

Management of descemetocoele: Our experience and a simplified treatment algorithm

Sree Shankar, Rinky Agarwal¹, Ritu Nagpal, Prafulla K Maharana, Siddhi Goel², Rajesh Sinha, Tushar Agarwal, Jeewan Singh Titiyal, Namrata Sharma

Purpose: To formulate a treatment algorithm for the management of descemetocoele. **Methods:** This was a prospective interventional study that was conducted at a tertiary eye-care center. All consecutive cases of descemetocoele during the study period (April 1, 2017–March 31, 2018) were evaluated for the following parameters: age, sex, previous medical or surgical therapy, risk factors, preexisting ocular diseases, location, site and size of descemetocoele, interventions undertaken, visual acuity, and the fellow eye status. The surgical modalities and fellow eye status were correlated individually with therapeutic and functional outcomes, based on which a treatment algorithm was formulated. **Results:** The study included 24 eyes of 24 patients (19M, 5F) with a median age of presentation of 45 years. The mean follow-up duration was 6.79 ± 3.97 months (3–12 months). The most common cause of descemetocoele was microbial keratitis (66.66%), and most cases were central (50%), small (58.33%), and non-perforated (79.16%). The surgical interventions undertaken were cyanoacrylate glue (CG, 37.5%), penetrating keratoplasty (PKP, 33.33%), patch graft (16.66%), and deep anterior lamellar keratoplasty (DALK, 12.5%). Therapeutic success was noted in 13/24 eyes (54.16%). Final visual acuity $> 3/60$ was seen in 25% cases. Suboptimal therapeutic ($P = 0.07$) and visual ($P = 0.34$) outcomes were noted in subjects with non-functional fellow eye. **Conclusion:** PKP was preferred for descemetocoeles with active microbial keratitis and extensive infiltrates, while CG and DALK were undertaken for healed microbial keratitis, neurotrophic keratitis, and ocular surface disorders with partial limbal stem cell deficiency (LSCD). For total LSCD, amniotic membrane graft was preferred.

Key words: Amniotic membrane, cyanoacrylate glue, descemetocoele, keratoplasty, keratitis

Descemetocoele refers to the herniation of an intact Descemet's membrane (DM) through a defect in the overlying corneal stroma.^[1-5] While all cases of descemetocoele require prompt management of underlying disease to suppress the ongoing inflammation, the primary aim of treatment remains the restoration of the ocular integrity, considering the imminent risk of perforation associated with a bare DM. Various treatment options include tissue adhesives, amniotic membrane transplantation, platelet-rich fibrin membrane grafting, umbilical cord patch transplantation, patch grafts, keratoplasty (penetrating, lamellar), and conjunctival flaps.^[1-11] Each of these surgical modalities has its benefits and limitations, and the choice of therapy is determined by various factors. These include the size and the site of descemetocoele, underlying etiology, the cost and availability of each option, and the clinician's experience.^[2,6] Restoration of ocular integrity is of prime importance, and functional results are usually considered

secondary to the anatomical outcome in eyes with descemetocoeles.

Due to the rarity of this complication and limited peer-reviewed data comparing the effect of various treatment options, ambiguity remains about the management of descemetocoele. In 1984, Arentsen *et al.*^[2] studied the causes, management, and outcome of patients with descemetocoele. However, they did not compare the different treatment protocols and ignored the effect of various parameters on surgical outcomes. Ozdemir *et al.*^[6] in 2018, evaluated the effect of numerous variables such as age, gender, cause and location of descemetocoele, and presence and size of perforation on surgical outcomes of descemetocoeles. Nevertheless, their study was limited to only two surgical interventions, PKP and AMT, and proved the superiority of the former over the latter.

We conducted a prospective study on cases of descemetocoeles at our tertiary eye-care center to formulate a treatment algorithm for similar cases.

Cornea, Cataract and Refractive Surgery Services, Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, ¹Department of Ophthalmology, Lady Hardinge Medical College, New Delhi, ²Asian Institute of Medical Sciences, Faridabad, Haryana, India

Correspondence to: Prof. Namrata Sharma, Cataract, Cornea and Refractive Services, Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi - 110 029, India. E-mail: namrata.sharma@gmail.com

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Methods

This was a prospective interventional study and adhered to the declaration of Helsinki. The study was approved by the institutional review board (Ref. No-IEC/PG-294/28.06.2018).

