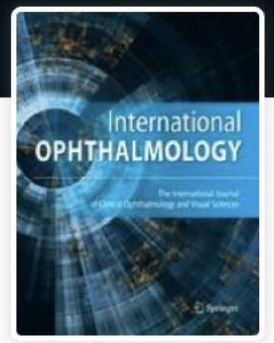
10th Evolving Practice Of Ophthalmology Middle East Conference
EPOMEC
EXPANDING VISION

Corneal cross-linking guards against infectious keratitis an experimental model

Ayah Marrie, MD

Ass. Professor, Cairo University



International Ophthalmology
The International Journal of Clinical Ophthalmology and Visual Sciences

Corneal cross-linking guards against infectious keratitis: an experimental model

Ayah Marrie [1], Abdussalam M Abdullatif [1], Sherief Gamal El Dine [1], Rania Yehia [2], Randa Saied [3], Doaa Ahmed Tolba [4]

Affiliations + expand

PMID: 36255611 DOI: 10.1007/s10792-022-02522-z

Background

- *PACK-CXL is now wildly used in treating corneal infections.*

Mechanism:

- *It inhibits corneal melting by increasing the stroma resistance.*

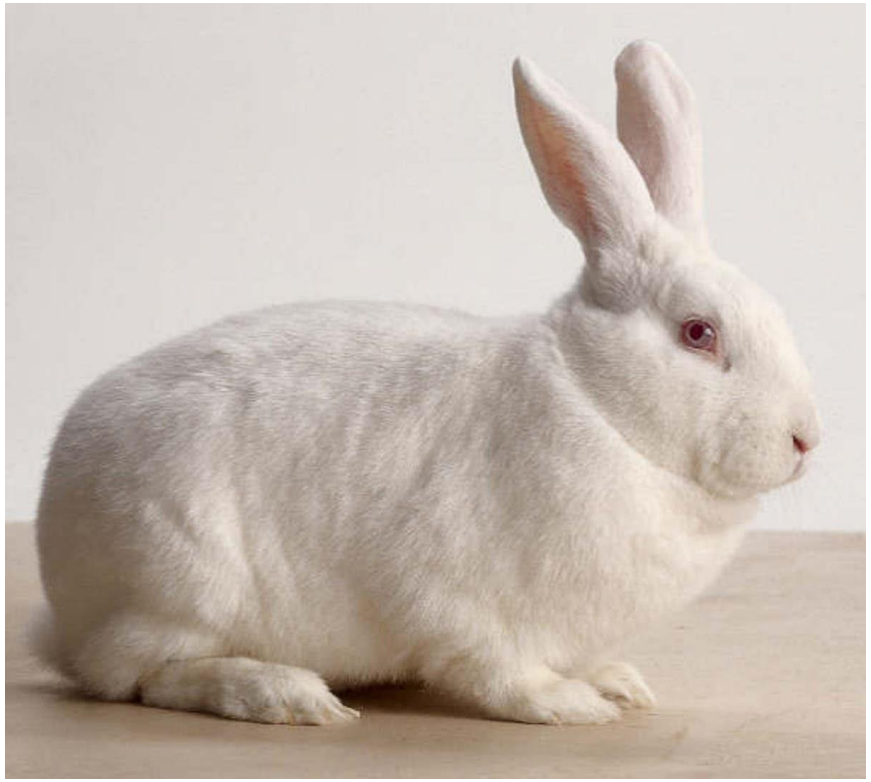
- *Besides the microbicidal effect of photoactivated riboflavin.*

Aim of our study

Is to prove the mechanical role of CXL if it guards against the progression of IK and stops organism penetration through increasing corneal rigidity and resistance to proteolytic enzymatic digestion of collagen fibers even in the absence of photo-activated riboflavin microbicidal role.

Methods:

- The study was held at kasr AlAiny animal house
- 10 healthy New Zealand rabbits
- No eye infection



