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STUDY OF SURGICAL OUTCOMES OF CONJUCTIVAL AUTOGRAFT IN THE RECONSTRUCTION OF OCULAR SURFACE DEFECTS USING FIBRIN GLUE.

[1]Dr. Manjunath Natarajan, *[2]Dr. H. N. Sowbhagya, [3]Dr. K. Sneha, [4]Dr. P. Santhosh, [5]Dr. Deepthi U. S., [6]Dr. Divya B.

[1,3,4,5,6]Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.
[2]*Professor, The Department of Ophthalmology, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

*** Corresponding Author: Dr. H. N. Sowbhagya**
Professor, The Department of Ophthalmology, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

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ABSTRACT

Objective: To study & assess the use of CA done using fibrin glue in:
1) Reconstructing ocular surface defects & postoperative cosmesis.
2) Prevention of recurrences of the pathology,
3) Reduction of postoperative complications.

Design of the study: Prospective, interventional case series study, conducted from Jan 2006 to Dec 2014. **Setting**: Institutional study, done at Kempegowda Institute of Medical Sciences, Bangalore. **Participants/Materials and methods**: Ten eyes of nine patients who visited the outpatient department with various ocular surface disorders were selected randomly. All underwent CA done using fibrin glue (Reliseal™) following surgical excision of the pathology. Eight eyes were of recurrent pterygia, one eye of malt lymphoma of size 12mm x 10mm & one case of combined naevus 8mm x 6mm. Follow up ranged from 3 to 8 years (Jan 2006 to Dec 2014). **Outcomes**: All the cases showed good ocular surface reconstruction & showed no recurrences over the follow up period. **Results**: Eight eyes with recurrent pterygia, satisfying the inclusion criteria underwent pterygium excision with CA using fibrin glue. A case with malt lymphoma of the conjunctiva in a single eye underwent CA with fibrin glue after total excision of the malt lymphoma. A case of single eye combined naevus of limbus in a single eye also underwent total excision with CA using fibrin glue. Success was achieved in 100% of the cases with respect to prevention of recurrences & 90% with respect to cosmetic surface reconstruction. **Conclusion**: CA done using fibrin glue resulted in the effective management of ocular surface defects following the excision of various conjunctival pathologies.

KEYWORDS: conjunctival auto graft, recurrent pterygium, malt lymphoma, limbal combined naevus, fibrin glue.

INTRODUCTION

1) Recurrent pterygia

A pterygium (plural pterygia) is a triangular fibro vascular sub epithelial ingrowth of degenerative bulbar conjunctival tissue over the limbus onto the cornea.[1]

Fig.1 – parts of a pterygium

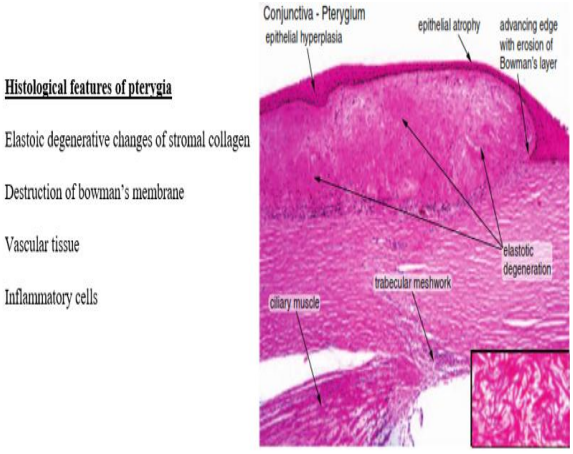


Fig.2 – histopathology of a pterygium

The most common indications for pterygium surgery are:

- **Inflammatory**: Persistent discomfort, chronic irritation, recurrent inflammation.
- **Visual**: The growth approaches the visual axis/ has encroached on to the visual axis, visual distortion, irregular astigmatism.
- Exhibits rapid growth, restricted ocular motility and cosmesis.[2]

RECURRENT PTERYGIUM

A recurrence may be defined as *the postoperative growth of fibro vascular tissue 2mm or more onto the clear cornea in the area of previous pterygium excision*.[3]

Following pterygium surgery the main complication is recurrence of the primary disease.

Recurrent pterygia may completely lack the histologic feature of elastotic degeneration and are more accurately classified as an exuberant fibro-connective tissue response. Some studies have demonstrated that there is abnormal expression of Ki-67 (a proliferation marker) and of tumour suppressor genes such as p53 and p63, as well as loss of heterozygosity and micro-satellite instability.[2]

Recurrent pterygium is more difficult to treat than primary pterygium because it often is accompanied by increased conjunctival inflammation and accelerated corneal involvement. Histopathological analysis has shown that a recurrent pterygium has predominantly fibroblastic proliferation and neovascularization, which is much more prominent than the elastotic conjunctival degeneration of a primary pterygium.

