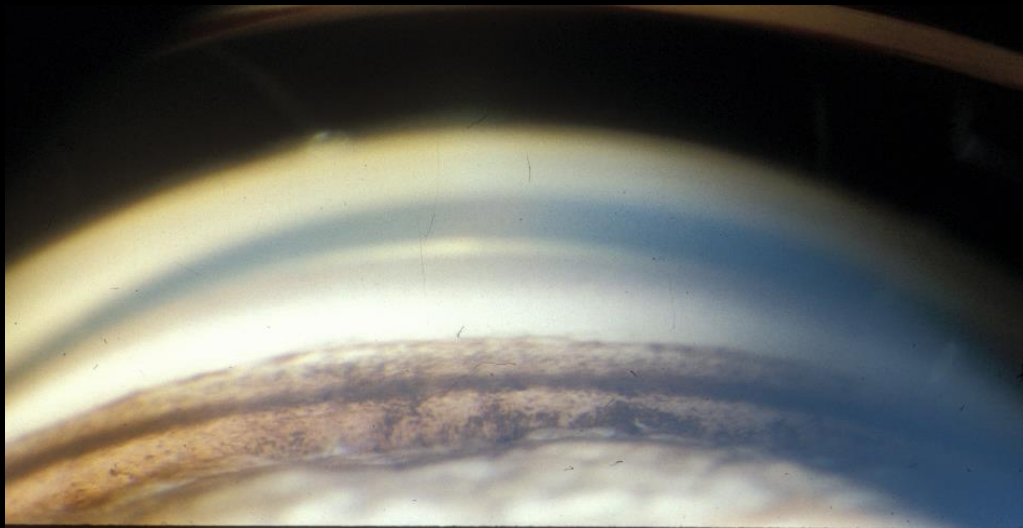
**in genere:**

**paziente anziano**

**danno avanzato**

**IOP elevata (fluttuazioni ampie)**

# Glaucoma pigmentario



**TRABECULOPLASTICA  
ma:  
Giovani  
IOP elevata**

**IRIDOTOMIA ?**

- Laser trabeculoplasty [I,C] is effective. However, the heavily pigmented trabecular meshwork warrants power settings lower than usual [I,D]. The initially good pressure fall may be lost over time. Repeat ALT is rarely successful<sup>100</sup>. c) Nd:YAG laser peripheral iridotomy (LPI) has been proposed as a means for eliminating reverse pupillary block (if present). The benefit from an LPI in patients with PDS and pigmentary ocular hypertension is not established<sup>101</sup>. d) Filtering procedures [I,D] are usually as successful as in POAG. Young myopic patients are at increased risk of hypotony maculopathy<sup>102</sup>.

Examination after exercise should be considered, especially when visual symptoms after exercises are reported. Increased pigment dispersion with posterior iris bowing during exercise is a sign of potentially progressing disease; in such patients; LPI may be considered<sup>103</sup>.

# Altri glaucomi ad angolo aperto

**Glaucoma a pressione normale**

**Glaucoma da cortisone**



# Glaucoma acuto da chiusura d'angolo

## FC VII - Management of Acute Primary Angle Closure Attack

### Medical Procedures

**Decrease AH<sup>+</sup> production**

Topical therapy

$\beta$ -blockers /  $\alpha_2$ -agonists

Systemic therapy (IV / oral)

Acetazolamide / Mannitol  
(repeat if necessary)

