


Lamellar Tarsectomy Procedure In Major Trichiasis Of The Upper Lid

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Khaled Hamdi Elbaklish 

Safaa M Saleh

Wael Adel Gomaa 

Ophthalmology Department, Ain Shams
University, Cairo, Egypt

Aims: Evaluation of failure rate and outcomes between skin and muscle surgery and lamellar tarsectomy procedure in major trichiasis of the upper lid.

Design: Quasi-randomized clinical study.

Methods and subjects: One hundred individuals with major trichiasis of the upper lid were enrolled and assigned to either skin and muscle surgery (group A) or a lamellar tarsectomy procedure (group B). Participants were examined at 6 and 12 months. The primary outcome measure (failure rate) was the percentage of participants having five or more eyelashes touching the globe or having surgery performed at any follow-up time in both groups. The secondary outcomes included failure time and changes in both visual acuity and corneal opacity.

Results: Risk failure over 6 months was 40% in group A and 10% in group B. Absolute risk reduction was 30% (95% CI=14.08–45.92%). Cumulative risk failure over 12 months was 20% in group A and 0.00% in group B after the second intervention. Absolute risk reduction was 20% (95% CI=8.58–31.42%). The number needed to treat (NNT) was 3.3 patients (95% CI=2.2–7.1). The mean number of rubbing lashes was greater in the skin and muscle group than in the lamellar tarsectomy group for 6 and 12 month examinations (0.002, 0.005). The change in visual acuity between the two groups was not significant. Recurrent trichiasis was noticed earlier, 6 weeks after surgery, in the skin and muscle group participants, and later, 3 months after surgery, in the lamellar tarsectomy group participants.

Conclusion: The lamellar tarsectomy procedure is a good choice for management of major trichiasis of the upper lid. The subjective symptoms and lid margin conjunctivalization were improved in lamellar tarsectomy participants. Absence of new corneal opacity or a change in existing corneal opacification was noticed at the 12 months follow-up study.

Keywords: tarsectomy, rubbing, lashes, trichiasis, lid

Key Message

Major trichiasis of the upper lid is a common complaint. Many kinds of surgical and non-surgical treatments have been prescribed before. The rate of failure and recurrence is not low. Major trichiasis is a strong predictor for corneal opacification, a drop in vision, and infection.

Upper lid surgery with strip removal of skin and another strip removal of orbicularis oculi was not enough, as the failure rate was 40%. Adding a lamellar tarsectomy step in the procedure reduced the failure rate to 10%.

This has high degree of followability, and experience can build rapidly.

Introduction

Trachoma is a chronic follicular conjunctivitis that has led to worldwide visual loss.¹ Attacks of ocular Chlamydia trachomatis infection in early life present with chronic

Correspondence: Khaled Hamdi Elbaklish
Ophthalmology Department, Ain Shams
University, Abbassia, Cairo 11566 Egypt
Tel +201000057550
Email khaled.hamdy62@yahoo.coffigm

active infection (active trachoma). This infection will end with conjunctival scarring, which will change the eyelashes position and direction to touch the corneal surface (trachomatous trichiasis [TT]).

Trichiasis is a big risk factor for the development of corneal opacity (CO) and visual deterioration in trachoma. Normally, 100 eyelashes are present in the upper lid, arranged in 3–4 irregular rows in front of the gray line and directed upward, forward, and lateral.²

The rate of progress of CO developing is related to trichiasis severity. In examination, we should differentiate between minor TT (one-to-five lashes touching the eye) and major TT (five lashes or more touching the eye).^{3–6}

The World Health Organization (WHO) considers surgery for individuals with one or more rubbing lashes, even with different lash locations (central or peripheral) or different grades of entropion. This recommendation is based on a real fact: patients having a minor degree of trichiasis may not be followed for a long time and the risk for trichiasis progression and visual impairment will increase.⁷ There is broad agreement that major TT should be treated surgically.

The management of minor TT is different, with many patients and clinicians not opting for early surgery. In some countries, epilation (repeated removal of lashes with forceps) was used for minor trichiasis and surgery for major trichiasis, which predated the WHO guidelines.⁸ Conventional treatment for trichiasis include epilation, electrolysis, or cryotherapy. Mechanical epilation provides only temporary relief. Electrolysis and laser application were used for a few rubbing lashes, with a high rate of recurrence⁹ When many rubbing lashes were present, electrolysis and diathermy might result in scarring of the lid margin and additional abnormal cilia growth. Recurrent trichiasis is a common problem.

