

Management of corneal graft necrosis in Boston KPro type 1



Our experience at Centro de Oftalmología Barraquer

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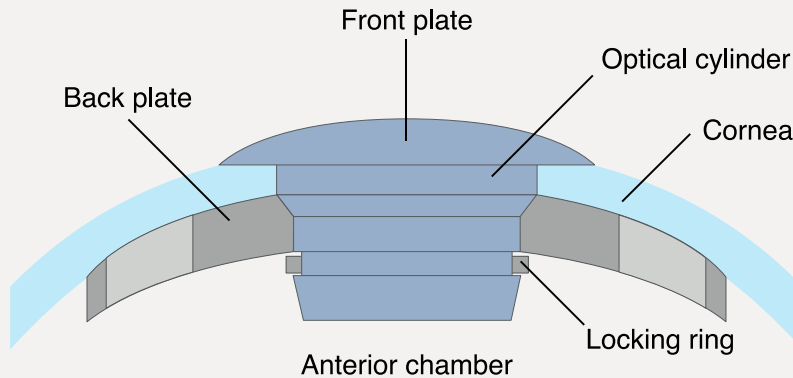


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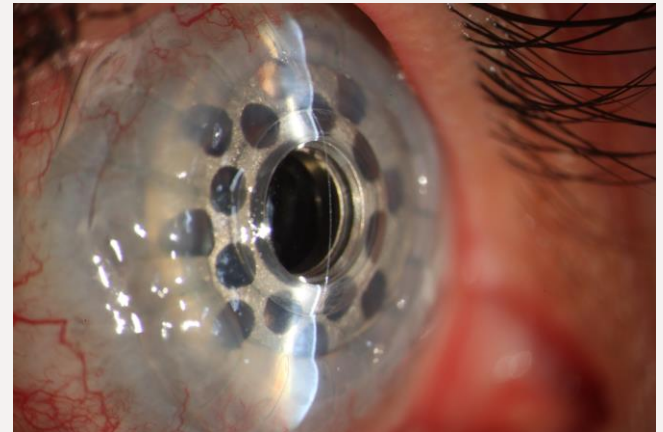
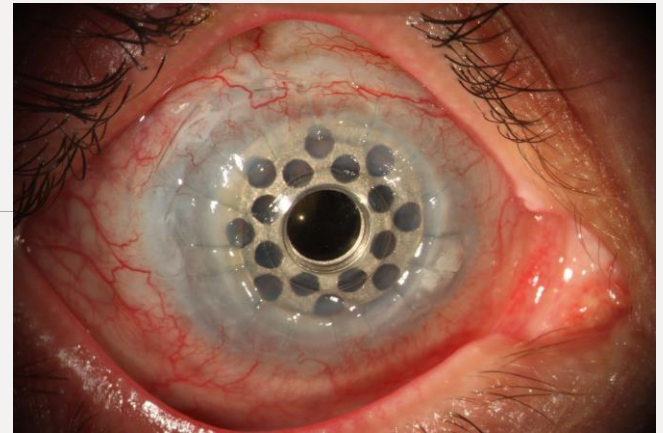
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Financial interests: None

