

CORNEAL PERFORATION: CLINICAL OVERVIEW AND THERAPEUTIC APPROACH

*A. Conigliello, A. Alberghina, E. Altobelli, D.
Salanitro, D. Scollo e A. Longo*

*Clinica Oculistica
Presidio Ospedaliero "G. Rodolico - San Marco" – Catania.
Direttore Teresio Avitabile.*

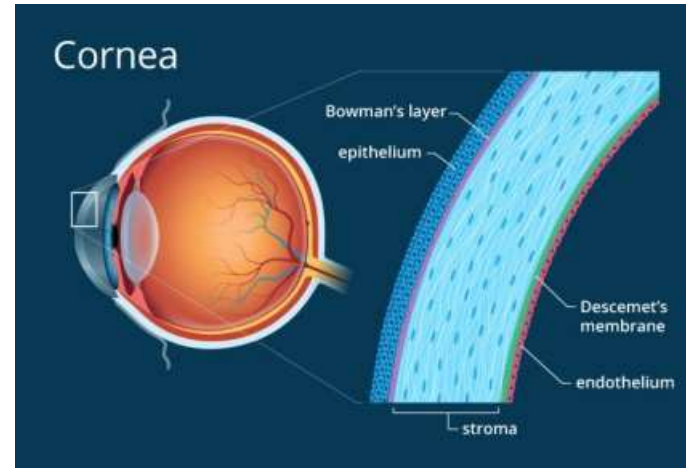


PRESIDENTE: PROF. PASQUALE ARAGONA

10-12 APRILE 2025
UNAHOTELS - NAXOS BEACH SICILIA (ME)



**Azienda Ospedaliero Universitaria Policlinico
"G.Rodolico - San Marco" - Catania**



*Corneal perforations are an **ophthalmologic emergency** that may threaten visual prognosis.*

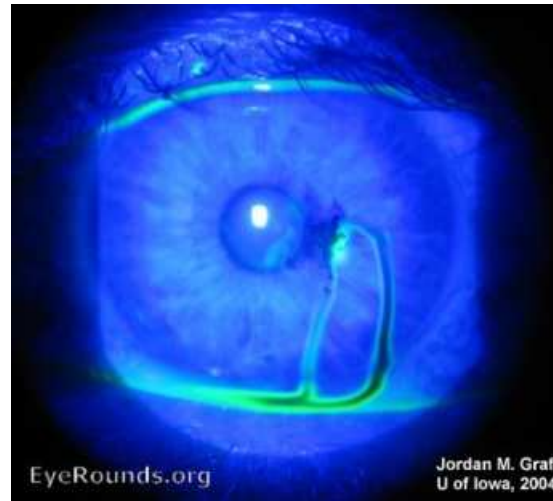
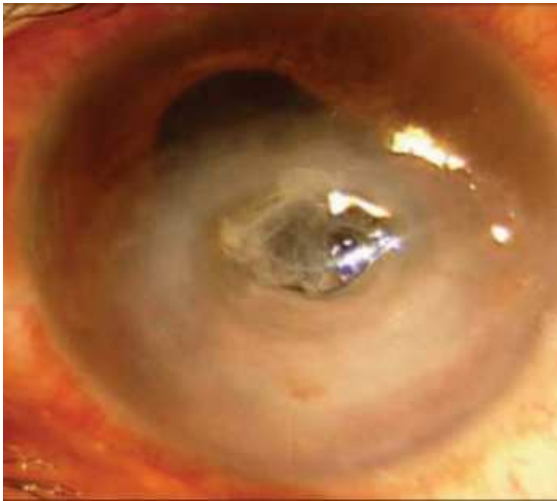
They are defined as a full-thickness defect of the cornea with communication between the anterior chamber and the external environment.

Etiology and clinical presentation

Causes include :

- *trauma,*
- *infections,*
- *autoimmune diseases.*

Clinical sign



Therapeutic approach: general principles

Immediate goal:

Restore the anatomical integrity.