Good surgery is a good solution. However, recurrent trichiasis is a common complication after surgery, where rates can reach up to 60% recurrence.^{4,10–12}

Different operations have been performed previously. These surgeries involve graft procedures, extensive tissue dissection, and complex suturing techniques. Some of these available techniques were simple, others had sophisticated techniques, and some had certain drawbacks with consequent corneal changes.¹³ Upper lid trichiasis is sometimes a resistant and recurrent problem, especially with many rubbing lashes. Successful trichiasis surgery can help in stopping the corneal opacity progression. However, trichiasis recurrence can significantly increase

the rate of corneal opacity progression. In addition, reduction of trichiasis load can reduce photophobia, epiphora, and allow fading of corneal scars in some patients.^{4,10} This study compared skin and muscle surgery versus a lamellar tarsectomy procedure for major upper lid trichiasis to estimate the recurrence rate and outcomes of these procedures.

Subjects And Methods

This is a quasi-randomized study. This study was approved by the Ethics Committee of Ain Shams University (registration number: FWA 000017585, FMASU R20/2017) and we have written informed consent according to the Declaration of Helsinki. All participants were provided information in Arabic about the trial. For those agreeing to participate, written informed consent in Arabic was required prior to enrolment. If the participant was unable to read and write, the information sheet and consent form were read to them and their consent recoded by witnessed thumbprint. Data of the trial was reviewed for patient safety and early detection of deviations from the original protocol.

The clinical examination and surgical procedures were performed in eye centers. Uncorrected and corrected visual acuities were measured at 6 m, using letter-E chart. The testing distance was reduced to 2 or 1 m if necessary. Ophthalmic examinations were done in a darkened room using a 2× magnifier and a bright lamp. All baseline examinations were performed with two ophthalmologists. The rubbing lashes number that touched the cornea and conjunctiva was counted (“lash burden”). The locations of rubbing lashes, single location or different locations, were recorded. The tarsal thickening and eyelid eversion were assessed. Patients with a history of epilation, electrolysis, and argon laser ablation were accepted. The evidence of previous epilation was detected through the presence of broken or newly growing lashes, or areas of absent lashes. We excluded patients with previous lid surgery or any additional lid diseases like lagophthalmos. Entropion cases and cases with damaged tarsus (patients who had previous tarsus surgery or short tarsus) were excluded.

The degree of conjunctivization of the lid margin (anteroposition of the mucocutaneous junction) was evaluated. Change in corneal opacity was assessed by slit lamp examination. Grading of corneal opacity was prescribed as stage 1A–central corneal opacity, stage 1B–peripheral corneal opacity, stage 2A–vascularized central corneal opacity, and stage 2B–vascularized peripheral

corneal opacity. Tarsal conjunctival papillary inflammation was classified as stage 1–quiet, stage 2–papillary reaction (repeated infection), stage 3–mixed papillary and follicular reaction (repeated infection), and stage 4–dense conjunctival scarring.

We did assessment of the baseline clinical work, then the participants were quasi-randomized to one of two intervention groups: skin and muscle procedure in upper lid trichiasis (group A–patients involved) or lamellar tarsectomy procedure in upper lid trichiasis (group B–patients involved). We assigned 50 patients to group A and 50 patients to group B. A total of 100 patients were involved in the trial between 2010 and 2012. Our aim in this study was to identify outcome differences after surgery in both groups and limit other confusing factors such as surgical experience.

Patient Visits

All participants returned 7–10 days after surgery to remove sutures and report any complications. Postoperatively, patching of the operated eye was done until the next morning, Augmentin (amoxicillin/clavulanate potassium) 1 g/12 hours oral for 5 days and fucithalmic eye ointment were self-administered twice a day for 2 weeks beside hot compress. Patient visits were regular for both groups, at 3, 6, 9, and 12 months. On each visit a clinical examination was performed. The preoperative, 6-month, and 12-month examinations were performed by two ophthalmologists. The primary outcome measure (failure rate) was the proportion of individuals at any follow-up who had “failed”, defined as either 1) five or more eyelashes touching the globe or 2) repeated surgery performed in the trial eye at any point during the follow-up period. The secondary outcome measures at 12 months were: CO, visual acuity, conjunctivalization of the lid margin, papillary reaction, feeling of pain, subjective visual acuity, epiphora, and dryness.