CHALLENGES DURING SURGERY OF RECURRENT PTERYGIA

1) Repeated surgeries for pterygium tend to lessen the time to recurrence, suggesting that pterygium recurs easily.[4]
2) Extensive surgical excision for recurrent pterygium can lead to further limbal stem cell deficiency and cicatricial changes in the ocular surface.[4]
3) Recurrent pterygia is frequently much more difficult to remove than primary pterygia because it is often scarred to the sclera & to the underlying rectus muscles, great care must be taken not to damage the underlying extraocular muscle.
4) Repeated surgeries can cause corneal thinning & symblepharon formation.
5) The superior conjunctiva is often scarred; therefore, harvesting a second autograft is technically more difficult and occasionally impossible and in such cases an inferior conjunctival autograft may need to be taken.

Syam and colleagues reported a recurrence rate of 3.3% following inferior conjunctival autograft for primary pterygia in a study of 30 eyes.[5]

RISK FACTORS OF RECURRENT PTERYGIA[6,7]

The risk factors for recurrence include

1) Geographic location – The "pterygium belt", area 40 degrees north & south of the equator having increased prevalence of pterygia.

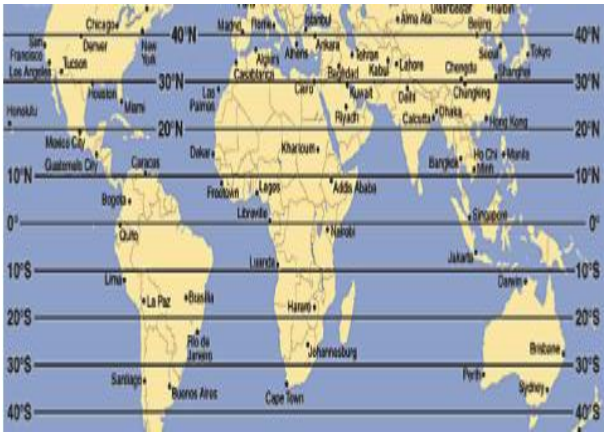


Fig 3 – showing the pterygium belt

2) Age - in individuals less than 40yrs of age. The lipoid degeneration in the peripheral cornea in elderly individuals may be an inhibiting factor to pterygium progression.
3) Morphology of pterygium - The pterygia showing non translucency or fleshiness have been described as having higher tendency to recur.
4) Sex - The incidence of both primary & recurrent pterygia were higher in males.

PATHOGENESIS OF PTERYGIA[6]

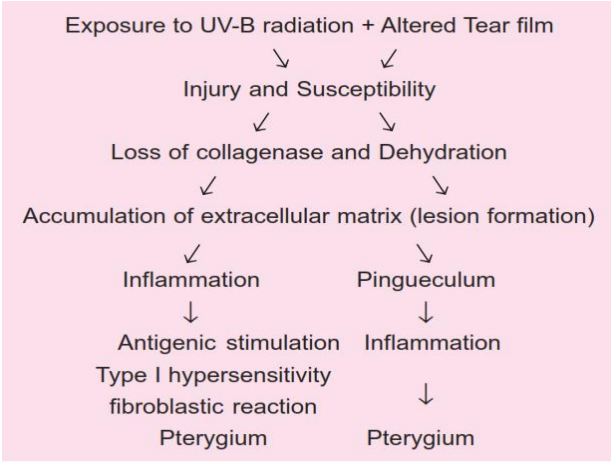


Fig 4 – pathogenesis of pterygia

TREATMENT & PREVENTION

1) Nonsurgical/preventive measures[6]

- Coexistent prolonged exposure to UV-B (ultraviolet) light – the radiations responsible for inciting pterygium formation are UV-B radiations, polarized glasses with additional UV filtering effect can help protect against these in people exposed to prolonged outdoor activities in sunny environments & hot sandy beaches.

- Preexisting dry eye – preventable by using artificial tear supplements.

2) Surgical measures

- **Operative technique**

Review of published literature suggests that the surgical technique could probably be the single most important factor influencing recurrence. Due to the inflammatory nature of pterygium tissue, the surgically induced inflammation is usually more intense after pterygium excision.

Sealing the gap left between conjunctiva & tenon's fascia - some authors[8] observed that a gap is inevitably created between the conjunctiva and Tenon's capsule after the excision of pterygium and Tenon's resection, through which fibrovascular tissue remnants can pass to cause recurrence. By closing this gap during surgery, the recurrence rate achieved was only 3.1%, thus pointing to the potential utility of this technique.

The aim of surgical sealing is to hinder the propagation of residues of the fibrovascular tissue across the gap created between the conjunctiva and Tenon's capsule after the pterygium excision, thus preventing its recurrence

Tissue adhesives: Several studies have quoted that an increase in post-operative inflammation is the primary cause of recurrent pterygium.

