

# A REVIEW OF OUTCOME OF PTERYGIUM EXCISION AT LIONS SIGHT FIRST EYE HOSPITAL

Dissertation in part fulfillment for the degree of Master of Medicine,  
Ophthalmology, University of Nairobi

(MMed Ophthalmology, U.O.N)


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**DECLARATION:**

This dissertation is my original work and has not been submitted for a degree in any other university.

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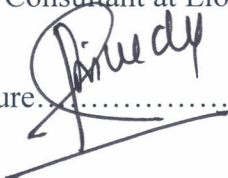
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**DEDICATION:**

To God Almighty Who Makes All Things Beautiful in His Time.



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## **LIST OF ABBREVIATIONS**

MMC.....Mitomycin C

5FU.....5-Fluorouracil

KNH.....Kenyatta National Hospital

MMPs.....Matrix Metalloproteinases

SPSS.....Statistical package for social scientists

VA.....Visual Acuity

UK.....United Kingdom

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## **1.0 ABSTRACT**

### **OBJECTIVES**

This study was conducted to review the outcome of pterygium, indications for excision, the pattern of complication in relation to surgical technique, the recurrence rate within the first six months post operatively and to compare recurrence amongst various races.

**STUDY DESIGN:** Retrospective case series done in which medical records of all patients who had pterygium excision at LSFEH between the year 2005 and 2007 were retrieved from the hospital registry and reviewed. A structured questionnaire was used to collect data which was entered into the computer and analyzed using statistical package for social scientist (SPSS).

**RESULTS:** In total, 185 eyes of 175 patients had pterygium excision. There were more females than males with a ratio of 0.8:1, the range was 17-86 years. Kenyan Africans accounted for 85.9% and Asians 14.1%. No European eye was operated. The most common reason for excision was cosmetic, accounting for 73%. The most common surgical technique was bare sclera with or without MMC. 50.5% of the patients were lost to follow up within the first one month post operatively.

The most common complication was recurrence (14.1% within the first six months post operatively). Astigmatism which is an indication and a complication of pterygium excision was not accounted for in this study because pre and postoperative refraction was not done. Bare sclera with or without MMC was noted to have the highest number of complications. There was no significant association between recurrence, sex, age, race and indication for surgery. Those who underwent



previous pterygium excision in the same eye were six times more likely to have recurrence and the difference was statistically significant ( $p=0.004$ ). Pyogenic granuloma was more likely to occur in patients who under-went surgery by simple closure and the difference was statistically significant ( $p<0.001$ ).

## CONCLUSION

The commonest presenting complaint for pterygium excision was whitish growth in the eye accounting for 73%.The most common complication was recurrence with a rate of 14.1% within the first six months and there was no statistically significant association between recurrence, surgical technique, age, sex, race and indication. The use of anti-metabolites and conjunctival flap was shown to be more likely to reduce recurrence although the difference was not significant compared to bare sclera only.

## RECOMMENDATIONS

Health education should entail proper counseling on the risk of recurrence and as such the need for compliance with follow-up post operatively. All patients undergoing pterygium excision should have the grading of the pterygium documented as it has been shown to influence recurrence.The use of antimetabolites be encouraged in order to reduce the recurrence rates. Refraction before and after surgery is also recommended to assess the astigmatism and visual acuity.

## **2.0 LITERATURE REVIEW**

### **2.1 INTRODUCTION**

Pterygium is defined as wing-shaped folds of fibrovascular tissue occurring from the interpalpebral conjunctiva and extending to the cornea. It is generally nasal but occasionally temporal or less often simultaneously nasally and temporally. A pterygium may be stable or may grow progressively across the cornea to cover the visual axis.<sup>1,2,3</sup> Described as an “ophthalmic enigma”, pterygium is of a great concern to both the surgeon and the patient as it has been shown to recur in up to 97 % of the patients within one year.<sup>4</sup>

### **2.2 GEOGRAPHICAL DISTRIBUTION/EPIDEMIOLOGY**

Pterygium is found in most parts of the world. It is more common in people who live close to the equator than those in more temperate climates. There is also a higher incidence of pterygia in people who have chronically been exposed to sunlight and wind such as farmers and fisherman.<sup>4</sup> The prevalence of pterygium obtained from a number of population based studies vary widely from 1.2 % in urban temperate white people,<sup>5</sup> to 23.4 % in black population of tropical Barbados,<sup>6</sup> and 36.6% in adult Indians of Brazilian rain forest. These study populations differ in race, latitude and sunlight exposure but generally the prevalence rate in the tropics are higher than at the temperate latitude.<sup>7</sup>

A population base study in Sumatra Indonesia showed that the overall age adjusted prevalence rate of any pterygia in adults over 21 years was 10.0 % .The prevalence was found to increase with age.<sup>8</sup> Catherine et al in Australia reported that age standardized rates of pterygium were higher in men and rural residents than urban and that in both



groups UV-B/sunlight was the primary risk factor and the overall prevalence rate was 2.83 %.<sup>4</sup>

The Meiktila Eye study also showed prevalence of pterygium in either eye was 19.6 % and of bilateral pterygia, 8.0 % and prevalence increased with age.<sup>9</sup> The Barbados Eye Study reported cases of pterygium among 23.4% of 2617 black, 23.7% of 97 mixed (black and white), and 10.2% of 59 white participants examined which showed that the frequency of pterygia was 2.5 to 3 times higher among blacks than among whites.<sup>6</sup>

In some African studies carried out by Ukponmwan, Ashaye, Farina, Alemwork, Ebana and Ignosi; the prevalence of pterygium varies between 1.10% to as high as 20%.<sup>10, 11, 12, 13, 14, 15</sup> The highest incidence of pterygium occurs between age 20 and 49 years and is rare under 15years.<sup>3</sup> Prevalence has been shown to increase with age, and more common in men than women.<sup>13</sup>

### **2.3 AETIOPATHOGENESIS**

Despite the fact that pterygium is very common in some parts of the world and has been recognized for many years, very little is known about the pathogenesis. This knowledge gap is reflected in the poor results of intervention and wide range of treatments advocated. It has been accepted that environmental factors are responsible for its development and that UV light exposure is the most important environmental influence and high exposure in the second <sup>or</sup> third decade of life is particularly relevant to causation. Other environmental irritant includes dryness, inflammation and exposure to wind and dust.<sup>2,16</sup>

Genetic factors are also important in the etiology .In certain environments some racial

groups are affected than others and there is tendency for pterygia to occur in family.<sup>16</sup>

Many theories have been advanced to explain the pathogenesis of pterygium. Results of two epidemiological surveys in Southern Africa found that chronic irritation (from whatever cause) produces a resultant inflammatory oedema, attempt at repair and cell induced angiogenesis are responsible for the fibrovascular reaction characteristic of pterygium.<sup>17</sup>

Nolan and colleagues found that U-VB radiation creates over expression of heparin binding epidermal growth factor (HB –EGF) in pterygia and because it's a potent mitogen, it may be considered a major driving force in the development of pterygium.<sup>18</sup>

Di Girolamo and colleagues have shown that in pterygium the cytokines, growth factors and matrix metalloproteinases (MMPs) are the main factors involved in this process.<sup>19</sup> An overall view of the growth process of pterygium reveals a multiplicity of factors that are correlated and interrelated. There are therefore three main factors that lead to the final products, of the pterygium namely Mitogenity, construction of a new vascular net and remodeling of the extra-cellular matrix. All these together create a new vascular and fibrotic tissue, which has an aggressive way of growing to and over the cornea.<sup>20</sup>

## **2.4 RISK FACTORS**

The main factors implicated are centered on environmental exposure and the single most important factor implicated is UV radiation. A population based study of the Melbourne residents showed independent risk factors for pterygiums were: Age, Male sex, rural residence, Lifetime ocular sun exposure.<sup>4</sup>

The Tanjong Pagar survey showed independent association with increasing age, male sex and occupations linked to outdoor work.<sup>21</sup> It is likely that advancing age provides greater exposure to UV radiation. Ichiro and colleagues also found a significantly high incidence of pterygium in welders who were exposed occupationally to excess UV radiation and found a close relationship between incidence and duration of employment as welders.<sup>22</sup>

## **2.5 HISTOLOGY/IMMUNOCHEMISTRY**

Histologically pterygium is akin to pinguecula with elastotic degeneration of collagen and appearance of sub-epithelial fibrovascular tissue but with additional destruction of the Bowman's layer by fibrovascular ingrowth, frequently with mild inflammatory changes. The epithelium may be normal, thick or thin and occasionally shows dysplasia.<sup>11, 23</sup>