Boston Kpro type 1

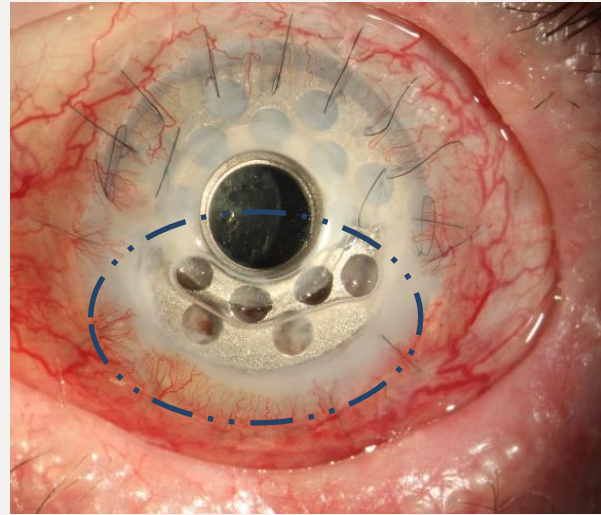
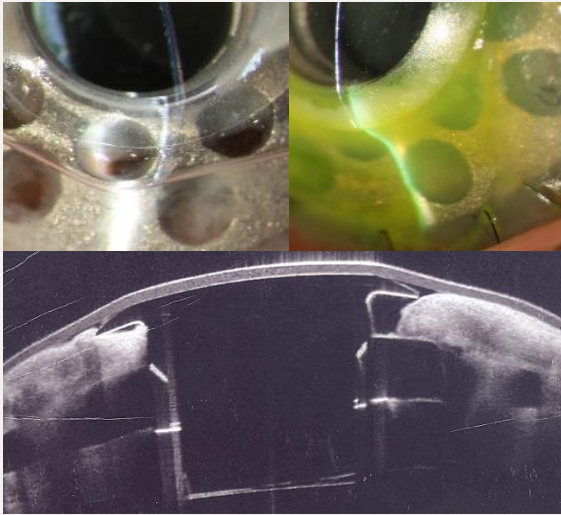


FDA approved in 1992 | CE mark in 2014
Most widely used artificial cornea worldwide



Aim of the study

To determine the **risk factors**, rate, **management**, complications and **outcomes** associated to **corneal melt** (CM), a severe complication in B-Kpro type 1



Materials & Methods

Retrospective review

130 eyes of 106 patients

May 2006 – May 2019

Average f/u: **48.4±35.6 months** [1-118]

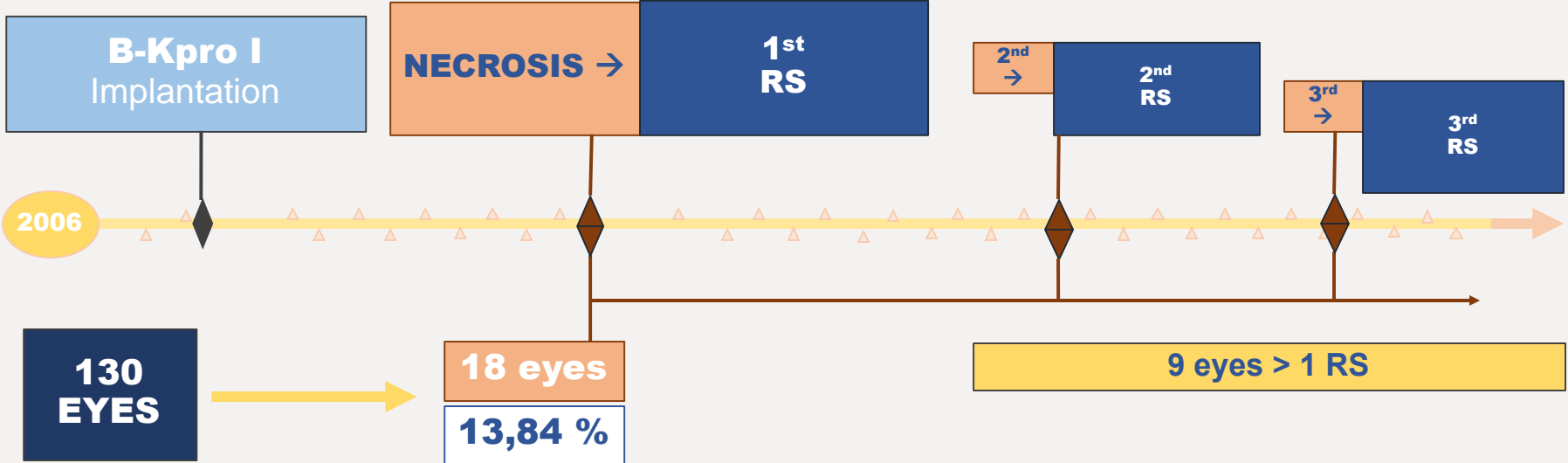
If the patient underwent bilateral B-Kpro implantation, both eyes were included.

