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Excision of the Pterygium with Conjunctival Autograft and Autologous Blood to Prevent Recurrence

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Abstract ***Background:*** The recurrence rate of primary pterygium has been decreased by the use of conjunctival autograft following surgical removal. This study describes the use of autologous blood for conjunctival autograft placement in order to reduce operative time, operative discomfort, and recurrence during follow-up. ***Materials and Methods:*** Fifty patients with primary pterygium were included in the study and divided into three groups. 7 patients aged 25–35 years in group I, 15 patients aged 36–45 years in group II and 28 patients aged 46–55 years in group III. The conjunctival autograft was grafted with autologous blood in all groups. Operative time, postoperative discomfort and recurrence were demonstrated in the three groups of patients. ***Results:*** Studies have shown that 80% of patients with pterygium excision are men, aged between 46 and 60 years. The study showed nasal 35 in male and 7 in female patients, while temporal 5 in male and 3 in female patients. The minimum surgical interval time with conjunctival autograft using autologous blood was 21 minutes and the maximum time was 45 minutes. After excision, the conjunctival limbal autograft has the lowest recurrence rate. The study represents at the end of the final follow-up at 3 months, the incidence of recurrence was observed in both male and female patients. Patients should be advised to wear sunglasses to reduce UV exposure and growth stimulation. ***Conclusion:*** The study concluded that without fibrin glue is the most effective method for conjunctival autograft attachment with autologous blood in pterygium surgery with minimal operative time and operative discomfort. Autologous blood instead of fibrin glue is an effective alternative way that is readily available, cost-effective, with less surgical time and operative discomfort. Using sutures is an old technique that involves maximum operation time and operative discomfort. Recurrence is reduced by using autologous blood without fibrin glue.

Keywords Excision, Conjunctival autograft, Autologous blood, Interval time, Pterygium

1. Introduction

Eye is the most important organ among the five senses, without which all human and animal life is dark. But in this beautiful enlightened life of all, suddenly various diseases spread to the eyes, which make everyone sick, many are deeply worried and don't want to see the dark world for the blind anymore [236]. Many people ask the question - why does the person suddenly have pain in the eyes [174]? Suddenly his eyes spread a lot of light why? Suddenly the person's vision became blurred? [9], why does his eye itch? What is the reason for his eyes suddenly turning red? Why suddenly double vision in his eyes? Why after a few days the triangular wings like fleshy hypertrophy [43,44,45] and decreased vision? [15,65,168]. Studies have shown that they cause pterygium and other eye diseases [1,6,7]. Pterygium, a term derived from "pterygion" (ancient Greek for wing), is a wing-shaped, fibrovascular overgrowth arising from subconjunctival tissue [74,213] that extends across the limbus of eyes [1,17,70,176]. Eyes are sensory organs that help all organisms see the world like bio-cameras [107]. Sudden overexposure to harmful rays of the eye causes abnormal triangular fin-like growths on the conjunctiva, resulting in reduced vision [235,236]. A pterygium is a membrane-like growth from the conjunctiva to the cornea [216], caused by the inner flesh of the eyelid, which is a worsening condition of the conjunctiva or subconjunctiva. It gradually grows from the canthus of the eye towards the cornea and many veins and arteries converge, resulting in a red appearance. The pterygium is also a degenerative condition of the subconjunctival tissue [213,215] that expands as vascularized granulation tissue to invade the cornea, destroying the superficial layers of the stroma and

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Bowman's membrane, the entire entity is covered by conjunctival epithelium [1,2]. This problem may recur after general surgery [36,37,48]. The prevalence of primary pterygium varies from 0.7% to 31% in different populations around the world [38]. Working outdoors increases the risk by 1.5 times [38]. Although the exact etiology is unknown, risk factors include genetic predisposition [180], chronic environmental irritants [108,110,111,141] such as dust, dryness, heat, and UV rays [5,19].

A pterygium is usually managed conservatively unless it has progressed to the pupillary area causing excessive astigmatism [76], resulting in vision loss [1,24]. Reported rate of recurrence [77], after simple excision of primary pterygium is 25%-45% [187,195]. High rates of recurrence are explained by the theory of corneal limbal stem cell deficiency [16,23,164,194]. A study by Spaeth et al [204] described a change in surgical technique using conjunctival autograft to cover the bare sclera after pterygium excision [12,13], resulting in reduced recurrence rates [3,29,33,50,55, 69,73,161]. After pterygium surgery [177], the conjunctival autograft is secured with absorbable or non-absorbable sutures [1,25,94]. The presence of stitches is associated with various complications [39,154], viz. discomfort, increased lacrimation and occasionally suture-related granuloma or abscess [1,31,85]. With the discovery of new alternatives such as fibrin glue [80] and autologous blood [151], suture-related complications have ceased [25,28]. The use of fibrin glue during pterygium surgery was first described by Cohen and McDonald in 1993 [32]. Since then, several studies have been published on the safety and efficacy of fibrin glue in ophthalmic surgery [88,89,91,166]. This study presents innovative ideas compared to other studies, which will be exceptional and realistic to many researchers [40]. Because fibrin glue is a blood-derived product [175], its use is associated with an increased risk of blood-related disease transmission [185,188]. In addition, fibrin glue is expensive and rare in adjacent areas [217,230]. In this case, autologous blood is a good option as it is easily available- the only exceptions are patients who regularly take aspirin or other blood thinners or who suffer from coagulation factor deficiencies.

This study illustrates innovative research on autologous blood and advanced technology compared to the traditional use of sutures in attaching conjunctival autografts. To the best of the researcher's knowledge, very few studies have demonstrated improved health techniques for pterygium retrieval to avoid complications.

