

# The Results of Pterygium Excision at Thammasat Hospital

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**Background:** Pterygium is a common ocular disease. Outcomes of pterygium surgery are variable.

**Objective:** To evaluate the results of pterygium excision, particularly the recurrence rate and complications of surgery.

**Material and Method:** Patient data who had pterygium excision at Thammasat Hospital from October 2010 to September 2013 were reviewed. Age, sex, primary or secondary pterygium, methods of surgery and complications were analyzed.

**Results:** Three hundred and thirty-four eyes (307 patients) were studied. One hundred and ninety-two (62.5%) were in women. The mean age  $\pm$  SD was 57.1 $\pm$ 12.2 years. Three hundred and twenty-two eyes (96.4%) were primary pterygium. Amniotic membrane graft technique was performed in 323 eyes (96.7%). Pterygium recurred after surgery in 80 eyes (24.0%). Intra-ocular pressure increased more than five mmHg in 34 eyes (10.2%) after steroids use. Scleral thinning was found in five eyes (1.5%) and four in this group were treated with Mitomycin C. There was granulation tissue formation in one eye (0.3%).

**Conclusion:** Pterygium excision with amniotic membrane graft technique was widely operated at Thammasat Hospital and recurrence after surgery was rather high. Increased intra-ocular pressure after steroids use was common complication. Scleral thinning was a critical problem with the application of Mitomycin C.

**Keywords:** Pterygium, Surgery, Outcomes, Recurrence, Scleral thinning

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Pterygium is fibrovascular tissue growing from bulbar conjunctiva to corneal surface. The symptoms are eye irritation, foreign body sensation, lacrimation, itching and red eye. Moreover, pterygium can cause blurred vision due to corneal astigmatism<sup>(1,2)</sup> or obscured visual axis. The etiology and pathogenesis are not clear. Exposure to ultraviolet light is the major risk factor<sup>(3-5)</sup>. Minor risk factors include genetics<sup>(6)</sup>, dry eye<sup>(7,8)</sup>, chronic irritation and inflammation of the eye<sup>(9)</sup>.

There are a variety of pterygium treatment methods such as using artificial tears to decrease eye irritation, steroids to reduce inflammation and surgical excision to remove pterygium tissue out of the eye. The gold standard for pterygium removal is inhibiting the pterygium recurrence. Different techniques in pterygium surgery include bare sclera, conjunctival autograft, amniotic membrane graft, possibly in conjunction with Mitomycin C, or Beta radiation as adjunctive therapies. The objective of the present study is to find out the results of pterygium excision at Thammasat Hospital, particularly the outcomes and

complications of surgery. Knowledge of these results can be used for planning pterygium treatments in the future.

## Material and Method

For this retrospective study, data were collected from medical record charts. Patients who had pterygium excision at Thammasat Hospital from October 2010 to September 2013 were enrolled. The subjects who had a follow-up period less than four weeks were excluded. Data such as age, sex, primary or secondary pterygium, method of surgery, anti-inflammatory drug usage, complications and recurrence (fibrovascular tissue overgrowth across limbus to corneal surface) were collected.

This research has been approved by the Ethics Committee at Thammasat University, Thailand. The authors verified that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research, adhering to the tenets of the Declaration of Helsinki.

## Results

413 eyes that had pterygium surgery were studied. Seventy-nine eyes were excluded due to having a follow-up period less than four weeks.

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Therefore, only 334 eyes from 307 patients, of which 115 were males (37.5%) and 192 were females (62.5%), were included in the present study. The mean age  $\pm$  SD was 57.1 $\pm$ 12.2 years. Age range was between 28 and 84 years old.

The types of pterygium were primary and secondary pterygium, in 322 eyes (96.4%) and 12 eyes (3.6%), respectively. The method of surgery included bare sclera in six eyes (1.8%), amniotic membrane graft in 323 eyes (96.7%), and conjunctival autograft in five eyes (1.5%). Types of adjuvant therapy were Mitomycin C, Beta radiation, and subconjunctival Triamcinolone acetonide in 17 eyes (5.1%), five eyes (1.5%) and one eye (0.3%), respectively.

Dexamethasone eye drops was the most common postoperative anti-inflammatory drug used in 214 eyes (64.1%), followed by Loteprednol eye drops and Dexamethasone eye ointment, were used in 93 eyes (27.8%) and 87 eyes (26.0%), respectively. The least commonly used drug was Methylprednisolone in only four eyes (1.2%). Some patients used more than one kind of drug for treatment.