+

**Re-open the angle**

Pharmacologically

Pilocarpine 2%

Mechanically

Corneal indentation (4 mirror lens)  
Consider clear cornea paracentesis

+

**Reduce Inflammation**

Topical Steroids

### Laser / Surgical procedures

**Break pupillary block + re-open angle**

Iris procedures

← and/or →

Lens extraction

Clear Cornea ←-----Try topical glycerin 10%----- Cloudy Cornea

Iridotomy / Iridectomy

Iridectomy

**!Remember prophylactic  
iridotomy  
in the other eye!**

\*Aqueous Humor

Depending on availability, consider laser  
iridotomy a first treatment option



# IRIDOTOMIA YAG LASER



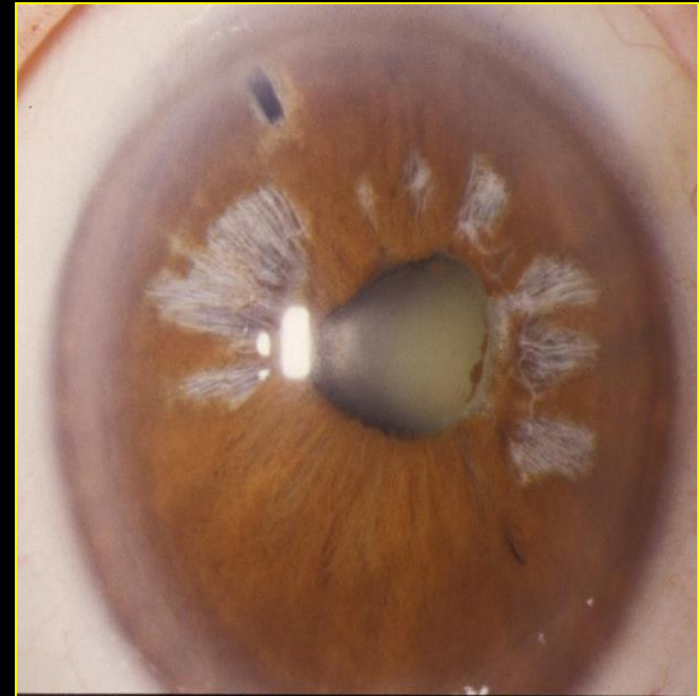
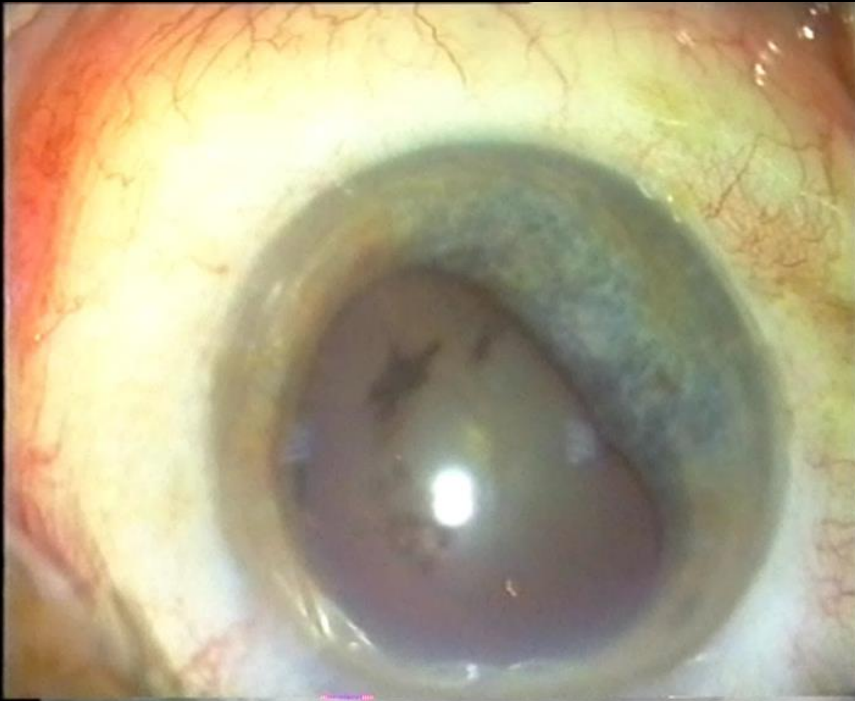
**facile esecuzione**

**scarse complicanze**

# Asportazione del cristallino?

Cataract surgery in PACG is generally more challenging and prone to complications than in normal eyes or eyes with POAG because of the shallow AC, larger lens, corneal oedema, poorly dilated or miotic pupil, extensive posterior synechiae, lower endothelial cell count, weaker zonules, especially after an acute angle closure attack.

In an eye with a clear lens: laser PI first. If the angle does not open and IOP not well controlled with unquestionable glaucomatous damage, consider to proceed with phacoemulsification and IOL implantation [I,D].



# Phacoemulsification versus Trabeculectomy in Medically Uncontrolled Chronic Angle- Closure Glaucoma without Cataract

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*Clement C. Y. Tl  
Dexter Y. L. Leun*

## Randomized Trial of Early Phacoemulsification versus Peripheral Iridotomy to Prevent Intraocular Pressure Rise after Acute Primary Angle Closure

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*Dennis S. C. Lam, MD, FRCOphth,<sup>1</sup> Dexter Y. L. Leung, FRCS, DRCOphth,<sup>1</sup> Clement C. Y. Tham, FRCS,<sup>1</sup>  
Felix C. H. L.  
Dorothy S. P.*

## Cataract Surgery for Residual Angle Closure after Peripheral Laser Iridotomy

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*Atsushi Nonaka, MD, Takehisa Kondo, MD, Masashi Kikuchi, MD, Kenji Yamashiro, MD,  
Masashi Fujihara, MD, Takuji Iwawaki, MD, Kaoruko Yamamoto, MD, Yasuo Kurimoto, MD*

# in corso: iridotomia vs asport. cristallino

**Eagle**

Effectiveness, in **A**ngle-closure **G**laucoma, of **L**ens **E**xtraction



Effectiveness in primary **A**ngle-closure **G**laucoma  
of early **L**ens **E**xtraction  
with intraocular lens implantation (EAGLE):