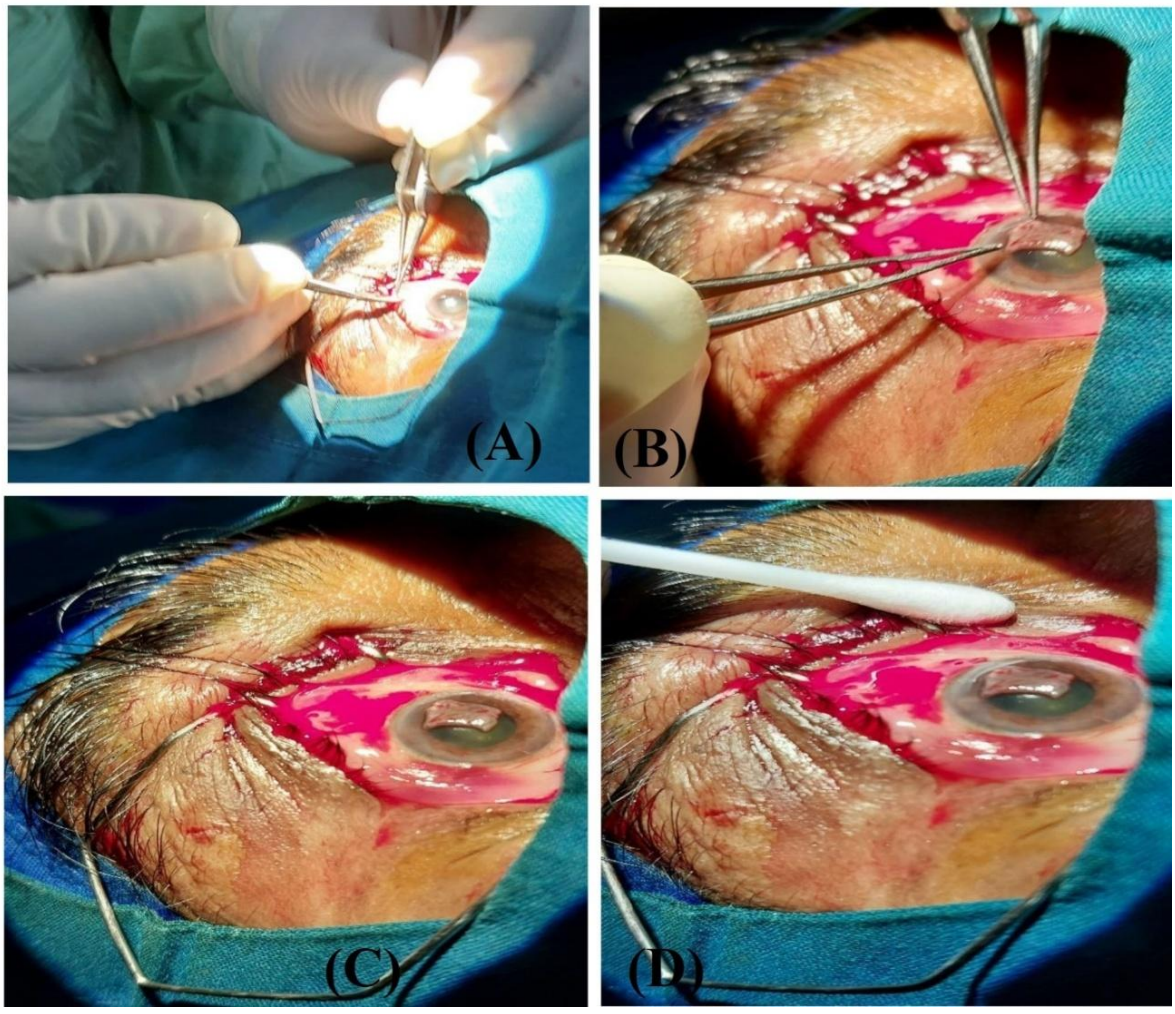

Figure 1. Representative images (A, B, C & D) of the conjunctival autograft using autologous blood of a patient in pterygium (male, age 57)

2. Materials and Methods

2.1. Data

50 patients reported with primary pterygium were recruited into the study after obtaining informed consent. A comprehensive evaluation was performed, which included the patient's biophysical profile, relevant medical and eye history, and a thorough eye ocular examination. Patients with recurrent pterygium or a history suggestive of hypersensitivity to human blood products were excluded from the study. Patients were divided into three groups of 20 each. In all three groups of patients, pterygium was excised with conjunctival autografting.

2.2. Techniques

The technique of securing the autograft was different in all three groups. Among the 50 patients, there were 7 patients aged 25-35 years in the first group, 15 patients aged 36-45 years in the second group and 28 patients in the third group aged 46-60 years. Autologous blood was used during surgery to secure the autograft for all patients. All surgeries were performed under local anesthesia [88] using a combination of 2% lignocaine and 0.5% bupivacaine [1]. The peribulbar block was followed by cleaning and sterile draping [84]. Tus bridle sutures were applied using Superior Rec 3-0 silk. Pterygium is excised using corneal scissors and sometimes a crescent blade is also used. Bleeding is controlled by applying pressure from a cotton bud. No cauterization was done. The area of the conjunctival defect was measured with (i) a caliper and (ii) a conjunctival limbal autograft obtained from the bulbar conjunctiva pretemporal quadrant measuring the same size, which as shown in Figure 1.

2.3. Interpretation

The graft was inverted over the cornea and brought close to the area of bare sclera formed by the incision of the pterygium. had the correct orientation maintenance is performed during graft placement. Depending on the group to which patients were assigned, the conjunctiva-limbal autograft was secured in place.

2.4. Postoperative management

All patients were given eye drops at regular intervals as advised by the ophthalmologist. Male and female patients were followed up at week 1 and then at weeks 2, 4 and 8, respectively. All patients were followed up with regular feedback for up to 3 months postoperatively.

3. Results

3.1. Gender Status

The study on excision of pterygium showed the gender status including male and female in Figure 2. The study also reveals that male patients were maximum (80%) in this study.

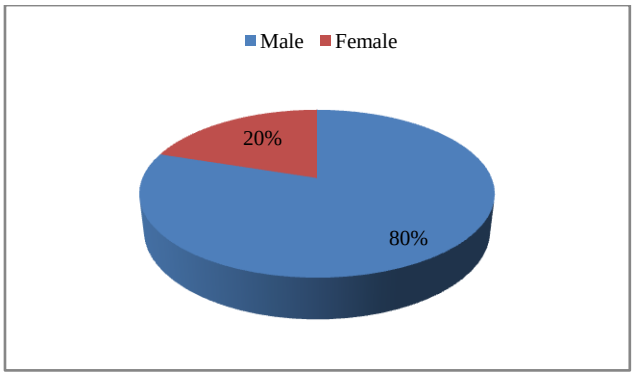

Figure 2. Male and Female status in the study of Excision of Pterygium

3.2. Age Gradation

The study showed the age status of excision of pterygium, which as shown in Figure 3. The study revealed that maximum patients were 28 (both male and female) within the age of 46-60 years.

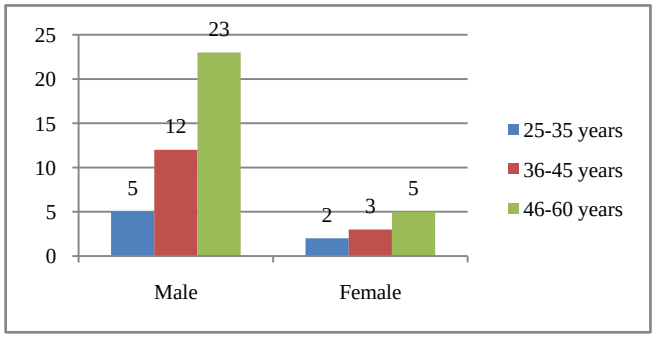

Figure 3. Age Gradation

3.3. Laterality of Pterygium on Gender

The study showed the laterality of pterygium on male and female, which as shown in Figure 4. The study revealed that nasal 35 in male and 7 in female patients, while temporal 5 in male and 3 in female patients.

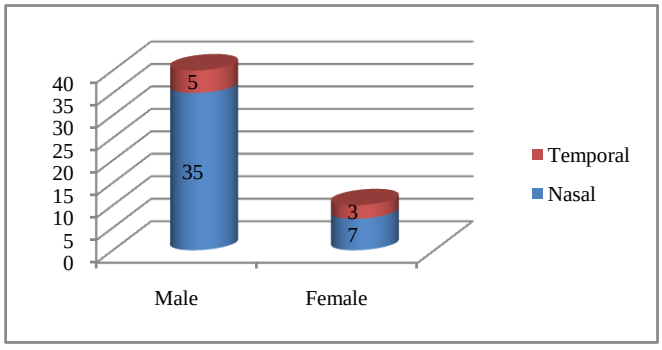

Figure 4. Laterality of pterygium on gender

3.4. Presentation Status of Pterygium

The study included the different presentation on excision of pterygium, which as shown in Figure 5. A 57-year-old landowner, Suranjan Das lives in Sunamganj district of Bangladesh. He came to the Department of Ophthalmology at North East Medical College Hospital with complaints of overgrowth of pink fleshy membrane in the right eye for the

past 3 months, associated with foreign body sensation and visual loss, which had been the same for the past 1 month. Both near and far vision and there was no diurnal variation. On examination, a wing-shaped fleshy fold of the conjunctiva is seen on the cornea. An expert ophthalmologist performed the surgery successfully on time. The patient was followed closely, and the pterygium recovered smoothly. Presentations are shown in various ways, namely:

i. Examination of head, face and eyes:
   (a) Head posture: straight and erect.
   (b) Eye symmetry: symmetrical, right eye.
   (c) Facial Symmetry: Symmetry.
ii. ROPLAS test: negative.
iii. Confirmation: Pterygium surgery with approval.
iv. Set up the preoperative environment
v. Surgery with conjunctival autograft using autologous blood.
vi. Follow dressing and postoperative period
vii. Wear anti-radiation sunglasses
viii. Recovery: Pterygium free postoperative eye.