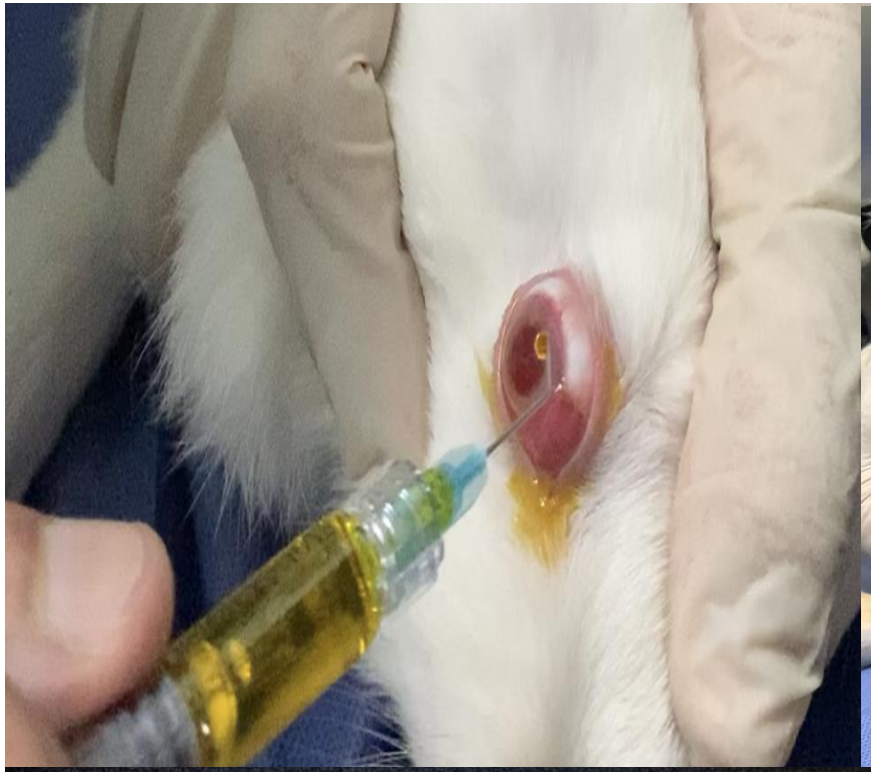
قصر العينى
KASR ALAINY
قسم طب العين وجراحتها – جامعة القاهرة
Ophthalmology Department - Cairo University

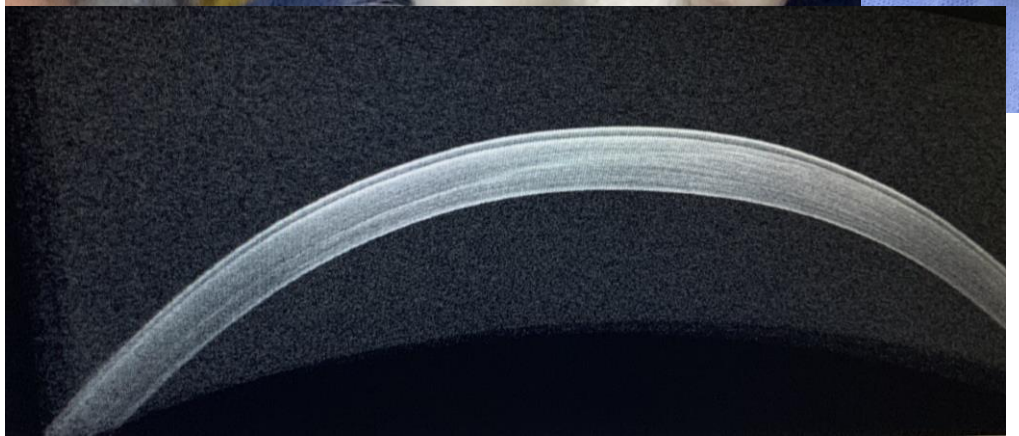
Methods:

Right eye was CXL

Ant seg OCT after 3 weeks

Left eye no CXL (control)





Methods:

- After 3 weeks we induced infective keratitis
- 5 rabbits with MRSA
- 5 rabbits with pseudomonas

- The progression of corneal infection was documented:
- Clinically over 3 days
- Then pathologically

Methods:

Clinical documentation

- Scoring system described by Hobden et al.
- Scores from 0 – 4

  0 is absent and 4 is severe
- On 7 parameters:

  conjunctival injection, conjunctival chemosis, iritis (cell and flare),
  fibrin in the anterior chamber, hypopyon, stromal infiltrate, and stromal edema.