The mean follow-up period  $\pm$  SD was 35.0 $\pm$ 34.6 weeks. The minimum and maximum follow-up time was at four and 240 weeks, respectively.

Pterygium recurred after surgery in 80 eyes (24.0%). The median recurrent onset time (interquartile range) was 12 (8.0-23.3) weeks. Most of patients (96.3%) had a recurrence within 60 weeks (Fig. 1). The recurrence rate distributed by associated factors is shown in Table 1. Intra-ocular pressure increased

more than five mmHg in 34 eyes (10.2%), and more than 15 mmHg in seven eyes (2.1%) after steroids use. The maximum increase was 23 mmHg from the pre-operative baseline (Table 2). There were scleral thinning in five eyes (1.5%) and granulation tissue formation in one eye (0.3%).

## Discussion

The most popular method for pterygium surgery is the conjunctival autograft technique. Chaidaroon et al<sup>(10)</sup> interviewed Thai ophthalmologists in the year 2010 and found that conjunctival autograft transplantation was the most widely used in Thailand. Furthermore, Mohammed<sup>(11)</sup> found that pterygium excision adjuncted with Mitomycin C and conjunctival autograft were common procedures. The reason might be that conjunctival autograft is easily available because it could be obtained from patients themselves. However, the present study at Thammasat Hospital revealed that amniotic membrane graft method was mostly done. The advantages of amniotic membrane technique are conjunctival remaining preserved with no fibrosis scar formation and the virgin conjunctiva is saved for filtering surgery in the future. Since a small number of conjunctival autograft cases were performed in this study, the recurrence rate was no statistically different between conjunctival autograft and amniotic membrane graft technique ( $p = 0.409$ ). In general, conjunctival autograft was superior to amniotic membrane graft technique in terms of reducing recurrent rate<sup>(12)</sup>. For this reason, conjunctival autograft may be suitable for high tendency recurrent cases.

Recurrence is the important and challenging problem<sup>(13)</sup>. In the present study, pterygiums recurred after surgery in 80 eyes (24.0%). Most of eyes in the present study (73.8%) recurred within 20 weeks. However, 96.3% of the eyes had a recurrence within 60 weeks. This agrees well with the study of Avisar et al which showed that 91.6% of the recurrences appeared by 360 days after surgery<sup>(14)</sup>.

There are many risk factors in recurrence such as age. Younger people have more recurrences than older patients do<sup>(15-18)</sup>. Masuda et al found that age was a significant risk factor in recurrence ( $p = 0.028$ )<sup>(15)</sup>. Mahar also showed that younger age (below 50 years old) was significant risk factor ( $p = 0.04$ )<sup>(17)</sup>. However, this was not found in the present study. There was no statistically significant difference in the recurrence rate between the young and the old ( $p = 0.431$ ). The reason might be that age is not a single risk factor.

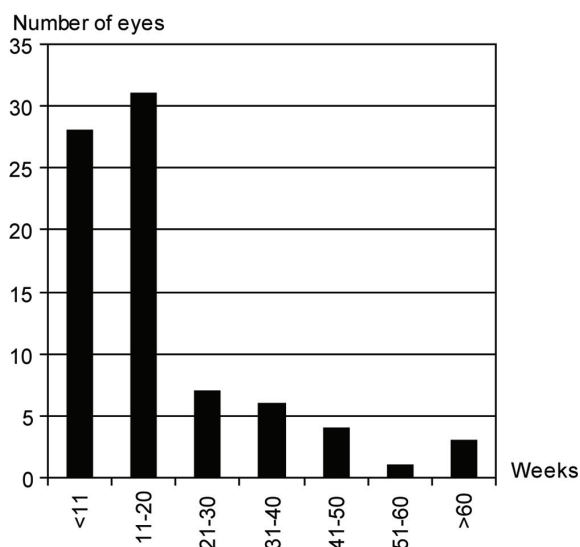


Fig. 1 Onset of recurrence after surgery.