Patient selection

All cases of descemetoceles presenting to the ophthalmic emergency department or the Cornea clinic of our center between April 1, 2017 and March 31, 2018 were recruited. Informed consent for research purposes was obtained from the patients/guardians before recruitment, and individuals not willing to participate or follow-up were excluded from the study. Patients with corneal perforation at the time of presentation were excluded from the study analysis.

Baseline examination

All patients were subjected to detailed history taking regarding the duration of presenting complaints, history of trauma, coexisting ocular or systemic comorbidity, and topical or systemic medications. The visual acuity was recorded using Snellen's chart at a 6-m distance in ambient light conditions. An experienced cornea surgeon performed a comprehensive slit-lamp examination (whenever possible), and the site and size of descemetocele and adjacent infiltrate (if any), staining pattern, Siedel's test, and anterior chamber reaction were noted.

Descemetocele was classified as central: within ≤ 5 mm from the center of the cornea, paracentral: 5–8 mm, and peripheral: ≥ 8 mm (also including limbus), based on its extent in maximum dimension and as small: < 3 mm, medium: 3–6 mm, and large: > 6 mm based on its size in maximum dimension. Patients with adjacent stromal infiltration underwent a gentle corneal scraping from the ulcer margins for a microbiological workup (smear examination and culture sensitivity). The base of the ulcer was left undisturbed due to the risk of perforation. Intraocular pressure was measured digitally, and posterior segment evaluation was undertaken using an indirect ophthalmoscope or B-scan ultrasonography based on media clarity.

The fellow eye of all patients was evaluated to look for any evidence of a prior episode of infectious or inflammatory corneal insult such as the presence of active or ghost vessels, corneal scarring, and secondary corneal ectasia. Coexistent ocular risk factors such as dry eye disease, ocular sequel of Stevens–Johnson syndrome, and bullous keratopathy were documented, and visual acuity was recorded. In uncooperative individuals, examination was performed under anesthesia. A detailed systemic evaluation was undertaken whenever required.

Medical therapy, as guided by the underlying cause, was started immediately in all patients. In the presence of active microbial keratitis cases, topical 0.5% moxifloxacin or fortified antibiotics were given according to the severity of the surrounding infiltrates at presentation, and the further regime was guided by clinical response and microbiological results. Lubricants, cycloplegics, anti-glaucoma medications, and steroids were added to the regimen as necessary. All the patients were explained the pros and cons of various surgical options available at our center (cyanoacrylate glue (CG), amniotic membrane application (AMT), patch graft, deep anterior lamellar keratoplasty (DALK), and penetrating

keratoplasty (PKP)), and informed consent was obtained for any surgical intervention.

Surgical therapy

A single experienced surgeon performed all the surgeries under local (peribulbar block or topical anesthesia) or general anesthesia. For CG, necrotic margins of the ulcer were debrided, and a thin layer of glue was applied. Following this, a bandage contact lens (BCL) was placed on the cornea. For AMT, 2–3 layers of AM were placed with the stromal side down to fill the defect, and the final layer was applied epithelial side down and secured with fibrin glue. For DALK, viscoelastic-assisted dissection, previously described by us, was undertaken.^[12] During keratoplasties performed for eyes with active infiltrates, an extra 0.25 mm margin was excised, and the host–donor disparity was maintained between 0.5 and 1 mm.

Follow-up

The preoperative medications were continued in all patients, and doses were adjusted depending on the patient's clinical response. All patients were examined on days 1, 3, and 7 and months 1, 3, 6, 9, and 12 after surgery or according to the discretion of the treating surgeon.

Outcome measures

Therapeutic success was defined as the ability to maintain the ocular integrity at all follow-ups without any need for repeat tectonic procedures. The functional outcome was considered reasonable if the patient gained visual acuity $> 3/60$ in the operated eye.