Data collection:

- Demographics (age, gender)
- Number of previous PKs
- Previous comorbidities
- Preoperative diagnosis leading to first B-Kpro
- Anatomical retention
- BCVA (pre and post)
- BCL fit
- Postoperative complications: **PED** and **keratolysis (corneal melting)**

Preop dx	N (%)	Postop complications	N (%)
Autoimmune	34 (26.2)	RPM	45 (34.6)
Chemical/thermal burns	25 (19.2)	PS (RD, ERM, VH...)	44 (33.9)
Leukoma	15 (11.5)	Glaucoma	41 (31.5)
PBK	13 (10)	Infectious keratitis	8 (6.2)
AS dysgenesis/hypoplasia	12 (9.2)	Endophthalmitis	4 (3.1)
Trauma	8 (6.2)	Extrusion	7 (5.4)
Corneal ectasia	6 (4.6)	Aesthetic/non-visual	11 (8.5)
Congenital opacity	4 (3)		
Corneal dystrophy	4 (3)		
Neurotrophic keratopathy	4 (3)	No complications	36 (27.7)
Trachoma	2 (1.5)	1 complication	54 (41.5)
CL-induced LSCD	2 (1.5)	>1 complications	40 (30.8)
Congenital glaucoma	1 (0.8)		

Average time to 1st RS: 27.3 months [2-101]



Average follow-up time:
48.4 months [5-118]

Indications for deciding the surgical technique

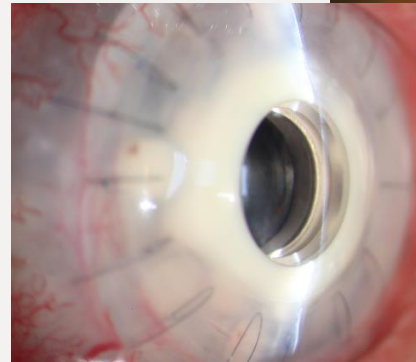
Extension of the thinning (number of **quadrants** affected)