Koranyi et al[9] were able to demonstrate a statistically significant decreased recurrence rate with the use of fibrin glue (FG) when compared with the use of sutures. They postulated that a possible reduction in the migration of fibroblast cells caused by the rapid adhesion of the graft with the FG may lead to decreased postoperative inflammation. Minimal handling of tissues, post-operative topical steroids are also measures to reduce inflammation.

Antimetabolites: intraoperative mitomycin C, 5 – Fluorouracil, interferon a 2b, are used to decrease inflammation & reduce the recruitment of fibroblast & inflammatory cells to the surgical site.

USING GRAFTS TO COVER THE BARE AREA

The simplest technique of bare sclera excision alone in pterygium surgery proved unsatisfactory because of high recurrence rates found by several studies. The high recurrence found in this technique has led to surgeons using grafts to cover the bare sclera.

- **Amniotic membrane grafting**: it helps in ocular surface reconstruction by covering the bare area & also by reducing the inflammation.

Amniotic membrane is costly, not freely available and requires preservation. Studies have reported higher recurrence with amniotic membrane compared to conjunctival grafting.[10]

- **Covering bare area with a graft/Conjunctival autograft (CA)**

Among various surgical procedures proposed for the treatment of recurrent pterygium, conjunctival autograft has a relatively low recurrence rate & is the safest & most effective modality.[11,12,13,14]

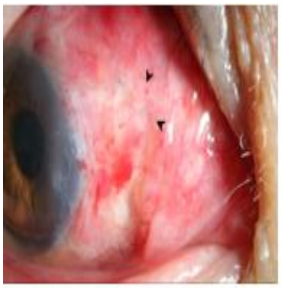
This is a technique which is safe & convenient procedure done either with or without inclusion of limbus & helps to prevent recurrences while covering the bare sclera. This technique is easy & free of most problems associated with the other measures to prevent recurrences. Studies have reported the effectiveness of CA in the prevention of recurrent of pterygia[15] & also that limbal conjunctival autografts were more effective than free conjunctival autografts for treatment of recurrent pterygia.

The main complications of conjunctival surgeries are recurrence of the primary lesion, formation of granulomas, ulcerations, symblepheron & the others include scleral melting, conjunctivitis, dellen, excessive bleeding, injury to medial rectus muscle, secondary glaucoma, iritis, corneal perforation or corneal ulcer.

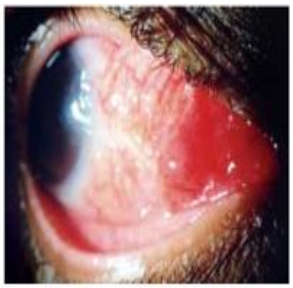
An official AAO (American Academic of Ophthalmology) reports has shown conjunctival autograft to have lower recurrences than amniotic membrane graft.[16]

Complications with grafting

The postoperative complications include graft dislodging, graft edema, ocular surface exposure and pyogenic granuloma.



Graft dehiscence



Pyogenic granuloma

Fig.5: complications of using graft for ocular surface reconstruction

Adjunctive treatments to pterygium excision & conjunctival grafting to reduce the recurrence rates are-

1) **Beta irradiation**: has reduced the recurrence rates to around 12%, but was associated with significant complications such as disfiguring skin depigmentation, cataract, severe secondary glaucoma, uveitis, corneal perforation and scleral

necrosis resulting in perforation secondary endophthalmitis.[3]

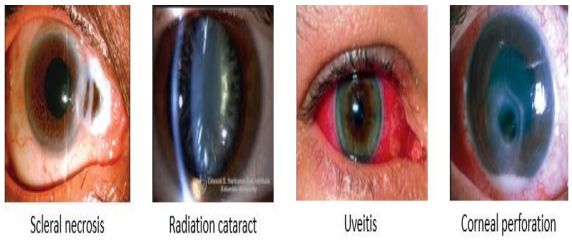


Fig 6: showing a few complication of beta irradiation

2) **Mitomycin C**: Intraoperative application of mitomycin C significantly reduces pterygium recurrence by inhibiting fibroblast proliferation and migration. It can reduce recurrence rates but can cause severe secondary glaucoma, corneal edema, corneal perforation, iritis, sudden onset mature cataract, scleral calcification and incapacitating photophobia and pain.

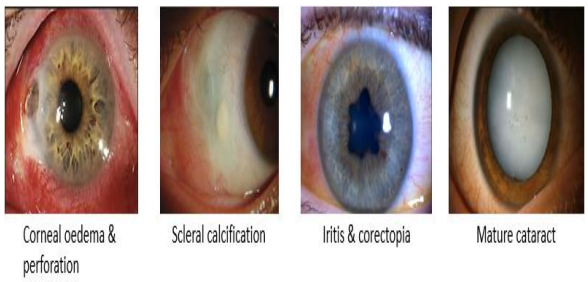


Fig 7: a few complications of mitomycin c

The safety of mitomycin C therapy remains to be determined with future long-term trials.[4]

In the present study we have used the technique of conjunctival limbal autograft which was used to cover the bare sclera using fibrin glue.