After the baseline clinical work, participants were referred to the surgeon. Quasi-randomization was stratified by the surgeon.

Any individual who showed evidence of recurrent trichiasis, defined as five or more trichiatric lashes (major trichiasis) or corneal changes related to observed lashes at any follow-up examination were immediately offered surgery, to be performed by the same surgeon. These individuals continued to be followed up according to the trial protocol.

Statistical Analysis

A quasi-randomized study was chosen in the management of upper lid trichiasis because of the greater acceptability and availability of lid surgeries.

Demographic data of the participants were estimated with Mann–Whitney, independent *T*-test and chi-square test of independence. The absolute risk reduction was measured with a Risk Reduction Calculator. The Mann–Whitney test was used to analyze the difference in the number of lashes touching the eye. The signed rank test and chi-square test were used to compare between baseline, 6 month, and 12-month follow-ups. The secondary outcomes were analyzed by Mann–Whitney *U*- and Chi-square tests. The presence of misdirected lashes without touching the cornea was omitted from the study. Kaplan–Meier survival curve was used to study the event (failure) in a 1-year study. An estimation of sample size was performed considering a study power of 0.80 with an α of 0.05, aiming to detect a more than 20% difference in failure rate between two groups in the 12 months follow-up. The overall study size of 100 was selected based on the results of a controlled trial of surgery for trachomatous trichiasis of the upper lid where tarsal rotation was successful in 77% of cases of major trichiasis, compared with a 41% success rate for tarsal advance and rotation.⁶ A *P*-value of 0.05 or less was considered statistically significant.

Operative Details

Upper Lids Trichiasis Patients Underwent Skin And Muscle Operation – Group A (Figure 1)

Surgery was performed with standard aseptic technique. The affected eyelid was infiltrated with 1–2 ml of local anesthetic 2% lignocaine and 1:200000 adrenaline into the submuscular space.

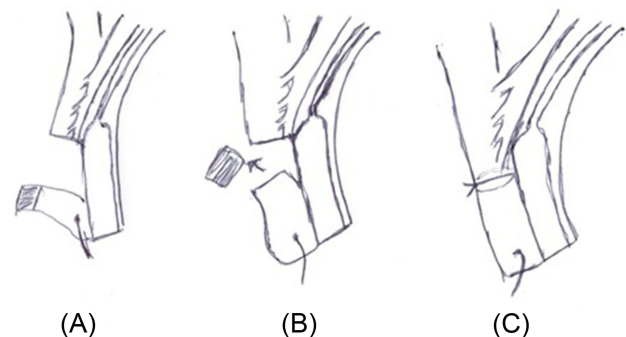


Figure 1 Skin and muscle surgery: (A) Skin incision was done 3–4 mm away from the lid margin covering the lateral 2/3 of lid width. (B) Incision in the orbicularis muscle (muscle layer) was made. A strip of orbicularis oculi was excised. (C) Closure of the muscle layer with 6/0 Coated VICRYL (interrupted stitches) was done. Closure of the skin with continuous 6/0 Coated VICRYL was done.

1. A skin incision was done 3–4 mm away from the lid margin covering the lateral 2/3 of lid width. The extent of the incision should not be short (23–25 mm).
2. An elliptical area of 2 mm of skin (past the last lateral lash follicle, and just lateral to the punctum) was excised.
3. An incision in the orbicularis muscle (muscle layer) was made.
4. A strip of orbicularis oculi was excised.
5. Closure of the muscle layer with 6/0 Coated VICRYL (interrupted stitches) was done.
6. Closure of the skin with continuous 6/0 Coated VICRYL was done.

Upper Lids Trichiasis Patients Underwent Lamellar Tarsectomy Operation Group B (Figure 2)

Surgery was performed with standard aseptic technique. The affected eyelid was infiltrated with 1–2 ml of local anesthetic 2% lignocaine and 1:200000 adrenaline into the submuscular space.

1. A skin incision was done 3–4 mm away from the lid margin covering the lateral 2/3 of lid width. The extent of the incision should not be short (23–25 mm).
2. An elliptical area of 2 mm of skin (past the last lateral lash follicle, and just lateral to the punctum) was excised.
3. An incision in the orbicularis muscle (muscle layer) was made.
4. A strip of orbicularis oculi was excised.