Statistical analysis

Demographic characteristics, etiology, size and location of descemetocele, presence of perforation, type of surgical procedure, and fellow eye status were tabulated into a point system in Microsoft Excel (Excel; Microsoft, Redmond, VA, USA) sheet and individually correlated with therapeutic and visual outcomes by using Stata 12.1 software. Two-sample Wilcoxon rank-sum (Mann–Whitney) test and Fisher's exact test was used for analysis, and $P < 0.05$ was deemed statistically significant.

Results

Demographic characteristics

Twenty-four eyes of 24 patients (19 male and 5 female) were included in the study. The mean age of patients was 43.37 ± 21 years (median: 45 years; range: 13–75 years); 7/24 (29.16%) patients had a systemic illness (diabetes mellitus: 2, hypothyroidism: 1, hypertension: 2, rheumatoid arthritis: 1, and chronic liver disease: 1) [Table 1].

Baseline characteristics

The common causes of descemetocele were microbial keratitis (active: 11/24, 45.83%; healed: 5/24, 20.83%), chemical/thermochemical injury (4/24, 16.66%), trauma (1/24, 4.76%), neurotrophic keratitis (1/24, 4.76%), Stevens–Johnson syndrome (1/24, 4.76%), and dry eye disease (1/24, 4.76%). In 8/11 cases (54.54%) with active microbial keratitis, the organisms could be identified in the following order: *Pseudomonas aeruginosa* (3/11, 27.27%), *Staphylococcus aureus* (2/11, 18.18%), *Staphylococcus epidermidis* (1/11, 9.09%), *Candida* (1/11, 9.09%), and *Bipolaris*

Table 1: A tabulated representation of clinical data of patients presenting with descemetocoele in our study

Age/ gender	Etiology	SI	Size/location/perforation	Thick- ness	Surgery	Anaes- thesia	F-up	Visual acuity at baseline	Visual acuity at f/up	Visual acuity in fellow eye	Complication/ intervention
13 years/M	Acid injury	--	3.8 mm/central/absent	79 µm	PKP + AMT	GA	6 months	LP	No LP	No LP	Graft infection (<i>P. aeruginosa</i>)/PKP
70 years/M	Healed MK	--	3.5 mm/paracentral/present	--	CG	TA	3 months	LP	HMCF	6/9	--
22 years/F	Healed MK	CLD	3 mm/paracentral/absent	116 µm	DALK	GA	12 months	2/60	6/24	No LP	Graft infection (<i>Cladosporium</i>)/DALK
48 years/M	MK (<i>S. aureus</i>)	--	4 mm/peripheral/absent	--	PKP	PBB	5 months	HMCF	LP	6/6	--
75 years/M	MK (<i>S. aureus</i>)	DM	2.5 mm/central/absent	258 µm	PKP	PBB	3 months	LP	LP	No LP	--
20 years/M	Posttraumatic MK	--	2 mm/central/absent	206 µm	PKP	GA	12 months	HMCF	No LP	FCCF	--
61 years/F	Healed MK	HyT	2.5 mm/central/absent	98 µm	CG	TA	3 months	HMCF	HMCF	6/9	--
30 years/F	SJS sequelae	--	1.2 mm/paracentral/absent	95 µm	CG	GA	3 months	HMCF	FCCF	HMCF	--
55 years/M	MK (<i>Candida</i>)	HTN	3.3 mm/peripheral/absent	--	Patch graft	GA	3 months	LP	No LP	6/6	Graft melt/AMT
43 years/M	Alkali injury	--	2.5 mm/paracentral/absent	--	Patch graft	PBB	12 months	HMCF	No LP	No LP	Graft infection/PKP
60 years/M	MK	DM	2.5 mm/peripheral/absent	--	CG	TA	5 months	2/60	4/60	6/6	--
60 years/M	Post SICS MK (<i>S. epidermidis</i>)	--	4 mm/peripheral/present	--	CG	TA	12 months	LP	No LP	6/18	Recurrence/Phthisis
75 years/M	Healed MK with BK	--	2 mm/paracentral/absent	260 µm	PKP, CE, IOL	PBB	6 months	HMCF	1/60	HMCF	--
70 years/M	Neurotrophic	--	4.5 mm/peripheral/absent	210 µm	DALK	GA	12 months	3/60	6/18	6/12	Cataract/CE+IOL
15 years/M	Chemical injury	--	1.8 mm/paracentral/absent	180 µm	CG	GA	3 months	HMCF	FCCF	6/6	--
28 years/M	MK (<i>P. aeruginosa</i>)	--	2.5 mm/central/absent	90 µm	Lamellar Patch graft + FG	TA	3 months	FCCF	HMCF	FCCF	Dislocated graft/CG
55 years/F	MK (<i>P. aeruginosa</i>)	HTN	2.8 mm/central/absent	160 µm	CG	PBB	8 months	FCCF	HMCF	6/6	Infection (<i>S. epidermidis</i>)/PKP
13 years/M	Thermochemical (Blast) injury	--	7.1 mm/central/absent	--	PKP	GA	12 months	HMCF	HMCF	FCCF	Failed graft
32 years/M	MK (<i>Bipolaris</i>)	--	1.6 mm/central/absent	--	PKP	GA	12 months	HMCF	No LP	No LP	Suture-related infection (<i>P. aeruginosa</i>)/PKP
28 years/M	Post-traumatic	--	4 mm/central/absent	--	DALK	GA	3 months	FCCF	6/60	6/6	--
53 years/F	DED	RA	1.8 mm/central/absent	--	CG	TA	3 months	HMCF	HMCF	No LP	Repeat CG
39 years/M	Healed MK	--	4 mm/peripheral/present	--	Patch graft	GA	4 months	3/60	5/60	6/6	--
16 years/M	CL induced MK (<i>P. aeruginosa</i>)	--	1.5 mm/paracentral/present	78 µm	CG	TA	12 months	HMCF	6/24	6/6	Repeat CG
60 years/M	Healed MK	--	1.3 mm/central/present	--	PKP	GA	6 months	HMCF	No LP	No LP	Graft infection (<i>Aspergillus</i>)/PKP