Hill and colleagues demonstrated that pterygia contained a lymphocytic infiltration, predominantly of T cells. They thought that following actinic damage, the damaged tissue is recognized as foreign and hypersensitivity reactions are mounted resulting to chronic inflammation. The T lymphocytes liberate lymphokines which induce angiogenesis.<sup>18</sup>

Other studies have shown histologically that conjunctiva in pterygia contained leucocyte margination and subepithelial basophilic degeneration. There is proliferation of conjunctival tissue, acanthosis, squamous metaplasia, plasma cells and areas of increased pigmentation in the basal epithelial layers. These findings suggest that in severe cases pterygium histo-pathologically can appear to be precancerous.<sup>24</sup> Conjunctival melanosis, pigmented lesions have been demonstrated in pterygia warranting histopathological examination of all excised pterygia.<sup>25</sup>



Liu suggested that immunologic mechanisms possibly type I and III hypersensitivity may contribute to the pathogenesis of pterygium. Direct immunofluorescence assay showed levels of Ig E, Ig G, Ig A in epithelial layer, Ig E, Ig G and C2 in basement membrane and Ig E, Ig G in stroma to be higher in pterygium samples than controls.<sup>26</sup>

## 2.6 CLINICAL FEATURES

### 2.6.1 Symptoms

A pterygium can cause a variety of symptoms which include cosmetic in which patients especially young ladies may complain of slight cosmetic blemish. It can present as recurrent inflammation because it is raised above the corneal surface leading to complaints of irritation. Loss of vision occurs when a large pterygium reaches the pupil and partially blurs the vision or completely covers the pupil<sup>2</sup>. It may also be asymptomatic.<sup>1</sup>

### 2.6.2 Signs

Different grading systems have been used to quantify pterygium and a commonly used one is as follows:<sup>27</sup>

*Type 1*; the lesion extends less than 2mm onto the cornea. A deposit of iron (stocker line) may be seen in the corneal epithelium anterior to the advancing head of the pterygium and indicate sign of stability.

*Type 2*; up to 4mm of cornea is involved. They may interfere with the precorneal tear film, and induce astigmatism.

*Type 3*; more than 4mm of cornea is invaded, involving the visual axis. Extensive lesion

particularly if recurrent may be associated with subconjunctival fibrosis and cause mild ocular motility restriction and diplopia. Signs of activity include rapid growth, engorged vessels, grey leading edge in the cornea, punctate epitheliopathy.

## **2.7 DIFFERENTIAL DIAGNOSIS.**

**2.7.1 Pseudopterygium:** This is caused by the adhesion of a fold of conjunctiva to a peripheral corneal ulcer or area of peripheral thinning and is fixed only at its apex to the cornea unlike true pterygium which is adherent to underlying structures throughout. A blunt probe can pass under it at the limbus, location is atypical. Often progresses onto the cornea at an oblique axis.<sup>27</sup>

**2.7.2 Pinguecula:** This is yellow-white flat or slightly raised conjunctival lesion found in the interpalpebral bulbar conjunctiva, located nasal or temporal to the limbus. It represents elastotic degeneration of collagen. It maybe highly vascularised or injected, does not involve the cornea. Prevalence and incidence increase with age and its common in both temperate and tropical climates, affecting both sexes.<sup>1</sup>

**2.7.3 Conjunctival intraepithelial neoplasia:** It is unilateral, jelly like velvety or leukoplakic (white) mass, often elevated vascularised not in a wing-shaped configuration but amoeboid shape not in the typical nasal or temporal positions of pterygium or pingueculum. Dysplastic epithelium is often associated with conjunctival neoplasia, which will stain with rose Bengal.<sup>1</sup>

**2.7.4 Squamous cell carcinoma of the conjunctiva:** This is a slow growing tumor which may arise de novo or from pre-existing conjunctival and corneal intra epithelial neoplasia. It occurs in late adult life but in Africa it is common in young

immunosuppressed patients and patients with xeroderma pigmentosa. It presents as a fleshy- pink papillomatous or gelatinous mass often associated with feeder vessels, sometimes covered by a plaque of keratin. Most frequently juxta limbal and seldom arise from fornix or palpebral conjunctiva. Limbal tumors may involve adjacent cornea. Surgical excision is associated with recurrence in a minority of patients.<sup>27</sup>

## **2.8 TREATMENT**

Management of pterygium depends on presenting symptoms and rate of progression. Drugs are used mainly for symptomatic relief. Inflamed pterygium will respond to ocular lubrication or a short course of corticosteroid. Other non surgical methods of relieving symptoms are the use of wide-brimmed hat and ultraviolet blocking sunglasses or goggles, especially in sunny, windy days. Artificial tears are important if dellen is present.<sup>1,28</sup> Surgical excision is the mainstay of treatment, unfortunately excision is often complicated by recurrence and recurrent pterygia are usually more troublesome than their antecedent.

### **2.8.1 Indications for surgical removal of pterygium include: <sup>1,3</sup>**

- Progression towards the visual axis, interfering with vision
- Pterygium >3-4mm
- Restricted ocular motility
- Intolerable cosmetic appearance
- Interference with contact lens wear.

- Excessive irritation not relieved by lubricants
- Occasionally some pterygia can cause cosmetically significant redness and inflammation to warrant surgical removal.
- Chronic inflammation, non responsive to medical therapy with patient experiencing excessive irritation.

However, the primary indication for surgical removal of pterygia is threat of or actual visual loss due to significant astigmatism or involvement of visual axis by pterygium.<sup>1,3</sup>

Pterygium is often complicated by recurrence as such reasons have been advanced for the high incidence of recurrence and various approaches as alternative to or adjunctive to surgery have evolved to prevent recurrence after excision.<sup>29</sup>

- Pterygium is made of fibrous tissue with fibroblast so excising it only stimulates these fibroblast, especially in young people whose fibroblast are more active. Pterygium which regrows following excision is usually bigger and more vascular than before.
- The limbal stem cells are special cells at the limbus which make the epithelium of cornea to develop normally. These stem cells are probably damaged after prolonged exposure to sunlight, so the conjunctiva grows across the limbus instead of corneal epithelial cells. Surgical excision does not alter either of these pathologic reasons and therefore is not advised unless absolutely indicated.

The two main ways of trying to lessen this high risk of recurrence are either by suppressing the activity of fibroblast or by transplanting limbal stem cells to suppress the



growth of blood vessels and the activity of fibroblasts.<sup>29</sup> The goal of pterygium excision are to remove the pterygium, restore conjunctival anatomy, leave cornea as smooth and clear as possible and prevent recurrences.

There are numerous techniques to achieve these goals. The lack of consensus on the preferred surgical approach is due to recognition that no surgical method is far superior to the other.<sup>3</sup> A common surgical technique is to remove the pterygium using a flat blade to dissect a smooth plane toward the limbus. Though it is preferable to dissect down to bare sclera at the limbus, it is not necessary to dissect excessive tenon's tissue medially as this can sometimes lead to bleeding from trauma to subjacent muscle tissue. Care should be taken not to excise the plica semilunaris and caruncle. After excision, light cautery is applied to sclera for hemostasis. Pterygium excised must be sent for histopathology examination.

## **2.8.2 Surgical Techniques:**

**2.8.2.1 Bare sclera Technique:** This is one of the most popular methods for excision of primary pterygium. Here no suture or fine, absorbable sutures are used to appose the conjunctiva to superficial sclera in front of the rectus tendon insertion, leaving an area of exposed sclera. This technique has an unacceptable high recurrence rate of 40-75%.<sup>30</sup> Ashaye showed in a study on pterygium in Ibadan that of 400 patients who had excision by bare sclera technique, 40% had recurrence.<sup>11</sup>

**2.8.2.2 Simple closure:** In this method, the free edges of the conjunctiva are secured together by suture (effective only when conjunctival defect is very small)

**2.8.2.3 Sliding flap:** In this technique an L-shaped incision is made adjacent to the wound



to allow a conjunctiva flap to slide into place.

**2.8.2.4 Rotational flap:** a U-shaped incision is made adjacent to the wound to form a tongue of conjunctiva that is rotated into place.