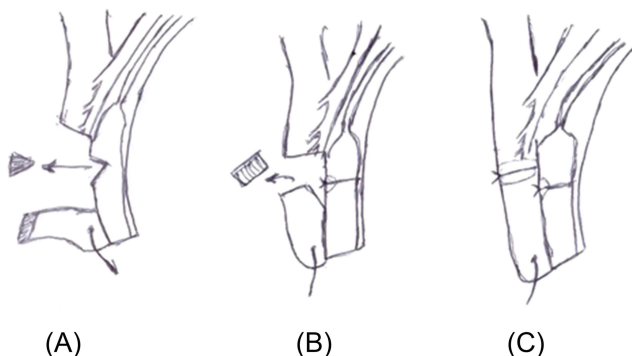


Figure 2 Lamellar tarsectomy procedure: (A) The pretarsal orbicularis fibers and the anterior fibers of the muscle of Riolan were divided till visualization of the external surface of the tarsus. Two lines in tarsal surface in a distance 2–3 mm in between were marked with superblade 30 degrees (MANI-MST-30), deep incisions. (B) D-shaped lamellar incision of external surface of tarsus was made to remove the superficial lamella of tarsus with groove formation. (C) Three 6/0 Coated VICRYL stitches were taken from the peripheral incision line to the anterior incision line without cutting the tarsus. As the sutures were tied, the lid margin might rotate outward, causing the lashes to rotate externally away from the cornea.

5. The pretarsal orbicularis fibers and the anterior fibers of the muscle of Riolan were divided until visualization of the external surface of the tarsus. At the medial end, care was taken to avoid touching the canaliculus.
6. Two lines in the tarsal surface with a distance 2–3 mm between them were marked with superblade 30 degrees (MANI-MST-30), deep incisions. The first line was a vertical incision that was in the exposed tarsal plate parallel to the margin and just behind the visible bulbs of the cilia. The second incision was made approximately 3 mm behind the first and it was curved.
7. The D-shaped lamellar incision of the external surface of tarsus was made to remove the superficial lamella of tarsus (Figure 3, nearly one third of tarsus thickness).
8. Three 6/0 Coated VICRYL stitches were taken from the peripheral incision line to the anterior incision line without cutting the tarsus. As the sutures were tied, the lid margin might rotate outward, causing the lashes to rotate externally away from the cornea.
9. The amount of rotation during surgery was adjusted by suture passing. If greater anterior rotation was desired, the suture will pass to exit distal on the lid margin. However, if less anterior rotation was desired, the sutures pass proximal on the lid margin. The sutures should be deeper to involve more than half the thickness of the tarsus. Mild over rotation of the lid margin (10%) that made the lashes rotate more outward was the desired end.
10. Closure of the muscle layer with 6/0 Coated VICRYL (interrupted stitches) was done.



Figure 3 Lamellar tarsectomy procedure, groove formation with removal of the superficial lamella of tarsus and starting the tarsal rotating sutures.

11. Closure of the skin with continuous 6/0 Coated VICRYL was done.

Results

The participants were Egyptian, of Arab ethnicity. The baseline demographic and clinical characteristics were similar and are presented in Table 1. The average age of the participants in group A was 41.23 ± 9.95 years and 41 ± 9.63 in group B. Forty-five participants were females and 55 participants were males. In group A, 27 were females and 23 were males, in group B, 22 were females and 28 were males.

The mean follow-up period was 380.92 ± 11.47 days (range=370–420 days) for group A and 384.26 ± 10.87 days (range=371–420 days) for group B ($P < 0.380$). All cases had at least five lashes rubbing the cornea. Thirty-

one patients had multiple rubbing lashes at multiple locations in group A vs 33 in group B. Nineteen patients had multiple rubbing lashes at single location in group A vs 17 in group B. The number of rubbing lashes varied between 5–8 in both groups. The median of the number of rubbing lashes in groups A and B were 7.00 and 7.00, and the distributions in the two groups did not differ (Mann–Whitney $U=1,178.500$, $n_1=n_2=50$, $P < 0.607$ two-tailed). Twenty-five cases had repeated/previous chlamydial infection. The median of Log MAR baseline visual acuities in groups A and B were 0.30 and 0.30 and interquartile range (IQR) 1.00 and 1.00, respectively, and the distributions in the two groups did not differ statistically (Mann–Whitney $U=1,249.500$, $n_1=n_2=50$, $P < 0.997$ two-tailed) (Table 1).