**Table 1.** Recurrence rate distributed by associated factors

Associated factors	Number of eyes	Number of recurrent eyes (%)	<i>p</i> -value (Chi-squared)
Pterygium (all cases)	334	80 (24.0)	
Pterygium type			
Primary	322	75 (23.3)	0.143
Secondary	12	5 (41.7)	
Age of patients			
Under 40 years	34	10 (29.4)	0.431
40 years and over	300	70 (23.3)	
Surgeon			
Resident	267	67 (25.1)	0.329
Staff	67	13 (19.4)	
Surgical technique			
Amniotic membrane alone	306	78 (25.5)	0.409
Conjunctival autograft alone	2	0 (0.0)	
Amniotic membrane	323	79 (24.5)	0.081
Amniotic membrane alone	306	78 (25.5)	
Amniotic membrane + Mitomycin C	16	1 (6.3)	
Amniotic membrane + Triamcinolone	1	0 (0.0)	
Conjunctival autograft	5	0 (0.0)	
Conjunctival autograft alone	2	0 (0.0)	
Conjunctival autograft + Beta radiation	3	0 (0.0)	
Mitomycin C	17	1 (5.9)	
Mitomycin C alone (+ Bare sclera)	1	0 (0.0)	
Mitomycin C + Amniotic membrane	16	1 (6.3)	
Beta radiation	5	1 (20.0)	
Beta radiation alone (+ Bare sclera)	2	1 (50.0)	
Beta radiation + Conjunctival autograft	3	0 (0.0)	
Bare sclera	6	1 (16.7)	
Bare sclera alone	3	0 (0.0)	
Bare sclera + Beta radiation	2	1 (50.0)	
Bare sclera + Mitomycin C	1	0 (0.0)	
Subconjunctival Triamcinolone	1	0 (0.0)	
Triamcinolone + Amniotic membrane	1	0 (0.0)	

**Table 2.** Postoperative complications (n = 334 eyes)

Complications	Number of eyes	%
Recurrence	80	24.0
Increased intra-ocular pressure	34	10.2
>5-10 mmHg	18	5.4
11-15 mmHg	9	2.7
16-20 mmHg	5	1.5
21-25 mmHg	2	0.6
Scleral thinning	5	1.5
Granulation tissue	1	0.3

Secondary pterygium has a tendency to recur more frequently than primary pterygium after removal. Mahar and Manzar found that secondary pterygium correlated significantly with the recurrence ( $p = 0.050$ )<sup>(17)</sup>. This contrasts with the present study,

although recurrence for secondary pterygium (41.7%) was more than for primary pterygium (23.3%), but there was no statistically significant difference ( $p = 0.143$ ). This might be due to the low number of secondary pterygium patients.

The surgeon's experience is another associated factor. Masuda et al<sup>(15)</sup> detected that skill of surgeon was a significant risk factor ( $p = 0.022$ ). In the present study, recurrence rate from resident and staff surgeons were 25.1% and 19.4%, respectively ( $p = 0.329$ ), which was not a statistically significant difference. The reason might be that an operation by residents was under a control of staffs. Therefore, the outcome was not much different.

Different surgical techniques give different results in the recurrence rate. Kareem et al<sup>(19)</sup> found that, with bare sclera technique, the recurrence rate was 32-34%. Kaufman et al<sup>(12)</sup> indicated that bare

sclera method resulted in a significantly high recurrence rate. However, in the present study, three eyes, with bare sclera technique alone, did not have recurrence after excision. The reason might be that the surgeries were performed on the old (69, 76 and 83 years old), who have a low recurrence tendency.

Recurrence rate with amniotic membrane graft was 10.9-41.7%<sup>(20-22)</sup>. A comparative study of Salman et al<sup>(22)</sup> in recurrent pterygium cases showed that the recurrence rate improved from 30% to 20% when excision was done by amniotic membrane graft combined with Mitomycin C versus amniotic membrane graft alone. In the present study, recurrence rate from amniotic membrane graft alone and amniotic membrane graft, combined with Mitomycin C, were 25.5% and 6.3%, respectively ( $p = 0.081$ ).

From the present study, intra-ocular pressure after steroids use increased more than five mmHg, 10.2%, and more than 15 mmHg, 2.1%. The increased intra-ocular pressure was not as high as studies in the past which showed that one-third increased more than 6 mmHg<sup>(23-26)</sup> and 5% increased more than 15 mmHg<sup>(25,27)</sup>. These might be due to different kind of steroids use.

Scleral thinning is common complication in cases combined with Mitomycin C<sup>(12,28,29)</sup>. Kaufman et al<sup>(12)</sup> concluded that Mitomycin C was associated with vision-threatening complications, including scleral thinning or ulceration (2-19%), and delayed conjunctival epithelialization (4-6%). In addition, there was some evidence of increasing complications with increased drug concentration and duration of exposure. In the present study, five eyes had scleral thinning (1.5%) and four in this group were treated with Mitomycin C.