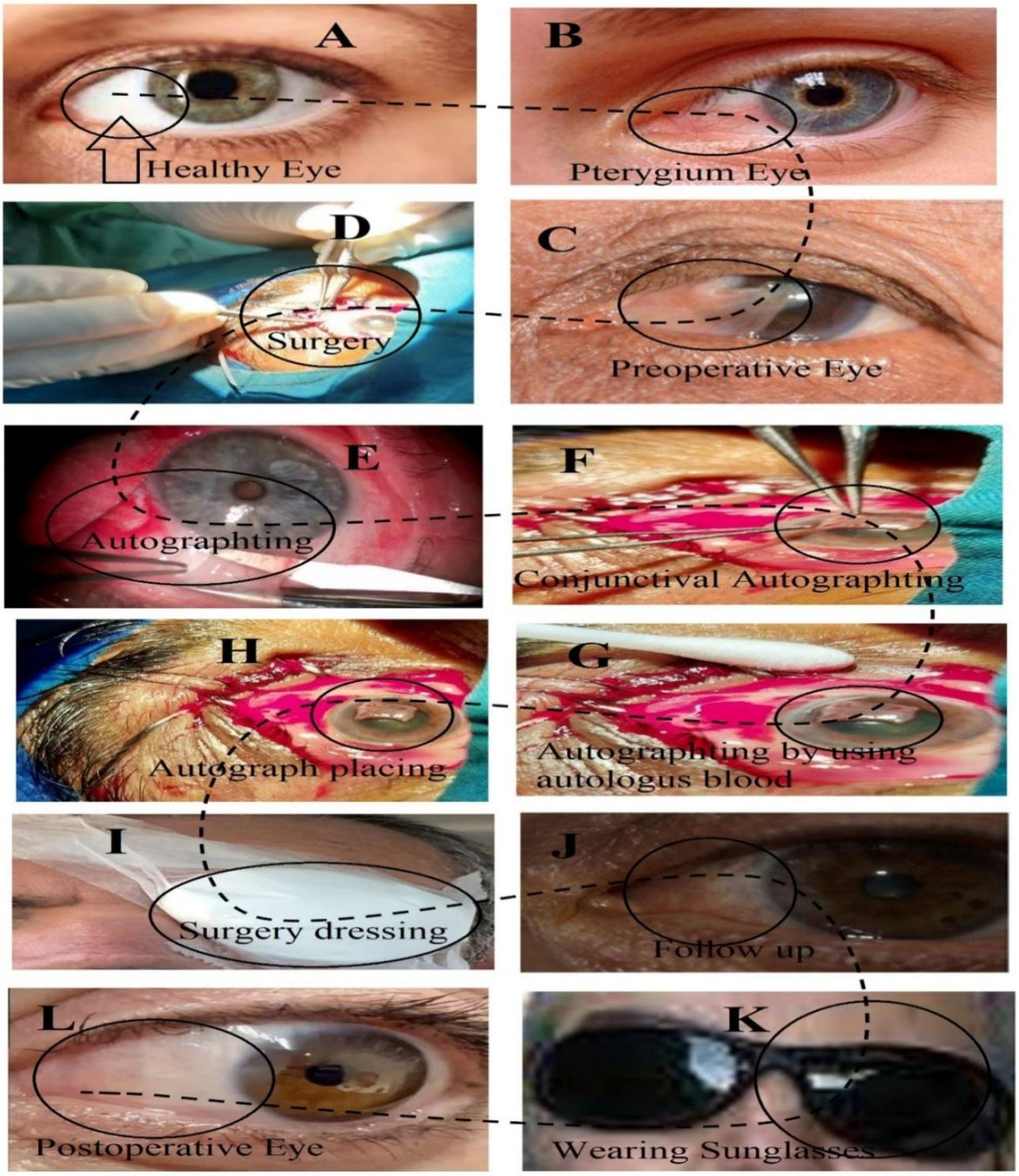

Figure 5. Showing Presentation status with different steps of Pterygium Excision at the Department of Ophthalmology, North East Medical College Hospital, Sylhet, Bangladesh. Patient Mr. Suranjan Das, male, 57 years, right eye, resident: Sunamganj

Table 1. Presentation Interval Time between male and female

Age of patient	Sex	Interval time (minute)	Group forming	Average Interval Time (minutes)	Impact
20 years	male	21	Group-I	29	Presentation success in time to follow the stipulated precautions
25 years	male	30			
30 years	male	35			
35 years	female	40	Group-II	37	
40 years	male	30			
45 years	female	40			
55 years+	male	45	Group-III	45	

3.5. Presentation Interval Time

The study showed the presentation interval time between male and female in different ages, which as shown in Table 1. The study also showed that the average interval time in Group-I (age 20-35) was 29 minutes, which was the lowest interval, but 45 minutes in Group-III (age 55+), which expressed as the maximum interval. Study represents interval time followed by age significance.

3.6. Risk Factors

The study identified the top ten risk factors during presentation of excision of pterygium in the study area. These include, (i) hot climate, (ii) sun exposure, (iii) ultraviolet exposure, (iv) dry heat, (v) high winds, (vi) prolonged dryness, (vii) heavy dust and (viii) certain misuse of GPS sensor devices in the area, (ix) post-operative, risk of patient travels due to lack of ambulance area network control devices, and (x) follow-up problems due to lack of patient residential area network control units.

3.7. Complications

The study found the complications including (a) cystic degeneration, (b) infection, (c) neoplastic change to epithelioma, (d) fibrosarcoma or malignant melanoma, (e) diplopia, (f) symblepharon, and (g) dimness of vision due to astigmatism.

4. Discussion

Research shows that Pterygium is a common eye condition that is mostly observed in populated, dry, hot, dusty areas [1]. Initially the disease is treated with alternative and readily available surgical options to manage its current condition with prevention of recurrence [1]. Although this is the "ideal" Pterygium surgery known to all, there is controversy regarding it in some cases [221]. The exact cause of this disease is not known, but recent studies have shown that it is caused by wireless sensor tracking [130]. The disease is more common in the elderly, but studies have shown that people with GPS tracking in their eyes develop the ophthalmic diseases [130]. Again, there is a foreign body sensation in the eye, but sometimes the eye twitches. Many say that people who work in the sun or in dusty conditions are more prone to this disease, hot weather, smoky environment and dry eye problems increase this veil. If this membrane grows too much to penetrate the cornea, surgery is required [97]. This problem may recur after general surgery [96]. Surgical use of a conjunctival graft to cover the bare sclera after pterygium excision is easily the most effective [12,13,53], as shown in this study—with an average recurrence rate of 5% and scientifically active methods to reduce complications in a short period of time [73,92,210,204]. On the other hand, conjunctival-limbal autograft transplantation helps to compensate for limbal stem cell deficiency in a short period of time [34-35,54,56]. Studies also show that care must be taken when harvesting the graft to include the organ component, which includes the stem cells [92].

