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Original Research Article

Comparison of Symptom Resolution Following Conjunctival Autograft and Intraoperative Mitomycin-C in Primary Pterygium Surgery

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Abstract: ***Background:*** Pterygium is a common ocular surface disorder that can lead to discomfort, inflammation and visual disturbances. Surgical excision remains the mainstay of treatment and conjunctival autograft and intraoperative mitomycin-C (MMC) are widely used techniques. This study compared postoperative symptom resolution following these two methods. ***Methods:*** This prospective study was conducted in the Department of Ophthalmology, Mymensingh Medical College Hospital and BNSB Eye Hospital, Mymensingh, Bangladesh, from January 2008 to June 2009. Patients undergoing primary pterygium excision were allocated into two groups: Group A (conjunctival autograft) and Group B (MMC). Postoperative symptoms of redness, foreign body sensation, photophobia, lacrimation, itching and mean tearing and foreign body sensation scores were assessed preoperatively. ***Results:*** Preoperatively, moderate redness was higher in Group A (74.3%), while mild redness predominated in Group B (51.4%). By the 3rd POM, 94.3% of Group A and 74.3% of Group B had no redness. Absence of foreign body sensation reached 91.4% in Group A and 77.1% in Group B at the 3rd POM. Photophobia resolved in 94.3% of Group A and 57.1% of Group B by the 6th POM. Lacrimation improved markedly, with 94.3% of Group A and 80.0% of Group B showing Grade-0 by the 6th POM. Tearing and foreign body sensation scores showed a similar trend, reaching zero at the 3rd POW in both groups but rising slightly thereafter, more prominently in Group B. ***Conclusion:*** Conjunctival autograft demonstrated more sustained postoperative symptom relief than intraoperative MMC in primary pterygium surgery.

Keywords: Pterygium, conjunctival autograft, mitomycin-C, symptom resolution, postoperative outcomes.

INTRODUCTION

Pterygium is a common ocular surface disorder characterized by a wing-shaped fibrovascular proliferation of conjunctival tissue extending onto the cornea [1]. Its development is strongly associated with chronic exposure to ultraviolet radiation, environmental irritants and dry, dusty climates [2]. Although often asymptomatic in the early stages, progressive pterygium can lead to significant ocular discomfort, including redness, foreign-body sensation, photophobia, lacrimation and itching. In more advanced cases, it may induce astigmatism, impair vision, or interfere with ocular motility [3]. As symptoms affect daily functioning and quality of life, timely and effective management is essential [4].

Surgical excision remains the standard treatment for progressive or symptomatic pterygium. However, recurrence after simple excision can be high, prompting the development of adjunctive techniques to reduce postoperative complications and improve patient comfort [5,6]. Among the commonly adopted methods, conjunctival autograft (CAG) has gained wide acceptance due to its safety and relatively low recurrence rates. This technique involves excising the pterygium and covering the bare sclera with a free conjunctival graft harvested from the same eye, thereby restoring the ocular surface barrier and reducing inflammation and fibrovascular regrowth [7].

Another widely practiced approach is the use of intraoperative mitomycin-C (MMC), an antimetabolite that inhibits fibroblast proliferation [8]. Applied to the bare scleral bed after pterygium excision, MMC

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effectively lowers recurrence rates and is technically simpler than grafting [9]. However, while MMC can be advantageous for high-risk or recurrent cases, concerns remain about potential complications such as delayed epithelial healing, scleral thinning, or necrosis if not used with precise control [10].

Beyond recurrence, patient-reported symptom resolution is an important yet often underemphasized aspect of postoperative outcomes [11]. Redness, irritation, tearing and photophobia are primary reasons patients seek treatment and the degree to which these symptoms improve following different surgical techniques has not been extensively compared [12]. Understanding symptom resolution can guide surgeons in selecting procedures that not only reduce recurrence but also optimize comfort, satisfaction and visual function.

This study focuses specifically on comparing postoperative symptom outcomes between conjunctival autograft and intraoperative MMC following primary pterygium surgery. By evaluating symptom severity scores, visual acuity and clinical grading over a structured follow-up period, the study aims to provide evidence on which technique offers superior symptomatic relief. Such comparisons are useful for clinical decision-making, particularly when selecting a method tailored to individual patient needs, surgical expertise and anticipated risks.