Presence of **extrusion**

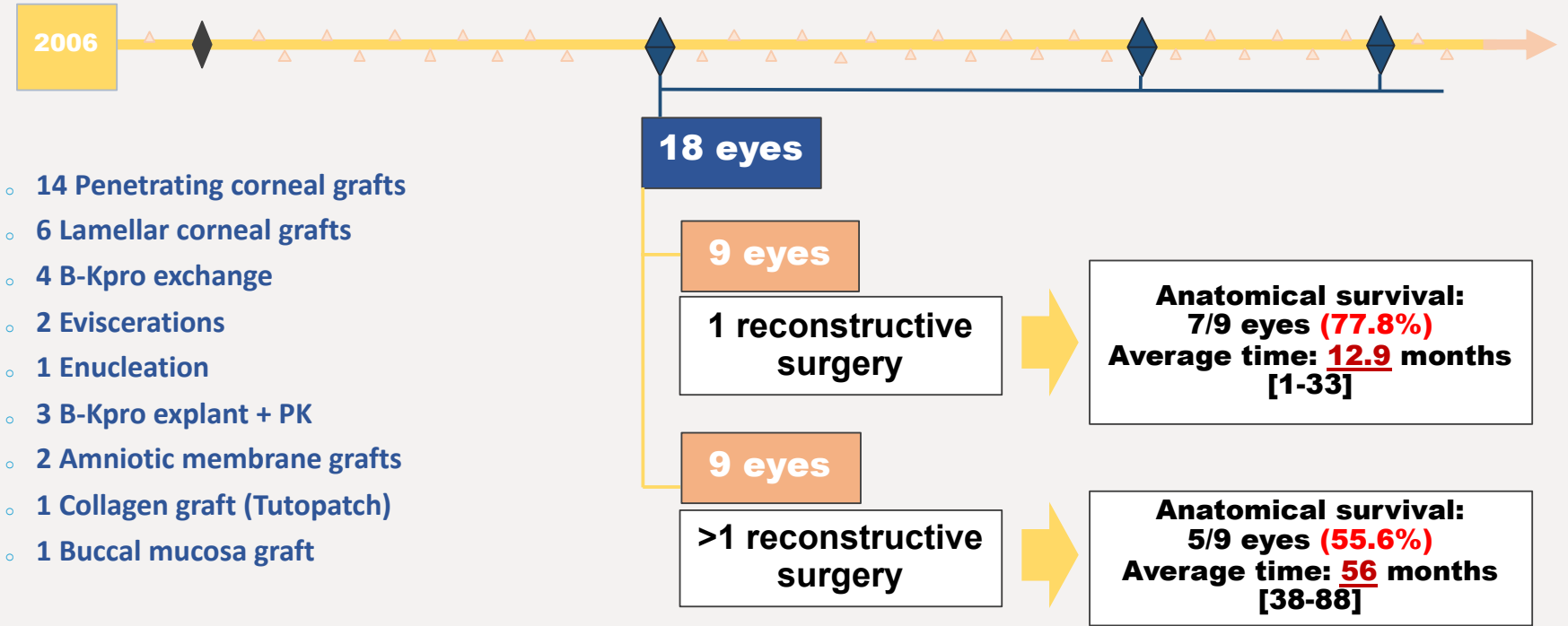
Number of **previous episodes** of CM

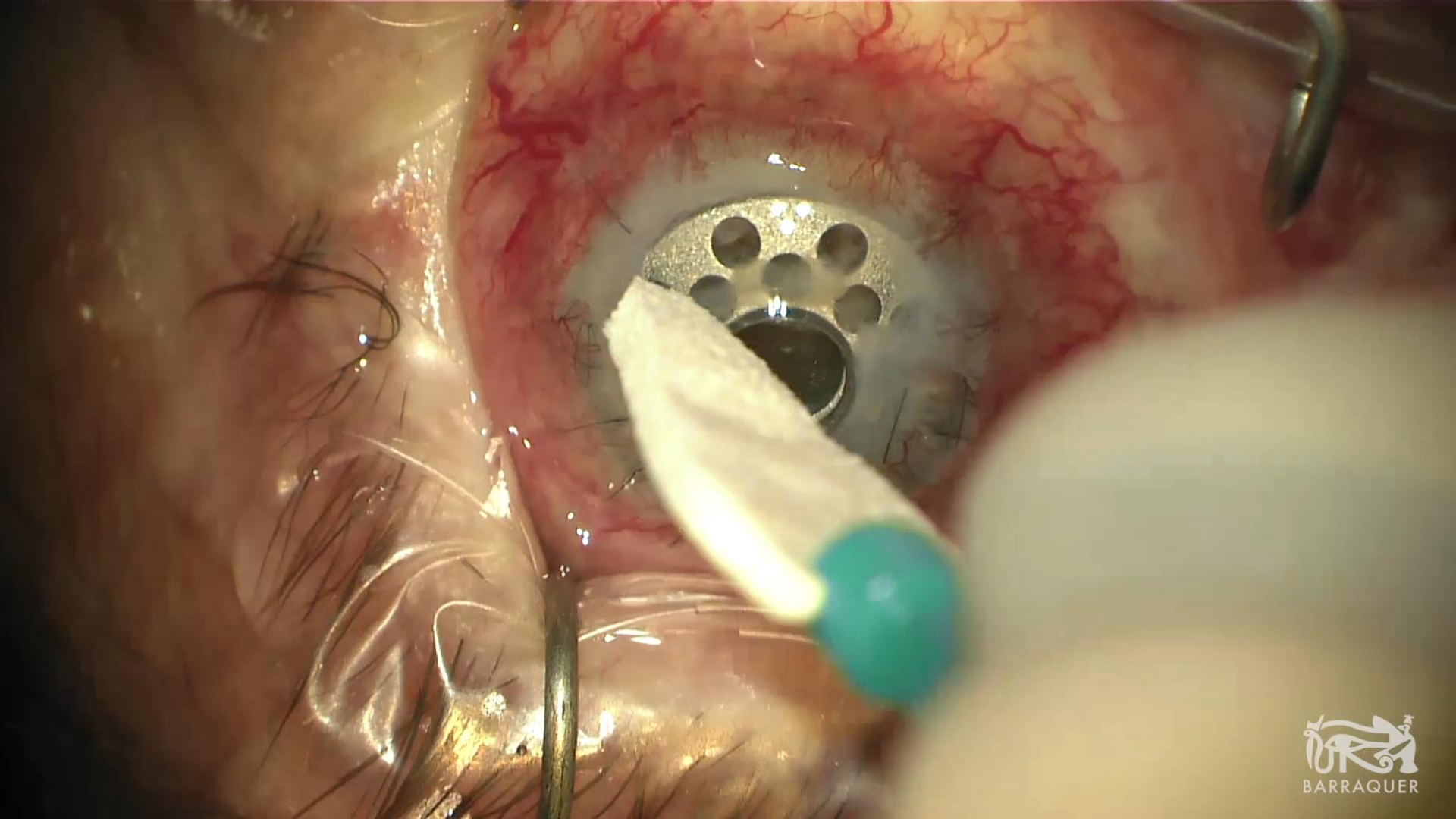
Conditions of the corneal epithelium, **ocular surface** and annexes