**2.8.2.5 Conjunctival graft:** In 1985, Kenyong et al proposed that a conjunctival auto-graft of bare sclera could be used in treatment of recurrent and advanced pterygium.<sup>31</sup> The most common indication for conjunctival transplantation is therefore management of advanced, primary and recurrent pterygium. It reduces the risk of recurrence to approximately 3-5% and ameliorates restricted extraocular muscle function sometime encountered after pterygium excision. This technique is a little time consuming but straight forward with encouraging reports about its use to prevent recurrence. Also it carries the risk of complications such as granuloma formation and giant papillary conjunctivitis, as well as significant patient discomfort after surgery. Conjunctival autograft has been used with low dose (Mitomycin C) MMC with good results. Frucht-Pery et al demonstrated that 30 patients that underwent pterygium excision in which conjunctival auto-graft combined with one minute application of MMC, 0.2mg/ml had lower recurrence rate compared with those without use of MMC(  $P < 0.0001$  ).<sup>32</sup>

**2.8.2.6 Amniotic membrane** has been advocated for management of ocular surface disorders, including its use in reconstruction of conjunctival defect after pterygium surgery. It functions by inhibiting pathological revascularization, scar formation and inflammation in ocular surface disease. Hui-Kang et al reported that amniotic membrane graft is as effective as conjunctival auto-graft and MMC in preventing pterygium recurrence, and can be considered a preferred grafting procedure for primary pterygium.<sup>33</sup>

**2.8.2.7 Fibrin-based adhesives** have also been introduced. Because of its biological and biodegradable properties; it may be used under a superficial covering layer (conjunctiva, amniotic membrane, etc) without inducing inflammation. Tissue adhesives of different types have been used in different studies to attach conjunctival grafts and compared with the use of sutures, were associated with a shorter operative time and reduced postoperative complaints. Jin Jiang et al in a study to determine the safety and efficacy of using fibrin glue to attach conjunctival auto grafts by comparing the results of such with the use of Vicryl sutures in patients undergoing pterygium excision found that the use of fibrin glue in pterygium surgery with conjunctival autografting significantly reduces surgery time, improves postoperative patient comfort and results in a lower recurrence rate compared with suturing.<sup>34</sup>

**2.8.2.8 Lamellar keratoplasty:** This may be required if corneal scarring is still severe once the recurrent pterygium (or rarely primary pterygium) is removed from the cornea.<sup>3</sup>

### **2.8.3 Adjunctive Therapy**

This is directed at suppressing fibroblast activity<sup>29</sup> and includes:

**2.8.3.1 Topical steroid drops:** This will suppress fibroblast activity and so should be given post operatively fairly frequently (six times daily) for four to six weeks until wound is fully healed. Tambe et al showed in a randomized controlled trial using 1% topical prednisolone after pterygium excision that 16% in the steroid treated group and 53.3% in the control developed recurrent pterygium and so concluded that topical steroid is a safe and effective adjunctive postoperative treatment after bare sclera surgery for primary pterygium.<sup>3,35</sup>

**2.8.3.2 Mitomycin C.** It is an alkylating agent and inhibits DNA, RNA and protein synthesis, thus has better anti-proliferative effects on those cells showing highest rate of mitosis and it is toxic to endothelial cells. It completely inhibits the activity of all fibroblast, prevents natural wound healing as well as the recurrence of the pterygium. The recommended strength is 0.02% solution in normal saline (0.2mg/ml). It is usually given intra-operatively by applying a small sponge soaked in MMC solution to the wound for 3-5 minutes, after which the wound is copiously irrigated with saline to wash away any excess and prevent complication.<sup>32</sup> Mastopasqua et al have reported the effectiveness of intra-operative MMC administration after bare sclera technique and showed a significant reduction of recurrence in the treated eye group (p=0.024) compared to the control.<sup>36</sup> Other ways by which MMC has been used are subconjunctivally and postoperatively as eye drops.<sup>37, 38</sup>

**2.8.2.3 Thiotepa (triethylene thiophosphoramide):** It is a radiomimetic alkylating agent with proven inhibitory action on vascular endothelium. It has been used topically as an adjunct to pterygium surgery in attempt to decrease the incidence of recurrence. It is similar to MMC but *weaker in its action*.<sup>29, 39</sup>

**2.8.3.4 Beta radiation:** These are electrons which have only very superficial penetration. As they are absorbed by tissues, they inactivate cells which tend to divide, whilst not damaging resting cells. Like MMC, it is thought to prevent recurrence of pterygium by inhibiting the proliferation of fast growing cells such as fibroblast and vascular endothelial cells after pterygium excision. It has been shown to reduce the recurrence rate after excision to 1.7-12%. Although the mechanism of action is the same as MMC, studies comparing the recurrence rate following pterygium excision by the same surgeon showed



significant lower recurrence in the MMC treated eyes compared with the  $\beta$  irradiation treated.<sup>29,40</sup>

**2.8.3.5 5-Fluorouracil (5-FU):** This is an antimetabolite which inhibits DNA synthesis and is active on the 'S' phase of cell cycle. It inhibits fibroblast proliferation but does not affect fibroblast attachment and migration. It is therefore believed to reduce pterygium recurrence. It is toxic only to proliferating cells and is considered safer than other agents. Anupama Pherwani et al used intra-lesional subconjunctival injection of 5-FU to treat recurrent pterygium and reported success after 8 months and concluded that it was safe, effective and well tolerated and recommended in the management of difficult cases of pterygium.<sup>41</sup> Bekibebe et al in another study compared the use of 5-FU as adjuvant treatment compared to conjunctiva autograft in the treatment of pterygium reported a recurrence of 11.4% in eyes treated with 5-FU and 12.1% in conjunctival autograft group and so concluded that 5-FU is marginally superior to conjunctival autograft in the prevention of pterygium recurrence but neither gives a more desirable single digit recurrence.<sup>42</sup>

## **2.8.4 Complications of pterygium excision:**

**2.8.4.1 Corneal infiltration and/or ulceration** in area of excision. Treatment with topical antibiotics is usually successful in preventing this complication. But should it occur, the infiltrate should be scraped for smear and culture and treated with intensive antibiotics<sup>3</sup>.

**2.8.4.2 Pyogenic granuloma:** This is common after bare sclera technique of pterygium excision. Incidence can be reduced by use of frequent topical steroids postoperatively.<sup>11,37</sup>

**2.8.4.3 Local conjunctivitis:** This follows surgical manipulation of conjunctiva and resolves with use of Steroids.

**2.8.4.4 Graft Retraction:** This is common in free conjunctival grafting combined with pterygium excision and is a consequence of subepithelial contracting fibrous tissue. It can be avoided by dissecting subconjunctival connective tissue and by over sizing the graft by extra millimetre.<sup>33</sup>

**2.8.4.5 Graft Inversion in pterygium excision:** This is followed invariably by necrosis and sloughing of graft which manifests on the first postoperative day as a white opaque graft that stains strongly with fluorescein. To prevent this within the first 48 hours the graft can be reoriented with surface and border facing the right direction.<sup>33</sup>

**2.8.4.6 Avascular Sclera:** This is due to excessive cautery, MMC or beta irradiation.

**2.8.4.7 Astigmatism** which can be a primary indication for surgical excision can also be significant in the postoperative period.

**2.8.4.8 Recurrence:** This is the most common and most feared complication. Recurrence is the reason why conjunctival graft has been used as primary procedure in pterygium excision and this has reduced the recurrence rate from as high as 70-80% to as low as 5-15%.<sup>3</sup> It is the major limitation for pterygium excision and usually more difficult to treat because there tend to be more scarring of the cornea and sclera underlying pterygium which makes surgical removal on the corneal side more involved, as a smooth surgical plane is often impossible to find potentially resulting in more corneal irregularity and scarring. Another problem is that there might be shortage of conjunctiva or stem cells for treatment.<sup>3,40</sup>

Karabatsos et al reviewed five different therapeutic approaches and outcome in the treatment of pterygium and reported incidence of recurrence of 23.2% for 43 eyes with primary pterygium, 23% for 13 eyes with recurrent pterygium. All recurrences occurred between 2.5 and 11 months postoperatively.<sup>43</sup>

The definition of pterygium recurrence after surgery differs among studies and this is thought to affect the recurrence rate in each study. For example, one study defined recurrence as postoperative regrowth of fibrovascular tissue crossing the corneosclera limbus. This definition reported a recurrence rate of 8.74%.<sup>44</sup>

Other studies using milder definition such as regrowth of fibrovascular tissue invading the cornea up to 1mm or 1.5mm into cornea reported lower recurrence rate of 4.1-8.6%. These rates have further been reduced by the use of conjunctival or limbal transplant after bare sclera excision and the use of adjuvant treatment.<sup>44</sup>

Hirst et al in a study to defined the amount of time necessary to follow patients after pterygium removal to identify a recurrence. Survival curve analysis showed that there was a 50% chance that there would be a recurrence within the first 120 days and there was a 97% chance there would be a recurrence within 12 months of its removal.<sup>45</sup>

Other complications are directly related to the surgical technique used. For example, those associated with conjunctival autograft include, poor wound healing, large button holes, excessive tension on graft causing cheese wiring of sutures, all increase chances of early graft problems. Oedema of graft occurs in the first two postoperative weeks. This responds to continued frequent steroids. Failure of the free graft can occur secondary to avascular sclera.<sup>3, 33</sup>

Complications associated with MMC are common with topical drops and include; corneosclera melting, cataract, corneal edema, corneal perforation, secondary glaucoma, pain, symblepharon, incapacitating photophobia and scleral calcification .Most of these complications can be avoided by using strict inclusion and exclusion criteria, using MMC intraoperatively only (for 5minutes) and close control of patients until epithelialisation of ocular surface is complete.<sup>40,41</sup>

### **2.8.5 Postoperative care**

Postoperative care includes topical antibiotics and corticosteroids. Initially, ointments are preferred over drops (e.g combination of tobramycin/dexamethasone 4 to 6 times a day) as they tend to be more comfortable and aid conjunctival reepithelialisation. These are changed to corticosteroid drops when re-epithelialisation has occurred, which are tapered slowly over several months. Absorbable sutures fall off over few weeks. Non-absorbable sutures should be removed between 3 and 6weeks postoperatively.<sup>3</sup>



### **3.0 RATIONALE OF STUDY**

Pterygium is often considered to be basically a cosmetic concern. However visual reduction may ensue due to induced astigmatism and eventual obscuration of the visual axis with potential to induce visual impairment, and as such can lead to economic, social and personal cost. Despite this there is no standardized surgical treatment protocol documented.