MK: Microbial keratitis; SICS: Small-incision cataract surgery; BK: Bullous keratopathy; DED: Dry eye disease; CL: Contact lens; CLD: Chronic liver disease; DM: Diabetes mellitus; HyT: Hypothyroidism; HTN: Hypertension; RA: Rheumatoid arthritis; PKP: Penetrating keratoplasty; AMT: Amniotic membrane transplantation; CG: Cyanoacrylate glue; DALK: Deep anterior lamellar keratoplasty; CE: Cataract extraction; IOL: Intraocular lens; FG: Fibrin glue; GA: General anesthesia; TA: Topical anesthesia; PBB: Peribulbar block; F/u: Follow-up; LP: Light perception; HMCF: Hand movement close to face; FCCF: Finger counting close to face

species (1/11, 9.09%). One patient with healed microbial keratitis and coexistent bullous keratopathy manifested with two descemetocelles at different locations.

All patients had a visual acuity of $\leq 3/60$ at presentation in the affected eye. Based on the size and location, the distribution of descemetocele was: small (14/24, 58.33%), medium (9/24, 37.5%), and large (1/24, 4.16%); central (12/24, 50%), paracentral (7/24, 29.16%), and peripheral (5/24, 20.83%). Further, 5/24 patients (20.08%) experienced perforation within 24–48 h of presentation, and three out of those five eyes had descemetocele with healed microbial keratitis and two had active microbial keratitis attributed to *Pseudomonas aeruginosa* and *Staphylococcus epidermidis*. The perforation in three eyes in the healed keratitis group was located in the central, paracentral, and peripheral areas, one in each of the three eyes, which was managed with a full-thickness keratoplasty, cyanoacrylate glue application, and a patch graft, respectively. The eye with active contact lens-induced microbial keratitis attributed to *Pseudomonas aeruginosa* developed a paracentral perforation, while a peripheral perforation was noted in one eye with post-SICS microbial keratitis attributed to *Staphylococcus epidermidis*.

No gross posterior segment pathology was detected in any patient. The anterior segment optical coherence tomography (ASOCT) could be captured in only 12/24 cases (50%).