Visual function **prognosis**



34 RECONSTRUCTIVE SURGERIES





Clinical presentation and management of the eyes with corneal melt.

N=18	N ^o of RS	CM onset (months)	Clinical Presentation					Management					Final VA (decimal)	Anat Surv (months)
			Thin	ED	Infilt	EXT	N ^o quad	PG	LG	BE	Other grafts (amn/collag/bucc)	Aesth. pr (ev/en/re)		
1	1	94	YES	YES	NO	NO	1	-	1	-	-	-	0.025	24
2	2	17	YES	YES	YES	NO	2	-	-	1	-	en	NLP	4
3	1	101	YES	NO	NO	NO	3	-	-	-	-	ev	NLP	0
4	1	56	YES	NO	YES	NO	2	1	-	-	-	-	HM	1
5	1	9	YES	NO	NO	YES	3	-	-	-	-	ev	NLP	0
6	2	10	YES	YES	NO	NO	1	2	-	-	-	-	HM	48
7	2	3	YES	NO	YES	YES	2	-	-	-	amn	re	NLP	2
8	1	62	YES	YES	NO	NO	1	1	-	-	-	-	HM	1
9	6	4	YES	NO	NO	NO	3	3	3	-	-	-	0.3	88
10	2	4	YES	NO	YES	YES	3	1	-	1	-	-	0.05	67
11	3	2	YES	YES	YES	NO	3	-	-	1	collag, buccal	-	HM	38
12	1	2	YES	YES	NO	NO	2	1	-	-	-	-	NLP	23
13	2	9	YES	NO	YES	NO	2	1	-	-	-	re	NLP	1
14	1	14	YES	YES	NO	NO	1	-	1	-	-	-	0.01	4
15	2	25	YES	NO	NO	NO	2	1	-	-	-	re	0.05	3
16	1	3	YES	NO	NO	NO	1	-	-	-	amn	-	HM	4
17	1	24	YES	NO	NO	YES	3	1	-	-	-	-	0.2	33
18	4	52	YES	YES	NO	YES	3	2	1	1	-	-	0.01	39
19	0	34	YES	NO	NO	NO	1	Observation and conservative treatment*2					0.3	N/A
20	0	20	YES	YES	YES	NO	1						0.2	N/A

Thin: thinning of the donor graft; ED: epithelial defect; Infilt: corneal infiltrate; EXT: extrusion; quad: n^o of quadrants affected; PG: penetrating donor graft; LG: lamellar donor graft; BE: B-KPro Exchange; amn: amniotic; collag: collagenous; buccal: buccal mucosa membrane; Aesth. pr: aesthetic and non-functioning final procedures (ev: evisceration, en: enucleation, re: B-KPro removal+penetrating keratoplasty); VA: visual acuity; Anat Surv: anatomical survival time after first RS; NLP: no light perception; HM: hand motion.