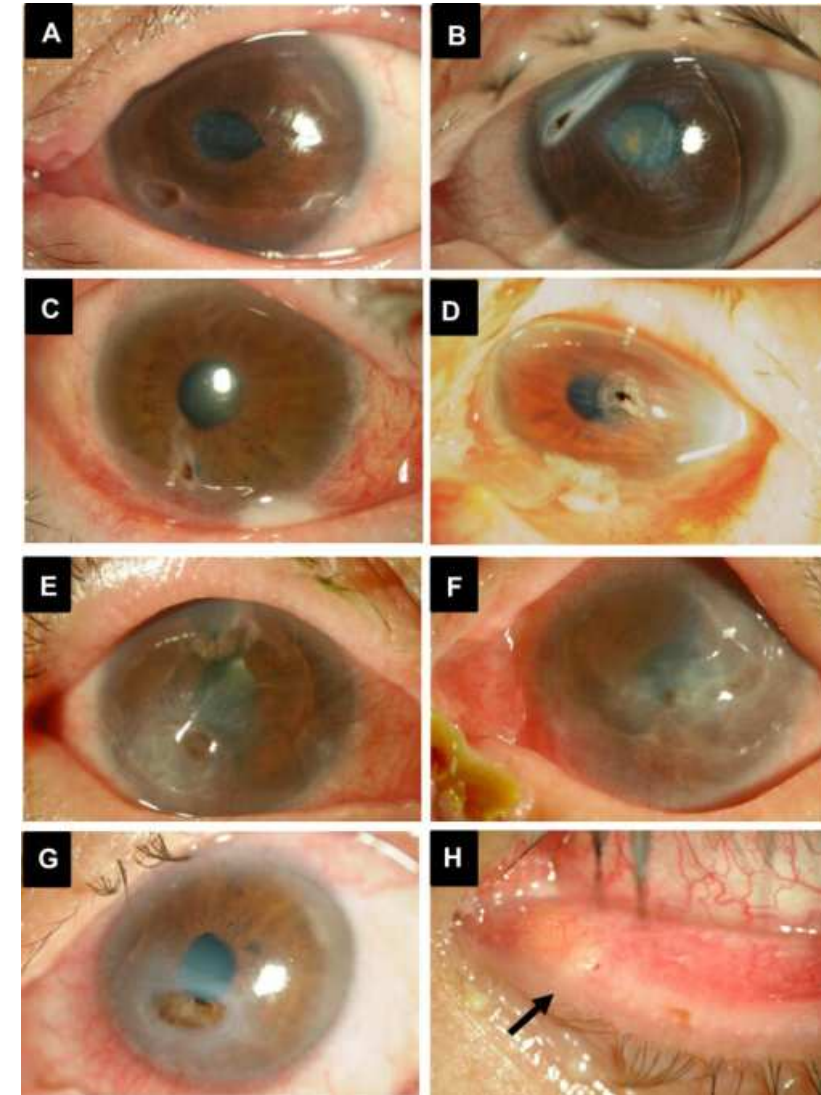
Secondary goals:

Control the underlying cause;

Preserve or restore visual function.

Management depends on multiple factors:

1. *Size of the perforation;*
2. *Location;*
3. *Etiology;*
4. *Ocular surface status and healing potential;*
5. *Systemic and local immune status;*



Management

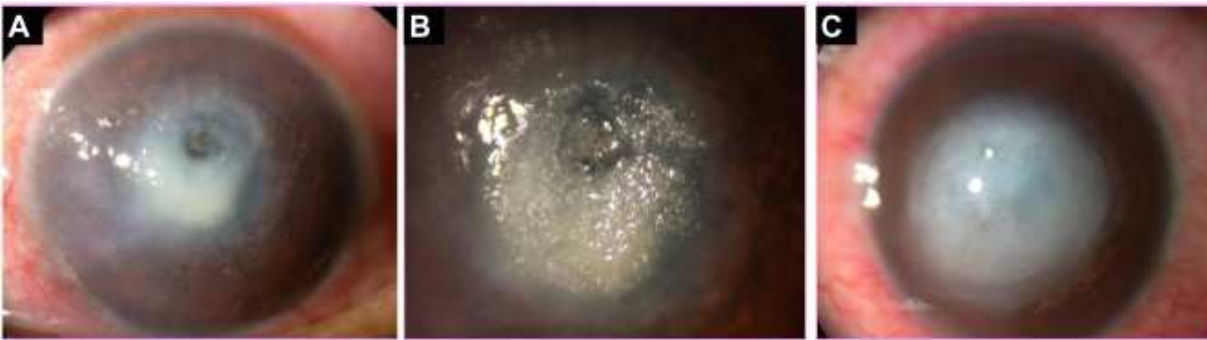
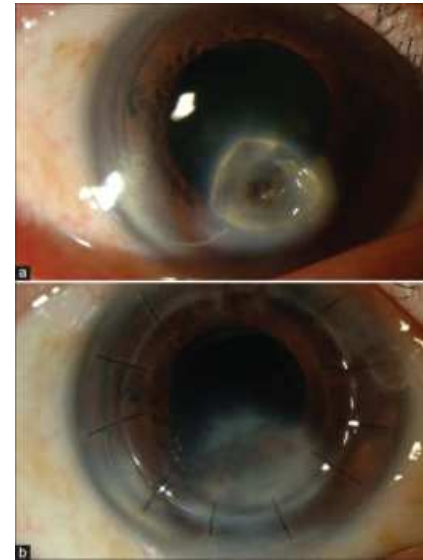
SMALL PERFORATION:

- *Therapeutic contact lenses;*
- *Cyanoacrylate glue, biological glue or keratoglue.*
 - *+ protective contact lens;*
 - *Corneal suture*
- *Topical and systemic antibiotics;*

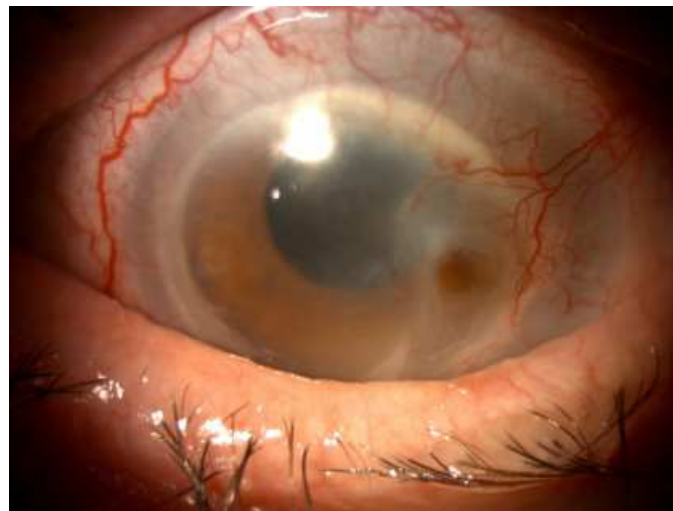
Close monitoring: surgical intervention if no improvement.

LARGE PERFORATION:

- *Congiuntival flap or amniotic membrane transplantation;*
- *Tenon's patch graft;*
- *Keratoplasty (lamellar or penetrating);*



CLINICAL STUDY



AIM OF THE STUDY

*Evaluate the clinical presentation, the treatment
and the outcomes of patients with corneal
perforation.*



MATERIALS AND METHODS

Retrospective single center study.

Included all patients with corneal perforations treated at the Eye Clinic of the University of Catania, Policlinico "G. Rodolico – San Marco" from January 2020 to december 2024.

From the clinical charts were retrieved demographics, systemic and ocular history, clinical presentation, treatment performed, outcomes and complications.

Visual acuity was assessed in decimals units. Slit lamp pictures and anterior segment OCT were taken.

Infective Perforation: *swabs with culture and antibiograms.*

Topical antibiotic treatment: *fortified tobramidine, vancomicine (50mg/mL), ceftriazone (50mg/mL), levofloxacin instilled every hour. After antibiogram, therapy was changed as per indication.*

Herpetic disease, *oral aciclovir (800 mg x 5 daily) and topical ganciclovir (TID) were used.*

Small perforation (<2 mm), *without iris adherence, cyanoacrylate glue+ contact lens.*

Corneal suture (*topical or general anesthesia*): *interrupted 10-0 nylon stitches.*

Penetrating keratoplasty

Parameters evaluated:

- *Baseline and final visual acuity*
- *Rate of Penetrating Keratoplasty (PK)*
 - *Number of procedures*

RESULTS

TRAUMATIC PERFORATION

16 patients (53.3%), (12 m – 4 f) mean age 56 ± 23 years (range 20-91).