Few studies have been done in Africa and in Kenya on the outcome of pterygium excision although studies in other countries have reported high prevalence and higher degree of recurrence among blacks.



## **4.0 OBJECTIVES**

### **4.1 Main objective**

To review the outcome of pterygium excision over three years in Lions Sight First Eye Hospital, Nairobi.

### **4.2 Specific Objectives**

1. To determine the indications for surgical excision of pterygium.
2. To evaluate the pattern of complications following pterygium excision in relation to surgical technique
3. To determine the proportion of patients that had pterygium recurrence within the first six months postoperatively.
4. To compare recurrence among the different races.

## **5.0 METHODOLOGY**

### **5.1 Study setting:**

Lions Sight First Eye Hospital. It is located in Nairobi. This hospital sees patients from within and outside Nairobi through outreach programs. A wide variety of surgeries are performed in the hospital and patients from outreach programmes form the majority and are treated free.

### **5.2 Study design:** Retrospective case series.

**5.3 Case definition:** All patients with a clinical diagnosis of pterygium who underwent surgical excision at Lions Sight First Eye Hospital between the period January 2005 and December 2007.

**5.4 Exclusion criteria:** Patients with incomplete hospital record.

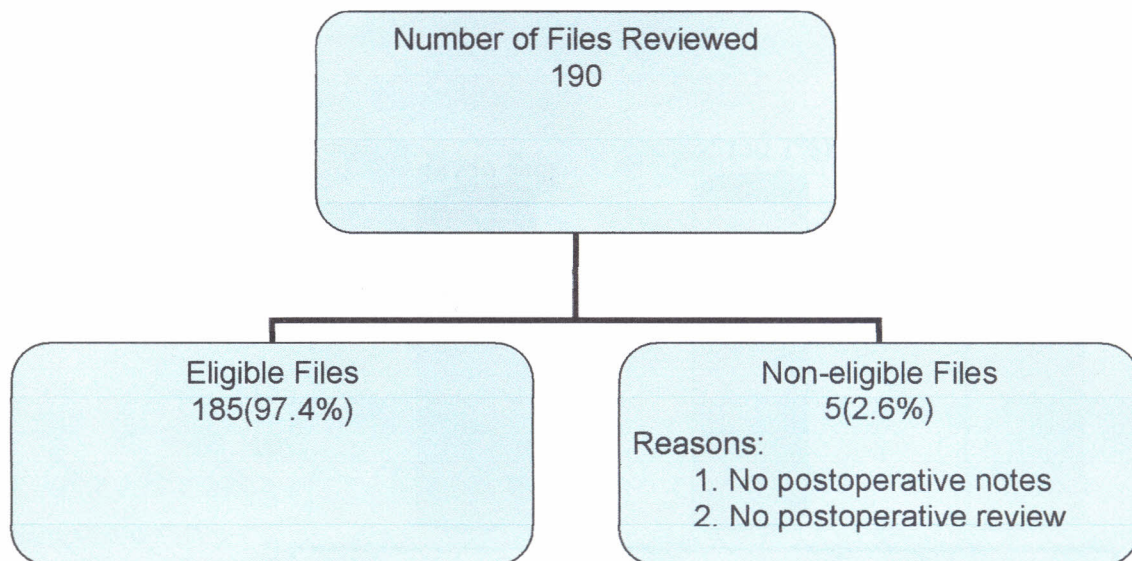
**5.5 Data collection:** Files of patients operated for the pterygium during this period were retrieved manually using hospital records. A questionnaire was used to record information obtained from each file.

**5.6 Data Analysis:** Analysis was carried out using SPSS version II. Numbers and relative proportions were used to describe the study sample, indications and complications and displayed as tables, histograms, bar charts or pie chart. P-value were used to demonstrate significant differences at the 95% confidence level. Odds ratios with their 95% confidence intervals were used to report association between variables.

**5.7 Ethical consideration in data collection:** Permission was obtained from Lions hospital and patient records were treated confidentially.

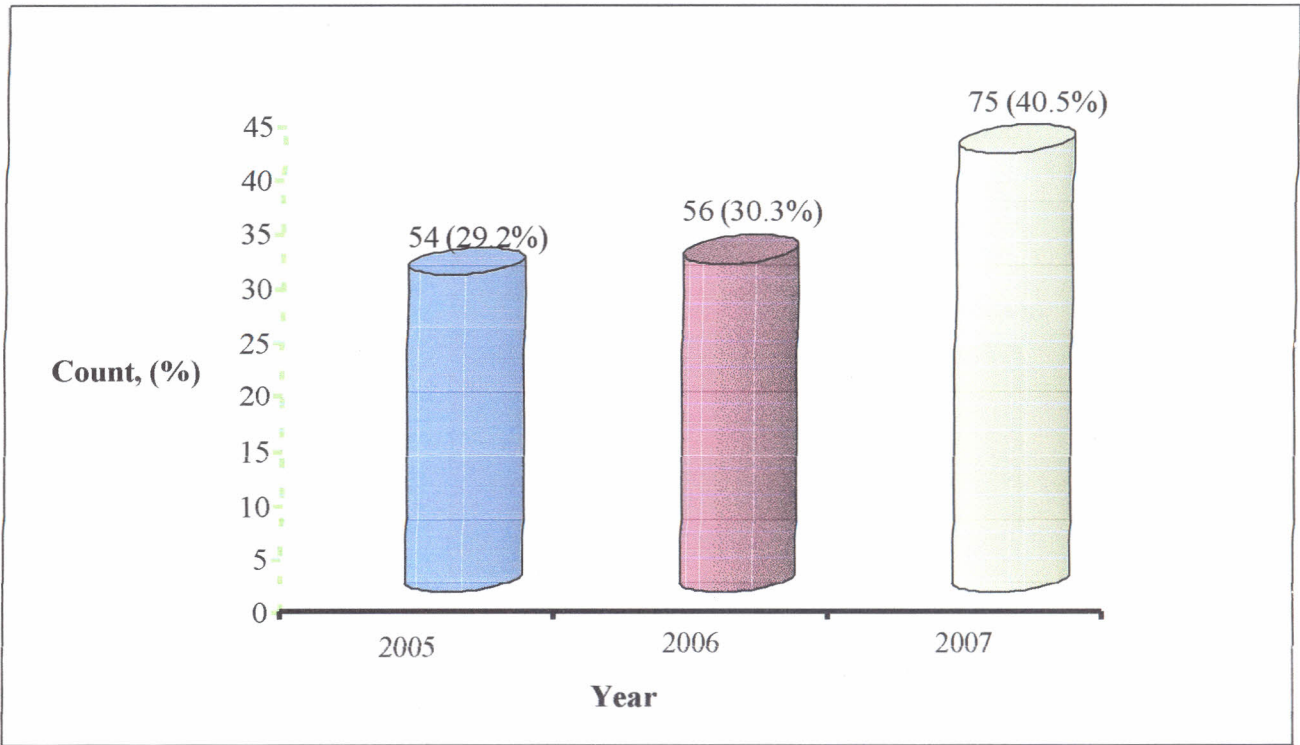
## 6.0 RESULTS

Figure 1: Study flow chart



One hundred and ninety eyes of one hundred and seventy-five patients had pterygium excision between the years 2005 and 2007 at LSFEH. Out of these five files were excluded because of missing information.