AUTOGRAFT TO COVER OCULAR SURFACE DEFECT CAUSED BY MALTOMA

Maltomas are lymphomas arising from the mucosa associated lymphoid tissue (MALT), It is a cancer originating from B cells in the marginal zone of the MALT, and is also called extranodal marginal zone B cell lymphoma.

Clinical features

Both benign (for example reactive lymphoid hyperplasia) & malignant lesion show the same clinical features, a salmon pink mobile mass on the conjunctiva, systemic features(present in 31% of lymphoid malignancies) & histopathology help in diagnosis.

The majority of lymphomas in ocular adnexa are low-grade B-cell lymphomas of mucosa-associated lymphoid tissue (MALT) lymphoma.

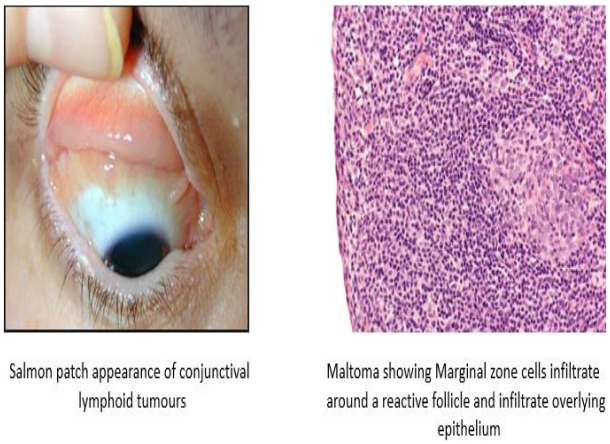


Fig 8: clinical appearance & histology of maltoma.

Management of maltomas

The cells of MALT lymphomas are CD20 positive but are negative for CD3, CD5, CD10 and CD23.

Maltomas show good response to radiotherapy but has side effects, of which the common ones are cataract formation & radiation retinopathy.

Patients with primary ocular adnexal MALT lymphomas presenting with localised disease require local treatment and have a better outcome compared with patients with other types. The follow up outcomes of only local excision are comparable to the outcomes of patients treated with adjuvant chemo &/or radiotherapy.[17]

As a small percentage of these tumours recur, patients should be followed up indefinitely.[17]

The mainstay of treatment for localized disease is external-beam radiotherapy (EBRT) with 30 to 36 gray (Gy), usually given in 20 daily fractions of 1.8 Gy. The complete remission rate is in excess of 90 percent for MALT lymphoma, with excellent long-term local control in the majority of patients. The potential complications of EBRT include xerophthalmia, keratitis, cataract formation and retinopathy.[18]

The conjunctival defect created during the surgical removal of a large lesion might result in symblepharon.[19] Hence there is a need to cover the bare sclera by an autograft.

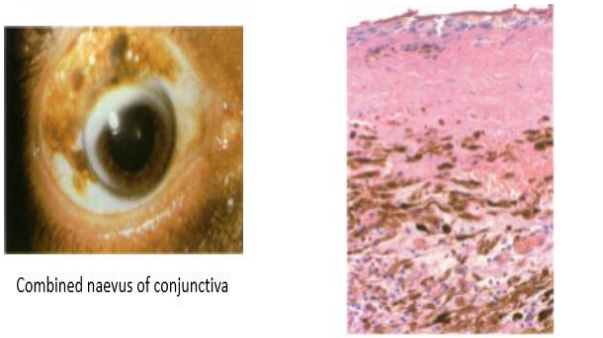
Keeping in view the side-effects of radiation therapy & other factors mentioned above, excision of the mass with conjunctival autograft to cover the bare area appears to be a viable alternative.

AUTOGRAFTING IN COMBINED NAEVUS

Combined nevi are neoplasms composed of 2 or more distinct melanocytic populations. They comprise any melanocytic nevus, including blue nevus, Spitz nevus, or nevus with deep dermal pigmented cells, combined with another type of nevus. The most common type of combined nevus is the combination of a blue nevus with

typical/naevocytic conjunctival naevus and it is histologically distinctive.[12]

Combined naevi of conjunctiva are not rare. The blue naevus cells are usually located deeper than most naevocytic naevus cells, may be bluer or grayer than usual naevi, & usually have been pigmented since early in childhood.