The study shows that scientific excision of pterygium with conjunctival autograft by using autologous blood to prevent recurrence can be done very easily and at low cost [28]. Autologous blood is a good alternative to sutures for conjunctival autograft attachment in pterygium surgery [155,175,185]. Sutures have inherent disadvantages of post-operative complications—comfort, eye opening, and other complications, whereas autologous blood is safer [185,217]. The use of autologous blood simplifies surgical procedures, shortens operating time, improves patient comfort, and sometimes produces less operative discomfort. Connecting the conjunctival autograft with autologous blood is technically difficult but can be learned with practice and is an excellent scientific method that avoids the need for sutures and glues, making it cost effective. Diabetic microvascular damage and differentiation of conjunctival tissue may be a major cause of pterygium [17,47,196,156, 169]. Moreover, pterygium is caused by multiple diseases through wireless sensor tracking, especially coronavirus [107,112,113,120,121,123,127,130,143,145,146,148], cardiac arrest [106], stroke, tracheal disorder [147], diabetes [110,126], chronic kidney disease (CKD) [68], numbness [147], cancer [150], ARDS (acute respiratory distress syndrome) [138], liver cirrhosis [130,212], dengue [142], stomach cancer [150], obesity [127], numbness [147], and digital dermal disease [125, 237]. Pterygium is also caused in child [130,139,144] and wildlife due to GPS sensor tracking [122,124,131,133,134,135,136,140,141,149]. Moreover, pterygium is also spread as pandemic due to GPS tracking at active open eyes and voice with ultra-violet sensors

[129,137]. Several observations are comparable to other studies on the priority application of advanced sensor technology [217].

4.1. Treatment

Pterygium needs to be treated at an early stage [51,152,207], which has not yet reached the stage of operation. Therefore, sometimes the use of beta-radiation or cryotherapy after surgery can be beneficial [199]. First line treatment-treatment of symptomatic patients involves tear substitutes, and topical steroids for inflammation [99,181-184,208]. Patient should also be advised to wear sunglasses to reduce ultraviolet exposure and decrease the growth stimulus [86]. Antibiotic treatment- has no role of antibiotic, but more adjuvant therapies can be applied [20,26,57,192].

PRAST Treatment Model [130]: PRAST implies Pterygium Recovery through Advanced Sensor Technology, a complementary model of DRAST (Disease Recovery through Advanced Sensor Technology). PRAST is a complementary procedure, which is simple, easy and acceptable and has a lower recurrence rate of ophthalmic diseases.

This PRAST model is newly in ophthalmic diseases treatment and less costly but taking more time. The patient must follow the principles of PRAST, which as shown in Figure 6, namely:

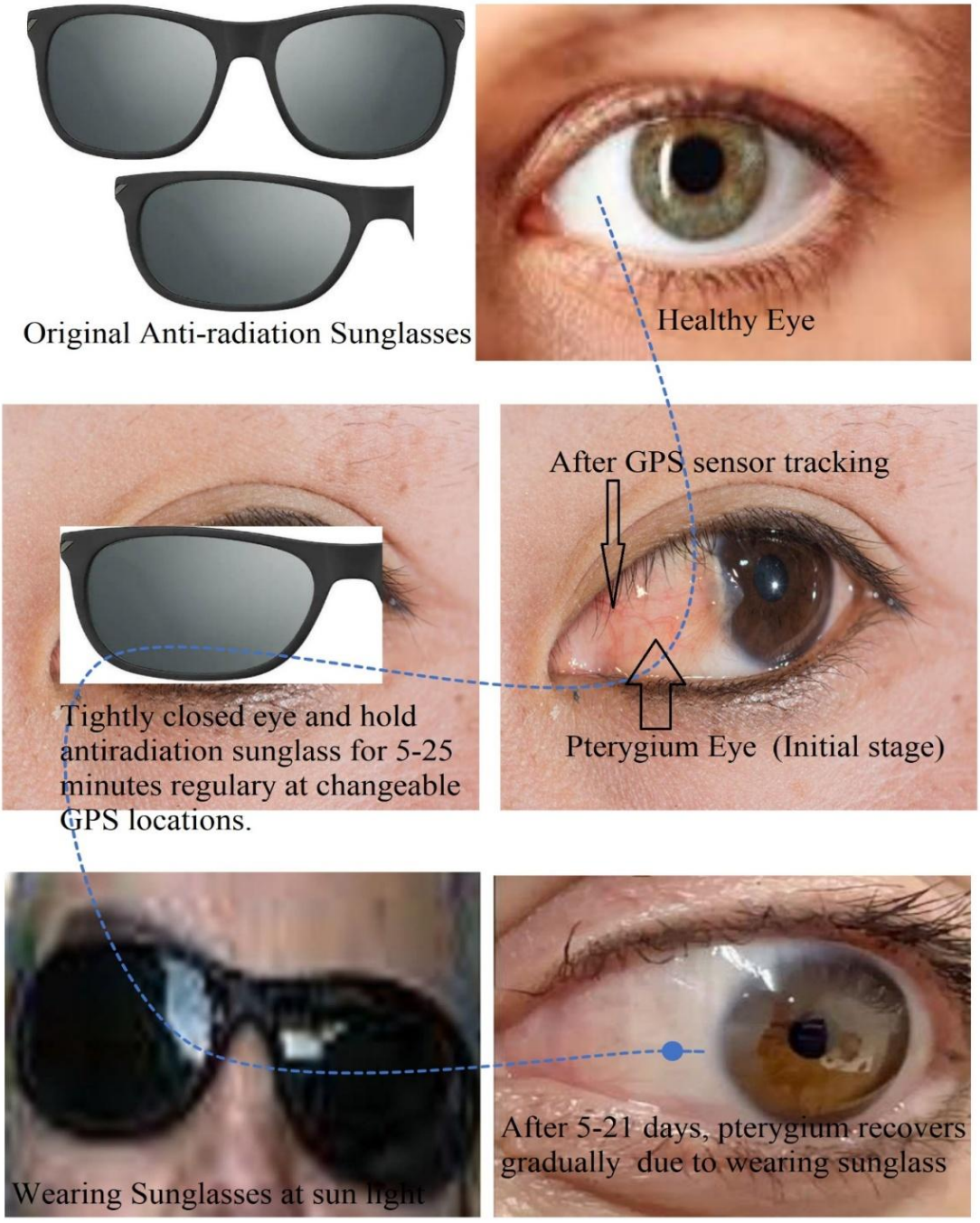

Figure 6. PRAST Treatment Model to recover pterygium

i. When a person experiences a sudden vision or a blurred vision, he must quickly move from his existing position to another place.
ii. The person with pterygium should immediately close the eyes tightly and keep the anti-radiation sunglasses on for 5 to 25 minutes or depending on the eye's good feeling.
iii. The sick person must remain quiet in the bedroom and when he feels sneezing, yawning, coughing and hiccups, he must quickly change his GPS position.
iv. A sick person must wear sunglasses while walking or being outside in sunlight.
v. When a healthy person is infected with Pterygium at an early stage, he must be in a network isolation zone,
vi. The person must remain in a silent mood as per mental health principles without switching-on the mobile phone till the time of recovery.
vii. Persons shall use PANCU (Personal Area Network Control Unit) devices for recovery of pterygium and other diseases.
viii. In case of sudden flatulence, nausea or polyphagia immediately close your eyes tightly and change your position quickly to recover.
ix. If the affected person uses a wireless sensor network isolator or residential area network control unit (RANCU) where he lives or works, he will recover.
x. When the person goes to sleep, if there are sudden itchy eyes, hiccups, sneezing, coughing or flatulence while awake on the pillow, move immediately and do it in another place, then he will sleep on the previous pillow soundly.
xi. Cybercriminals track the device with GPS sensor that makes the person sick, detect it with cloud network detector and disconnect the said connection, he will get well immediately.
xii. If the growth of pterygium is unexpected, he must follow the advice of an ophthalmologist.