**Figure 2: Number Eyes operated per year (n = 185)**



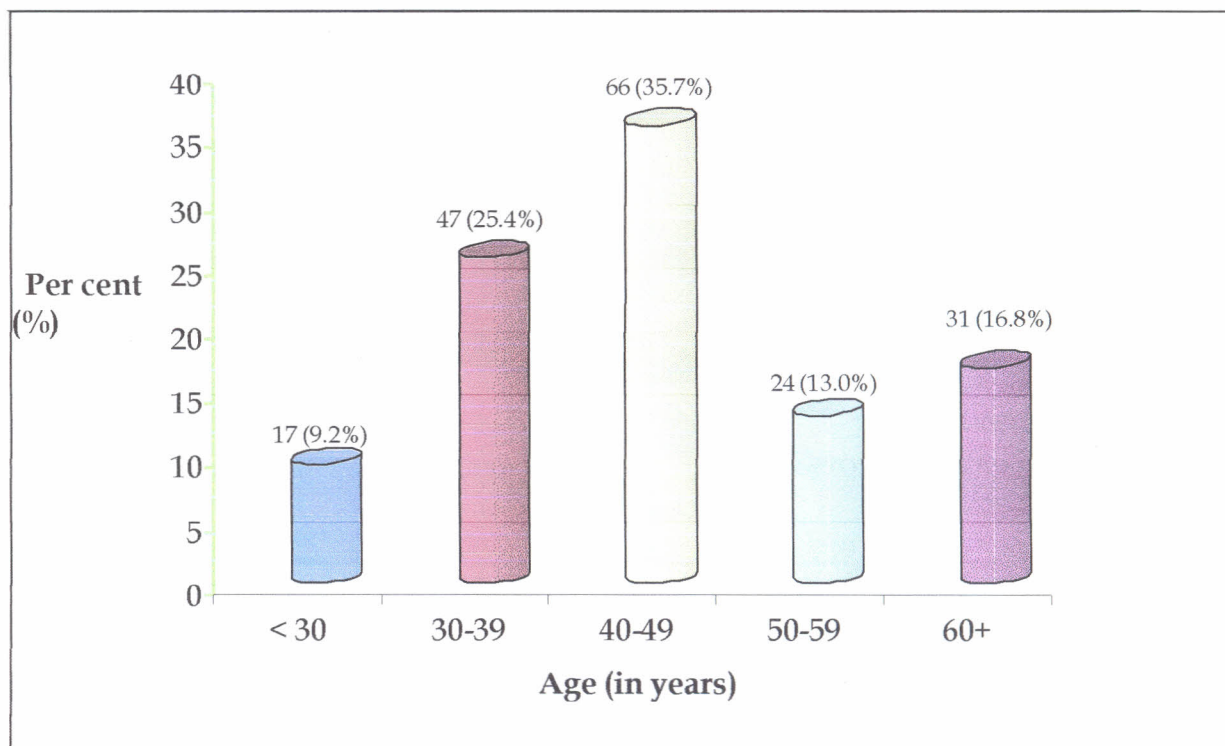
The number of surgeries has been increasing over the years which may signify more patient awareness.

**Table 1: Distribution by Sex (n = 175patients)**

Factor	Count	Per cent
Sex		
Male	75	42.9
Female	100	57.1
Total	175	100

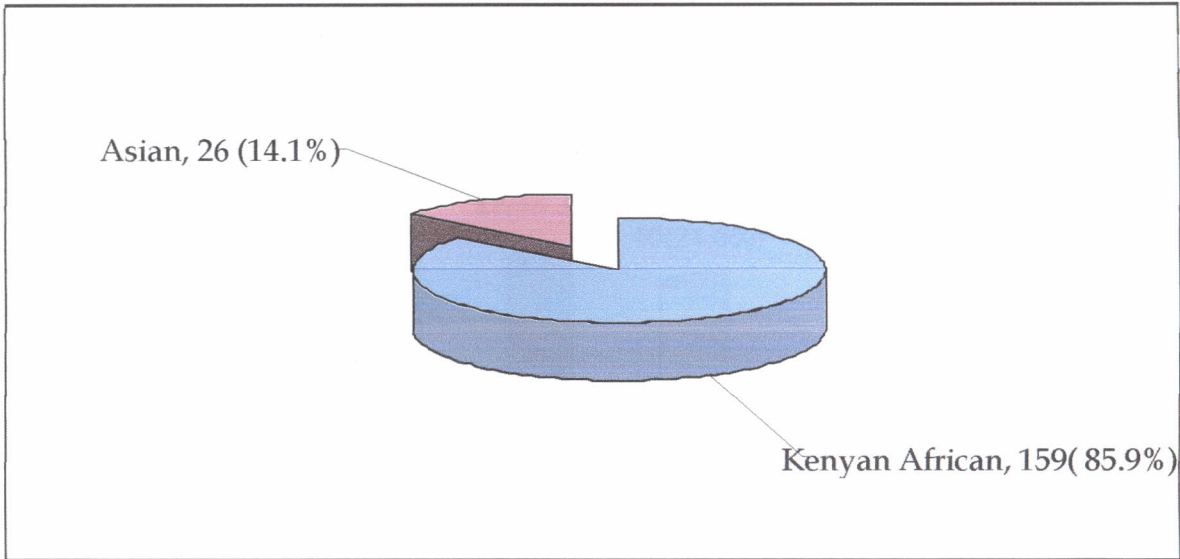
More women presented for surgery than men in this study with a ratio of 1:0.8

**Figure 3: Distribution by age (n = 185)**



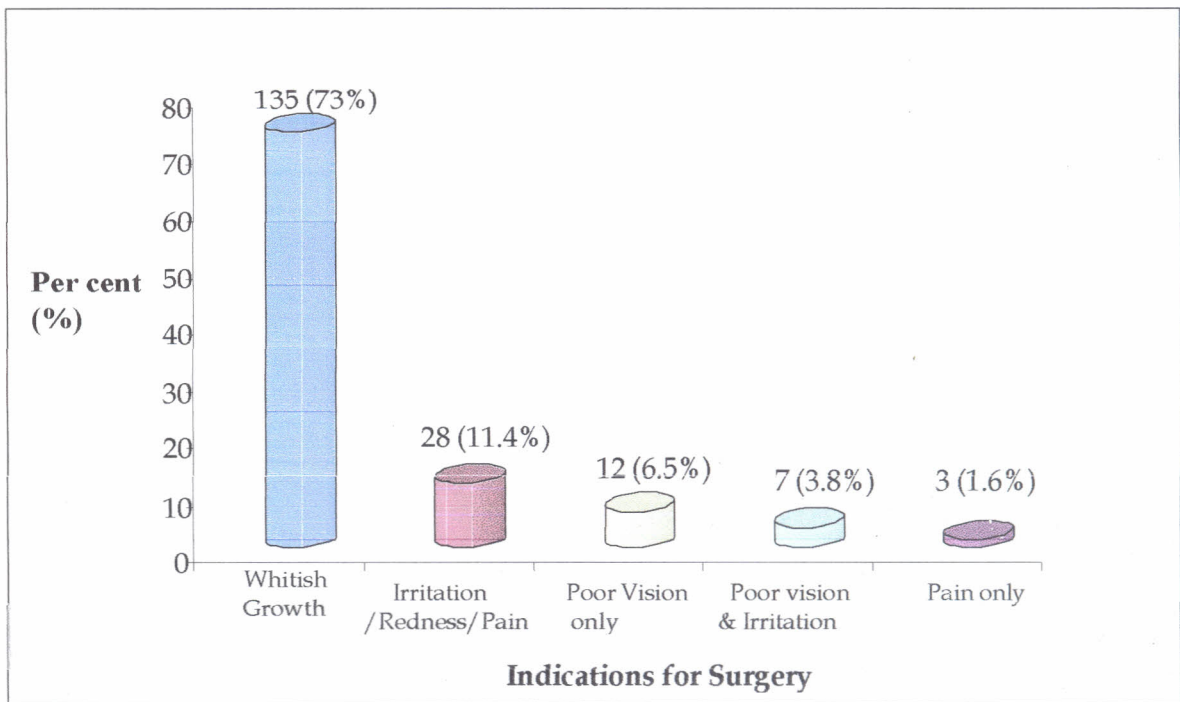
The mean age was 44.8years, median age was 44.0years. The youngest patient in this study was 17 years and the oldest was 86years.

**Figure 4: Distribution by Race (n = 185)**



Most of our patients were blacks which is not an incidental finding. No European was operated for pterygium.