Surgical therapy

The most common surgical intervention was CG (9/24, 37.5%), followed by PKP (8/24, 33.33%), patch graft (4/24, 16.66%), and DALK (3/24, 12.5%) [Fig. 1]. In one case, where a lamellar patch graft (size: 3 mm) was secured with fibrin glue, graft dislocation was noted on the first postoperative day, and CG was applied to restore the corneal integrity. In all other keratoplasties, the graft was sutured to the host with intermittent 10-0 nylon sutures. In only one child with chemical injury, AMT was combined with full-thickness keratoplasty.

Outcomes

The mean follow-up time was 6.79 ± 3.97 months (3–12 months) in our study [Table 1]. Therapeutic success was noted in 13/24 patients (54%). Among the remaining 11 patients, graft infection occurred in five patients (subjected to PKP (4), DALK (1)), graft dislocation occurred in one patient (managed successfully by CG application), and graft melt occurred in one patient (managed successfully by AMT). The course of the remaining four patients was: recurrence of primary infection in two patients (one experienced phthisis bulbi and one was managed successfully by PKP) and dislodgement of CG in two patients (both managed successfully by repeat CG application).

The visual acuity at the final follow-up was $> 3/60$ in 6/24 cases (25%), while 11/24 eyes (45.83%) reported a drop in visual acuity from the preoperative level. The age, gender, systemic illness, etiology, size, location, and thickness of descemetocele or presence of perforation did not have a statistically significant correlation with the therapeutic or functional success. However, the choice of therapy affected the final outcome, and DALK proved to be the most successful procedure, both anatomically ($P = 0.007$) and visually ($P = 0.007$) [Table 2].

Further, 12/24 patients (50%) had a non-ambulatory vision ($\leq 3/60$) in the fellow eye at the time of presentation. Poor therapeutic ($P = 0.077$) and visual ($P = 0.342$) outcomes were noted in these patients [Table 2].

Children versus adults

The mean age of children in our study was 14.25 years (13–16 years). In children, the most common cause was chemical/thermochemical injury (3/4, 75%) followed by microbial keratitis (1/4, 25%); in adults, the most common cause was microbial keratitis (15/20, 75%). Chemical injury constituted only 5% (1/20) of all cases in adults. In children, 2/4 CG (50%) and 2/4 PKP (50%) were undertaken, whereas in adults, 7/20 CG (35%) and 6/20 PKP (30%) were performed. The therapeutic ($P = 0.6401$) and visual ($P = 0.4696$) outcomes were comparable between both groups.