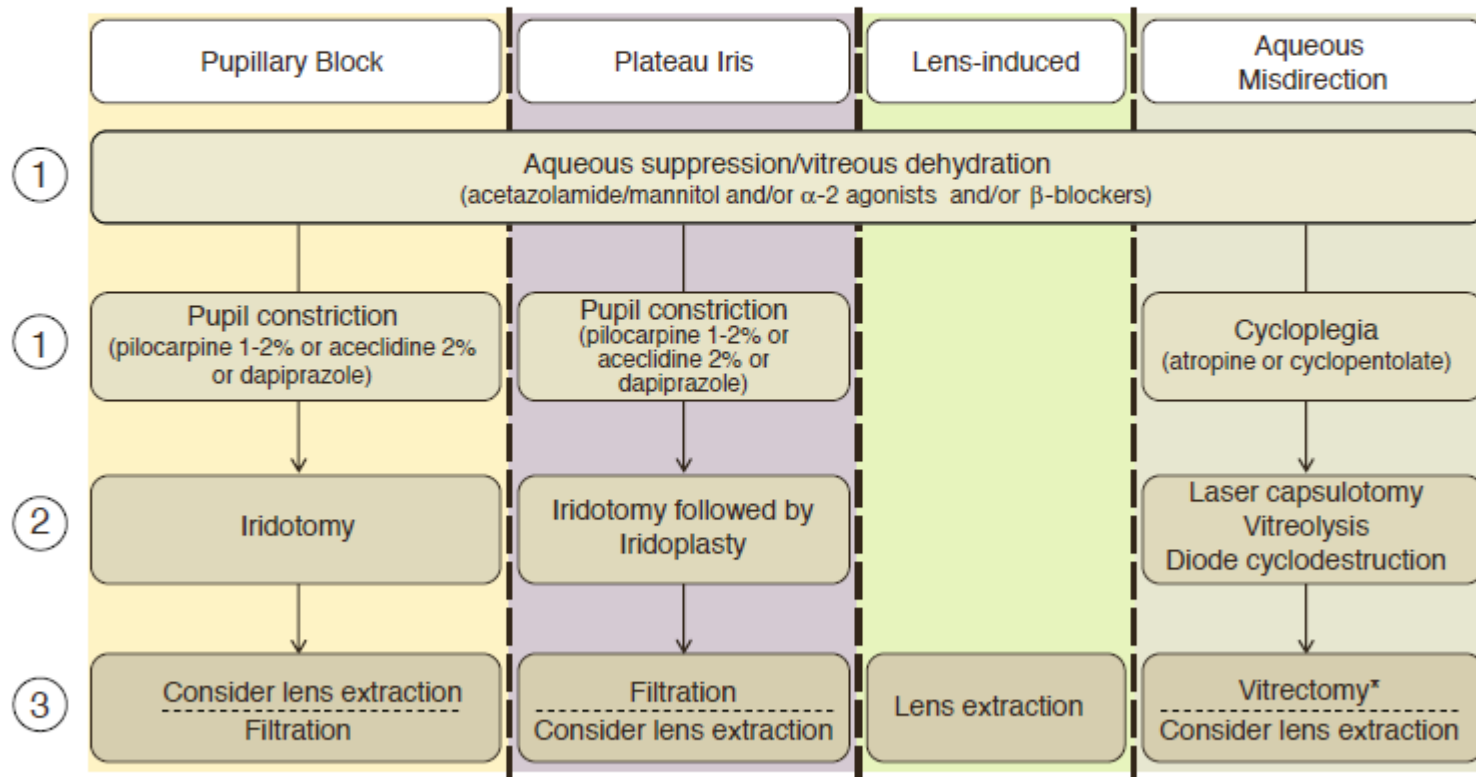
Augusto Azuara-Blanco\*, Jennifer M Burr, Claire Cochran, Craig Ramsay, Luke Vale, Paul Foster, David Friedman, Zahidul Quayyum, Jimmy Lai, Winnie Nolan, Tin Aung, Paul Chew, Gladys McPherson, Alison McDonald and John Norrie, for Effectiveness in Angle-closure Glaucoma of Lens Extraction (EAGLE) Study Group

# Glaucoma cronico da chiusura d'angolo

## FC VIII - Management of Chronic Angle Closure

### IDENTIFY THE PATHOPHYSIOLOGICAL MECHANISM(S) RESPONSIBLE

Make sure a **patent Iridotomy** is present/made before considering mechanisms other than pupillary block



\* Combined with zonulectomy+iridectomy in pseudophakia

#### 2.4.1.7.4 Intermittent Angle-Closure (IAC)

Treatment:

Pupillary constriction, iridotomy, iridoplasty or lens extraction are to be considered according to the main mechanism determining angle occlusion [I,D]

#### 2.4.1.7.5 Chronic Angle-Closure Glaucoma (CACG) (See FC VIII)

Treatment:

Medical treatment alone is contraindicated as all patients require relief of pupil block by iridotomy, iridectomy or lens extraction [I,D]. If the synechial closure is less than half the circumference, iridectomy/iridotomy may be sufficient.

Since complications of iridotomy are uncommon, its use as the initial procedure is justified in practically every case [I,D].