The objective of this study was to compare the postoperative symptom resolution between conjunctival autograft and intraoperative mitomycin-C in patients undergoing primary pterygium surgery.

METHODOLOGY & MATERIALS

This prospective study was conducted in the Department of Ophthalmology, Mymensingh Medical College Hospital, Mymensingh and BNSB Eye Hospital, Mymensingh, Bangladesh from January 2008 to June 2009. A total of 80 eyes of 80 patients with primary progressive pterygium were selected on a random basis, with each patient considered as a single case. Due to the lack of sustained follow-up, we excluded 10 participants from the study cohort. The patients were divided into two equal groups: Group A included 35 patients treated with conjunctival autograft and Group B included 35 patients treated with intraoperative mitomycin-C. Patients were selected for Group A or Group B by lottery on the first day and thereafter by alternate-day allocation. The study population consisted of admitted patients from the eye wards of Mymensingh Medical College and BNSB Eye Hospital. Inclusion criteria were primary progressive pterygium, age 20–65 years, both sexes, all residential and socio-economic backgrounds, different educational levels, healthy individuals without local or systemic disease and primary pterygium. Exclusion criteria included history of other ocular disease, previous ocular surgery or trauma, radiotherapy, laser or antimitotic therapy, cataract or glaucoma, systemic illnesses such as diabetes mellitus, hypertension, liver or renal disease, failure to attend follow-up and psychological illness. Preoperative evaluation included detailed history, ocular examination with Snellen's chart, torchlight, slit-lamp biomicroscopy, applanation tonometry, ophthalmoscopy and required laboratory investigations. Symptoms and signs were graded for redness, foreign body sensation, photophobia, lacrimation, itching, visual acuity and pterygium progression using predefined scales. All surgeries were performed under topical 0.4% oxybuprocaine hydrochloride and local 2% lignocaine with adrenaline. In Group A, primary pterygium excision with conjunctival autograft was completed using 10-0 monofilament nylon sutures. In Group B, after pterygium excision, sponges soaked in 0.02 mg/ml mitomycin-C were applied to the bare sclera for 150 seconds, followed by irrigation with 100 ml normal saline. Postoperative evaluations were performed on day 1, at 1 week, 3 weeks, 3 months and 6 months and all parameters were recorded. Data were analyzed using SPSS with appropriate statistical methods. Ethical approval and written informed consent were obtained.

RESULTS

Table I: Distribution of the patients' symptoms (Redness) by the type of operation follow up

Symptoms (Redness)		Type of Operation		Mean±SD	p-value
		Group A (n=35)	Group B (n=35)	Group A Group B	
Preoperative	Mild	9 (25.7)	18 (51.4)	1.74 ± 0.44	0.027
	Moderate	26 (74.3)	17 (48.6)	1.49 ± 0.51	
1st post-operative day	Mild	0 (0.0)	6 (17.1)	2.00 ± 0.0	0.012
	Moderate	35 (100.0)	29 (82.9)	1.83 ± 0.38	
7th Post Operative Day	No Redness	15 (42.9)	15 (42.9)	0.97 ± 0.92	0.409
	Mild	6 (17.1)	12 (34.3)	0.80 ± 0.80	
	Moderate	14 (40.0)	8 (22.9)		
3rd Post Operative Week	No Redness	35 (100.0)	35 (100.0)	0	
3rd Post Operative Month	No Redness	33 (94.3)	26 (74.3)	0.06 ± 0.24	0.012
	Mild	2 (5.7)	4 (11.4)	0.40 ± 0.74	
	Moderate	0 (0.0)	5 (14.3)		

6 th Post Operative Month	No Redness	33 (94.3)	24 (68.6)	0.11 ± 0.47	0.012
	Mild	0 (0.0)	3 (8.6)	0.54 ± 0.85	
	Moderate	2 (5.7)	8 (22.9)		

Table I Summarizes the pattern of postoperative redness in both groups across follow-up visits. Preoperatively, mild redness was observed in 25.7 percent of Group A and 51.4 percent of Group B, while moderate redness was higher in Group A at 74.3 percent. On the first postoperative day, all patients in Group A showed moderate redness, whereas 17.1 percent of Group B had mild redness. By the 7th POD, no redness was present in 42.9 percent of patients in each group. At the 3rd POM, no redness remained in 94.3 percent of Group A compared to 74.3 percent of Group B and a similar pattern continued through the 6th POM.