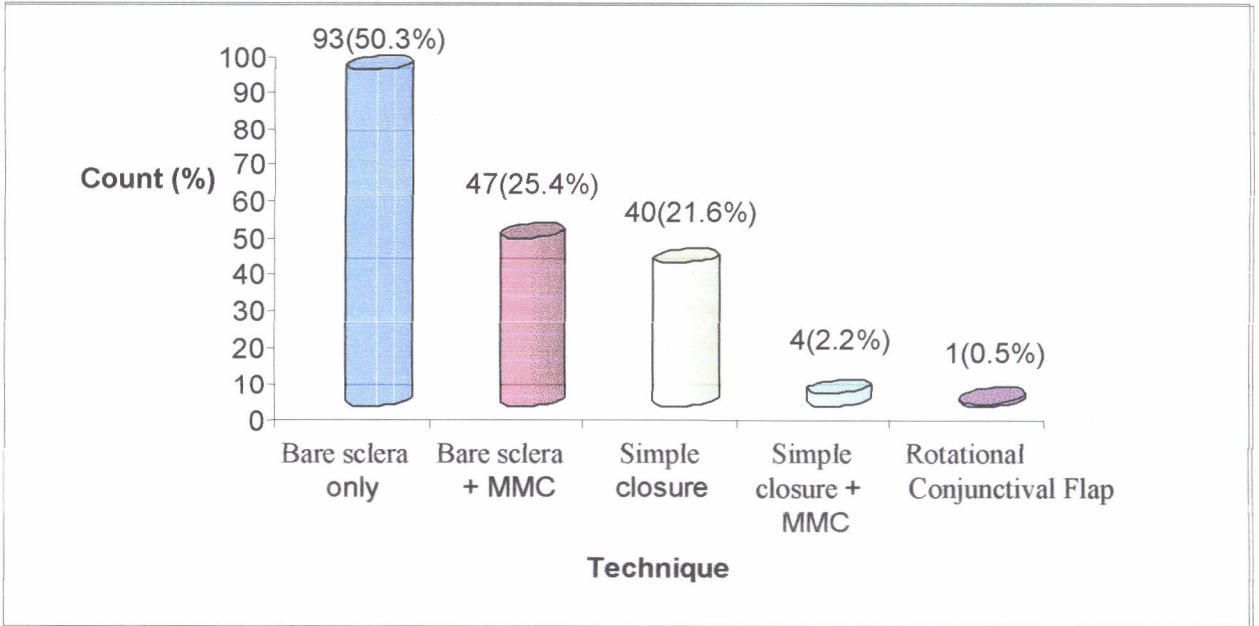
**Figure 5: Reasons for Excision (n=185)**



The most common reason for excision was whitish growth in the eye.



**Fig 6: Surgical Techniques (n=185)**



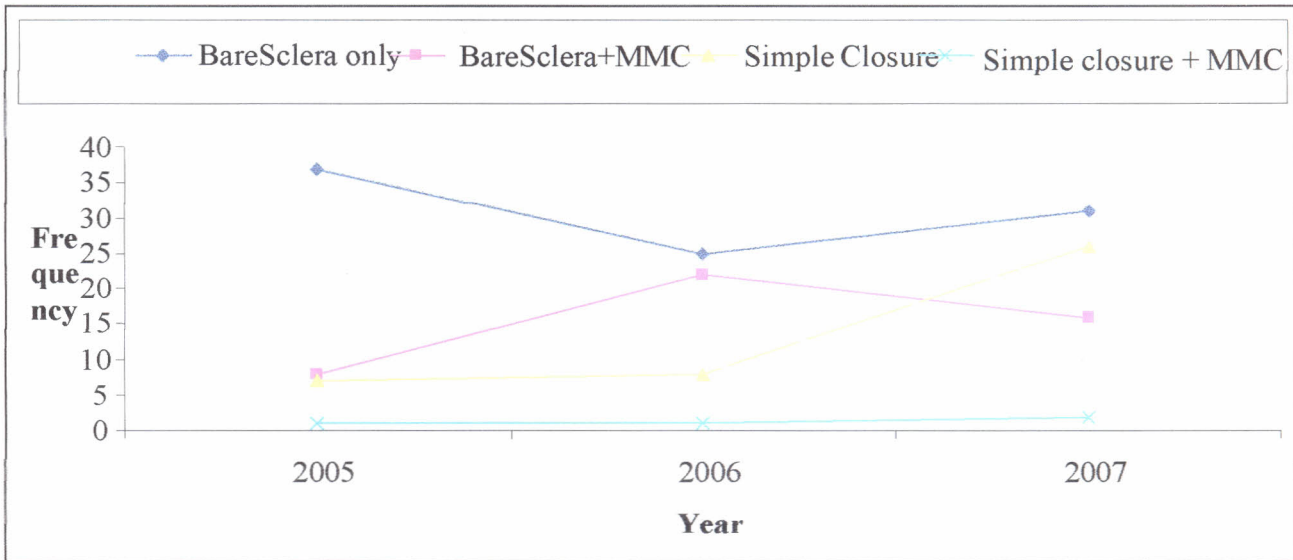
Bare Sclera with or without adjunctive therapy was the commonest surgical technique in this setting and has remained so over the years.

**Table 2: Surgical Technique by Year (n=185)**

Techniques	Year		
	2005(%)	2006(%)	2007(%)
Bare Sclera only	37(68.5)	25(44.6)	31(41.3)
Bare Sclera + MMC	8(14.8)	22(39.3)	16(21.3)
Simple Closure	7(13)	8(14.3)	26(34.7)
Simple closure + MMC	1(1.9)	1(1.8)	2(2.7)
Rotational Conj. Flap	1(1.9)	0	0
<b>Total</b>	<b>54(100)</b>	<b>56(100)</b>	<b>75(100)</b>

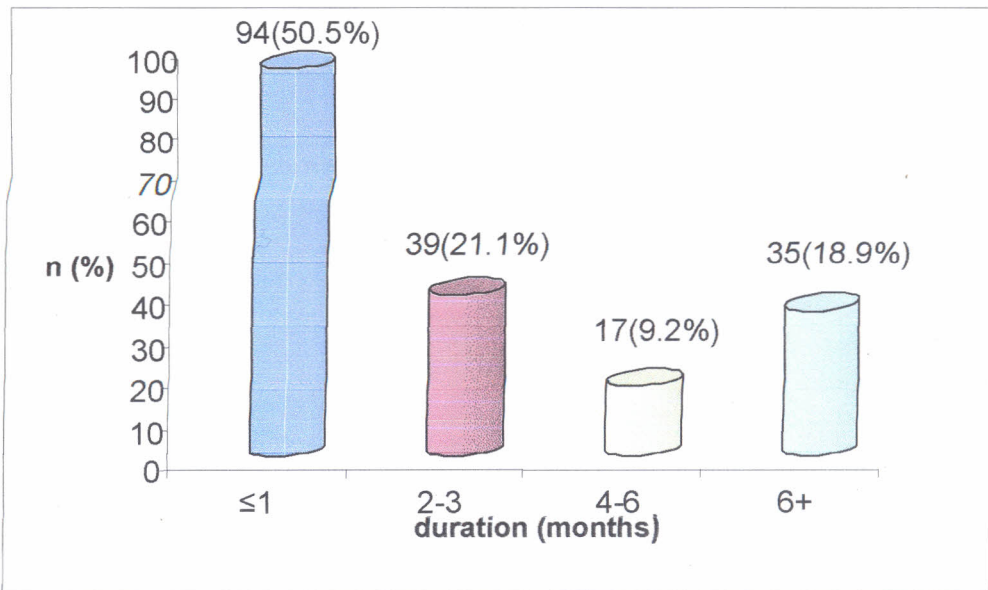
Bare sclera only has remained the commonest surgical techniques over the years.

**Figure 7: Trend of surgical technique over the years**



Over the years, simple closure is becoming popular although bare sclera has remained the most common technique in this setting.

**Fig 8: Trend of Follow-up (n=185)**





More than half of the patients were lost to follow up in the first one month postoperatively.