Argon laser trabeculoplasty is contraindicated as it may increase synechial angle-closure [I,D]. Lens removal may be considered at all stages and can lead to relief of pupil block and sufficient IOP control [II,D].

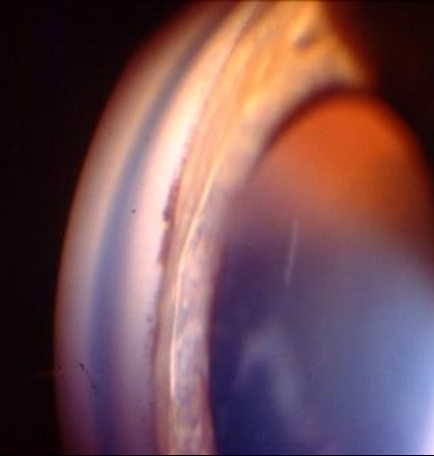
If IOP cannot be controlled medically after breaking pupil block (with or without lens extraction), a filtering procedure is indicated [II,D].

These eyes are more frequently prone to develop posterior aqueous misdirection and the necessary precautions must be taken when considering surgery.

#### 2.4.1.7.6 Status Post-Acute Angle-closure Attack

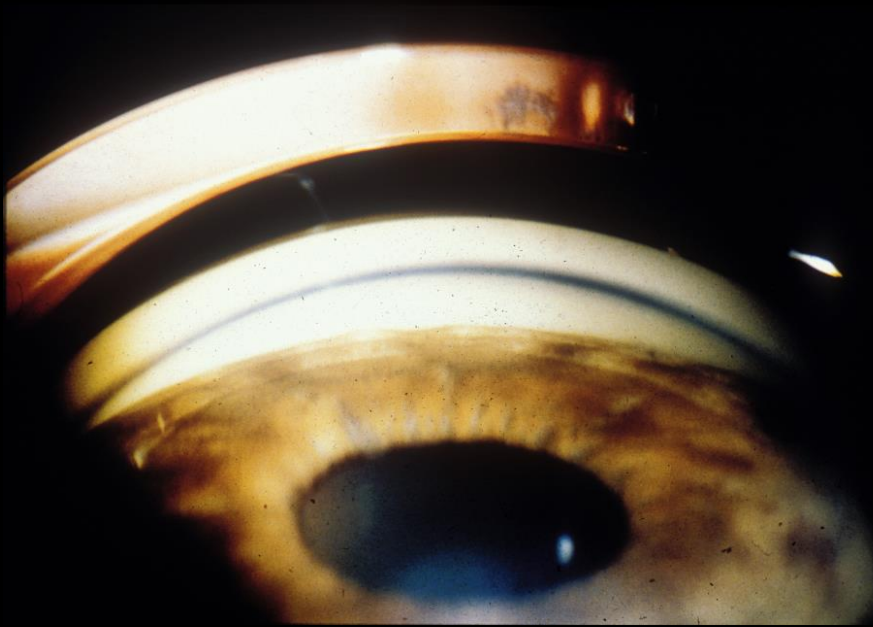
Therapy:

Management according to angle, lens, IOP and disc/visual field. In case of cataract surgery, non dilatable pupil, low endothelial cell count and loose zonules are of concern.



**Miosi, iridotomia, terapia ipotonizzante event. asportazione cristallino**

# Iride a plateau



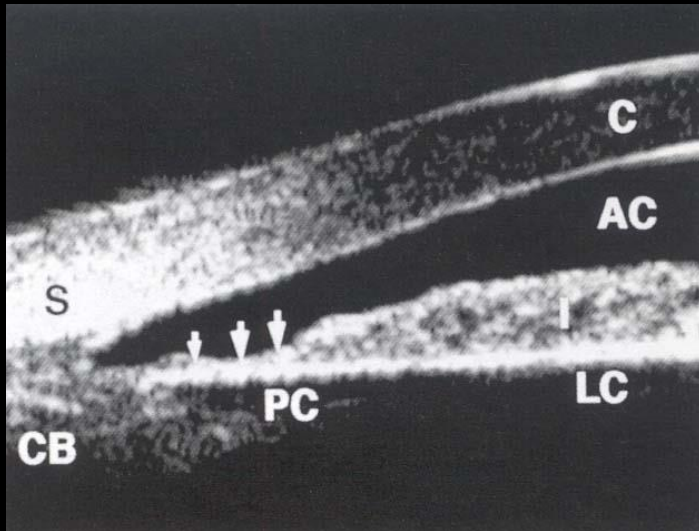
## Medical treatment [II,D]:

- Pupillary constriction to pull the peripheral iris centripetally
- In plateau iris configuration, a modest pupillary constriction may prevent further angle- closure
  - pilocarpine 1%, aceclidine 2%, carbachol 0.75%
  - dapiprazole 0.5%

## Surgical treatment [I,D]:

- Iridotomy is essential to confirm the diagnosis because it eliminates any pupillary block component
- Argon Laser Peripheral Iridoplasty (ALPI) stretches the iris and widens the chamber angle<sup>149</sup>.