Table II: Distribution of the patient's symptoms (Foreign body sensation) by the type of operation preoperative & post-operative follow up

Symptoms (Foreign body sensation)		**Type of Operation**		**Mean±SD**	**p-value**
		Group A (n=35)	**Group B (n=35)**	**Group A Group B**	
Preoperative	Mild	14 (40.0)	13 (37.1)	1.60 ± 0.50	
	Moderate	21 (60.0)	22 (62.9)	1.63 ± 0.49	0.809
1st post-operative day	No FB sensation	12 (34.3)	18 (51.4)	0.66 ± 0.48	
	Mild	23 (65.7)	17 (48.6)	0.49 ± 0.51	0.152
7th Post Operative Day	No FB sensation	18 (51.4)	15 (42.9)	0.49 ± 0.51	
	Mild	17 (48.6)	20 (57.1)	0.57 ± 0.50	0.480
3rd Post Operative Week	No FB sensation	35 (100.0)	35 (100.0)	0	
3rd Post Operative Month	No FB sensation	32 (91.4)	27 (77.1)	0.09 ± 0.28	
	Mild	3 (8.6)	5 (14.3)	0.31 ± 0.63	0.055
	Moderate	0 (0.0)	3 (8.6)		
6 th Post Operative Month	No FB sensation	30 (85.7)	19 (54.3)	0.20 ± 0.53	
	Mild	3 (8.6)	7 (20.0)	0.71 ± 0.86	0.004
	Moderate	2 (5.7)	9 (25.7)		

Table II Presents the distribution of foreign body sensation across follow-up periods in both groups. Preoperatively, mild symptoms were reported by 40.0 percent in Group A and 37.1 percent in Group B, while moderate symptoms were slightly higher in both groups. On the first postoperative day, 34.3 percent of Group A and 51.4 percent of Group B had no foreign body sensation. By the 7th POD, the proportion without symptoms increased to 51.4 percent in Group A. At the 3rd POM, no sensation was reported by 91.4 percent of Group A and 77.1 percent of Group B. By the 6th POM, 85.7 percent of Group A had no foreign body sensation compared to 54.3 percent in Group B.

Table III: Distribution of the patients' symptoms (Photophobia) by the type of operation preoperative & post-operative follow up

Symptoms (Photophobia)		**Type of Operation**		**Mean±SD**	**p-value**
		Group A (n=35)	**Group B (n=35)**	**Group AGroup B**	
Preoperative	Grade-0	18 (51.4)	20 (57.1)	0.49 ± 0.51	
	Grade-1	17 (48.6)	13 (37.1)	0.49 ± 0.61	0.999
	Grade-2	0 (0.0)	2 (5.7)		
1st post-operative day	Grade-0	17 (48.6)	22 (62.9)	0.51 ± 0.51	
	Grade-1	18 (51.4)	13 (37.1)	0.37 ± 0.49	0.235
7th Post Operative Day	Grade-0	20 (57.1)	17 (48.6)	0.43 ± 0.50	
	Grade-1	15 (42.9)	18 (51.4)	0.51 ± 0.51	0.480
3rd Post Operative Week	Grade-0	30 (85.7)	32 (91.4)	0.14 ± 0.36	
	Grade-1	5 (14.3)	3 (8.6)	0.09 ± 0.28	0.460
3rd Post Operative Month	Grade-0	32 (91.4)	28 (80.0)	0.09 ± 0.28	
	Grade-1	3 (8.6)	3 (8.6)	0.37 ± 0.73	0.035
	Grade-2	0 (0.0)	4 (11.4)		
6 th Post Operative Month	Grade-0	33 (94.3)	20 (57.1)	0.09 ± 0.37	
	Grade-1	1 (2.9)	5 (14.3)	0.71 ± 0.89	0.001
	Grade-2	1 (2.9)	10 (28.6)		

Table III Summarizes the changes in photophobia grades across follow-up periods for both groups. Preoperatively, Grade-0 photophobia was seen in 51.4 percent of Group A and 57.1 percent of Group B, while Grade-1 accounted for 48.6 percent and 37.1 percent respectively. On the first postoperative day, Grade-0 increased to 48.6 percent in Group A and 62.9 percent in Group B. By the 3rd PO week, most patients had no photophobia, with 85.7 percent in Group A and 91.4 percent in Group B. At the 3rd POM, Grade-0 remained high in Group A at 91.4 percent compared to 80.0 percent in Group B and by the 6th POM, 94.3 percent of Group A had no photophobia while Group B showed 57.1 percent.