- 4 (Small perforations): medical therapy + contact lens;
- 1 Cyanoacrylate glue;
- 6 Corneal suture;
- 1 Corneal suture + cataract surgery;
- 3 PK;
- 1 PK + cataract surgery;

Sex	Age	Baseline BCVA	Cause	Treatment	Final BCVA
M	82	3.0	Trauma	PK	7.0
M	57	10.0	Trauma	Medical tx + contact lens	10.0
M	80	5.0	Trauma	Cyanoacrylate glue	7.0
F	64	5.0	Trauma	Medical tx + contact lens	8.0
F	91	2.0	Trauma	PK+cataract	8.0
M	44	2.0	Trauma	Wound suture	7.0
M	87	3.0	Trauma	Wound suture	9.0
M	55	7.0	Trauma	Wound suture	10.0
M	30	6.0	Trauma	corneal suture + iris prolapse reductions	9.0
M	26	3.0	Trauma	corneal suture + iris prolapse reductions + cataract surgery	8.0
M	36	2.0	Trauma	Wound suture + iris prolapse reductions	8.0
M	81	1.0	Trauma	Wound suture	9.0
F	59	0.2	Trauma	PK	7.0
F	47	3.0	Trauma	Medical tx + contact lens	8.0
M	39	9.0	Trauma	Medical tx + contact lens	10.0
M	20	1.0	Trauma	PK	7.0

Overall: 12 of 16 not received a PK (75%)



RESULTS

NON-TRAUMATIC PERFORATION

14 patients (46.7%), (9 m - 5 f); mean age 73 ± 16 years (range 36-87).

8 bacterial keratitis, 1 HSV keratitis, 3 had previous PK, 2 ocular pemphigoid.

4 medical therapy + contact lens application;

1 corneal patch;

7 PK and 2 PK with cataract surgery.

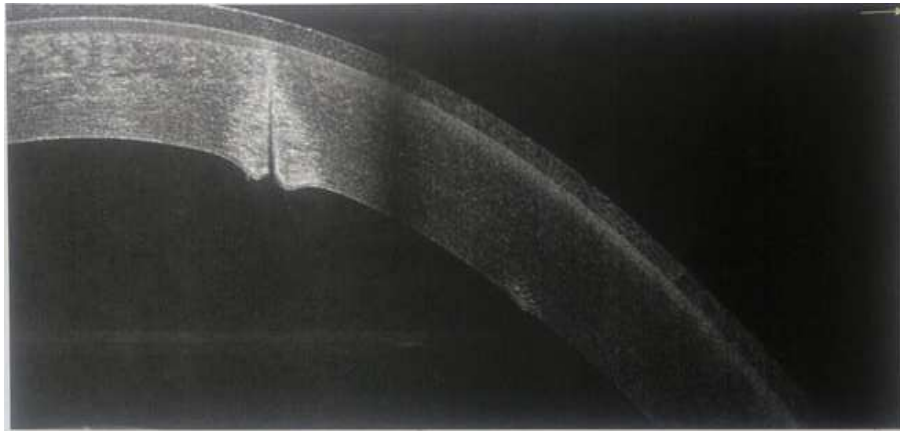
Sex	Age	Baseline BCVA	Cause	Treatment	Final BCVA
M	63	1	Post-DSAEK	Glue + PK	8
F	36	2	Ocular Pemphigoid	Medical tx + contact lens	9
M	78	1	Post-PK	Medical tx + contact lens	7
M	70	0.4	Infective keratitis	Corneal Patch	6
F	82	0.6	Post-PK	Medical tx + contact lens	7
M	84	1	Infective keratitis	PK	9
F	78	0.6	Infective keratitis	PK	7
F	68	0.2	Corneal melting	PK	8
F	87	0.6	Infective keratitis	Medical tx + contact lens	6
M	83	2	Ocular Pemphigoid	PK	7
M	86	1	Infective keratitis	PK	8
M	83	1	Infective keratitis	PK+cataract surgery	6
M	82	4	HSV	PK+cataract surgery	8
M	40	2	Infective keratitis	PK	10

In this group 9 of 14 received a PK (64.3%)

Traumatic vs nontraumatic: better baseline ($p=0.018$) and final ($p=0.032$) visual acuity.