Combined naevus of conjunctiva

Pigmented dendritic and spindle-shaped blue nevus cells in area adjacent to nevocytic component of combined nevus

Fig 9 – clinical appearance & histopathology of combined naevus of the conjunctiva

A biopsy should also be performed for pigmented lesions on the tarsal conjunctiva, the caruncle, or the plica semilunaris or in the fornix, as nevi are rare in these locations.

A correct diagnosis will make surgical excision unnecessary, if an excision is necessary, the surgeon can avoid doing a deep excision involving the sclera. If excision is necessary because of the cosmetic defect, the superficial component could be excised & examined, while the deeper pigment could presumable be eliminated with cryotherapy.[20]

Most studies support observation of cases due to the benign nature of the lesion. In our study we conceded to the patient's wish for the removal of the lesion as it was increasing in size & also for cosmetic reasons. We used conjunctival autografting to cover the bare sclera as literature review suggests it to be a good material to reconstruct the ocular surface.

Clinical features that are suspicious for malignancy in a naevus are

1. Onset in childhood
2. Recent increase in growth of the naevus.
3. Recent color change of the naevus.
4. Location other than bulbar conjunctiva, plica semilunaris and caruncle
5. Prominent feeder vessels
6. Recurrence of excised lesion

FIBRIN GLUE

Fibrin glue (FG) is a blood derived product that is absorbable, relatively easy to use, stored in a refrigerator. FG includes a fibrinogen component and thrombin component, both prepared by processing plasma. FG forms a smooth seal along the entire length of the wound and edges and provides better comfort with the least amount of complications, FG uses the mechanism of blood clotting formation by the coagulation cascade resulting in an adhesive glue. There is subsequent proliferation of fibroblasts and formation of granulation tissue within hours of polymerization of fibrin. Clot organization is complete two weeks after application. The resultant fibrin clot degrades physiologically.

Reliseal™ (manufactured by Reliance Life Sciences)[21]

The Fibrin glue kit (Reliseal™, manufactured by Reliance Life Sciences Laboratories, India) contains 2 components in separate vials:

1) Freeze dried human fibrinogen (Yellow Capped)
2) Freeze dried human thrombin (Blue Capped)

The kit also contains:

1) Aprotinin solution (Bovine) — 3000 & 1500 kallikrein inhibitor units (kiu/ml) in 1ml & 0.5ml units respectively, (Red Capped)
2) 1 × 5 ml ampoule of sterile water for injection,
3) 4×2ml syringes for reconstitution &application,
4) 4×21G sterile needles for aspiration of the two components; 2×20G blunt application needles.
5) Fibrin glue applicator with two mixing chambers & 1 plunger guide.

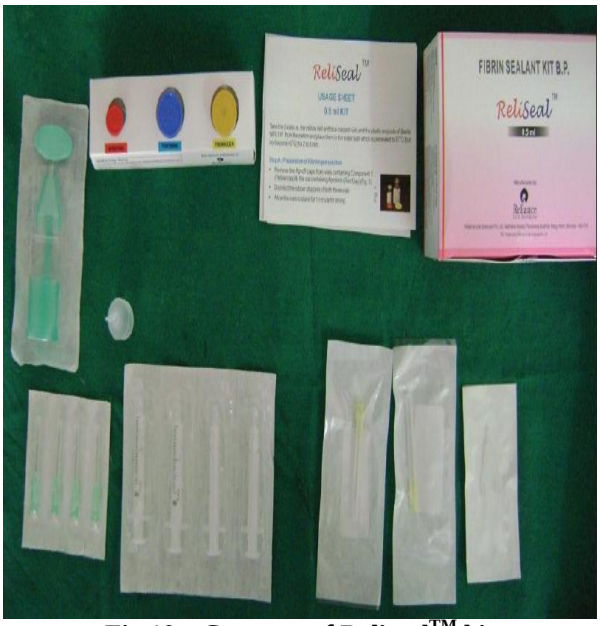


Fig 10 – Contents of Reliseal™ kit

Solutions were then combined by using duploject syringe shown below and the reconstituted components in the solution were applied locally as soon as possible.

Fig 11 - Duploject syringe

Safety & viral inactivation of the product: The product is screened for HIV 1 & 2, Hepatitis B virus, HCV, parvovirus & HAV. Solvent Detergent Technology is used to inactivate lipid coated viruses. Though, there is a remote possibility of an unknown infectious agents to be present in these products.

The fibrin adhesion system initiates the last phase of physiological blood coagulation cascade.

Fibrinogen ---- $^{\text{thrombin}}$ -------> fibrin monomers

Cross linking of fibrin monomers---- $^{\text{factor xiii \& calcium}}$ -----> clot formation

The locally applied mixture quickly sets to form a milky white to translucent mass which continues to gain strength within 2 hrs following application. As wound healing progresses, increased fibrinolytic activity is induced by plasmin & the decomposition of fibrin to fibrin degradation products is initiated. Proteolytic degradation of fibrin is inhibited by aprotinin (plasmin inhibitor). Graft dehiscence is a recognized complication of using tissue glue.[22]

MATERIALS AND METHODS

Prospective interventional study done between Jan 2006 to Dec 2014 at Kempegowda institute of medical sciences & research centre affiliated to RGUHS. Permission & Ethical clearance were obtained. Procedures done according to Organ Transplantation Act & Helsinki guidelines.