This PRAST model recovers early-stage pterygium within 5-21 days depending on the principles followed accordingly. Post-operative pain was lower when anti-radiation glass was held over the eye compared to other methods. Because the anti-radiation glass disconnects the body cloud network at a specific GPS location.

4.2. Recurrence

After excision the recurrence rate is lowest in conjunctival limbal autograft, which follow the other studies [14,33,50, 55,64,66,93,94,157,158,160,167,171,179,186,187,190,200, 201,203,205,209,210,225,226,241].

4.3. Precautions

Precautions to prevent recurrence of pterygium- after excision the bare sclera is treated with-

a) Beta radiation (by strontium-90) not more than 2000 rads during the 1st week of surgery [83].
b) Thio-TEPA solution as drop (1 in 2000) 4 times daily for 6 weeks [162,206].
c) Mitomycin-C (0.02%) solution locally during operation [10,18,49,61,62,71,81,82,95,98,100,191,193].
d) Conjunctival limbal Autograft or amniotic membrane graft [4,12,21,27,30,52,57,69,72,75,78,79,87,90,98, 153,159,163,165,173,186,189,197,198,202,211,214].
e) Surgical excision with lamellar keratectomy or lamellar keratoplasty [8,13,22,60,157,160,239].
f) old methods to prevent recurrence (not preferred now)- included transplantation of pterygium in lower fornix (McReynolds's operation) and postoperative use of beta radiation [3,12,21,30,52,72,73,75,83,87, 165,170,172,189,197,202,211,214].

4.4. Myths about Pterygium

Many doctors still have lies about pterygium. Some of them say that pterygium is due to diabetic [46] and heredity [11,58,59], some say that pterygium is due to ultraviolet radiation, some say that the patient is suffering from various diseases, some doctors say that pterygium is caused by virus/ bacteria like human papilloma virus [41,42,178]. Research shows that the above reasons are all myths. Pterygium is through GPS sensor tracking. Although advanced sensor technology was not invented before, when sensor devices were invented, natural pterygium was converted to disease simulation code and converted to ophthalmic disease (pterygium) code [130]. If the code is tracked by the GPS sensor, the pterygium occurs. When a person sits or lies down with eyes open at a specific GPS location, tracking the eyes with the GPS sensor device is affected by too much light and immediately blurs the person's vision. A flash of sensor light falls into the eye, causing a layer called a pterygium. The ISNAH (Impact of Sensor Network towards Animals and Humans) [112] effect suggests that the root cause of pterygium is wireless sensor tracking [130]. As the range of radiofrequency increases, so does the degree of ocular involvement, i.e., the prevalence of various ophthalmic diseases. Ophthalmic diseases can become pandemic due to this sensor tracking [130].

4.5. Risks

The human eye is a bio-camera, which receives all images through photoreceptors [107]. Cybercriminals convert sensor cells into images, and those images have digital tracking, digital poisoning, burning, collapsing, fracturing, damaging, blocking, swelling, shrinking and disturbing effects built-in to the device. By tracking these sensor cells with a wireless device, pterygium and other diseases in the eye are infected. Research has shown that humans and animals instantly become ill with CASSID (Common Acute Sudden Sensorineural Infection and Disorder) by tracking a GPS sensor to a specific location [112]. Light sensor tracking exposes the eye to intense light, causing the person to see a sudden blur at a specific GPS location. Failure to move quickly results in the formation of a triangular-shaped covering at one corner of the eye, called a pterygium. This

pterygium increases due to repeated wireless sensor tracking through cloud networks. Pterygium is one type of ophthalmic diseases. So, individuals are in risks in pterygium with CASSID in the following top-ten ways [130], (Figure 7) namely:

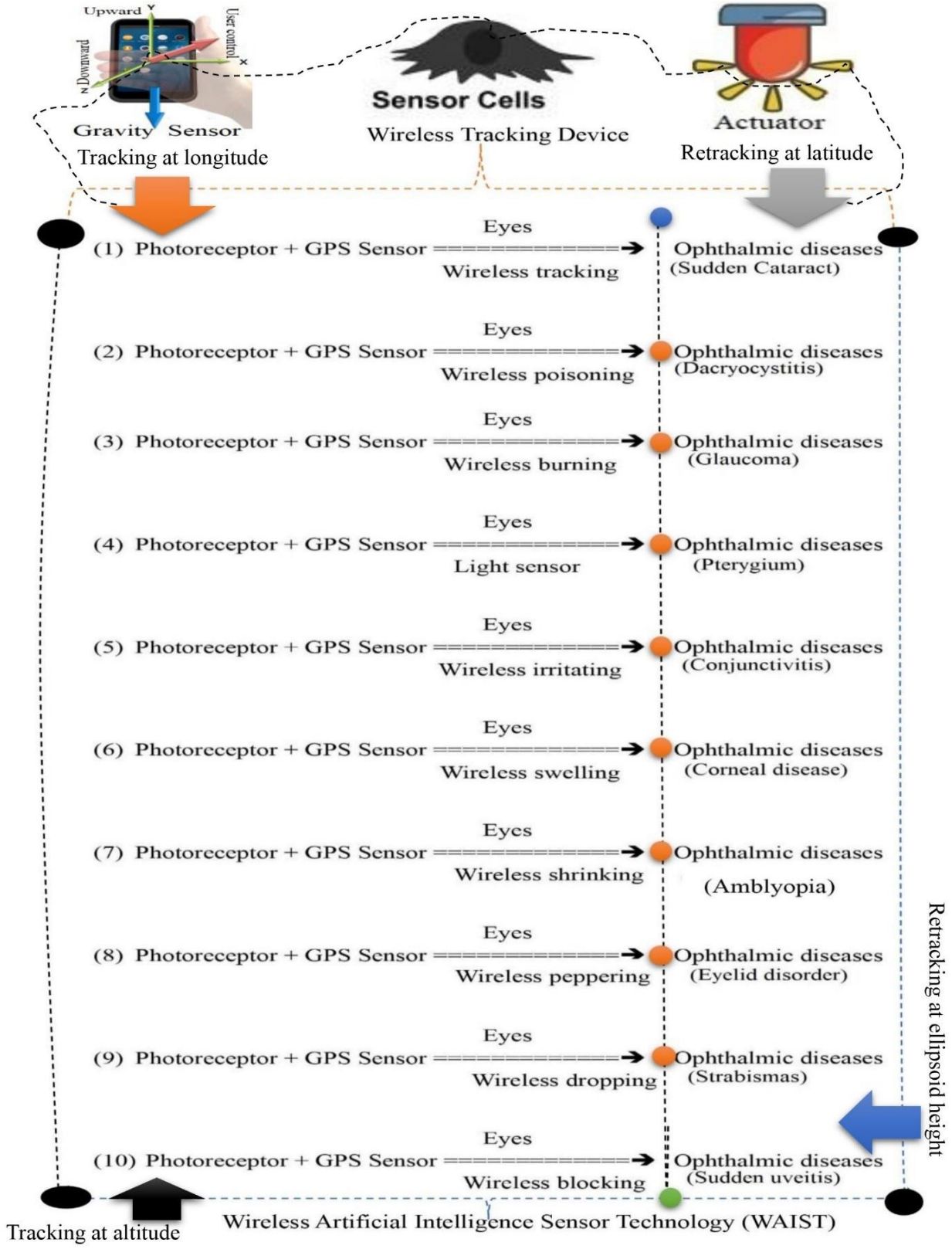

Figure 7. Individuals infect in ophthalmic diseases due to GPS sensor tracking [130]