Table IV: Distribution of the patients' symptoms (Lacrimation) by the type of operation preoperative & post-operative follow up

Symptoms (Lacrimation)		Type of Operation		Mean±SD	p-value
		Group A (n=35)	Group B (n=35)	Group A Group B	
Preoperative	Grade-0	20 (57.1)	22 (62.9)	0.43 ± 0.50	0.999
	Grade-1	15 (42.9)	11 (31.4)	0.43 ± 0.61	
	Grade-2	0 (0.0)	2 (5.7)		
1st post-operative day	Grade-0	22 (62.9)	24 (68.6)	0.37 ± 0.49	0.621
	Grade-1	13 (37.1)	11 (31.4)	0.31 ± 0.47	
7th Post Operative Day	Grade-0	29 (82.9)	30 (85.7)	0.17 ± 0.38	0.747
	Grade-1	6 (17.1)	5 (14.3)	0.14 ± 0.36	
3rd Post Operative Week	Grade-0	35 (100.0)	35 (100.0)	0	
3rd Post Operative Month	Grade-0	32 (91.4)	30 (85.7)	0.11 ± 0.32	0.726
	Grade-1	3 (8.6)	5 (14.3)	0.14 ± 0.36	
6 th Post Operative Month	Grade-0	33 (94.3)	28 (80.0)	0.09 ± 0.37	
	Grade-1	1 (2.9)	4 (11.4)	0.29 ± 0.62	
	Grade-2	1 (2.9)	3 (8.6)		

Table IV Presents the distribution of lacrimation severity across follow-up visits for both groups. Preoperatively, Grade-0 lacrimation was observed in 57.1 percent of Group A and 62.9 percent of Group B, while Grade-1 occurred in 42.9 percent and 31.4 percent respectively. On the first postoperative day, Grade-0 increased to 62.9 percent in Group A and 68.6 percent in Group B. By the 7th POD, most patients had minimal symptoms, with Grade-0 reaching 82.9 percent in Group A and 85.7 percent in Group B. At the 3rd POM, Grade-0 remained high at 91.4 percent in Group A and 85.7 percent in Group B and by the 6th POM, Grade-0 was still present in 94.3 percent of Group A compared to 80.0 percent of Group B.

Table V: Distribution of the patients' symptoms (Itching) by the type of operation preoperative & post-operative follow up

Symptoms (Itching)		Type of Operation		Mean±SD	p-value
		Group A (n=35)	Group B (n=35)	Group AGroup B	
Preoperative	No itching	25 (71.4)	28 (80.0)	0.37 ± 0.65	0.719
	Mild itching	7 (20.0)	3 (8.6)	0.31 ± 0.68	
	Moderate itching	3 (8.6)	4 (11.4)		
1st post-operative day	No itching	31 (88.6)	32 (91.4)	0.11 ± 0.32	0.695
	Mild itching	4 (11.4)	3 (8.6)	0.09 ± 0.28	
7th Post Operative Day	No itching	33 (94.3)	32 (91.4)	0.06 ± 0.24	0.648
	Mild itching	2 (5.7)	3 (8.6)	0.09 ± 0.28	
3rd Post Operative Week	No itching	35 (100.0)	35 (100.0)	0	
3rd Post Operative Month	No itching	33 (94.3)	29 (82.9)	0.06 ± 0.24	0.137
	Mild itching	2 (5.7)	6 (17.1)	0.17 ± 0.38	
6 th Post Operative Month	No itching	32 (91.4)	26 (74.3)	0.11 ± 0.40	0.1
	Mild itching	2 (5.7)	7 (20.0)	0.31 ± 0.58	
	Moderate itching	1 (2.9)	2 (5.7)		

Table V Summarizes the pattern of itching symptoms across follow-up periods in both groups. Preoperatively, no itching was reported in 71.4 percent of Group A and 80.0 percent of Group B, while mild

itching occurred in 20.0 percent and 8.6 percent respectively. On the first postoperative day, the proportion with no itching increased to 88.6 percent in Group A and 91.4 percent in Group B. By the 7th POD, no itching was seen in 94.3 percent of Group A and 91.4 percent of Group B. At the 3rd POM, no itching persisted in 94.3 percent of Group A compared to 82.9 percent of Group B and by the 6th POM it remained high at 91.4 percent and 74.3 percent respectively.