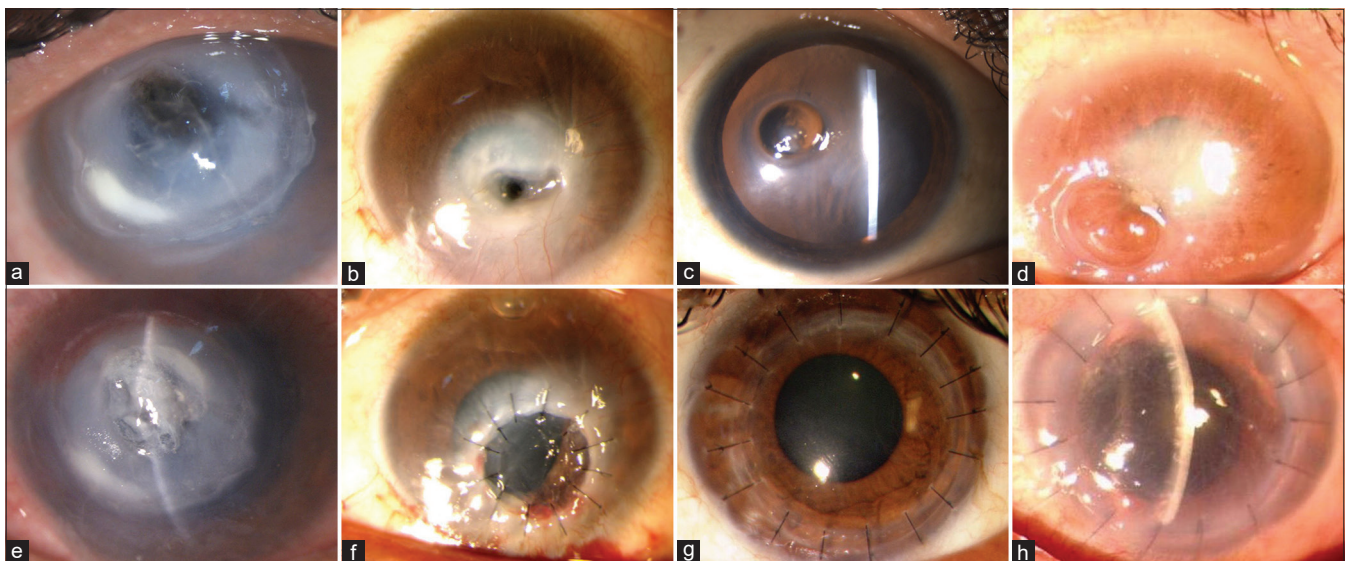


Figure 1: Preoperative (a–d) and postoperative (e–h) slit-lamp photographs of patients presenting with descemetocele, which were managed by cyanoacrylate glue application, patch graft, lamellar, and full-thickness keratoplasty, respectively

Table 2: Categorization of surgery specific details with respect to anatomical and functional outcomes in our study

Category	Intervention	Anatomical success	Visual acuity >3/60
Overall (n=24)	CG (n=9)	13/24 (54.16%)	6/24 (25%)
	PG/LPG (n=4)	5/9 (55.55%)	2/9 (22.22%)
	DALK (n=3)	1/4 (25%)	1/4 (25%)
	PKP (n=8)	2/3 (66.66%)	3/3 (100%)
		5/8 (62.5%)	0/8 (0%)
<i>P</i>		0.007	0.007
According to age			
Adults (n=20)	CG (n=7)	11/20 (55.55%)	5/20 (25%)
	PG/LPG (n=4)	4/7 (57.14%)	1/7 (14.28%)
	DALK (n=3)	1/4 (25%)	1/4 (25%)
	PKP (n=6)	2/3 (66.66%)	3/3 (100%)
		4/6 (66.66%)	0/8 (0%)
Children (n=4)	CG (n=2)	2/4 (50%)	1/4 (25%)
	PKP (n=2)	1/2 (50%)	1/2 (50%)
		1/2 (50%)	0/2 (0%)
<i>P</i>		0.6401	0.4696
According to the status of the fellow eye			
Functional (n=12)	CG (n=7)	8/12 (66.66%)	5/12 (41.66%)
	PG/LPG (n=2)	4/7 (57.14%)	1/7 (14.28%)
	DALK (n=2)	1/2 (50%)	1/2 (50%)
	PKP (n=1)	2/2 (100%)	2/2 (100%)
		1/1 (100%)	0 (0%)
Non-functional (n=12)	CG (n=2)	5/12 (41.66%)	1/12 (8.33%)
	PG/LPG (n=2)	1/2 (50%)	0 (0%)
	DALK (n=1)	1/2 (50%)	0 (0%)
	PKP (n=7)	0 (0%)	1/1 (100%)
		4/7 (57.14%)	0 (0%)
<i>P</i>		0.077	0.342
According to etiology			
Active MK (n=11)	CG-5, PG-2, PKP-4	5/11 (45.45%)	2/11 (18.18%)
Healed MK (n=5)	CG-1, PG-1, DALK-1, PKP-2	3/5 (60%)	2/5 (40%)
CI/TCl (n=4)	CG-1, PG-1, PKP-2	2/4 (50%)	0 (0%)
Trauma (n=1)	DALK-1	1/1 (100%)	1/1 (100%)
DED (n=1)	CG1	0 (0%)	0 (0%)
SJS (n=1)	CG-1	1/1 (100%)	0 (0%)
Neutrotrophic (n=1)	DALK-1	1/1 (100%)	1/1 (100%)
<i>P</i>		>0.999	0.157

CG - Cyanoacrylate glue; PG - Patch graft; DALK - Deep anterior lamellar keratoplasty; PKP - Penetrating keratoplasty; MK - Microbial keratitis; CI/TCl - Chemical/thermochemical injury; DED - Dry eye disease; SJS - Steven-Johnson syndrome