Granulation tissue is a common complication of pterygium surgery. Many studies reported that the prevalence was mostly 2.7% to 3.1%<sup>(21,30,31)</sup>, and might be as high as 10%<sup>(32)</sup>. In the present study, only one eye (0.3%) had developed granulation tissue after pterygium excision, and it was cured after excising the granulation mass. Dayanir et al<sup>(33)</sup> stated that a deviation in wound healing caused excessive granulation tissue. The amniotic membrane graft technique was mostly performed in the present study and its advantage is promoting wound-healing. This might lead to a low incidence of this complication.

## Conclusion

Pterygium excision with amniotic membrane graft technique was mostly performed at Thammasat

Hospital and recurrence after surgery was rather high. Increased intra-ocular pressure after steroids use was a common complication. Scleral thinning was a critical problem with the application of Mitomycin C.

## What is already known on this topic?

Pterygium is a common ocular disease. The important problem after pterygium surgery is recurrence. Scleral thinning is a dangerous complication with the application of Mitomycin C.

## What this study adds?

Associated factors in pterygium recurrence may be age, types of pterygium, surgeon's experience and surgery techniques. Scleral thinning is still the serious problem after using Mitomycin C.

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## Potential conflicts of interest

None.

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## ผลการผ่าตัดลอกต้อเนื้อในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ

โกศล คำพิทักษ์, อนันต์ พรมาตา

ภูมิหลัง: ต้อเนื้อเป็นโรคที่พบได้บ่อยทางจักษุวิทยา ผลการผ่าตัดต้อเนื้อมิได้หลากหลาย

วัตถุประสงค์: เพื่อประเมินผลการผ่าตัดลอกต้อเนื้อ โดยเฉพาะอย่างยิ่งอัตราการกลับเป็นใหม่และภาวะแทรกซ้อนจากการผ่าตัด  
วัสดุและวิธีการ: รวบรวมข้อมูลผู้ป่วยที่ได้รับการผ่าตัดลอกต้อเนื้อที่โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ ตั้งแต่เดือนตุลาคม  
พ.ศ. 2553 ถึง กันยายน พ.ศ. 2556 วิเคราะห์ข้อมูล อายุ เพศ ชนิดต้อเนื้อที่เป็นครั้งแรกหรือเป็นซ้ำ วิธีการผ่าตัด และผลแทรกซ้อน  
ผลการศึกษา: ศึกษาจำนวนตัวอย่าง 334 ตา จากผู้ป่วย 307 ราย เป็นเพศหญิง 192 ราย (ร้อยละ 62.5) ค่าเฉลี่ยอายุ  $\pm$  ส่วน  
เบี่ยงเบนมาตรฐาน เท่ากับ  $57.1 \pm 12.2$  ปี ต้อเนื้อที่เป็นครั้งแรก 322 ตา (ร้อยละ 96.4) ผ่าตัดด้วยวิธี *amniotic membrane  
graft* 323 ตา (ร้อยละ 96.7) ต้อเนื้อกลับเป็นใหม่หลังผ่าตัด 80 ตา (ร้อยละ 24.0) ความดันลูกตาเพิ่มมากกว่า 5 มิลลิเมตรปรอท  
หลังได้รับยาสเตียรอยด์ 34 ตา (ร้อยละ 10.2) ตาขาวบาง 5 ตา (ร้อยละ 1.5) และ 4 ใน 5 ตานี้ มีการใช้ยา *Mitomycin C* เกิด  
เนื้อเยื่อแกรนูเลชัน 1 ตา (ร้อยละ 0.3)

สรุป: การผ่าตัดลอกต้อเนื้อด้วยวิธี *amniotic membrane graft* เป็นวิธีการผ่าตัดที่นิยมทำมากที่สุดที่โรงพยาบาลธรรมศาสตร์  
เฉลิมพระเกียรติ และการกลับเป็นใหม่ของต้อเนื้อหลังผ่าตัดค่อนข้างสูง การเพิ่มขึ้นของความดันลูกตาภายหลังได้รับยาสเตียรอยด์  
เป็นภาวะแทรกซ้อนที่พบได้บ่อยและตาขาวบาง เป็นปัญหาที่อันตรายภายหลังการใช้ *Mitomycin C*

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