# Iridoplastica laser



## Preoperative preparation: [I,D]

Instillation of Pilocarpine followed by the same preoperative preparation as for laser trabeculoplasty.

Lens: Abraham (+66 diopters), Wise (+103 diopters), CGI©LASAG CH lens or the central non-mirrored part of the Goldmann lens.

## Contraindications: [I,D]

Flat anterior chamber

Extensive peripheral anterior synechiae.

## Laser parameters [II,D]

Laser parameters [II,D]	Contraction burns (long duration-low power-large spot size)
Spot size	200-500 $\mu$ m
Exposure	0.3-0.6 sec
Power	200-400 mW
Location	Aiming beam should be directed at the most peripheral part of the iris
Optimal reaction	Visible contraction of the peripheral iris with flattening of the iris curvature (without bubble formation or pigment release)
Number of spots	20-24 spots over 360° leaving 2 beam diameters between each spot and avoiding visible radial vessels

## Complications:

Mild iritis

Corneal endothelial burns

Transient elevation of IOP

Post-operative synechiae of the pupil

Permanent pupil dilation

Iris atrophy

Non-dilatable pupil

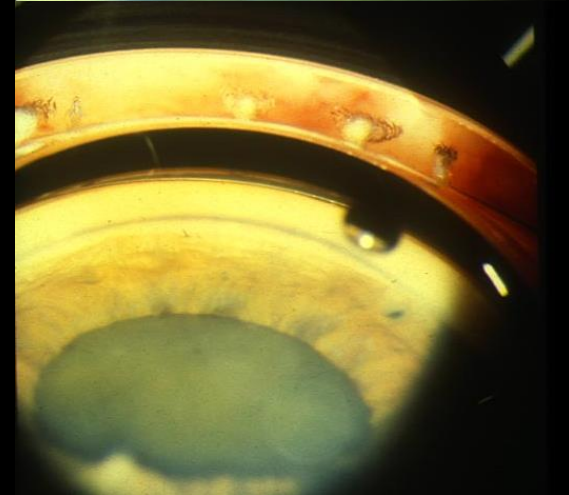
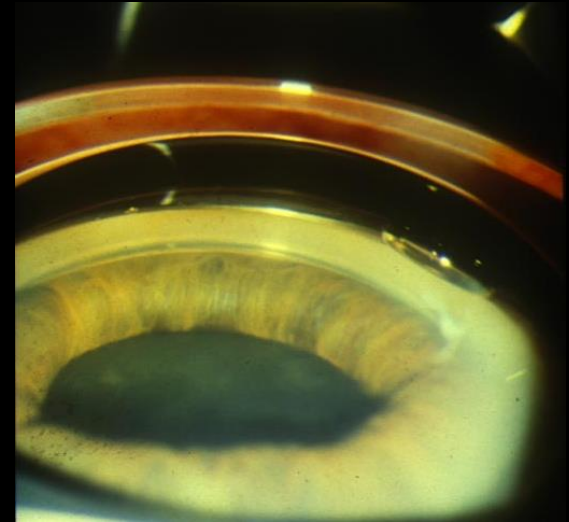
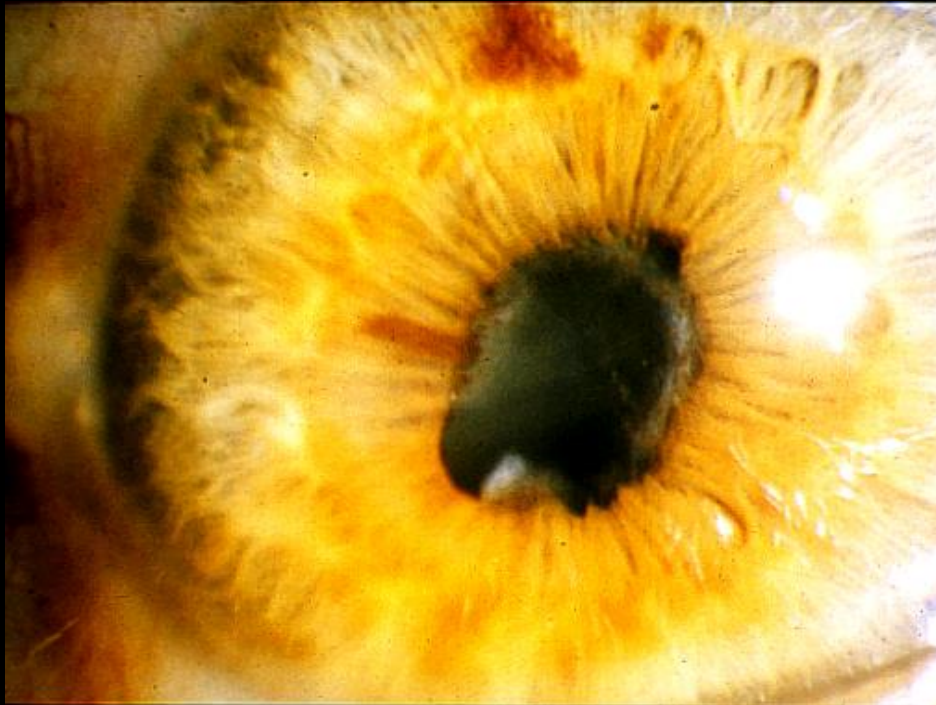
**miotico**