Discussion

Ours was a prospective study inclusive of 24 patients with age distribution, gender distribution, and etiology of descemetocoele comparable to previous studies.^[2,12] Lower culture positivity from corneal scraping samples in our study (6/11, 54.54%) can be ascribed to the presence of extensive necrotic materials at ulcer margins, inaccessibility of deeply residing organisms to superficial scrapings, and lack of scraping from the base of the ulcer due to fear of perforation. This limitation can be overcome by performing repeated scraping immediately before any surgical intervention and sending the host samples trephined during keratoplasty for microbiological evaluation. A higher incidence of *P. aeruginosa* keratitis in our study can be attributed to the organism's higher virulence and ability to induce rapid stromal destruction. This indicates that a high index of suspicion for *P. aeruginosa* should be maintained when dealing with microbial keratitis presenting with

descemetocoeles. Although previous studies have established the role of ASOCT in the diagnosis and management of descemetocoeles, the images could be captured in only 50% of cases in our study, and even these demonstrated falsely high values for a descemetocoele.^[3-5] It is, therefore, imperative to specifically image the area of descemetocoele, preferably by the treating clinician, to obtain more representative images.

The most commonly performed procedure in our study was CG application (9/24, 37.5%), followed by PKP (8/24, 33.33%), patch graft (4/24, 16.66%), and DALK (3/24, 12.5%). This is in contrast to the study performed by Arentsen *et al.*,^[2] where PKP was the most commonly undertaken intervention (12/18, 66.67%). This difference can be explained by the variable selection criteria, which skewed toward large-sized descemetocoeles in their study, compared to small-sized (14/24, 58.33%) in our study. Also noted was a decline in conjunctival flaps and enucleation and the emergence of DALK and patch grafts as primary procedures for patients with descemetocoeles.

This reflects an improvement in microsurgical skills, leading to a changing trend in the management of descemetocoele.^[13]

Suboptimal therapeutic and visual outcomes in our study can be ascribed to the presence of active microbial keratitis in many of our cases. Additionally, these patients had a non-functional fellow eye, were recipients of keratoplasty, or suffered from serious postoperative complications. Although adults and children varied in their primary diagnoses, a similar therapeutic and functional outcome was witnessed in both subgroups. The final outcome in our study was not significantly influenced by the age, the size and location of descemetocoele, and presence of perforation, but by the underlying etiology, the type of surgical intervention, and the status of the fellow eye.^[6] Delayed presentation, poor self-care, preference for PKP, poor compliance with medications, financial constraints, and social isolation were major contributory factors for adverse outcomes in patients with the non-functional fellow eye. To the best of our knowledge, this is the first study evaluating the role of the fellow eye in the management of descemetocoeles.

When surgery-specific outcomes were considered, DALK proved to be the most successful surgery, both anatomically and visually [Table 2]. However, this has to be cautiously interpreted due to a low number of subjects and a biased case selection (non-inflamed and non-infective cases underwent DALK) in our study, and larger long-term comparative trials are required to validate the superiority of DALK over other surgical interventions for descemetocoeles.^[12,14,15] In contrast to previous reports, dismal outcomes with PKP in our study can be attributed to the severity of the most common underlying disease, microbial keratitis, in our series of patients.^[2,6] This is partly contributed by insufficient awareness, accessibility, and affordability to ophthalmic care in our country, which results in delayed presentation and a grim prognosis.

Based on our 15-year experience, inclusive of the present study, we have formulated a treatment algorithm for the management of descemetocoeles [Fig. 2]. Underlying etiology and the fellow eye status should determine the overall choice of surgical procedure for managing descemetocoeles. The type of keratoplasty (full-thickness versus lamellar) performed has an important bearing in deciding the final anatomical as well as the functional outcome. Overall, we prefer keratoplasty for descemetocoeles in cases with active microbial keratitis and extensive infiltrates to rid the cornea of infectious material and allow better penetration of antibiotics. For descemetocoeles with healed keratitis, neurotrophic keratitis, and ocular surface disorders with partial limbal stem cell deficiency (LSCD), we advise CG for small-sized perforations and lamellar keratoplasty (either patch graft or DALK) for medium to large-sized descemetocoeles. We reserve AMT for eyes with total LSCD owing to its high cost, strict preparation criteria, limited availability, and risk of transmission of infection. We perform multilayer AMT for small-sized descemetocoeles and combine it with lamellar keratoplasty for medium to large-sized descemetocoeles.^[16,17] While we try to avoid emergent keratoplasty procedures in functionally one-eyed individuals and in children due to higher postoperative complications, sometimes, the presence of extensive infiltrates renders the eye non-salvageable to CG and AMT.

