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CONJUNCTIVAL AUTOGRAFT FIXATION WITH PROTEIN COAGULATION AND BLOOD FIBRIN AS TISSUE ADHESIVE IN PTERYGIUM SURGERY

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ABSTRACT: INTRODUCTION: Pterygium represents fibroblastic degeneration of the conjunctiva with encroachment over the cornea; common causative factors are hot, dry climate, UV radiation, limbal stem cell damage etc. **AIM:** Alternative surgical approach for Auto-conjunctival Graft fixation. Current management is excision with conjunctival autograft placement. It was first done by Kenyon et.al. In 1985. Several new techniques have been described over the past few years main concern was higher recurrences and for this new technique is needed. **METHOD:** A prospective study done in 25 eyes of 22 patients in a tertiary eye care centre at Bhopal between December 2011 to April 2013. All surgery performed under peribulbar block anesthesia. Technique was based on use of wet field bipolar diathermy to achieve heating to the target tissue & subsequent coagulation of proteins and tissue adhesion with Hemostasis. Additional use of oozing blood in between bare sclera & graft. **RESULT:** This study enrolled 25 eyes of 22 patients, 18 male and 4 females. Average Time taken for surgery was 22.5 min. We found button holing in 2 patients, graft displacement in 2 patients, in 7 patients, we found tissue retraction post-operatively, astigmatism developed in 3 patients within 3rd to 4th postoperative period with cyl. Power 25 - 0.5 D at 90° which was completely resolved before final follow up. In our study no graft loss seen in any patients and no recurrence found in any patient. **CONCLUSION:** protein coagulation as tissue adhesive and blood fibrin could be a better option with advantage of less surgical time, faster recovery, good cosmesis and lesser recurrence rate. **KEYWORDS:** Protein coagulation, blood fibrin, bipolar diathermy, autoconjunctival graft, suture, recurrence.

INTRODUCTION: Pterygium represents fibroblastic degeneration of the conjunctiva with encroachment on to the cornea, causing chronic Inflammation and ultimately interfering with vision. It usually occurs nasally, unilateral or bilateral.

It is more common in hot, dry windy climate with increased exposure to ultraviolet radiation. Some have speculated damage to limbal epithelial Stem cells as an etiology, hereditary component is also considered as causing factor.

When chronic fibrosis with contraction of tissue occurs, significant corneal astigmatism is induced, which affects vision. In younger patients cosmetic correction is the main indication of surgery.

Current management for primary and recurrent pterygium surgery is excision with conjunctival autograft placement. It was first done by Kenyon et.al. in 1985. This has an acceptable low recurrence rate, good cosmesis, and less gross post-operative complication. Several new techniques have been described over the past few years because of concern over recurrence and better cosmesis. 3 basic techniques of surgical removal are:

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- Simple excision with primary closure after controlled application of mitomycin C intraoperatively.
- Or excision followed by free conjunctival Autograft secured in position with 10-0 monofilament nylon or 7-0 to 10-0 absorbable Vicryl suture.
- Suture less graft fixation with Use of fibrin glue as tissue adhesive in pterygium surgery has recently gained Popularity since the work of Koryani et. al. in 2004.

Problems with current technique: Complications with MMC remain a major issue for concern iritis, limbal avascularity, scleral melting or calcific plaque formation, corneal decompensation, corneal or sclera perforations, secondary glaucoma and cataract have all been reported with the use or abuse of MMC eye drops. Recurrence rates reported with intraoperative use of MMC range from 3% to 43%. Intra operative MMC application also results in early punctuate keratitis, chemosis, delayed conjunctival healing and conjunctival granuloma formation.

- Suturing significantly increase in operative time and contributes to postoperative Inflammation and discomfort.
- Suture related problems like chronic inflammation, granuloma formation and an irritable post-operative period are mostly encountered.
- Fibrin glue is derived from fibrinogen and thrombin, two elements of Human blood and when mixed, works by simulating the later stages of Coagulation process. But it carries the potential risks of anaphylaxis, prion Disease transmission, apart from its higher cost and difficulty in availability. Our technique is easy, quick, no issues of suturing; no foreign material like glue is used, cost effective, devoid of complications due to MMC, suture and fibrin glue.

MATERIALS & METHODS: This was a prospective, interventional case study done in a tertiary eye care centre at Bhopal in which 25 eyes of 22 patients both primary and recurrent pterygium were underwent for pterygium surgery with autoconjunctival graft fixation with protein coagulation and autoblood fibrin between December 2011 to April 2013. Out of total 22 patients, 18 male and 4 were female patients. All the pre-operative examination including visual acuity and slit lamp examination of ocular surface and surrounding adnexa were done. Informed written consent was obtained from all the patients after explaining the safety/ drawbacks of the procedures. Sensitivity test for local anesthetic agent injection lignocaine 2% done.

All the surgery performed under peribulbar block anesthesia, to attain maximum ocular immobility and patient's co-operation during surgery. All surgery performed by single surgeon to avoid any bias in result. Surgical techniques was based on Bipolar diathermy that achieves heating by passing an electric current through the target tissue the resistance of the tissue to the electrical current results in heating of the tissue with subsequent coagulation of proteins and adhesion with added advantage of the formation of a coagulum that prevents further blood flow (Hemostasis).