Lower number of procedures, lower rate of PK ($p=0.002$)

Medical Therapy and LAC



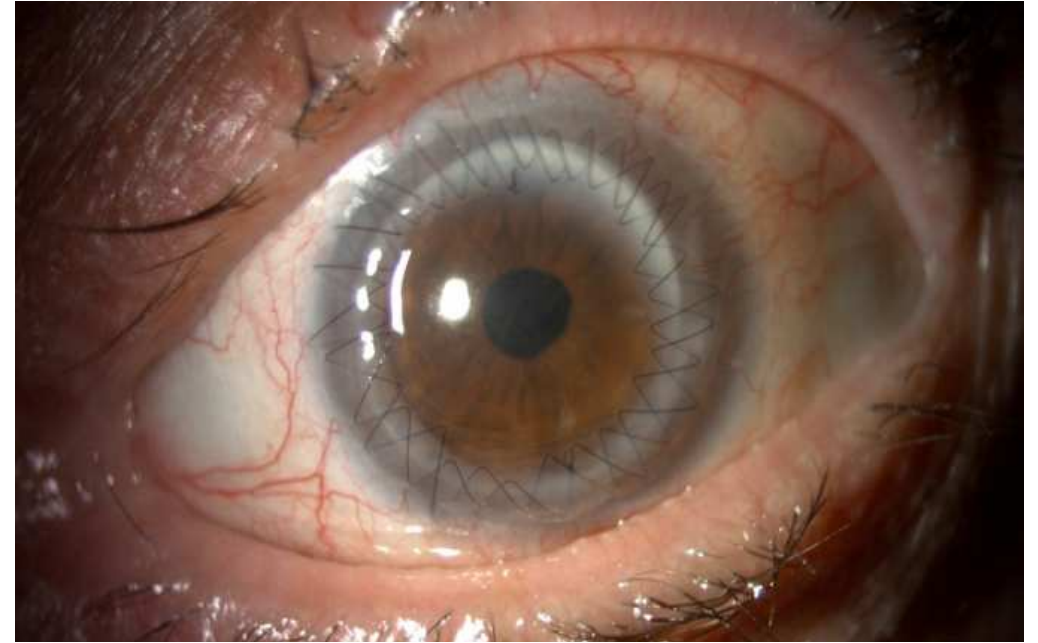
Corneal Suture + cataract surgery



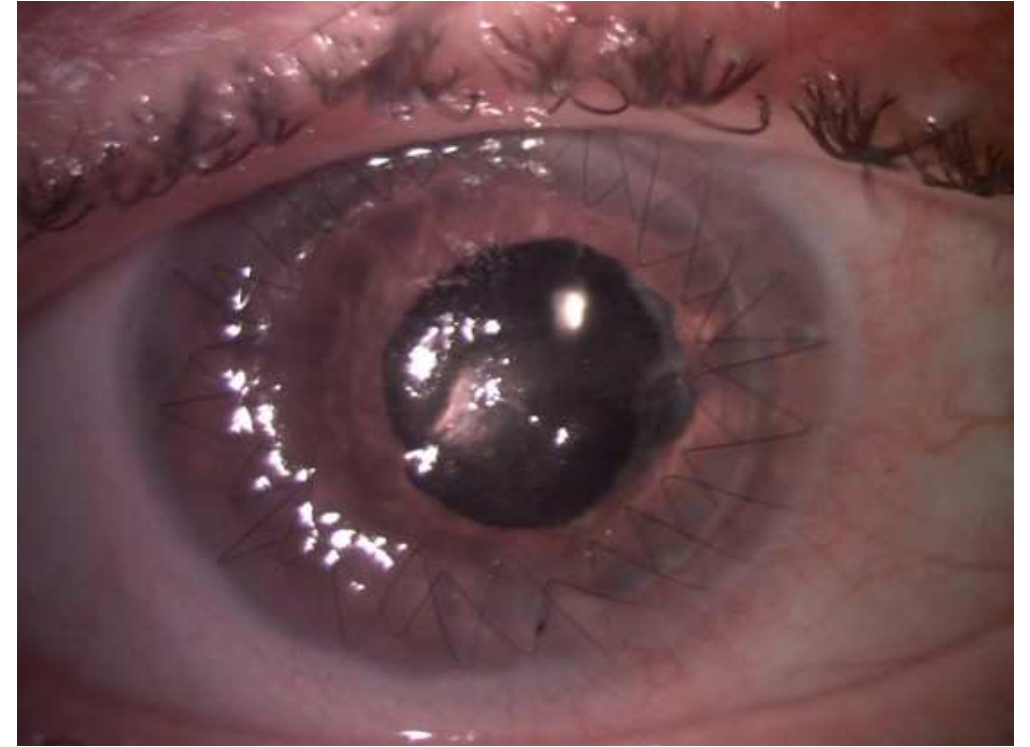