**iridotomia (conferma diagnosi)**

**Iridoplastica laser**



# Blocco pupillare secondario (seclusio)



**Iridotomia**

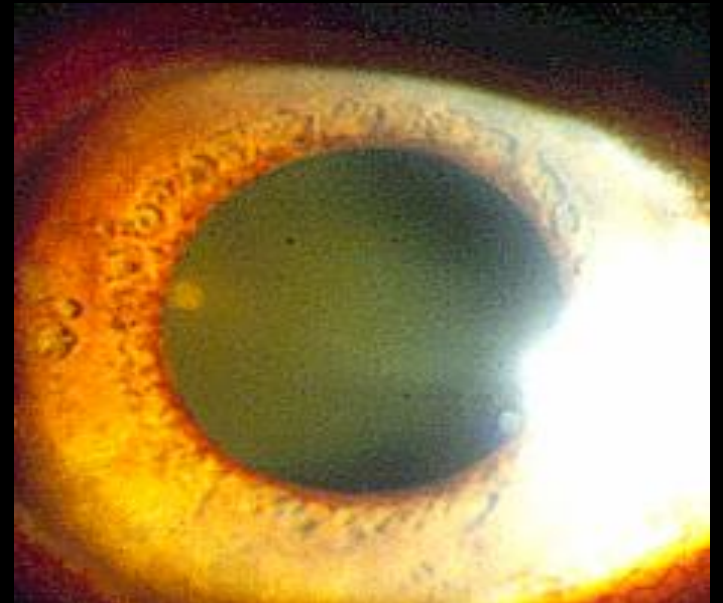
**Terapia antiflogistica ed ipotonizzante**

# GLAUCOMA NEOVASCOLARE

## PANFOTOCOAGULAZIONE RETINICA

ESTESA IN PERIFERIA  
ESEGUITA IN TEMPI BREVI  
FATTORI SISTEMICI  
(GIOVANE ETA', COMPENSO PRECARIO)

## EDEMA MACULARE CONCOMITANTE?



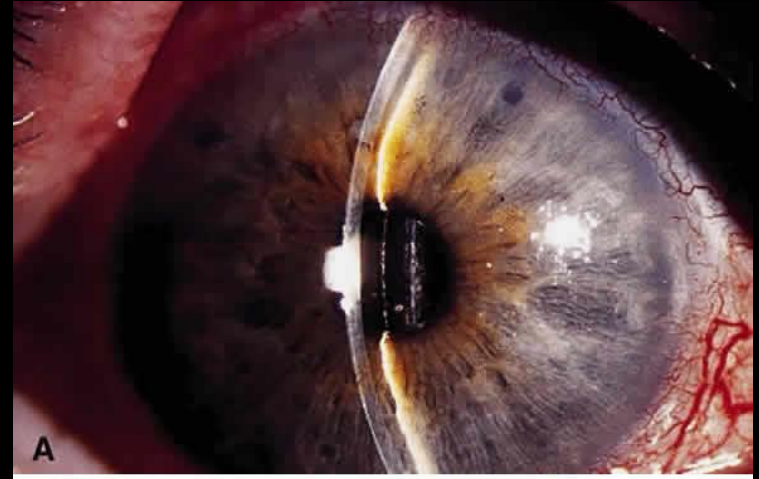
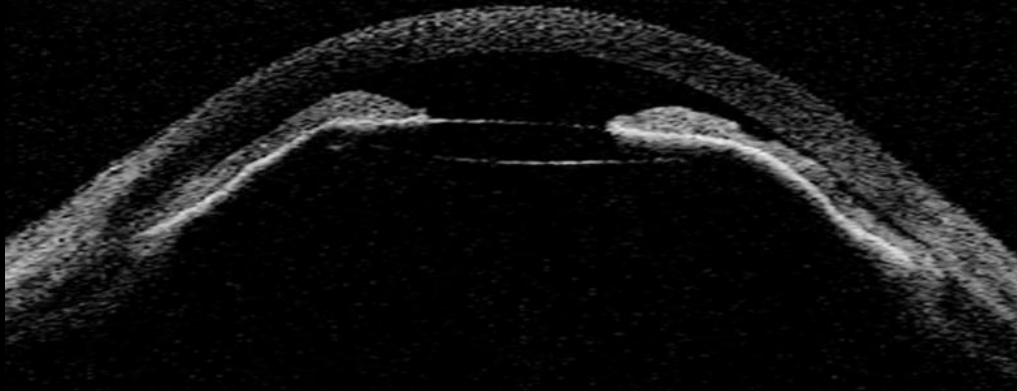
# **Aqueous misdirection (blocco cilio-lenticolare, gl. maligno)**