Random selection of recurrent pterygia cases were done. After slit lamp evaluation of the extent of the lesion, availability of healthy conjunctiva for grafting at supero temporal quadrant. All the cases were evaluated for tear film stability. Schirmer's test was done to exclude dry eyes. Patients with lid abnormalities lid infections and chronic inflammations of conjunctiva are excluded from the surgery. Of the patients having recurrent pterygia, five had right sided & three were left sided & one of these cases had double headed pterygium (combined nasal and temporal pterygia in the same eye).

History & findings of the cases with combined naevus of conjunctiva & maltoma are given below.

PREOPERATIVE PREPARATION

Demographic data of all the patients recorded. Written consent obtained after they were explained about the procedure of the surgery. Patients were screened for HIV infections, HbSAg, HCV (hepatitis C virus), Complete Hemogram, Coagulation profile. Preoperative topical antibiotics instilled for three days, oral antibiotics started twelve hours before surgery.

OPERATIVE PROCEDURE

All cases were operated under peribulbar anaesthesia. The steps of pterygium surgery included:

1. Release of head of the pterygium in flush with the cornea without leaving any tags on the cornea by peel and shave technique – head of the pterygium was held with traction using colibri forceps after creating a window at the progressive head of the pterygium and No.11 blade used to shave the pterygium head in flush with the cornea, by this technique the pterygium head could be released from surface of the cornea without leaving any tags (free cut ends of pterygium), after releasing the head end of the pterygium, the undersurface of the head of pterygium shaved from the cornea, from the free end towards the limbus.
2. On reaching the limbus, head of the ptrergium was excised
3. The conjunctival mucosa was separated from the body of the pterygium, including the wings upto the semilunar fold.
4. The wings are separated from the underlying sclera & the superior & inferior limits
5. Whole body of the pterygium was separated from the underlying sclera by taking care to prevent injury to the medial rectus upto semilunar fold
6. Whole of the separated body of the pterygium excised at the level of semilunar fold taking care not to injure or button hole the retained conjunctival mucosa.
7. Maximum conjunctiva was saved to reduce size of the bare sclera
8. The bare area thus created was measured using calipers,
9. 1 mm wider area than the bare sclera measured, was marked on the supero-temporal conjunctiva with methylene blue.
10. Subconjunctival infiltration of 2% xylocaine done to create cleavage between the epithelial layer from underlying adenoid layer.
11. A quadrangular flap of conjunctiva was harvested from the donor area (superotemporal quadrant) was slid on to recipient area (bare sclera), holding the medial end with McPherson's forceps to avoid curling, rolling or turning of the flap upside down. The graft was then spread over recipient area to avoid wrinkles. Reliseal^{TM} was reconstituted as per instructions & injected on to bed by raising the graft

with two way cannula and made uniform spreading with help of muscle hook or cannula, so that the conjunctiva is in close contact with episcleral tissues without leaving much space between conjunctival mucosa and episcleral tissues and wait for 3 mins for glue adhesion. After five minutes excess glue projecting from edges of the graft was excised to prevent lift-up of the graft which can happen at the time of bandage removal if fibrin strands were found adherent to the bandage and lid surface.

12. The donor area was covered with remaining fibrin glue, no suturing done.

The eyes were padded for 12 to 18hrs and the patients were kept under observation in the hospital for 3 days. All cases were prescribed antibiotics (moxifloxacin0.5%) & loteprednol (0.5%) for three weeks, carboxymethyl cellulose for 3-6 months topically, all patients were advised postoperative U.V. filtering glasses for all outdoor activities. Observations done on the first 3 post operative days, 1st 2nd & 3rd weeks,2nd 3rd and 6th months and few cases were followed upto 8 years.

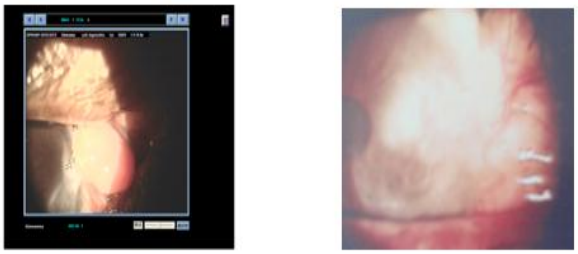


figure 12: cystic degeneration in a recurrent pterygium & the postoperative photograph of the same patient showing good results.