Cyanoacrylate glue



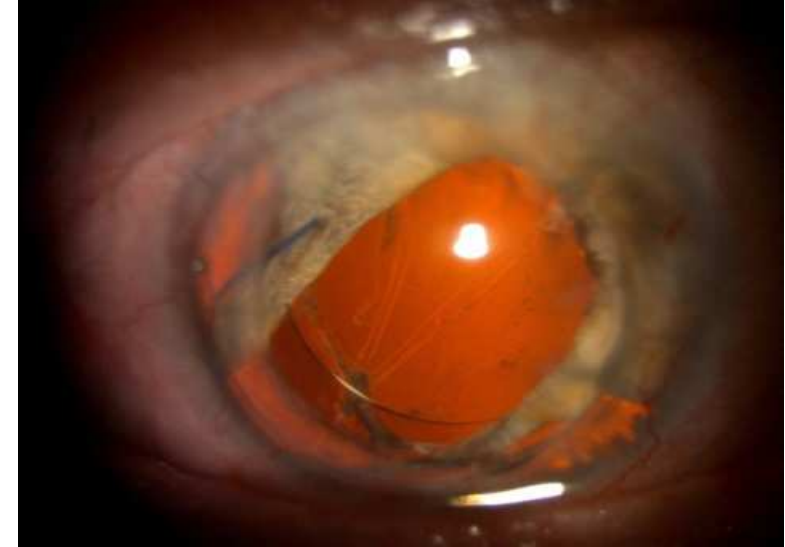
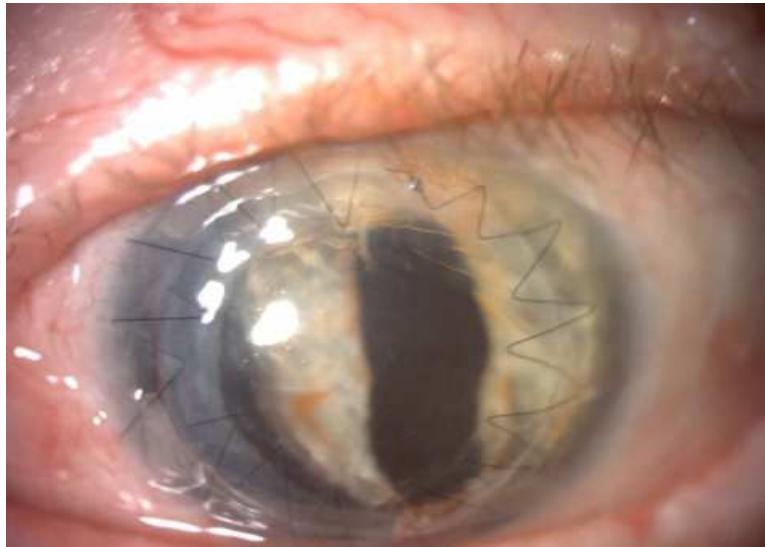
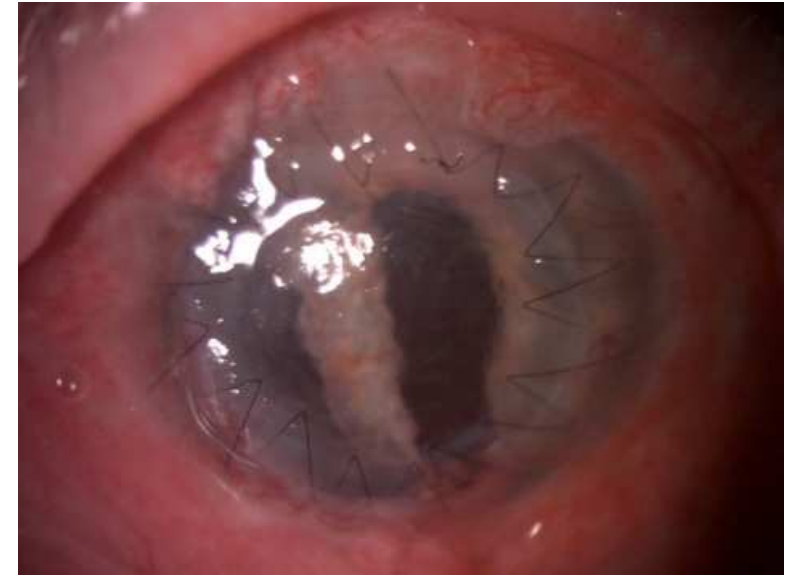
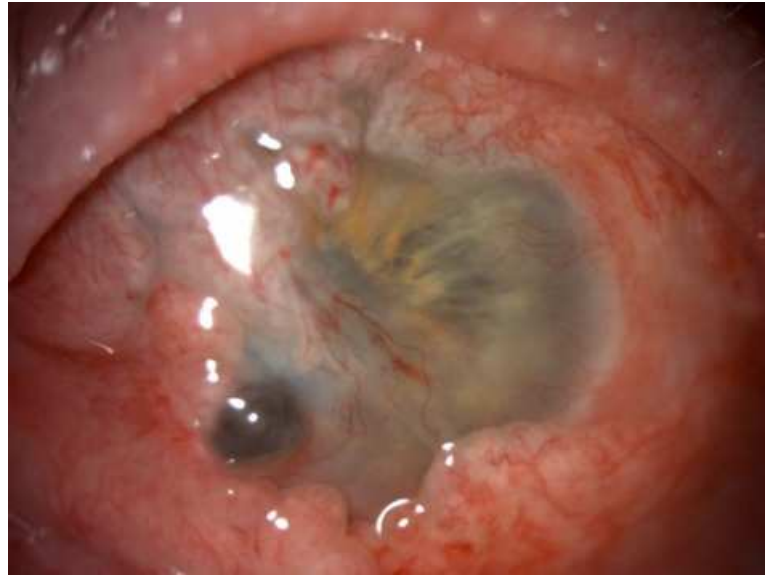
PK and Cataract surgery