By adding numbers, we get a score out of 28

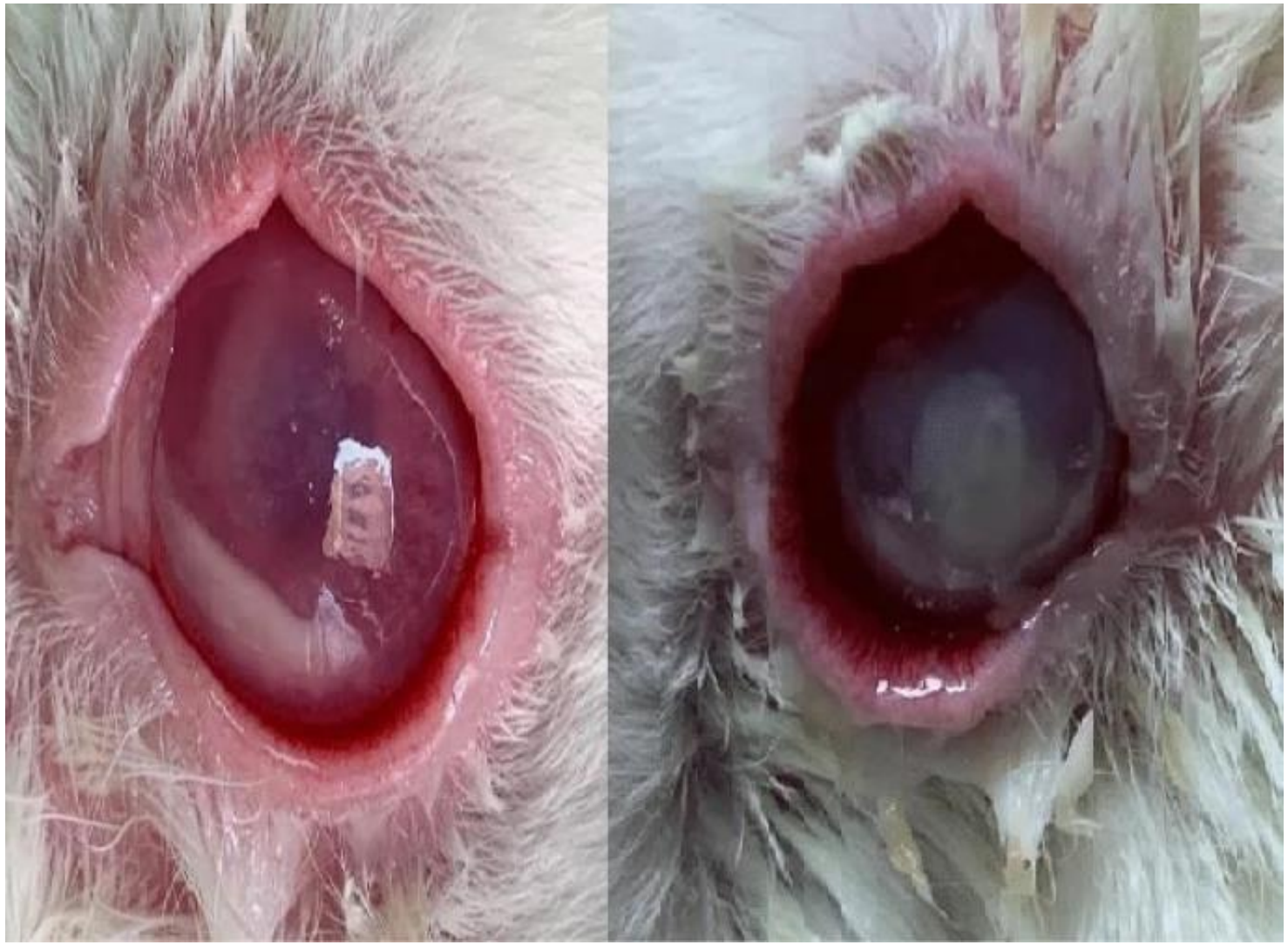
The higher the worse

Results:

Overall look:

- Both groups started signs of infective keratitis from day one that increased over the second and third day

- The signs were more severe in the non CXL –ed group



Results:

Group	Post-infection slit lamp examination score				
	24 h	36 h	48 h	60 h	72 h
Pseudomonas aeruginosa (group 1A)	3.2 ± 0.45	6 ± 0.70	6.8 ± 0.83	8 ± 1.00	9 ± 1.41
Staph aureus (group 1B)	3 ± 0.70	5.8 ± 0.83	6.4 ± 0.54	7.4 ± 0.54	8.8 ± 0.83
Control (group 2)	7.6 ± 1.14	14 ± 3.39	18 ± 2.23	22.4 ± 2.30	27.6 ± 0.54

Better score (lower number) in the CXL group than the non- CXL group

Methods:

Pathological documentation:

- *Specimens were stained with hematoxylin and eosin*

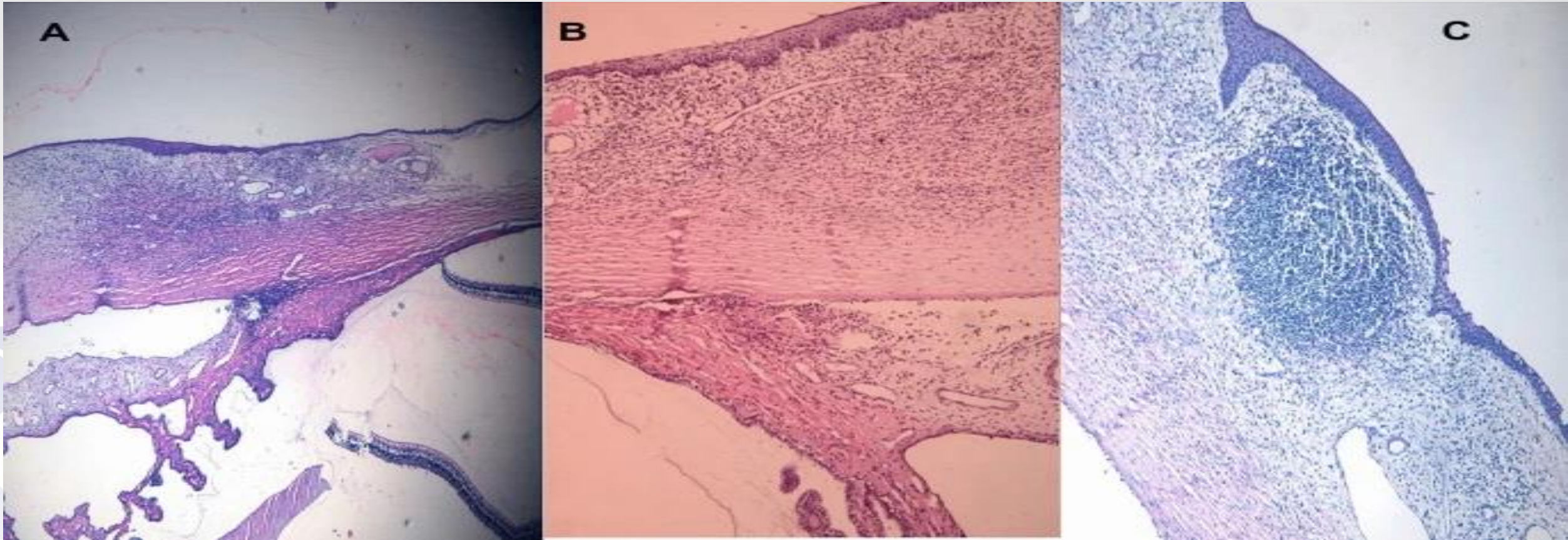
- We documented:

The extent of inflammation, epithelial changes, ulceration, organism penetration and the thickness of corneal stromal affection.

Pathologically:

CXL group

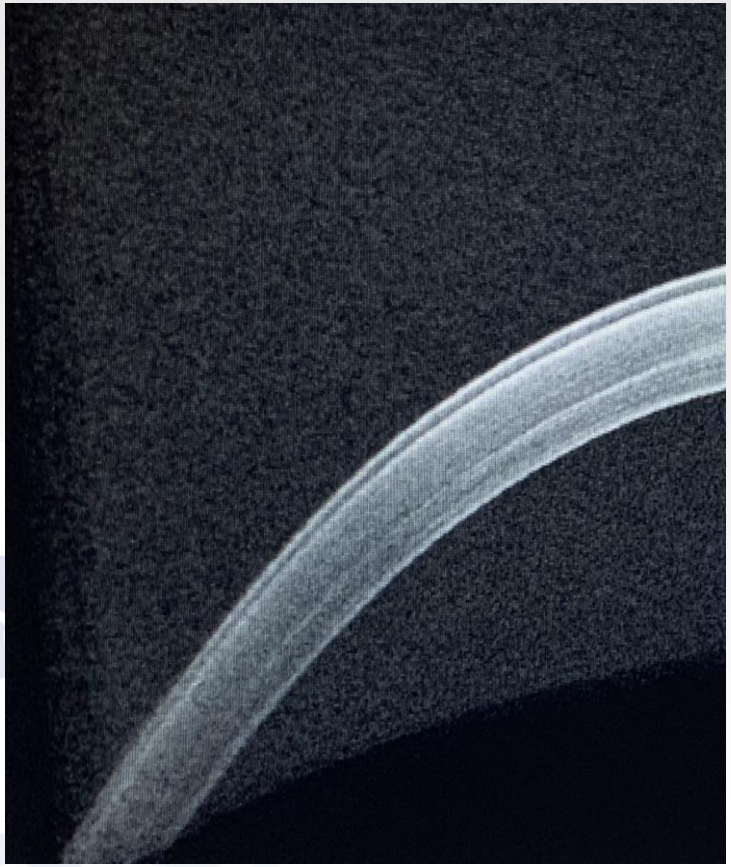
CXL group: infiltration was confined to the anterior stroma, intact epithelium
Type of cells denoting healing
Minimal affection of iris and ciliary processes