4.6. One Health Policy Implication

The number of patients with pterygium is increasing unexpectedly. Studies have shown that the misuse of wireless sensor technology is increasing the impact of disease in humans and animals, which is a cause for concern. Hence one health policy is needed to address this. Global crises require dynamic solutions and integrated responses linked to one health system [240]. Research findings reveal that the impact of one health policy is essential for advanced generations, including HELPTAP: (i) Human health [112, 113,125,126,127], (ii) Environmental health [108,109,103, 111,115,116,117,118,119,122,124,129], (iii) Legal health [128,130,131,132,133,135,238], (iv) Political health [136, 243], (v) Technological health [101,102,104,105,114,134, 150], (vi) Animal health [119,242], and (vii) Plant health [114,242,244]. As wireless sensor technology improves, its misuse due to lack of security is increasing. These abuses pose a threat to public health, which is difficult and time-consuming to address within a single sector. The One Health Approach facilitates new programs, policies, legislation, technology use, research and implementation across multiple sectors to communicate and work together to achieve improved public health outcomes. It promotes mutual cooperation between sectors, stakeholders and countries in the use of advanced technologies for protection, disease control and health care eco-technology-linked prevention. One health system can play an important role in getting comprehensive solutions to public health threats arising at the human-environment-legal-political-technological-animal -plant (HELPTAP) interface in the present era, especially in treating ophthalmic diseases and avoiding unforeseen risks.

5. Conclusions

Conjunctival autografting and autologous blood represent an exceptional concept in the health world in the treatment of pterygium. Studies show that autografting without sutures greatly reduces recurrence rates and effective surgical time. Furthermore, adequate management of the patient's ocular surface and reduction of postoperative inflammation without medication are crucial for low recurrence rates and good cosmesis. New methods on the subject of scientific research are currently being developed to standardize pterygium treatment in less time and less cost without surgery. A better understanding of the PRAST process by medical stakeholders can bring future treatments within reach by improving health science and ensuring the use of safe technologies to create a pterygium-free world.

Declaration

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This research work has no financial support from any doners. So, the funders had no role in the design of the research, in data collection, analyses or final interpretation of data, in the writings of the manuscript, or in the decision to publish the findings.

Data Availability

The data being used to support the findings of this research work are available from the corresponding author upon request.

Competing Interests

The authors declare no potential conflict of interests in this research work.

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REFERENCES

[1] Kumar, S. & Singh, R. (2018). Pterygium excision and conjunctival autograft: a comparative study of techniques. Oman J Ophthalmol. 11(2): 124–128.

[2] Akarsu C, Taner P, Ergin A. (2003). 5-Fluorouracil as chemoadjuvant for primary pterygium surgery: preliminary report. Cornea. 22(6): 522–526.

[3] Al Fayez MF. (2002). Limbal versus conjunctival autograft transplantation for advanced and recurrent pterygium. Ophthalmology. 109(9): 1752–1755.

[4] Allen CL, Clare G, Stewart EA, et al. (2013). Augmented dried versus cryopreserved amniotic membrane as an ocular surface dressing. PLoS One. 8(10): e78441.

[5] Allen, B.D., Short, P. & Crawford, G.J. (1988). Pinguecula and pterygia. Surv Ophthalmol. 32:41–49.

[6] Almond MC, Dastrup BT, Kaufman SC. (2012). 5-Fluorouracil and mitomycin C: adjuncts to pterygium surgery. In: Hovanesian JA, editor. Pterygium: Techniques and Technologies for Surgical Success. Thorofare, NJ: Slack Inc, 55–64.

[7] Alpay A, Uğurbas SH, Erdogan B. (2009). Comparing techniques for pterygium surgery. Clin Ophthalmol. 3:69–74.

[8] Alsmman AH, Radwan G, Abozaid MA, Mohammed UA, Abd Elhaleim NG. (2017). Preoperative subconjunctival combined injection of bevacizumab and mitomycin C before the surgical excision of primary pterygium: clinical and histological results. Clin Ophthalmol. 11: 493–501.

[9] Altan-Yaycioglu R, Kucukerdonmez C, Karalezli A, Corak F, Akova YA. (2013). Astigmatic changes following pterygium removal: comparison of 5 different methods. Indian J Ophthalmol. 61(3): 104–108.

[10] Amano S, Motoyama Y, Oshika T, Eguchi S, Eguchi K. (2000). Comparative study of intraoperative mitomycin C and beta irradiation in pterygium surgery. Br J Ophthalmol. 84(6): 618–621.

[11] Anguria P, Kitinya J, Ntuli S, Carmichael T. (2014). The role

of heredity in pterygium development. Int J Ophthalmol. 7(3): 563–573.

[12] Arain MA, Yaqub MA, Ameen SS, Iqbal Z, Naqvi AH, Niazi MK. (2012). Amniotic membrane transplantation in primary pterygium compared with bare sclera technique. J Coll Physicians Surg Pak. 22(7): 440–443.

[13] Arenas E, Garcia S. (2007). A scleral soft contact lens designed for the postoperative management of pterygium surgery. Eye Contact Lens. 33(1): 9–12.

[14] Ari S, Caca I, Yildiz ZÖ, Sakalar YB, Dogan E.(2009). Comparison of mitomycin C and limbal-conjunctival autograft in the prevention of pterygial recurrence in Turkish patients: a one-year, randomized, assessor-masked, controlled trial. Curr Ther Res Clin Exp. 70(4): 274–281.

[15] Aspiotis M, Tsanou E, Gorezis S, et al. (2007). Angiogenesis in pterygium: study of microvessel density, vascular endothelial growth factor, and thrombospondin-1. Eye. 21(8): 1095–1101.

[16] Aydin A, Karadayi K, Aykan U, Can G, Colakoglu K, Bilge AH. (2008). Effectiveness of topical ciclosporin A treatment after excision of primary pterygium and limbal conjunctival autograft. J Fr Ophtalmol. 31(7): 699–704.

[17] Balci M, Sahin S, Mutlu FM, Yağci R, Karanci P, Yildiz M. (2011). Investigation of oxidative stress in pterygium tissue. Mol Vis. 17: 443–447.

[18] Bamdad S, Kooshki AS, Yasemi M. (2017). Surgical outcome of conjunctival rotational autograft-mitomycin C (MMC) versus free conjunctival autograft-MMC for pterygium removal: a randomized clinical trial. Electron Physician. 9(12): 5877–5884.