Corneal Patch Graft and PK



Congiuntival Flap and Penetrating Keratoplasty



DISCUSSION

Corneal perforation is an emergency and requires an immediate (available) treatment, followed by other therapies

- **Cyanoacrylate glue:** *Small tissue loss (<2mm, or larger with sloping edges): success in 73% at 10 days, but majority of the eyes required a tectonic surgical intervention within 6 months. (Singh et al 2020).*
- **Eyes with nontraumatic perforations** *(underlying corneal disease) have more severe features and larger perforations.*
- **Amniotic membrane:** *Bigger perforations, ocular surface disease. Cons: availability, cost, poor tectonic support, infection*
- **Tenon patch grafts:** *Small perforations, (+ glue). Cons: opaqueness, poor tectonic support, infection (Singhal et al 2021)*
- **Penetrating keratoplasty (PK)** *the only treatment that allows to remove the whole infected and inflamed tissue, but has an high risk of rejections, opacifications of the graft, and need of a further corneal surgery. Besides, the availability of corneal tissue is often a limiting factor in managing emergencies. PK has an increased risk of failure in eyes with severe dry eye, and autoimmune disease, such as rheumatoid arthritis and ocular pemphigoid.*



CONCLUSIONS

*Corneal perforations have different causes and lead to different level of tissue damage. The treatment is challenging and requires clinical expertise and mastering of many surgical techniques. **Antibiotic treatment is always required.***

Consideration of concomitant systemic disease, preexisting eye disease, concurrent corneal damage, and the amount of corneal tissue loss should be made in choosing the treatment of this emergency.

Further corneal surgery can be required in order to improve vision when ocular condition (infection and inflammation) have improved.

*Indian J Ophthalmol 2019 Dec 19;68(1):7-14.
doi: 10.4103/ijo.IJO_1151_19*