**Table 3 : Visual Acuity(uncorrected) n=185**

VA	First ,n (%)	Last, n (%)
6/6	99 (53.5)	104 (56.2)
6/9	32 (17.3)	40 (21.6)
6/12	20 (10.8)	18 (9.7)
6/18	14 (7.6)	15 (8.1)
6/24	8 (4.3)	4 (2.2)
6/36	4 (2.2)	2 (1.1)
6/60	2 (1.1)	0
3/60	1 (0.5)	0
CF 3M	1 (0.5)	1 (0.5)
CF 2M	0	1 (0.5)
CF 1M	2 (1.1)	0
CF 1/2M	1 (0.5)	0

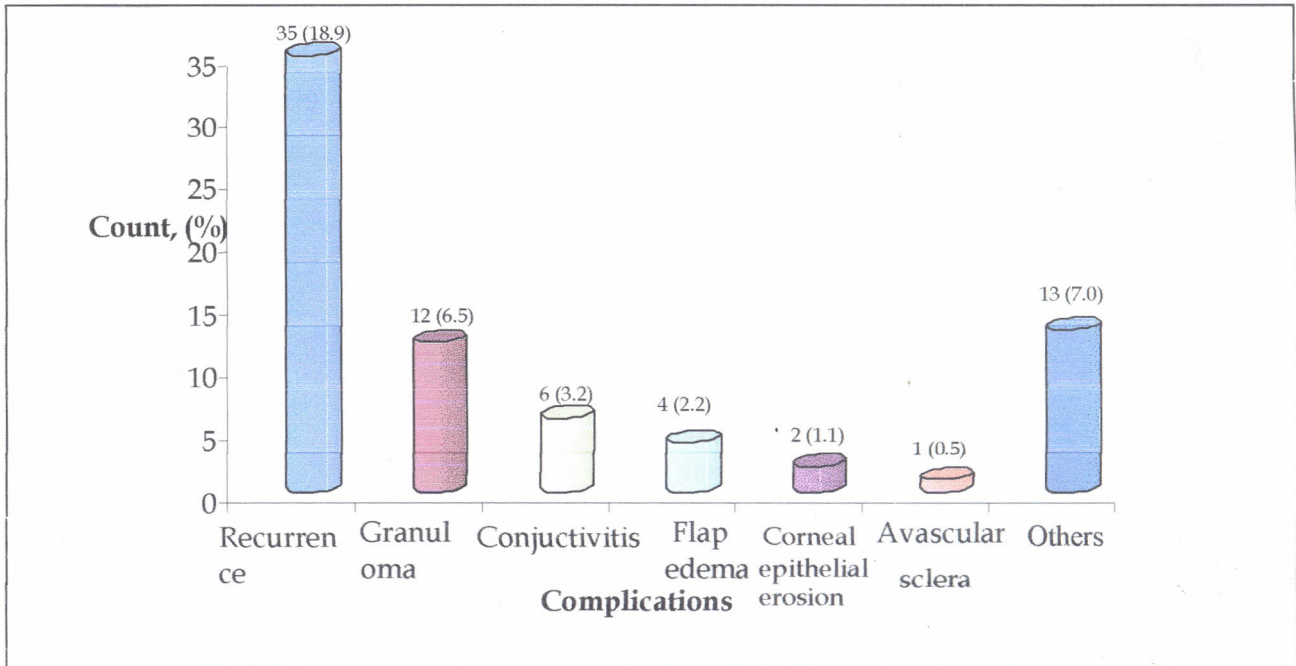
Majority of the eyes showed no change in uncorrected VA.

**Table 4: Pattern of VA postoperatively (uncorrected) n=185**

VA CHANGES	Frequency	Percent
Improved VA	55	29.7
No change in VA	102	55.1
Deteriorated VA	28	15.1
<b>Total</b>	<b>185</b>	<b>100.0</b>

Most of the eyes showed no change in uncorrected VA, accounting for 55.1%

**Figure 9: Pattern of Complications(n=185)**



Others included; (Chronic inflammation, Foreign body Sensation)

**Table 5: Proportion of complications per Technique**

Complications	Techniques			
	Bare Sclera only	Bare Sclera + MMC	Simple Closure	Simple closure + MMC
Recurrence	69.0	44.4	26.9	0
Granuloma	6.9	22.2	23.1	0
Conjunctivitis	6.9	11.1	7.7	0
Cornea Epithelial erosion	0.0	11.1	0.0	0
Avascular sclera	0.0	5.6	0.0	0
Flap edema	0.0	0.0	15.4	0
Other	17.2	5.6	26.9	0
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>0</b>

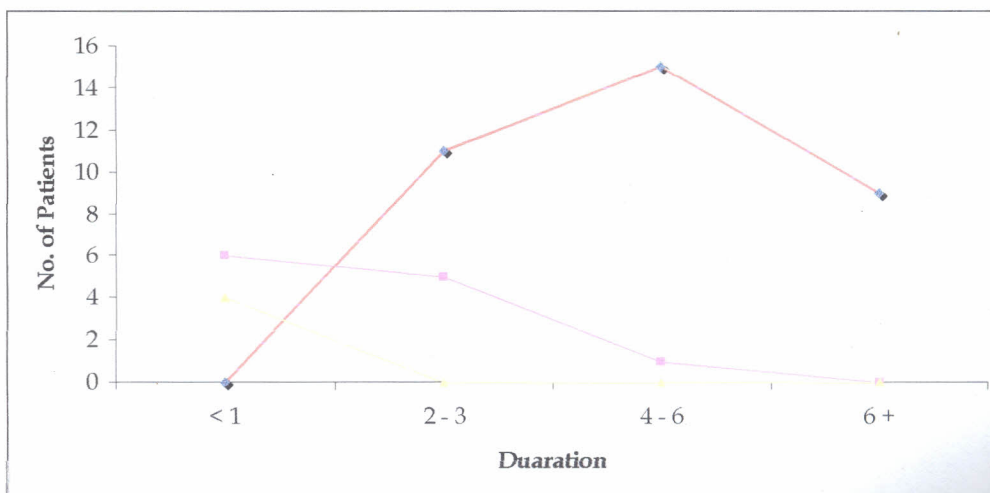
Bare sclera only recorded the highest proportion of recurrences. Other complications were directly related to technique used.

**Table 6: Time of occurrence of Complications**

Complications	Timing of Complications (in Months)				Mean	Median
	≤ 1	2-3	4-6	6+		
Recurrence (35)	0	11	15	9	6.2	6.0
Granuloma (12)	6	5	1	0	2.1	1.5
Conjunctivitis (6)	2	3	1	0	2.8	3.0
Avascular sclera (1)	1	-	-	-	-	-
Flap edema (4)	4	-	-	-	-	-
Corneal Epithelial erosion (2)	-	1	1	-	-	-

Recurrence and flap oedema were related to time of occurrence

**Figure 10: Trend of Major Complications**



**LEGEND**  
 Recurrence — (red line)  
 Granuloma — (purple line)  
 flap edema — (yellow line)

**Table7: Association between recurrence and demographic characteristics (n=185}**

Baseline Factors	Recurrence n (%)	OR (95% CI)	P-values
Sex			
Male	16 (21.1)	1.3 (0.6-2.7)	0.536
Female	19 (17.4)	Reference	
Age			
< 30	5 (29.4)	1.9 (0.6-5.8)	0.246
≥30	30 (17.9)	Reference	
Race			
Black	30 (19.1)	1.0 (0.34-2.8)	0.965
Asian	5 (20.0)	Reference	

There was no statistically significant association between recurrence and demographic characteristics.

**Table 8: Association between Recurrence and Indications(n=35)**

<b>Indications</b>	<b>Recurrence n (%)</b>	<b>OR (95% CI)</b>	<b>P-values</b>
Whitish growth	27 (20.0)	1.3 (0.6 – 3.1)	0.537
Irritation/Redness/Pain	6 (28.6)	1.9 (0.7-5.2)	0.230
Poor vision only	1 (5.3)	0.2 (0.0-1.7)	0.109
Poor Vision & Irritation only	0	-	0.193
Pain Only	6 (28.6)	1.9 (0.7-5.2)	0.230

There was association between recurrence and indication for surgery.

**Table 9: Association between Recurrence and Technique(n=35)**

<b>Technique</b>	<b>Recurrence</b>	<b>OR (95% CI)</b>	<b>P-value</b>
Bare Sclera only <sup>1</sup>	20 (57.1)	Reference	Reference
Bare Sclera + MMC	8 (22.9)	1.3 (0.5-3.6)	0.569
Simple Closure	7 (20.0)	1.5 (0.6-3.0)	0.556

Bare sclera only was associated with more recurrences compared to other techniques but this difference was not statistically significant.



**Table 10: Association between Recurrence and Previous pterygium Surgery (n=5)**

Previous Surgery	Recurrence n (%)	OR (95% CI)	P-values
Yes	5 (55.6)	6.1 (1.5-23.9)	<b>0.004</b>
No	30 (17.0)		

Recurrence was 6 times more likely to occur in eyes that had previous pterygium surgery.

**Table 11: Association between Granuloma and Technique**

Technique	Granuloma	OR (95% CI)	P-value
Bare Sclera only	2 (16.7)	7.8(1.3-59.0)	<0.001
Bare Sclera + MMC	4 (33.3)	1.8(0.4-8.4)	0.596
Simple Closure	6 (50.0)	Reference	Reference

Pyogenic granuloma was more common in eyes that had simple closure and this was significantly higher compared to the the other techniques.



## 7.0 DISCUSSION

Pterygium is common in the tropics. Aetiology is unknown but thought to be related to solar exposure. Although the recurrence rate is very high there is still no consensus regarding the ideal treatment for the disease. Different therapeutic approaches are currently used but comparability studies have been difficult because of the different definitions of pterygium recurrence.

