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Pterygium: Surgical Techniques and Choices

Alvin L. Young, FRCSIrel, FRCOphth†*
and Ka Wai Kam, MSc, Epidemiology (Lond), FCOphthHK†*

Pterygium is known to exist for >3000 years. Ancient Egyptians and Greeks applied potions of various chemicals to the ocular surface as an attempt to eradicate the lesion. The first documentation of a surgical excision was around 500 to 1000 BC (by Susruta), similar to the bare sclera excision of today. This was followed by application of an ointment to prevent recurrence.[1] The concept of recurrence after pterygium removal is known to us for a long time. Despite advancements in surgical instrumentation, microscopes, suturing materials and medications, and also techniques developed, studied and tried in clinical research worldwide, recurrence of pterygium is still of concern several millennia later. The "ideal technique" with the least risks of recurrence and best side-effects profile remains elusive.

Phathanthurarux and Chantaren[2] conducted a survey across Thailand and reviewed the perspectives and practices of ophthalmologists in their country. They set out to identify the important barriers, explore the ideal practice, and study the underlying factors driving these practices. In their questionnaire with >400 respondents, the most practiced methods were the bare sclera technique and conjunctival autograft in primary and recurrent pterygia. In both types of pterygia, the majority of respondents indicated that they would not consider adjuvant therapy, which was attributed to concerns regarding the potential complications and overall inexperience with the surgical techniques. Phathanthurarux and Chantaren also highlighted issues on the lack of accessibility to or availability of amniotic membranes and the relative high cost of fibrin glue (of relevance in the context for less affluent economies or practices in the Asia-Pacific region). In their survey, recurrence of pterygium was the most common late postoperative complication, reported by over three quarters of the respondents. Although the study did not directly measure the actual recurrence rates, the high number of respondents encountering recurrence was in line with earlier reports of similarly high recurrence rates expected in primary pterygium excision with bare sclera techniques.[3]

During the past millennia, ophthalmologists sought after the ideal method of managing both primary and recurrent pterygia. The most commonly employed techniques would include the various conjunctival grafting with or without limbal tissue,[4–6] fixated with either absorbable or nonabsorbable sutures, fibrin glue or even autologous blood or fibrin.[7,8] Beta-irradiation is seldom if at all being practised nowadays, whereas antimetabolites such as mitomycin-C (MMC) and 5-fluorouracil had gained popularity in comparison. Various modes of applications have been used, either intraoperatively as a single dose or postoperatively as subconjunctival injections or drops, adopting different concentrations and durations of treatment. MMC used in conjunction with tissue grafts in randomized, controlled studies would lower pterygium recurrences.[9] However, concerns regarding the potential complications including delayed conjunctival healing, scleromalacia, and necrotizing scleritis may keep some surgeons at bay.

Apart from the nature of pterygia, other important factors in adjuvant therapy determination would include the experience of the surgeon, the available operative time, the need of normal conjunctiva preservation, and or limited tissue availability. This would be particularly relevant in patients suffering from recurrent pterygia and those with poorly controlled glaucoma, who may require subsequent drainage procedures.

Amniotic membrane has been used as an alternative to conjunctiva as grafting material, acting as a substrate transplant. Earlier studies on the use of amniotic membrane for primary pterygium reported a high recurrence rate of >60%,[10] whereas later studies yielded more acceptable recurrence rates between 13.8% and 18.6% at 6 to 12 months after excision of primary pterygium.[11,12] Clearfield et al systematically reviewed 20 randomized controlled trials containing >1900 eyes, and concluded that amniotic membrane was inferior to conjunctival autograft in preventing pterygium recurrence.[13]

From the *Department of Ophthalmology & Visual Sciences, Prince of Wales Hospital, Hong Kong SAR; and †Department of Ophthalmology & Visual Sciences, The Chinese University of Hong Kong, Hong Kong SAR.
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Correspondence: Alvin L. Young, Department of Ophthalmology & Visual Sciences, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, New Territories, Hong Kong SAR. E-mail: youngla@ha.org.hk.

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However, the addition of intraoperative MMC in combination with amniotic membrane improved the recurrence rate to 5.8% for an average follow-up period of 17 months.[14]

MMC is an antimetabolite that inhibits pterygium cell proliferation and migration.[15] The medication has been widely studied as an adjuvant in pterygium surgery, with earlier reports on scleral melting ranging from 3% to 19%.[9] This could be significantly lowered with acceptable recurrence rates when a standard defined protocol is applied, even without simultaneous conjunctival grafting.[16] Long-term data on this regime also confirmed its safety at 10 years.[5] In addition to preservation of surrounding healthy conjunctiva, the duration of operation is also shorter than in situations where harvesting conjunctival graft is needed, particularly if sutures are required to secure the grafts instead of fibrin glue and in the hands of less experienced surgeons or surgical trainees.

Subconjunctival administration of anti-vascular endothelial growth factor (anti-VEGF) as an adjuvant in pterygium surgery has been evaluated in a handful of meta-analyses with conflicting conclusions.[17,18] Despite the overall reasonable safety of bevacizumab, better designed clinical trials evaluating the efficacy of anti-VEGF are warranted. In addition, the relative high costs of anti-VEGF may be a prohibitive factor in less affluent economies or practices.

A recent strategy in pterygium surgery would include the use of mini-simple limbal epithelial transplant (mini-SLET). The initial technique of SLET was developed to treat unilateral limbal stem cell failure[19]; an adaptation of this technique has been applied to other ocular surface conditions such as ocular surface squamous neoplasia and pterygium. A few published studies evaluated the use of mini-SLET or SLET in pterygium surgery with promising results.[20–22] More data from larger studies and preferably controlled trials should be conducted so as to evaluate the merits of this technique.

In conclusion, there is yet to be a panacea in treating pterygium. The remarks by Phathanthurarux and Chantaren highlighted the importance for surgeons to appreciate the potential complications of each of the treatment modality and the need to gain proficient experience with various approaches. Only then will one be able to lead a discussion with the patient and to decide on an agreed appropriate treatment plan for that particular individual. This can be facilitated through enhanced education and training, perhaps in better design of fellowship programs and/or local or regional surgical courses, to disseminate the knowledge and experience to the much needed areas. Armed with the appropriate knowledge and expertise, we will then have a fair chance in purging the plight of recurrence in pterygium surgery.

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