Table 1 Baseline Demographic And Clinical Characteristics Of Patients In Both Groups Of The Study

Demographic And Clinical Characteristics	Group A	Group B	P-Value
Ages	41.23 ± 9.95 SD	41 ± 9.63 SD	0.924*
Sex, n (%) patients			0.317**
Female	27 (54%)	22 (44%)	
Male	23 (46%)	28 (56%)	
Best corrected Log MAR VA	0.0–1 (6/6–6/60)	0.0–1 (6/6–6/60)	0.997***
Median	0.3000	0.3000	
Interquartile Range	0.62	0.68	
Trichiasis (number of lashes touching eye)			0.607***
Median of lashes,	7	7	
Interquartile Range	1	1	
Number of rubbing lashes			
cases with 5 rubbing lashes	9 (18%)	7 (14%)	
cases with 6 rubbing lashes	13 (26%)	12 (24%)	
cases with 7 rubbing lashes	18 (36%)	20 (40%)	
cases with 8 rubbing lashes	10 (20%)	11 (22%)	
Location of rubbing lashes			
Single	19	17	
multiple	31	33	
Corneal opacity			0.628***
CO, none	40 (80%)	42 (84%)	
CO, peripheral	7 (14%)	5 (10%)	
CO, central	3 (6%)	3 (6%)	
Lid margin conjunctivization	36 (72%)	29 (58%)	0.292*
Mean, SD	0.96 ± 0.102 (95% CI=0.75–1.16)	0.80 ± 0.11 (95% CI=0.57–1.02)	
Papillary inflammation			0.823***
Mild (P1)	26 (52%)	29 (58%)	
Moderate (P2)	12 (24%)	10 (20%)	
Severe (P4)	12 (24%)	11 (22%)	

Notes: *Assessed by independent t-test. **Assessed by Chi-square test of independence. ***Assessed by Mann–Whitney U-test

Twenty -five of the 100 (25%) individuals in the study developed the primary outcome (failure) over 6 months: 40% (20/50) in group A and 10% (5/50) in group B. Absolute risk reduction was 30% (95% CI=14.08–45.92%). The number needed to treat (NNT) was 3.3 patients (95% CI=2.2–7.1).

In group A, 20 cases had as least five affected lashes and ten participants had repeated surgery, with the remaining ten participants in refusing the second surgery. In group B, five cases had at least five affected lashes and had the lamellar tarsectomy procedure.

The median of the number of rubbing lashes in groups A and B were 1.00 and 0.00 over 6 months and the distributions in the two groups differed significantly (Mann–Whitney $U=824.500$, $n_1=n_2=50$, $P<0.002$ two-tailed).

The number of rubbing lashes reduced significantly between baseline and 12 months in both groups (0.00). Repeated surgery was associated with a reduced failure rate (Absolute risk reduction in group B=20%, [CI=8.58%–31.42%] (Table 2). The median numbers of rubbing lashes in groups A and B were similar at 12 months, with a reduced Interquartile Range (Table 2) (0.005).

Kaplan-Meier analysis revealed early failure occurred 6 weeks after surgery in group A participants, the mean time for recurrence (surgical failure) was 33.85 weeks (CI=27.99–39.87 weeks), late failure occurred 3 months after surgery in group B participants, the mean time for recurrence (surgical failure) was 47.57 weeks (0.001) (CI=44.46–50.78 weeks) (Figure 4).

Table 2 Trichiasis Status Of Participants In Each Group Of The Study At 6 And 12 Months

Characteristic	Group A	Group B	Rank P-value
Trichiasis – no of lashes touching eye at 6 months			0.002*
Median of lashes	1.00	0.00	
Interquartile Range	6.00	1.00	
Minimum–maximum no of rubbing lashes at 6 months	0–8	0–7	
Trichiasis – no of lashes touching eye at 12 months			0.005*
Median of lashes	1.00	0.00	
Interquartile Range	2.00	1.00	
Minimum–maximum no of rubbing lashes at 12 months	0–7	0–2	

Note: *Assessed by Mann–Whitney U-test.