*2 Conservative managed cases were not taken into account for some statistical analyses.

Anatomical retention and complication rates following B-KPro implantation (eyes with and without CM)

VARIABLES	CM group (n=18)		Non-CM group (n=112)		OR	95% CI	p value
	n	(%)	n	(%)			
ANATOMICAL RETENTION	Student's t: 6.38, df (128), Levene's (p=0.539). Mann-Whitney U: 268. Cohen's d (1.62)						1.0
An. ret. failures 1 st year	4	22.2	1	0.9	31.7	3.31–304	0.001
An. ret. failures 3 rd year	8	44	14	12.5	5.60	1.89–16.6	0.003
An. ret. failures 5 th year	12	66.7	18	16.1	10.4	3.47–31.4	<0.001
COMPLICATIONS							
RPM	5	27.8	40	35.7	0.692	0.230–2.08	0.511
PS Complications	9	50.0	31	27.7	2.61	0.949–7.19	0.057
Glaucoma	4	22.2	37	33.0	0.579	0.178–1.88	0.425
Hypotony	5	33.3	10	66.7	3.92	1.16–13.3	0.036
Confirmed infection	4	22.2	8	7.1	3.71	0.989–14.0	0.063
Endophthalmitis	2	11.1	2	1.8	6.88	0.904–52.3	0.092
Infectious keratitis	3	16.7	6	5.4	3.53	0.798–15.6	0.110
Extrusion	5	27.8	2	1.8	21.2	3.72–120.0	<0.001
Aesthetic procedure end	6	33.3	5	4.5	10.7	2.83–40.4	<0.001
Multiple complications	11	61.1	29	25.9	4.5	1.59–12.7	0.003
No complications	0	0.0	36	32.1	0.0566	0.003 – 0.966	0.003

CM: corneal melt; OR: odds ratio; CI: confidence interval; An. ret.: anatomical retention; RPM: retroprosthetic membrane; PS: posterior segment.

Risk factors for developing CM in all B-KPro eyes

RISK FACTORS	CM group (n=18)		Non-CM group (n=112)		OR	95% CI	p value
	n	(%)	n	(%)			
Poor BCL fit	14	77.8	16	14.3	21.0	6.13–71.9	<0.001
PED	9	50.0	24	21.4	3.67	1.31–10.3	0.017
Poor follow-up	7	38.9	20	17.9	2.93	1.01–8.48	0.058
RPM* ²	4	22.2	40	35.7	0.514	0.19–1.67	0.298
PS/other qxs complic* ²	7	38.9	37	33.0	1.29	0.462–3.60	0.626
Previous infectious keratitis* ²	6	33.3	15	13.4	3.23	1.05–9.92	0.077

CM: corneal melt; OR: odds ratio; CI: confidence interval; BCL: bandage contact lens; PED: persistent epithelial defect; RPM: retroprosthetic membrane; PS: posterior segment; qxs complic: surgical complications.

*² Only the cases that presented the risk factor prior to the CM diagnosis were taken into account.

Conclusions

CM is a **serious complication** that significantly obscures the prognosis of B-Kpro

RS procedures, such as tectonic corneal grafts, oral mucosa grafts and B-KPro exchanges, together with a **close follow-up** and a close **control of risk factors** (BCL fit, PEDs and infectious keratitis), may be useful in the management of CM, prolonging the **anatomical retention** rate of the device



THANK YOU FOR YOUR ATTENTION!

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