Bipolar diathermy is preferred because it restricts the current to an elliptical field between two electrodes and avoids passage of current with inadvertent heating injury to non-target tissues although Excessive diathermy may cause tissue destruction by charring and necrosis.

Surgical Technique: Pterygium excision was carried out with the help of Westcott scissor and all fibrous scar tissues removed. Encroached corneal bed up to limbus shaved by using crescent blade

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and ensured complete removal of the fibrous tissue .the conjunctival bare area, thus created, was measured both vertically and horizontally. To obtain the graft, the supero-temporal aspect of the bulbar conjunctiva of the same eye was exposed and 1mm larger area than the recipient bed was marked with gentian violet. No cautery applied to bare scleral bed, no solution used to attain hemostasis in view of getting some natural fibrin clot over the bare sclera derived from the oozing blood during the surgery.

A technique of protein coagulation used to adhere the two edges of conjunctival tissue by gentle bipolar diathermy applied at 6-8 places for a very short time (light blanching spot appears) followed by irrigation of conjunctival surface with balanced salt solution and ensured there was no blood clot left over the conjunctival epithelial surface that could lead to graft slippage on 1st POD by friction force created between palpebral conjunctiva to fibrin strands of conjunctival surface. The exposed area created by donor tissue removal was also closed by ballooning of the conjunctiva in 3 patients and in rest of the patient's donor tissue gap was closed by applying 10-0 monofilament nylon sutures with buried knots, one at either side near the limbus to completely cover the donor side of conjunctiva.

Subconjunctival injection of 2mg Dexamethasone and 20mg Gentamicin completed the surgery. Eye was patched after instilling topical antibiotic and steroid combination eye drop. Eye ointments are not used because they can enter underneath the autograft and may cause non-apposition by its retention between bare sclera and auto graft and it can develop some tissue reaction by its chemical property. In addition, bandage was applied as extra precautionary measure. Bandage and patch removed after 24 hrs. visual acuity tested on snellens test type chart and ocular surface were examined under slit lamp with special emphasis on host and graft conjunctival tissue. Patients were followed up on 1st post op day, 1st post op week, and weekly till 1 month and finally after 3 months. Moxifloxacin eye drop 4 times a day, fluorometholone eye drops 3 times a day, flurbiprofen eye drop 3 times a day and carboxymethyl cellulose eye drop prescribed for 6-8 times/day during first postoperative week. All the drugs were gradually tapered except carboxymethyl cellulose. The necessary instructions were given to patient during each follow up visit regarding postoperative care and precautionary measures.

RESULTS: Out of 22 patients, Minimum age of patient was 21yrs. and maximum 44 yrs.⁽¹⁾ 18 were male and 4 were Female patients. (table2), 20 patients had primary And 2 patients had Recurrent Pterygium.20 patients had primary and 2 patients had Recurrent Pterygium.19 patients had unilateral& 3were with bilateral pterygium. Majority patient between 20-40 Years of age and 9 cases were Belonging to non- industrial work. Industrial workers, farmers, Students were 3 each, other Cases were 4 out of 22 cases. 54.5% pterygium were Progressive in nature, 18.2% were regressive and 27.3% were stationary. Cosmetic pterygium surgery was higher were15 patients, 4 were operated for optical purpose, 2 for recurrence, one case due to other reason. Average time taken to complete the surgery was 22.5 min. (20-25min.). In 7 patients small tissue wound gap found which was followed by infiltration of cells and ultimately healed with complete closure of wound Postoperative Inflammation and congestion over host (+++) and graft (++) was found in all cases. Dramatic change in Colour seen in conjunctival autograft, dark red on 1st POD and 1st follow up than it turned pale to yellow on 2nd to 3rd follow up and then changed orange to pink in colour after 3rd follow-up. Graft tissue retraction was Found in 7 patients, 5 from host conjunctival and 2 from limbal

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side. intraoperative complications like excessive tissue exposure to heat during diathermy and poor compliance of patients during postoperative period could be the reason that also plays crucial role in tissue adherence and graft survival as excessive eye ball movement in opposite direction of graft have also be considered for tissue retraction and creating wound gap.

Few patients had complaint of some ocular discomfort like blurring of vision, foreign body sensation, redness, watering. In 3 patients, postoperative astigmatism developed within 3rd to 4th postoperative period with cyl. Power 0.25-0.5 D at 90° but spontaneously it resolved after epithelization and complete healing up to final follow up (2.5%).