Survival Functions of skin, muscle surgery (curve 1) and lamellar tarsectomy surgery (curve 2)

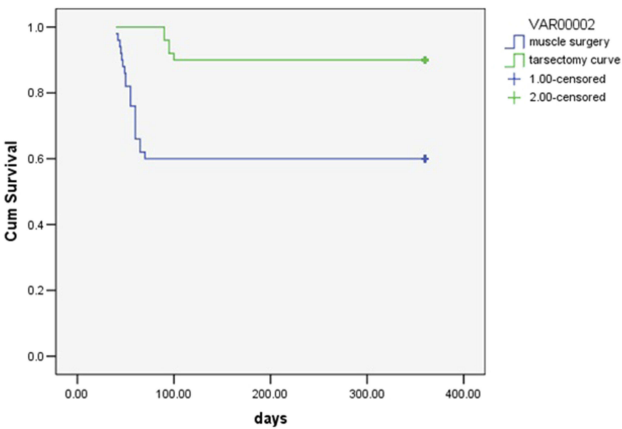


Figure 4 Cumulative survival analysis revealed early vertical sloping (failure 6 weeks after surgery) in the skin and muscle surgery group (blue curve; success rate 60%), and late vertical sloping (failure 3 months after surgery) in the lamellar tarsectomy group in (green curve; success rate 90%).

Secondary Outcomes

There was no difference in visual acuity assessment (Table 3) from baseline to 12 months follow-up between the two groups (OR=1.00, 95% CI=0.07–12.55). (0.804) There was similarly no difference between the baseline and 12 months visual acuity in both groups (0.997).

There were no statistically significant differences in CO between the two groups (OR=3.69, 95% CI=0.15–87.38) (0.596).

Baseline CO was compared with 12-months follow-up corneal opacities, and little or no progressive corneal opacity was found (0.717) (Table 3).

Major trichiasis recurred in 10 (20%) individuals in group A by 12 months, and in group B at 12 months none (0%) had five lashes touching the eye. There was a marked reduction in lid margin conjunctivization over 12 months in the Lamellar tarsectomy group (OR=1.28, 95% CI=0.02–68.09) (0.001).

Papillary reaction grades did not differ between groups A and B (OR=0.55, 95% CI=0.01–37.56) (0.808).

Surgery was associated with improved lid margin conjunctivization at 12 months follow-up compared to baseline features in both groups (0.003, 0.000).

Surgery was not associated with a reduction in papillary reaction grades (0.681) at 12 months follow-up compared to baseline features in both groups (Table 3).

Subjective symptoms were evaluated. At 12 months follow-up, group A participants felt greater treatment pain (28%), subjectively better vision (60%), and epiphora (26%). Group B participants felt ocular pain

Table 3 Clinical Characteristics Of Participants In Each Group Of The Study At 12 Months

Characteristic	Group A	Group B	P-value
VA (mean±SD) at 12 months	0.45±0.04	0.45±0.05	0.804*
Median of lashes,	0.30	0.30	
Interquartile Range	0.62	0.62	
95% Confidence Interval for Mean	0.36–0.55	0.34–0.56	
CO chi-square test	40 (80%) 7 (14%) 1 (2%) 2 (4%)	39 (78%) 5 (10%) 4 (8%) 2 (4%)	0.596**
Lid margin conjunctivization at 12 months	0.54±0.07 SD	0.22±0.059	0.001*
Median	1.00	0.00	
Interquartile Range	1.00	0.00	
95% Confidence Interval for Mean	0.39–0.68	0.10–0.33	
Papillary reaction grades, chi-square test	30 (60%) 8 (16%) 12 (24%)	31 (62%) 8 (16%) 11 (22%)	0.808**

Notes: *Assessed by Mann–Whitney U-test. **Assessed by χ^2 .

(14%), reported better vision (84%), and epiphora (10%) (Table 4).

Ten patients in group B (20%) had an early nodular lid margin after surgery, which improved within 2 weeks, bacterial conjunctivitis with conjunctival redness, and discharge in both groups (8 cases in group A; 4 cases in group B). No active trachoma was clinically detected. Participants did not have persistent tarsal conjunctival inflammation in either group (Table 4).