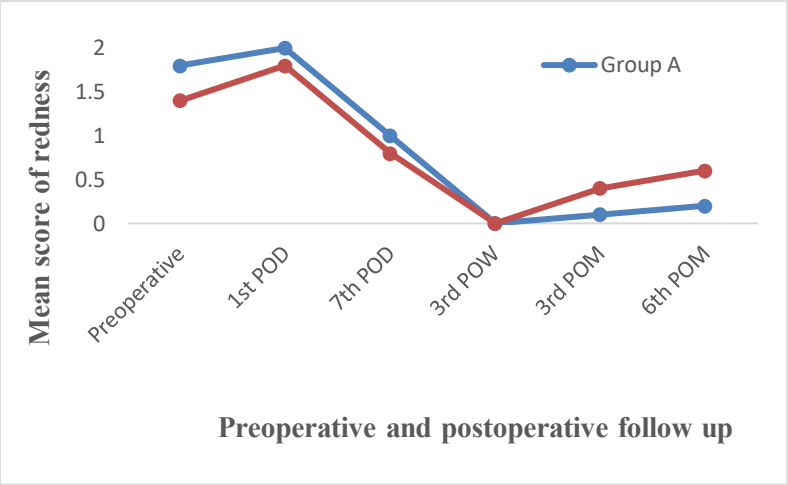

Figure 1: Line graph shows distribution of the patients' symptoms (Redness) by the type of operation preoperative & post-operative follow up

Figure 1 Presents the mean tearing scores for both groups across the preoperative and postoperative follow-up period. Preoperatively, Group A and Group B had scores of 1.8 and 1.4. The scores peaked at the 1st POD, reaching 2.0 in Group A and 1.8 in Group B, before decreasing to 1.0 and 0.8 by the 7th POD. Both groups reached 0 at the 3rd POW. A slight increase was noted at the 3rd POM, with scores of 0.1 in Group A and 0.4 in Group B and further at the 6th POM to 0.2 and 0.6 respectively.

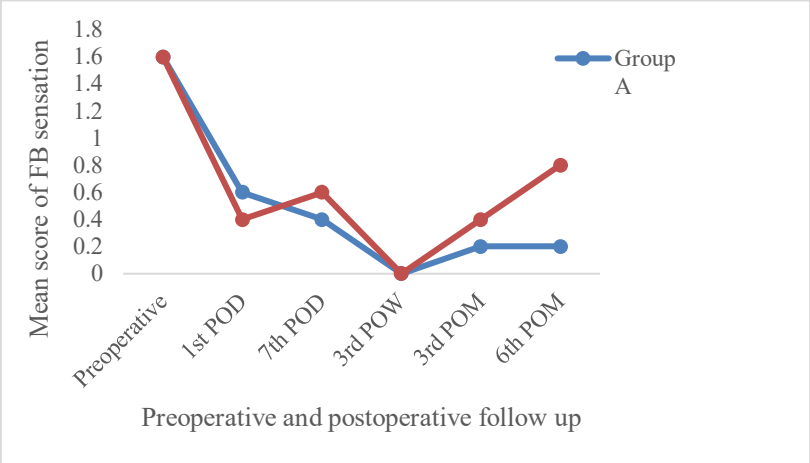

Figure 2: Line graph shows distribution of the patients' symptoms (Foreign body sensation) by the type of operation preoperative & post-operative follow up

Figure 2 Illustrates the mean score of foreign body (FB) sensation in both groups across the preoperative and postoperative follow-up period. Preoperatively, both Group A and Group B showed the same FB sensation score of 1.6, which dropped sharply by the 1st POD to 0.6 and 0.4, respectively. The scores continued to decline by the 7th POD (0.4 in Group A and 0.6 in Group B) and reached 0 in both groups at the 3rd POW. A mild increase was observed thereafter, with Group A scoring 0.2 and Group B 0.4 at the 3rd POM, rising further at the 6th POM to 0.2 in Group A and 0.8 in Group B.