Age group	No. of patients(n=22)	Percentage (%)
<20 years	0	0
21-30 years	12	54.5
31-40 years	4	18.2
41-50 years	6	27.3
TABLE NO. 1 AGE WISE DISTRIBUTION		

sex	No. of patient (n=22)	Percentage (%)
male	18	81.8
female	4	18.2
TABLE NO. 2 SEX RATIO		

Laterality	No. of patient (n=22)	Percentage (%)
Unilateral	19	86.4
Bilateral	3	13.6
TABLE NO. 3 LATERALITY		

Stages	No. of patient (n=25)	Percentage (%)
Progressive	12	54.5
Regressive	4	27.3
stationary	6	18.2
TABLE NO. 4 NATURE OF DISEASE		

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Occupation	No. of patients(n=22)	Percentage (%)
Nonindustrial workers	9	40.9
Industrial workers	3	13.6
Farmers	3	13.6
Students	3	13.6
others	4	18.2
TABLE NO. 5 OCUPATION		

Surgical indication	No. of patients(n=22)	Percentage (%)
Visual disturbance	4	18.2
Cosmetic	15	68.2
Recurrence	2	9
	1	4.6
TABLE NO. 6 SURGICAL INDICATION		

Complications	No. of patients(n=25)	Percentage (%)
Button holing	2	9
Graft displacement	2	9
Wound retraction	7	31.8
Astigmatism	3	13.6
Graft loss	0	0
recurrence	0	0
TABLE NO. 7 COMPLICATIONS		

DISCUSSION: Current management for pterygium is excision with graft conjunctival autograft; first done by Kenyon et al.¹ In 1985 had acceptable low recurrence rate, good cosmesis and little gross post-operative complications. Several new modalities have been described over the past few years by different surgeons because of concern over recurrence and better cosmesis. Koch JM, Mellin JB Waubke TN in 1990, shared their Initial experiences with autologous conjunctival transplantation in pterygium,² Cohen RA, McDonald MB. In 1993 used organic tissue adhesive to fix the graft.³ Koranyi G. Seregard in 2004, started a no Suture, small incision approach to pterygium surgery by Cut and paste technique.⁴ Many surgeons started using fibrin as tissue adhesive, which reduces the suture related complications like pain, chronic irritation, granuloma formation, post-operative discomfort to patients and surgical time.⁵⁻⁸ Few surgeons used amniotic membrane with the graft.⁹ In our technique we used tissue protein coagulation for conjunctival edges adhesion and fixation of conjunctival autograft to scleral bed with natural blood fibrin. We promoted wound healing by primary intention through fixing the graft at scleral bed and wound edges this resulted in faster wound healing, less scarring and better cosmetic results. Chen PP, et al. In 1995¹⁰ and Pradeep G. Sunno et al.¹¹ conducted

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a study in 2010 pterygium excision and autoconjunctival Graft with use of mitomycin C in 52 eyes of 50 patients and noted that two patients developed Graft oedema, 3 patients with SPK, 1 patient had scleral necrosis and recurrences seen in 2 Patients. Malik K. Patel et. al in 2012 at merut, UP (published in Nepal J.Ophthalmol. 2012 Jul-Dec.)¹² carried out a study in 40 eyes with Primary nasal pterygium with suture less and glue free Limbal conjunctival autograft surgery followed by Bandaging for 48 hrs. and reported graft dehiscence in 2 Eyes (5%), graft retraction in 3 eyes (7.5%) and recurrence was seen in 1 eye (2.5%). In our study Graft tissue retraction was seen in 7 patients (%), button holing in 2 patients (%), Graft displacement seen in 2 patients on 1st POD (%), no graft loss seen in any Patients. In our study, postoperative astigmatism developed In 3 eyes (13.6%) within 3rd to 4th postoperative period with cyl. Power 0.25 -0.5 D at 90° but spontaneously resolved before final follow-up, It was due to donor site which covered with subconjunctival ballooning, wound retraction occurred than healing taken place with secondary intention that resulted in fibrosis and contracture and ultimately induced astigmatism in three patients, in rest of the patient's donor tissue gap was closed by applying 10-0 monofilament nylon sutures with buried knots, one at either side near the limbus to completely cover the donor side of conjunctiva and found no astigmatism in rest of patients. In a follow up of 3 months no recurrence was seen. in our new technique we achieved our goals in terms of faster surgical time, reducing the suture related complications, improving the cosmetic results, fast recovery, reducing recurrence and also reducing the cost of the surgery.

CONCLUSION: various techniques have evolved in past decade in to prevent recurrence of pterygium which is the mainstay of treating pterygium surgically. Conjunctival autograft has come out as a promising technique. Different methods to fix the conjunctival graft is again being evaluated most common being suturing and use of fibrin glue. Our technique is simple which fixes conjunctival graft to the bare sclera without use of glue or suture it uses bipolar cautery and oozing blood, thus saves time and use of any external material, safe and cheap. Long term follow up is required to assess the affectivity of this technique. Better surgical outcome can be achieved by promoting Tissue fixation and wound healing in more natural way Which proves tissue coagulation technique as a better Surgical option with the following advantages -Quick surgery and faster recovery time. Less complications and better postoperative comfort. Promotion of wound healing by primary intention Resulting in less scarring and better cosmesis. Cost effective and less or no recurrence.

Picture 1

Picture 2

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Picture 3

Picture 4

Picture 5

Picture 6

Picture 7

Picture 8

Picture 9

Picture 10

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