In occhi con ridotta lunghezza assiale (<21 mm)

Ipermetropia elevata (>6D)

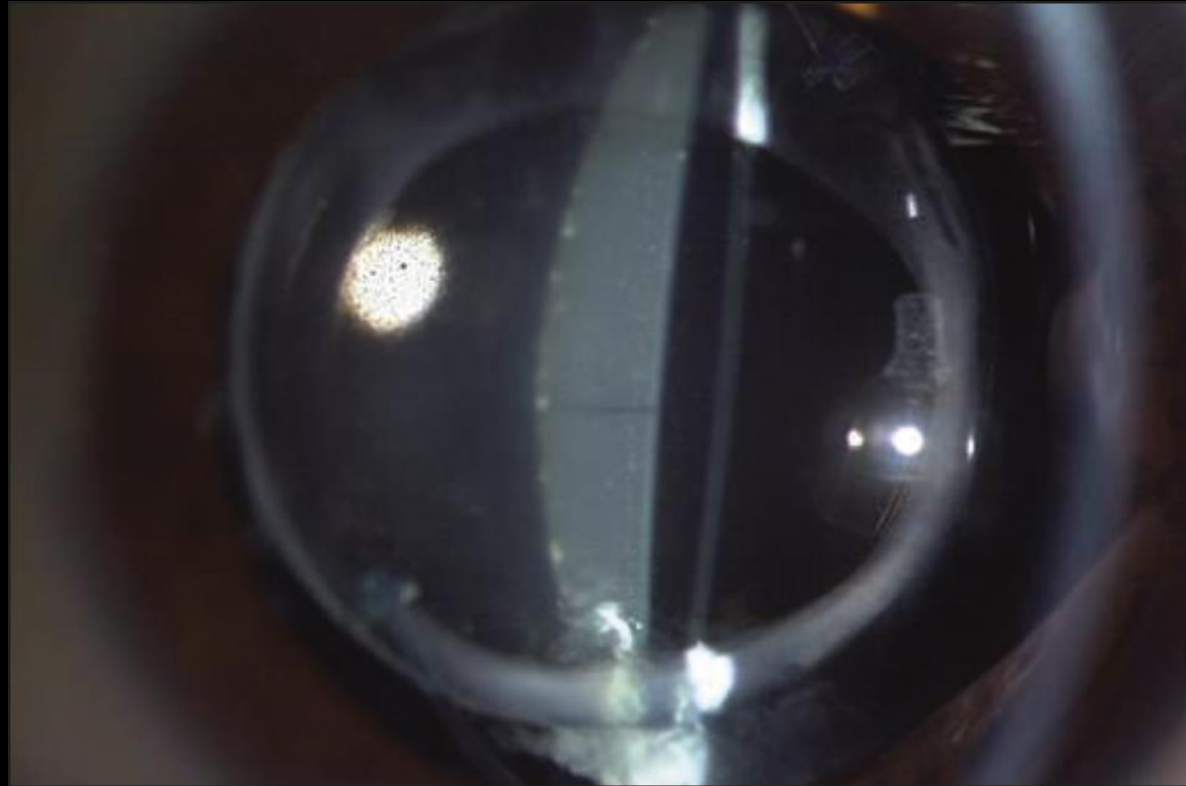
Dopo chirurgia glaucoma o

in pseudofachico



## **CAPSULOTOMIA**

# GLAUCOMA DA CAPSULAR BLOCK SYNDROME



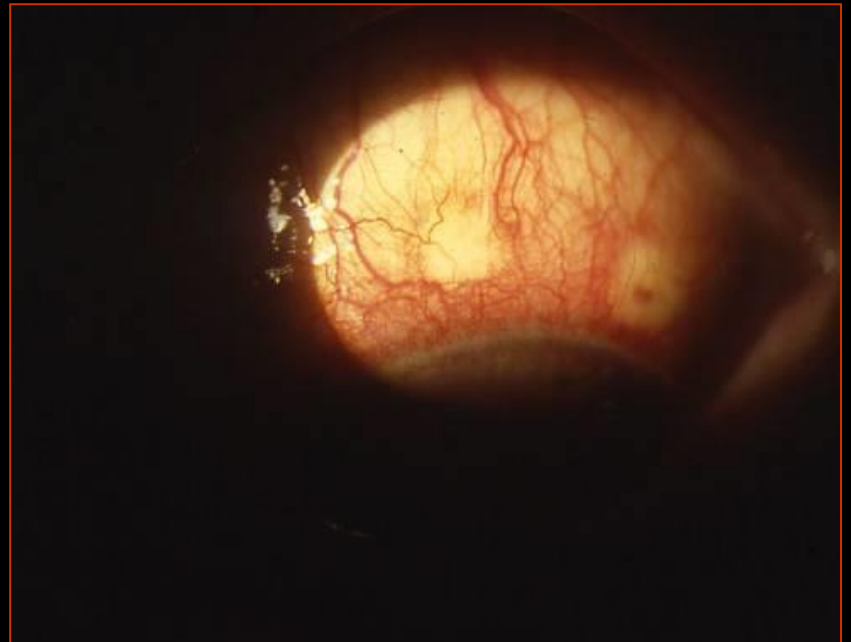
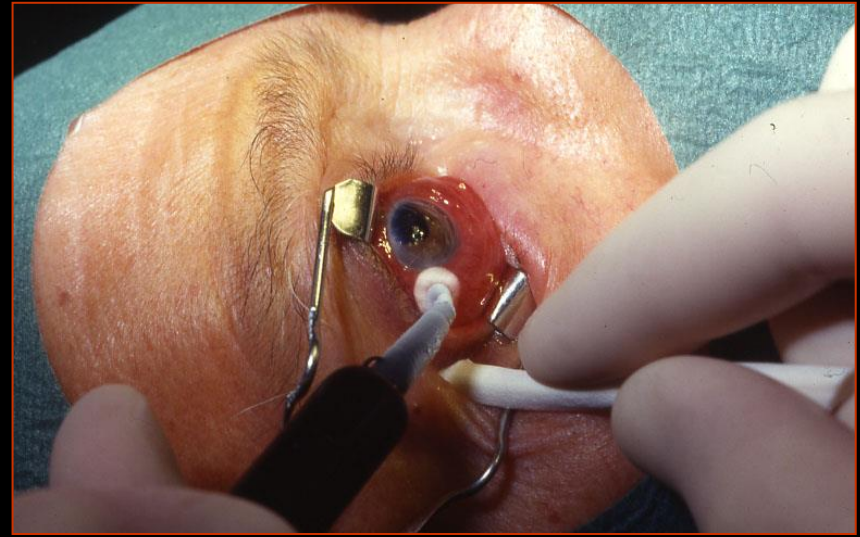
**CAPSULOTOMIA  
(SOTTO TERAPIA IPOTONIZZANTE)**

# CICLOABLAZIONE

GLAUCOMA REFRATTARIO  
VISUS RIDOTTO

CICLIOCRIO

CICLODIODO



Technique: [II,D]

Transscleral cyclophotocoagulation with diode laser and G probe	
Anesthesia	Retrobulbar or peribulbar injection of a 50:50 mixture of 2% lidocaine and 0.75% bupivacaine with hyaluronidase
G probe positioning	The G probe footplate is placed on the conjunctiva with the short side adjacent to the limbus, which positions the fiberoptic tip 1.2 mm behind the limbus. The ciliary body should be identified with transillumination as its position may vary and the placement of the G probe is adjusted accordingly <sup>173</sup>
Scleral transillumination	The fibre optic light source is directed approx. 4 mm posterior to corneoscleral limbus to identify ciliary body by transillumination. The dark demarcation line indicates the anterior margin of the ciliary body