2 A CASE OF MALTOMA OF THE CONJUNCTIVA

On Jan 2008, a 55 year old moderately built & nourished female presented with complaints of a painless, gradually progressive swelling in her right eye since 1.5 years, following foreign body sensation and redness of two months duration in the same eye.

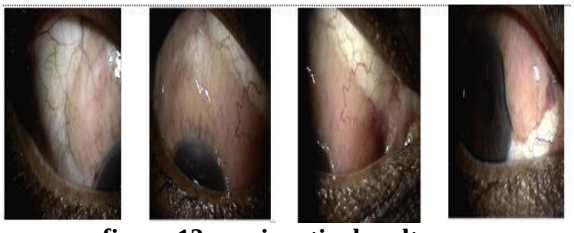


figure 13: conjunctival maltoma

Examination revealed a pink mass, extending from 10 o'clock to 1 o'clock horizontally along the superior limbus and 5mm vertically and a prospective diagnosis of foreign body granuloma was made. Patient refused surgical excision. She was given topical steroids and antibiotics, & was advised follow up visits. The lesion progressed both horizontally and vertically. In Jan 2009 its dimensions were 10 to 4'o clock horizontally and 10mm vertically. The patient then consented for excision on 16 Jan 2009.

Operative Procedure

Total excision of the mass was done leaving clear margins of 1 to 2mm of healthy conjunctiva (15 mm horizontal & 11 mm vertical), bleeding points were cauterized. The bare area was covered with CA (2 grafts, each of size 5 mm x 5mm) using FG, the graft was obtained from the inferior bulbar and fornicial conjunctiva of the same eye. Antibiotic-steroid ointment was applied and the eye was patched. The topical treatment was continued for 4 months.

Investigations

Haematology and biochemistry: With in Normal Limits
Histopathology: Extranodal Marginal zone B cell small Lymphocytic
Immunohistochemistry: Positive for CD20, CD79a, CD23 &
Negative for CD30, CD10, CD3, Tdt
Whole body PET scan: With in Normal Limits

Follow-up: done on 1st and 3rd post operative day, then weekly for six weeks, After 6 weeks patient had no complaints, the whole surgical area was clear and did not show any swelling/infiltration, corneal or conjunctival signs.

figure 14: postoperative images of the same patient following excision of maltoma & autografting

After 4 months- no conjunctival or corneal thinning, no recurrence of the swelling and cosmetically the eye looked just like the normal left eye. In Mar 2010 the patient developed right cortical cataract. She underwent cataract surgery with temporal clear corneal incision and postoperative period was uneventful.

3 A CASE OF COMBINED NAEVUS OF THE CONJUNCTIVA

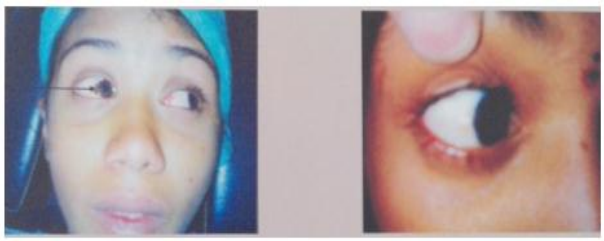


figure 15: conjunctival combined naevus in the right eye pre (right) & postoperative (left) phtografts.

A 16yr old female presented with a black mass in her right eye at the temporal part of the palpebral aperture since birth & was increasing in size over 6 months. On examination the lesion was found extending upto limbus, measuring 6mmx5mm, not vascularized, surface was irregular and raised above the conjunctival surface. The patient wanted surgery for cosmetic reasons.

Surgical excision of the lesion done & the bare area was covered with CA from same eye using FG, topical antibiotic & steroid drops were prescribed for 3weeks.

Histopathology: combined naevus of the conjunctiva.

Follow-up: done on 1st and 3rd postoperative day, then weekly for six weeks, After 6 weeks the patient had no complaints, the surgical area was clear.

RESULTS

Of the eight eyes with recurrent pterygium who underwent pterygium excision with CA using fibrin glue, 7 had uniform conjunctival surface & did not have irritation, discomfort & recurrence of the lesion. One patient had unevenness of the grafted area due to wrinkling & had foreign body sensation for months, later the patient got adapted & all cases were followed up for minimum period 2yrs & maximum period of 5yrs. No recurrences were found in any of the cases studied.

One eye of malt lymphoma, after total excision of the lesion underwent CA with FG, the conjunctival surface became normal by the end of 4 months & no recurrences found after 5yrs of follow up.

One case of combined naevus of limbus underwent local excision then C A using fibrin glue. Conjunctival surface became normal by the end of 2 weeks & no recurrences found after follow up for 5yrs.

Success achieved in 100% of cases as per recurrence, 90% with respect to cosmetic surface reconstruction, in a case of recurrent pterygium which showed wrinkling of the graft causing irregularity of conjunctival surface & symptoms of grittiness & foreign body sensation for more than 6 months.