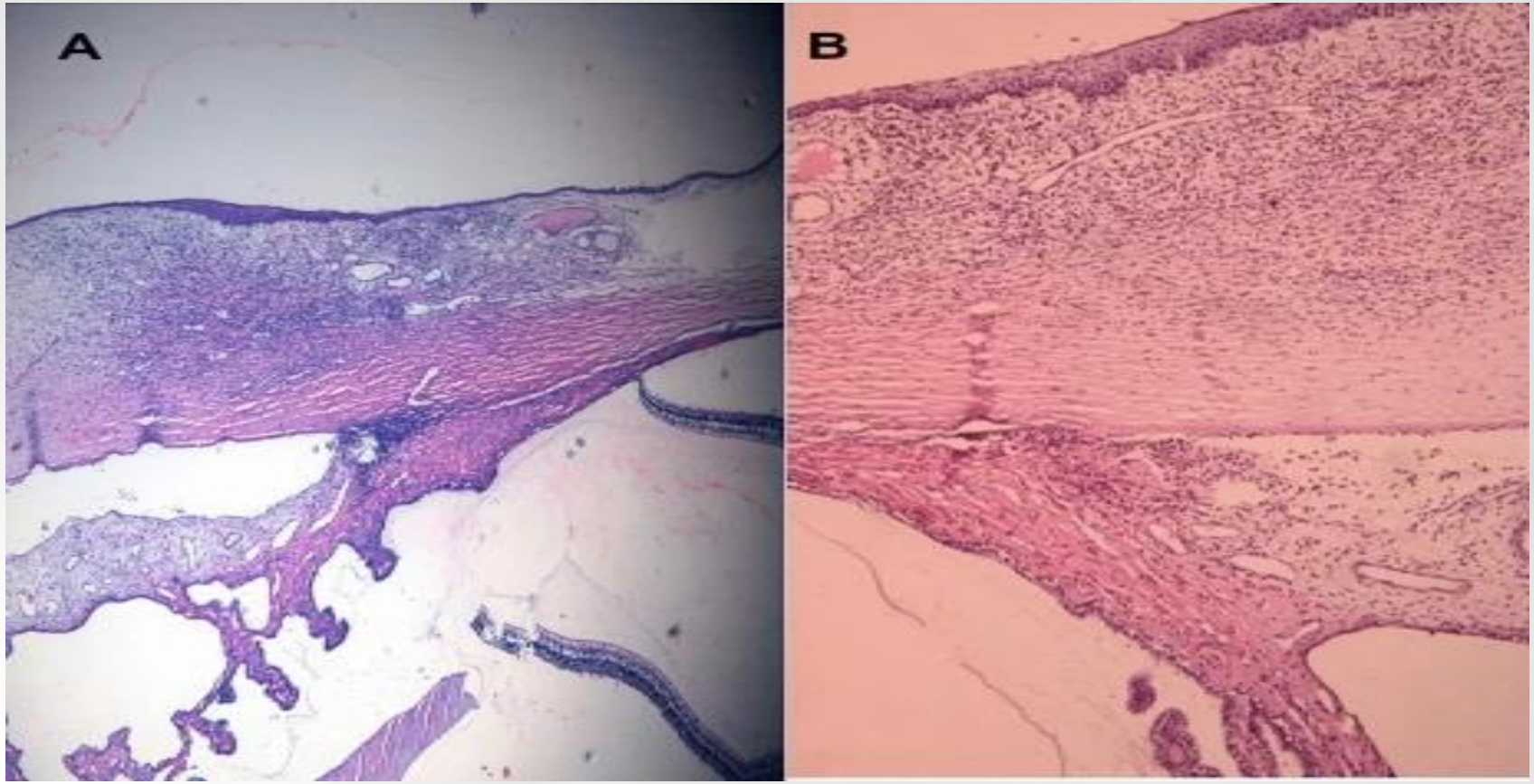


Pathologically:

CXL group

- As if infection stops at the demarcation line

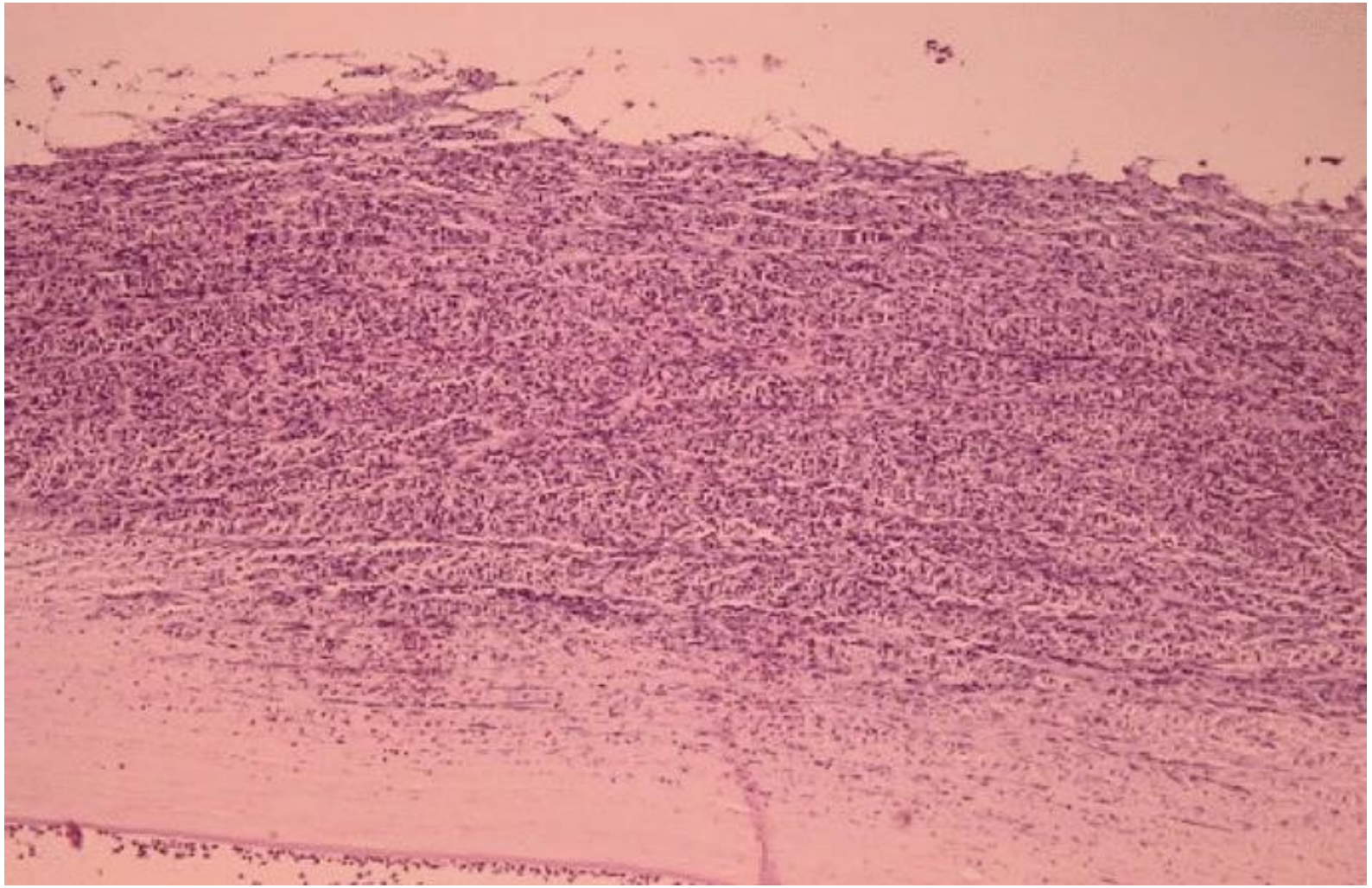




Pathologically:

Control group: Non- CXL group

- Marked corneal abrasions and erosions
- Dense inflammatory infiltrates digesting the basement membrane, invading most of the stromal depth more than 75% of the specimens
- Lymphocytic aggregation reaching the anterior chamber.



Conclusion

PACK-CXL provides infection localization through increasing the corneal rigidity and resistance to enzymatic digestion,

even in the absence of the riboflavin microbicidal role.

So, early PACK-CXL is worth to be considered in the IK treatment algorithm.

Thank you