[19] Barbados Eye Studies Group, Nemesure, B., Wu, S.Y., Hennis, A., & Leske, M.C. (2008). Nine-year incidence and risk factors for pterygium in the Barbados eye studies. Ophthalmology. 115: 2153–8. [PubMed: 18930552].

[20] Bekibele CO, Baiyeroju AM, Olusanya BA, Ashaye AO, Oluleye TS. (2008). Pterygium treatment using 5-FU as adjuvant treatment compared to conjunctiva autograft. Eye. 22(1): 31–34.

[21] Besharati MR, Miratashi SA, Ahmadi AB. (2006). Pterygium surgery: amniotic membrane or conjunctival autograft transplantation. Int J Ophthalmol. 6: 1258–1262.

[22] Bilge AD. (2018). Comparison of conjunctival autograft and conjunctival transposition flap techniques in primary pterygium surgery. Saudi J Ophthalmol.32(2):110–113.

[23] Biswas MC, Shaw C, Mandal R. (2007). Treatment of pterygium with conjunctival limbal autograft and mitomycin C – a comparative study. J Indian Med Assoc. 105(4):200, 202, 204.

[24] Cárdenas-Cantú E, Zavala J, Valenzuela J, Valdez-García JE. (2016). Molecular basis of pterygium development. Semin Ophthalmol. 2016, 31(6): 567–583.

[25] Celik T. (2018). In situ blood coagulum versus sutures for autograft fixation after pterygium excision. Curr Eye Res. 43(8): 977–980.

[26] Chen KH, Hsu WM. (2006). Intraoperative ethanol treatment as an adjuvant therapy of pterygium excision. Int J Biomed Sci. 2(4): 414–421.

[27] Cho H, Chuck RS. (2012). Pterygium excision and placement of amniotic membrane grafts. In: Hovanesian JA, editor. Pterygium: Techniques and Technologies for Surgical Success. Thorofare, NJ: Slack Inc, 91–100.

[28] Choudhury S, Dutta J, Mukhopadhyay S, et al. (2014). Comparison of autologous in situ blood coagulum versus sutures for conjunctival autografting after pterygium excision. Int Ophthalmol. 34(1):41–48.

[29] Chowers I, Pe'er J, Zamir E, Livni N, Ilsar M, Frucht-Pery J. (2001). Proliferative activity and p53 expression in primary and recurrent pterygia. Ophthalmology. 108(5): 985–988.

[30] Clearfield E, Hawkins BS, Kuo IC. (2017). Conjunctival autograft versus amniotic membrane transplantation for treatment of pterygium: findings from a Cochrane systematic review. Am J Ophthalmol. 182: 8–17.

[31] Clearfield, E., Muthappan, V., Wang, X. & Kuo IC. (2016). Conjunctival autograft for pterygium. Cochrane Database Syst Rev., 2(2): CD011349. doi: 10.1002/14651858.CD011349.pub2. PMID: 26867004, PMCID: PMC5032146.

[32] Cohen, R.A, McDonald, M.B. (1993). Fixation of conjunctival autografts with an organic tissue adhesive. Arch Ophthalmol., 111: 1167–1168. [PubMed: 8363455].

[33] Cornelius CR. (2017). Recurrence rate and complications of pterygium extended removal followed by extended conjunctival transplant. Cornea. 36(1): 101–103.

[34] Coroneo MT. (1993). Pterygium as an early indicator of ultraviolet insolation: a hypothesis. Br J Ophthalmol. 77(11): 734–739.

[35] Coroneo, M.T, Di Girolamo, N. & Wakefield, D. (1999). The pathogenesis of pterygia. Curr Opin Ophthalmol., 10: 282–8. [PubMed: 10621537].

[36] Dadeya S, Malik KP, Gulliani BP. (2002). Pterygium surgery: conjunctival rotation autograft versus conjunctival autograft. Ophthalmic Surg Lasers. 33: 269–274.

[37] Daglioglu MC, Coskun M, Ilhan N, et al. (2014). The effects of soft contact lens use on cornea and patient's recovery after autograft pterygium surgery. Cont Lens Anterior Eye. 37(3): 175–177.

[38] Detels, R. & Dhir, S.P. (1967). Pterygium: A geographical study. Arch Ophthalmol. 78: 485–91. [PubMed: 6046844]

[39] Detorakis ET, Drakonaki EE, Spandidos DA. (2000). Molecular genetic alterations and viral presence in ophthalmic pterygium. Int J Mol Med. 6(1): 35–41.

[40] Di Girolamo N, Chui J, Coroneo MT, Wakefield D. (2004). Pathogenesis of pterygia: role of cytokines, growth factors, and matrix metalloproteinases. Prog Retin Eye Res. 23(2): 195–228.

[41] Di Girolamo N, Kumar RK, Coroneo MT, Wakefield D. (2002). UVB-mediated induction of interleukin-6 and -8 in pterygia and cultured human pterygium epithelial cells. Invest Ophthalmol Vis Sci. 43(11): 3430–3437.

[42] Di Girolamo N. (2012). Association of human papilloma virus with pterygia and ocular-surface squamous neoplasia. Eye. 26(2): 202–211.

[43] Droutsas, K. & Sekundo, W. (2010). Epidemiology of pterygium. A Review. Ophthalmologe, 107, 511-2.

[44] Duke-Elder SS. (1965). System of Ophthalmology. Vol. VIII. London: Henry Kimpton, 574.

[45] Dushku N, John MK, Schultz GS, Reid TW. (2001). Pterygia pathogenesis: corneal invasion by matrix metalloproteinase expressing altered limbal epithelial basal cells. Arch Ophthalmol. 119(5): 695–706.

[46] Ebrahimi ME, Kordi-Tamandani DM, Arish M. (2016). A novel approach to investigation of the pathogenesis of pterygium based on assessment of promoter hyper-methylation and expression profile of CTLA4 gene: a credible report of CTLA4 gene expression in human eye tissue. Gene. 583(2): 130–133.

[47] Erogul, O., Erogul, L.E., Korkmaz, N.S., Celik, F., Dogan, M. & Gobeka, H.H. (2020). Histopathological Evaluation of Pterygium Patients with Type 2 Diabetes Mellitus. Beyoglu Eye J., 5(2): 122-128. doi: 10.14744/bej.2020.43434. PMID: 35098075, PMCID: PMC8784475.

[48] Fernandes M, Sangwan VS, Bansal AK, et al. (2005). Outcome of pterygium surgery: analysis over 14 years. Eye. 19(11): 1182–1190.

[49] Fonseca EC, Rocha EM, Arruda GV. (2018). Comparison among adjuvant treatments for primary pterygium: a network meta-analysis. Br J Ophthalmol. 102(6): 748–756.

[50] Frucht-Pery J, Raiskup F, Ilsar M, Landau D, Orucov F, Solomon A. (2006). Conjunctival autografting combined with low-dose mitomycin C for prevention of primary pterygium recurrence. Am J Ophthalmol. 141(6): 1044–1050.

[51] Fuest, M., Mehta, J.S. & Coroneo, M.T. (2017). New treatment options for pterygium. Expert Review of Ophthalmology, 12:3, 193-196, doi: https://doi.org/10.1080/17469899.2017.1324297.

[52] Ghanavati SZ, Shousha MA, Betancurt C, Perez VL. (2014). Combined conjunctival autograft and overlay amniotic membrane transplantation, a novel surgical treatment for pterygium. J Ophthalmic Vis Res. 9(3): 399–403.