Settings	Recommended setting: duration of 2 sec., from 1500 mW for dark to 2000 mW for light-coloured irides and increase the energy until an audible »pop« is heard indicating tissue disruption. If a »pop« sound occurs during two sequential subsequent laser applications, the power is reduced by 150 mW and treatment completed at this power <sup>174</sup>
Applications	10-20 over 180°, energy 5-6 J per pulse, total treatment per session up to 270° of circumference avoiding 3 and 9 o'clock positions (to avoid long posterior ciliary nerves). Some surgeons prefer to use low energy and more applications. Retreatments are often needed, but the incidence of severe complications is low [II,D].

# QUANDO LA PARACHIRURGIA ?

## GLAUCOMA ANGOLO APERTO

### TERAPIA DI SECONDO LIVELLO

SE TERAPIA MEDICA INSUFFICIENTE  
NON IN PZ. DANNO AVANZATO / GIOVANI

## GLAUCOMA ANGOLO CHIUSO

### TERAPIA DI PRIMO LIVELLO

IN SEGUITO TERAPIA MEDICA / CHIRURGIA



November 2014 • June 2015

# European Frontiers in Ocular Pharmacology

Tenth Series

Aula Magna del Rettorato  
Palazzo dell'Università  
Piazza Università, 2 - Catania

21<sup>st</sup> May 2015

17:15-17:30

Introduction

17:30-18:30

Reducing medical error and improving  
patient safety: a global initiative

Richard L. Abbott (USA)

18:30-19:30

Meet the expert session

CON IL CONTRIBUTO DEI CONDIRETTORI DI



Under the auspices of the  
ITALIAN SOCIETY OF PHARMACOLOGY

Scientific secretariat

Claudio Bocchi  
Caterina Spigolon

Organized by

Pharm Group  
Società Italiana



**Richard L. Abbott**