This study reviewed 185 eyes of 175 patients that underwent pterygium excision between the years 2005 and 2007. Ten of these patients had bilateral excision. The diagnosis of pterygium was made on clinical grounds because only 10 eyes had pterygium confirmed histologically. There were more females (100) than males (75) that had excision giving a male to female ratio of 0.8: 1 (Table 1). This same finding was noted by Ignosi and Tambe et al in studies done in Kenya.<sup>15,35</sup> This was in contrast to what has been reported in other studies where pterygium was more in males than females. Fernandes et al in India found more males than females in their studies.<sup>46</sup> The reason why more females presented in this study could be explained by the fact that pterygium is basically a cosmetic problem.

The mean age in our study was 44.8 years, median was 44 years and range was 17-86 years (figure 3). Ajayi et al in Nigeria reported the youngest patient in their study to be 10 years old while the oldest was 89 years. Peak age in our study was 30-49 years. This age range can be explained by the different factors related to the aetiology of pterygium as seen in the population based study of the Melbourne residents and the Tanjong Pagar

Survey.<sup>4,22</sup> The peak age of 30-49 years in our study also reflects the fact that this is the group more at risk of solar exposure since it is the working age group.

Most of our patients were Kenyan Africans and this was not incidental finding because there are more blacks than Asians and Europeans in Kenya (figure 4).

The most common reason why patients presented to the hospital was whitish growth in the eye, comprising 73% in this study (figure 5). Ashaye in Ibadan in a review of 400 patients that had pterygium showed that 70% of the patients had complaints of whitish growth in the eye. This can explain the fact that pterygium is considered to be a cosmetic complaint and can further explain why more females were presenting to the hospital for excision than males.

Five different surgical techniques were used in this study. The most common surgical technique was bare sclera, followed by bare sclera with MMC accounting for 50.3% and 25.4% respectively (figure 5). Like many other studies in other parts of the world, bare sclera with or without adjunctive anti-metabolite,  $\beta$  irradiation or post operative use of topical corticosteroids has remained the commonest technique used.<sup>15,34,35,40,44,46</sup>

More than 50% of the patients were lost to follow up within the first month and so patients for comparison were few ( figure 8). Ignosi in a study at KNH had 10.8% follow up.<sup>15</sup> Tambe et al had a mean follow up of 8 weeks.<sup>35</sup> The loss to follow up in this study could be explained by the fact that the patients did well post operatively or they had problems and decided to seek alternative opinions.

Uncorrected VA for most of the eyes remained unchanged. Although outcome of VA was not one of our objectives, pre and postoperative refractions could explain astigmatism

which is not only an indication, but a complication of pterygium excision, and thus the reason why some VA deteriorated (Table 3 and 4). Those who improved could be explained by the fact that pterygium excised must have been large enough to obscure the visual axis but this explanation was limited by the fact that the size of pterygium (which has been shown to influence recurrence) was also not documented as seen in the grading system.<sup>27</sup>

The definition of recurrence in different studies differs and this is thought to affect recurrence rate.<sup>44</sup> In this study there was no specific definition. Recurrence was the commonest complication in this study with a rate of 14.1% within the first 6 months post operatively (figure 9). Those who underwent surgery by bare sclera with or without MMC had the highest proportion of recurrences accounting for 57.1 and 22.9% respectively. Same finding has been shown in other studies.

Most of the other complications such as flap oedema, pyogenic granuloma and avascular sclera were directly related to the surgical technique used (table 5). In this study 0.05mls of MMC, one drop on cotton tip applied on bare sclera for 3mins was used and this could explain why there were no serious complications of MMC recorded.

Most of the recurrences occurred between 2 and 6 months (figure 10). Hirst et al in a study on pterygium recurrence time in Australia showed that there was a 50% chance that pterygium will recur within the first 120 days post operatively and that 97% chance of recurrence at 12 months.<sup>45</sup> There was no significant association between recurrence rate, sex, age, race and indication (Table 7 and 8 respectively). This was in contrast to some studies in which recurrence has been shown to be commoner in patients less than 40



years but could be explained by the fact that many of the patients were lost to follow up within the first month postoperatively as such few for comparison.<sup>44</sup>

Although those who underwent surgery by bare sclera only were more likely to have recurrence, the difference in this study showed no statistical significance (Table 9). This was in contrast to some studies done in Kenya and other parts of the world. Tambe et al showed that out of 15 patients that underwent bare sclera only, 53.3% had recurrence compared to that group that received topical steroids and the difference was statistically significant(  $p=0.0017$ ). All patients in our study received topical corticosteroids post operatively and so the use of topical corticosteroids as adjunctive treatment was not comparable, although it has been shown to reduce recurrence rate.<sup>35</sup>

Recurrence was also shown to be more likely to occur in eyes that had previous pterygium excision and the difference was statistically significant (Table 10). Karabatsas et al reviewed outcome of pterygium excision in Bristol,UK and showed that out of 13 eyes with recurrent pterygium, 23% had recurrence. The high recurrence rate associated with secondary pterygium has been explained by the fact that it is more difficult to treat because of more scarring of the cornea and sclera making surgical removal more difficult and that there might be shortage of conjunctiva or limbal stem cells for treatment.<sup>43</sup>

Another major complication noted was pyogenic granuloma which showed that patients that underwent excision by simple closure technique were more likely to have granuloma than those who had excision by bare sclera only and the difference was statistically significant( $p<0.001$ ).

In general,comparisons in this study were limited by the fact that there were five surgeons involved in operations with no standardized protocol on method of excision.

## 8.0 CONCLUSION

The commonest reason for pterygium excision was whitish growth in the eye accounting for 73% and can explain the fact that pterygium is more of a cosmetic problem and was reflected in the male: female ratio of 0.8:1

The most common complication was recurrence with a rate of 14.1% within the first six months and 18.9% within one year and there was not statistically significant association between recurrence, surgical technique, age, sex or race.

The trend in this setting was noted towards bare sclera technique although it has been shown to have an unacceptably high recurrence rate and in this setting had the highest proportion of recurrence, accounting for 69% of recurrences.

There was no significant association between recurrence and age, sex, race and indication for surgery.

The use of anti-metabolites and conjunctival flap was shown to be more likely to reduce recurrence although the difference was not significant compared to bare sclera only.



## 10.0 APPENDIX

### QUESTIONNAIRE FOR REVIEW OF OUTCOME OF PTERYGIUM EXCISION AT LION SIGHT FIRST EYE HOSPITAL –LORESHO,NAIROBI.

1. IP No ----- Date \_\_\_\_\_

2. SEX Male  Female  3 OCCUPATION(specify) -----  
-----

4 .RESIDENCE/Address -----5 .Race Black  White  Indian

6 .Presenting complaints

Growth in the eye, painless, Irritation, Redness, Pain Poor vision Cosmetic

7 .Past Ocular History

a. Previous surgery (how many times)

Reason (specify) -----

b. Use of eye drops Yes (specify) No

Reason (specify) -----

c. Use of native medication Yes (specify) No

8. OCULAR EXAMINATION

I. Visual Acuity R L

Uncorrected

Corrected

II. Intra ocular Pressure R L

III. Anterior segment examination R L

a. Conjunctiva :

(i)Fleshy lesion (shape); Nasal  Temporal  Both

(ii) Redness

(iii) Leucoplakia

(iv) Pigmentation

b. Cornea :

(i)Wing shaped lesion (position) Nasal  Temporal  Both

(ii)Superficial punctuate erosion (iii) Dellen (iv) Stocker line

9 .Surgical treatment

Bare Sclera + MMC/5-FU/Beta Radiation, Simple closure, Sliding flap ,Rotational flap ,  
Conjunctival graft ,Amniotic membrane graft ,Lamellar keratoplasty, Penetrating keratoplasty ,  
Laser

10. Histology Results -----

11. Follow up : RE  LE

Day 1 -----Week 4 -----3/12 -----6/12 -----1 year -----

12. Post operative complications

- |                                   |       |       |         |
|-----------------------------------|-------|-------|---------|
| a. Visual Acuity                  | R     | L     |         |
| Refraction                        | ----- | ----- |         |
| b. IOP                            | ----- | ----- |         |
| c. Sclera Necrosis                |       |       | Yes /No |
| d. Cornea Epithelial erosion      |       |       | Yes/No  |
| e. Conjunctivitis                 |       |       | Yes/No  |
| f. Pyogenic granuloma             |       |       | Yes/No  |
| g. Graft inversion/ Graft Failure |       |       | Yes/No  |
| h. Recurrence                     |       |       | Yes/No  |
| i. Others                         | ----- |       |         |

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