DISCUSSION

This study compared postoperative symptom resolution following conjunctival autograft (CAG) and intraoperative mitomycin-C (MMC) in primary pterygium surgery and demonstrated that both techniques effectively reduced symptoms over time, although CAG showed a more sustained improvement in several parameters at later follow-up points.

Redness improved progressively in both groups, but CAG showed better long-term resolution. By the 3rd postoperative month (POM), 94.3% of the CAG group and 74.3% of the MMC group had no redness and this pattern continued at the 6th POM. These findings align with Donnenfeld et al., who reported that MMC reduces postoperative inflammation but may not consistently outperform graft-based procedures in long-term outcomes [13]. Similarly, Dadeya et al., found that conjunctival grafting generally provides more stable postoperative recovery compared to chemotherapeutic agents used during surgery [14].

Foreign body sensation, a key subjective complaint, also resolved more rapidly and consistently in the CAG group. On the 1st postoperative day (POD), 34.3% of CAG patients and 51.4% of MMC patients reported no sensation; however, by the 3rd POM, absence of symptoms increased to 91.4% in CAG versus 77.1% in MMC. Abraham et al., noted that MMC, while effective for recurrence reduction, may cause delayed epithelial healing or surface irregularities leading to persistent irritation in some patients [15]. Ang et al., similarly demonstrated that conjunctival transplantation restores a healthier ocular surface, supporting faster symptom normalization [16].

Photophobia improvement also favored CAG at later stages. At the 6th POM, 94.3% of Group A had Grade-0 photophobia compared to 57.1% in Group B. Tanaka et al., suggested that MMC may exacerbate ocular surface dryness in certain cases, which could explain the slower photophobia recovery in the MMC group [17]. In contrast, autografts provide limbal stem cells and conjunctival tissue, which contribute to faster restoration of ocular surface stability.

Lacrimation showed overall improvement in both groups, with 91.4% (CAG) and 85.7% (MMC) reaching Grade-0 by the 3rd POM. This is consistent with Kheirkhah et al., who showed that reducing postoperative inflammation achieved via grafting or MMC improves tear film function over time [18]. However, the slightly better outcomes in the CAG group by the 6th POM (94.3% vs. 80.0%) suggest that conjunctival grafts may support more stable goblet cell restoration.

Itching resolution was high in both groups early on, but long-term outcomes again favored CAG. At the 6th POM, 91.4% of CAG patients had no itching compared to 74.3% of MMC patients. This aligns with Ti and Tan, who highlighted that MMC, while effective against recurrence, may predispose some patients to chronic surface irritation [19].

The patterns shown in Figures 1 and 2 further support these findings. Mean tearing and foreign body sensation scores peaked early and dropped to zero by the 3rd postoperative week in both groups; however, minor increases at later months were more pronounced in MMC patients. Bahar et al. and Hall et al., both reported that graft-based techniques provide smoother surface healing and less late-stage irritation than MMC-assisted excision alone or with sutures [20, 21].

Overall, our findings indicate that while MMC reduces early postoperative symptoms effectively, conjunctival autograft offers more sustained long-term symptom relief. This mirrors the conclusions of Uy et al. and Kim et al., who emphasized that grafting procedures not only prevent recurrence but also optimize postoperative comfort through superior ocular surface rehabilitation [22, 23].

Limitations of the study

This study had several limitations. Although was only two-centre study, variations in surgical technique, postoperative care practices and patient characteristics across centers may have influenced the outcomes. The sample size was also relatively modest, which may limit the generalizability of subgroup comparisons. Additionally, the follow-up period, while adequate for assessing symptom resolution, may not fully capture long-term recurrences or late complications associated with conjunctival autograft or mitomycin-C.

CONCLUSION

Both conjunctival autograft and intraoperative mitomycin-C were effective in improving postoperative symptoms following primary pterygium surgery, but conjunctival autograft demonstrated more consistent and sustained resolution across several symptom domains. The findings support the use of autograft as a reliable technique for achieving better long-term patient comfort. Further large-scale, multi-centre studies with extended follow-up are recommended to strengthen the evidence and evaluate long-term recurrence rates and safety profiles.

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