DISCUSSION

Use of FG has made CA easy, with less tissue injury, quick, with least post-operative inflammation and fast recovery. This procedure is adopted.in treating conjunctival defects of various conjunctival surgeries. In this study 10 eyes underwent C A to cover ocular surface defects created following excision of various conjunctival lesions. All cases had good reconstruction of the defects and uneventfully regained the normal architecture, none of the cases showed recurrence during a follow up period of 5yrs. Allen BD and Prabhaswat P have also found CA to cover the naked scleral bed as an effective and safe technique, associated with low rates of primary lesion recurrence.[23]

Use of FG made gluing of the graft quick & easy and less damaging to tissues compared to suturing. Patient comfort was good as no sutures were used & no inflammatory reactions found as the graft was an autograft.

Even though several studies have demonstrated that fibrin glue significantly reduces surgery time and improves postoperative patient comfort and cosmesis, there have not been many studies with respect to the question of recurrences and, the recurrence rate was not evaluated in many studies. Some studies did, however, demonstrate lower rates of recurrence when fibrin glue was used.[23-29]

Autografting from superior or inferior quadrants in primary pterygia has no significant difference in recurrence rates, but in recurrent pterygia, autografting from the inferior quadrant resulted in a higher recurrence tendency.[30]

In our study we procured conjunctival autograft from the supero-temporal quadrant for all cases except for maltoma, where the graft obtained was from the inferior quadrant. In our study, graft obtained from the inferior quadrant of the eye did not show any recurrences in malt lymphoma in 5yr follow-up.

The procedure of conjunctival autograft with fibrin glue was painless & free of complications like granuloma formation, inflammations & recurrences, scleral necrosis, irregular scarring, perforations & staphyloma, use of FG in CA has reduced the surgical time & inflammatory reactions which can occur following suturing. The average time consumed during our procedures was 10 minutes with fibrin glue.

Since the surgical time is lesser, the inflammation & thus recurrences will be lower. The longest series published after using fibrin glue showed a mean recurrence of 4.50% in a series of 111 operated pterygium over a follow-up period of two years.[31] This study had a follow up period ranging from 3 to 8 years & has not showed any recurrences. Starc and colleagues in their study with mean follow-up of 2 years detected only three (5.3%) recurrences after autograft transplantation and found a 7.3% secondary recurrence in patients with recurrent pterygium, the most common method of autograft fixation is suturing, with drawbacks of prolonged operating time, postoperative discomfort, suture abcesses, buttonholes, and granuloma formation. Usually requiring a second operation for removal of sutures.[3]

CONCLUSION

Thorough dissection and removal of subconjuctival pathologies & covering the defects using conjunctival autograft with the help of fibrin glue is a successful procedure.it can be adopted to cover all conjunctival defects caused by various ocular surface lesion surgeries as it is 1) less time consuming, 2) patients comfort is

good 3) cosmetic outcome is good 4) achieved normal architecture 5) no recurrences were found.

Koranyi et al demonstrated a recurrence rate of 5.3% with glue versus 13.5% with sutures and suggested that immediate adherence of the graft and lack of postoperative inflammation may inhibit fibroblast ingrowth and reduce the recurrence.[9]

Currently, no reports are available to compare the surgical results of CA in cases of combined naevus & MALT lymphoma. This study showed that the surgical defects created by excision of such conjunctival pathologies can also be covered with CA. The important requirement is to excise the diseased tissue completely to get healthy & disease free margins, disease free margins were obtained here by marking the surgical incision using methylene blue marker pen 1-2mm beyond the visible pathology.

The use of conjunctival autograft using fibrin glue is a successful procedure in reconstruction of surgical ocular surface defects as seen in cases of recurrent pterygia, case of conjunctival MALToma & also in a case of combined naevus.

This study shows that with CA using FG has low postoperative discomfort, no recurrences & also good cosmesis. This may be attributed to biocompatible nature of fibrin glue which avoids complications of sutures and diminishes the sensation of a foreign body in the eye following surgery.

The problem of high cost of fibrin glue can be overcome by using the glue for operating on multiple pooled patients at a time, as only a small amount of glue is required per case. FG also avoids the need for a separate follow-up for suture removal.

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CHIEF AUTHOR: Dr. MANJUNATH.N, Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

CORRESPONDING AUTHOR: **Dr. H.N.SOWBHAGYA**, Professor, The Department of Ophthalmology, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

AUTHOR: Dr. K. Sneha, Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

AUTHOR: Dr. P. Santhosh, Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

AUTHOR: Dr. Deepthi. U. S, Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

AUTHOR: Dr. Divya. B, Ophthalmology Resident, Kempegowda Institute of Medical Sciences, V.V. Puram, Bangalore-04.

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