Conclusion

To conclude, the etiology, size, and location of descemetocoele along with the fellow eye status remain major determinants of surgical decision-making and prognosis of descemetocoele in developing countries. CG with BCL remains the most common mode of management followed by PKP and patch grafts. While lamellar keratoplasty requires appropriate case selection, the

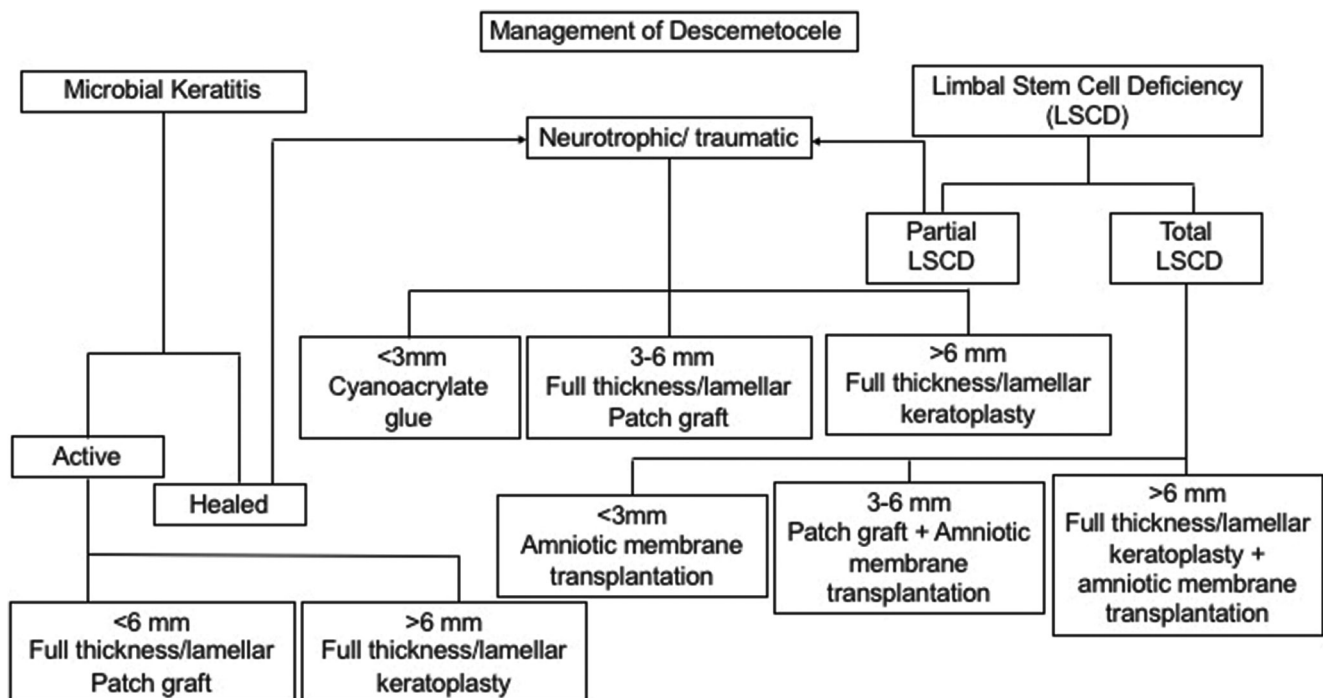


Figure 2: A flowchart representing the management protocol, formulated for managing patients presenting with descemetocoele

utility of AMG in the management of descemetocoele needs further evaluation.

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Conflicts of interest

There are no conflicts of interest.

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