Table 4 Symptoms And Complications Reported By Participants At 12-Months Follow-Up

Characteristic	Group A	Group B
Vision		
Better	30	42
Same	16	6
Worse	4	2
Eye pain	14	7
Eye watering	13	5
Early nodular lid margin	—	10
Bacterial conjunctivitis	8	4
Persistent tarsal conjunctival inflammation	—	—
Dense extensive conjunctival scarring	+++	+++

Discussion

We found skin and muscle surgery is inferior to the lamellar tarsectomy procedure for the management of major upper lid trichiasis, the failure rate was 40% in group A vs 10% in group B at 6 months follow-up. The risk reduction was 30% after the first procedure. Repeated surgery had a good effect on the rate of failure, the risk reduction was 20% at 12 months follow-up. Lamellar tarsectomy surgery has a good response to prevent lashes from touching the eye. Most individuals in the lamellar tarsectomy surgery group reached endpoint at 6 months follow-up.

There was no statistically significant difference in visual acuity change between both groups at 12 months follow-up. After lamellar tarsectomy surgery, more people subjectively felt better vision compared to those in the skin and muscle surgery group. Watering eye (epiphora) may be responsible for this difference and was perceived more frequently in the skin and muscle surgery group and may be caused by residual/recurrent lashes.

These symptoms will interfere with work and are prognostic factors for accepting repeated surgery.⁸ Overall, no significant visual changes over 12 months within either group were reported. Two previous studies have detected visual acuity improvement in the short period following surgery; however, both studies involved advanced cases

with severe trichiasis; these people have the potential to feel visual improvement.^{4,14}

Without recurrence, surgery can provide a solution over a long period of time, whilst recurrence can make intervention still in progress, and the surgery can be repeated when trichiasis lashes touch the cornea again. Although 45 individuals in the Lamellar tarsectomy group reached endpoint, 5/50 (10%) developed recurrent trichiasis. This percentage is good compared with that reported in previous studies and case series.^{4,10,12}

Early lid margin notching, which was cosmetically poor, was found in 20% of participants in the lamellar tarsectomy group. This interventional study is applicable in clinical practice with clinical and statistical significance.

Recurrent trichiasis after surgery is a serious complication that can lead to blindness from trachoma. Trichiasis recurrence rates is as low as 7% at 1 year in tightly supervised clinical trials, and this rate can be higher under operational conditions.¹¹ Recurrences were reported within the first year and recorded as 32% at 6 months and 40% at 12 months.⁴ The recurrence rate was reported as 16% at 8 weeks after surgery in previous studies.¹⁵ Trichiasis recurrence was related to surgical skill or performance as reported in studies before.¹⁶ In lamellar tarsectomy, rotating tarsal sutures are the hallmark of tarsal grooving, evert the intact lid margin, relieving tarsal contraction and high orbicularis oculi tone. Recurrence may be related to surgeon skills and technique. However, we cannot know the features of the surgery that can influence the outcome.⁴

Early recurrence may be related to poor technique, whereas late recurrence may reflect a progressive cicatrizing process.¹⁷ In the skin and muscle surgery group, 20 failures occurred 6 weeks after surgery, indicating a less efficient surgery. The mean number of rubbing lashes, and the number of patients with at least five rubbing lashes were greater in the skin and muscle surgery group.

Trichiasis severity was usually associated with high orbicularis oculi tone and a relatively short lid. So, the progressive increase in orbicularis oculi tone and the contraction could affect the lid margin stability. With disturbance of lid margin stability, the misdirected lashes are easily touching the cornea, especially if the lashes present at multiple locations.¹⁶

Comparison of the baseline with 12 months corneal opacity found that there was no progress in corneal opacification in both the groups.

With two previous longitudinal non-randomized studies in major trichiasis, they reported no difference in

corneal opacification between the operated participants and non-operated persons.^{5,10,18} This study is a 6 month and 12 month study (short-term study). This time is not enough to accept that new CO will not develop in non-operated eyes. Better surgery is expected to prevent any eyelashes from touching the eye. Surgery can give long-established changes.

Study Limitation

We should confirm that the lamellar tarsectomy in this trial was performed by a surgeon with high quality operating ability, and a good record of this procedure. So, the results he achieved were maybe higher than average. Detecting differences and changes in corneal disease and visual acuity may require a time longer than 12 months follow-up.

Conclusion

The lamellar tarsectomy procedure is a good choice for management of major trichiasis of the upper lid. The subjective symptoms and lid margin conjunctivalization were improved in the lamellar tarsectomy participants. Absence of new corneal opacity or a change of existing corneal opacification was noticed in the 12 months study.

Disclosure

The authors report no conflicts of interest in this work.

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