[53] Gumus K, Erkilic K, Topaktas D, Colin J. (2011). Effect of pterygia on refractive indices, corneal topography, and ocular aberrations. Cornea. 30(1): 24–29.

[54] Gumus K, Topaktas D, Göktaş A, Karakucuk S, Oner A, Mirza GE. (2012). The change in ocular higher-order aberrations after pterygium excision with conjunctival autograft: a 1-year prospective clinical trial. Cornea. 31(12): 1428–1431.

[55] Ha SW, Park JH, Shin IH, Kim HK. (2015). Clinical analysis of risk factors contributing to recurrence of pterygium after excision and graft surgery. Int J Ophthalmol. 8(3): 522–527.

[56] Hanahan D, Folkman J. (1996). Patterns and emerging mechanisms of the angiogenic switch during tumorigenesis. Cell. 86(3): 353–364.

[57] Hao Y, Ma DH, Hwang DG, Kim WS, Zhang F. (2000). Identification of antiangiogenic and antiinflammatory proteins in human amniotic membrane. Cornea. 19(3): 348–352.

[58] Heindl, L.M. & Cursiefen, C. (2010). Pterygium: Etiology, clinical aspects and novel adjuvant therapies. Ophthalmologe, 107, 517-20.

[59] Hilgers JH. (1960). Pterygium: its incidence, heredity and etiology. Am J Ophthalmol. 50(4): 635–644.

[60] Hilmi MR, Che Azemin MZ, Mohd Kamal K, Mohd Tamrin MI, Abdul Gaffur N, Tengku Sembok TM. (2017). Prediction of changes in visual acuity and contrast sensitivity function by tissue redness after pterygium surgery. Curr Eye Res. 42(6): 852–856.

[61] Hong HS, Lee J, Lee E, et al. (2009). A new role of substance P as an injury-inducible messenger for mobilization of CD29(+) stromal-like cells. Nat Med. 15(4): 425–435.

[62] Hosal BM, Gürsel E. (2000). Mitomycin-C for prevention of recurrent pterygium. Ann Ophthalmol. 32(2): 107–109.

[63] Hovanesian JA, Starr CE, Vroman DT, The ASCRS Cornea Clinical Committee. (2017). Surgical techniques and adjuvants for the management of primary and recurrent pterygia. J Cataract Refract Surg. 43(3): 405–419.

[64] Ibáñez M, Eugarrios MF, Calderón DI. (2009). Topical cyclosporin A and mitomycin C injection as adjunctive therapy for prevention of primary pterygium recurrence. Ophthalmic Surg Lasers Imaging. 40(3): 239–244.

[65] Jin J, Guan M, Sima J, et al. (2003). Decreased pigment epithelium-derived factor and increased vascular endothelial growth factor levels in pterygia. Cornea. 22(5): 473–477.

[66] Jürgenliemk-Schulz IM, Hartman LJ, Roesink JM, et al. (2004). Prevention of pterygium recurrence by postoperative single-dose beta-irradiation: a prospective randomized clinical double-blind trial. Int J Radiat Oncol Biol Phys. 59(4): 1138–1147.

[67] Kase S, Osaki M, Jin XH, et al. (2007). Increased expression of erythropoietin receptor in human pterygial tissues. Int J Mol Med. 20(5): 699–702.

[68] Kase S, Takahashi S, Sato I, Nakanishi K, Yoshida K, Ohno S. (2007). Expression of p27(KIP1) and cyclin D1, and cell proliferation in human pterygium. Br J Ophthalmol. 91(7): 958–961.

[69] Katırcıoglu YA, Altiparmak U, Engur Goktas S, Cakir B, Singar E, Ornek F. (2015). Comparison of two techniques for the treatment of recurrent pterygium: amniotic membrane vs conjunctival autograft combined with mitomycin C. Semin Ophthalmol. 30(5–6):321–327.

[70] Kau HC, Tsai CC, Lee CF, et al. (2006). Increased oxidative DNA damage, 8-hydroxydeoxy-guanosine, in human pterygium. Eye. 2006, 20(7): 826–831.

[71] Kaufman SC, Jacobs DS, Lee WB, Deng SX, Rosenblatt MI, Shtein RM. (2013). Options and adjuvants in surgery for pterygium: a report by the American Academy of Ophthalmology. Ophthalmology. 120(1): 201–208.

[72] Keklikci U, Celik Y, Cakmak SS, Unlu MK, Bilek B. (2007). Conjunctival-limbal autograft, amniotic membrane transplantation, and intraoperative mitomycin C for primary pterygium. Ann Ophthalmol. 39(4): 296–301.

[73] Kenyon, K.R., Wagoner, M.D., Hettinger, M.E. (1985). Conjunctival autograft transplantation for advanced and recurrent pterygium. Ophthalmology, 92: 1461–1470. [PubMed: 4080320].

[74] Khalfaoui T, Mkannez G, Colin D, et al. (2011).

Immunohistochemical analysis of vascular endothelial growth factor (VEGF) and p53 expression in pterygium from Tunisian patients. Pathol Biol. 59(3): 137–141.

[75] Kheirkhah A, Nazari R, Nikdel M, Ghassemi H, Hashemi H, Behrouz MJ. (2011). Postoperative conjunctival inflammation after pterygium surgery with amniotic membrane transplantation versus conjunctival autograft. Am J Ophthalmol. 152(5): 733–738.

[76] Kheirkhah A, Safi H, Molaei S, Nazari R, Behrouz MJ, Raju VK. (2012). Effects of pterygium surgery on front and back corneal astigmatism. Can J Ophthalmol. 47(5):423–428.

[77] Kim KW, Kim JC. (2018). Current approaches and future directions in the management of pterygium. Int J Ophthalmol. 1(5): 709–711.

[78] Kim KW, Park SH, Kim JC. (2016). Fibroblast biology in pterygia. Exp Eye Res. 142: 32–39.

[79] Kim KW, Park SH, Wee SW, Kim JC. (2013). Overexpression of angiogenin in pterygium body fibroblasts and its association with proliferative potency. Invest Ophthalmol Vis Sci. 54(9):6355–6362.

[80] Kim, H.H., Mun, H.J., Park, Y.J, Lee, K.W & Shin, J.P. (2008). Conjunctivolimbal autograft using a Fibrin adhesive in pterygium surgery. Korean J Ophthalmol., 22: 147–54. [PMCID: PMC2629906] [PubMed: 18784440].

[81] Koç F, Demirbay P, Teke MY. (2002). Primer ve rekürren pterygiumda konjonktival otogreftleme. T Oft Gaz. 583–588.

[82] Koranyi G, Artzén D, Seregard S, Kopp ED. (2012). Intraoperative mitomycin C versus autologous conjunctival autograft in surgery of primary pterygium with four-year follow-up. Acta Ophthalmol. 90(3):266–270.

[83] Koranyi G, Seregard S, Kopp ED. (2004). Cut and paste: a no suture, small incision approach to pterygium surgery. Br J Ophthalmol. 88(7): 911–914.

[84] Koranyi G, Seregard S, Kopp ED. (2005). The cut-and-paste method for primary pterygium surgery: long-term follow-up. Acta Ophthalmol Scand. 83(3):298–301.

[85] Koranyi, G., Seregard, S. & Kopp, E.D. (2004). A no suture, small incision approach to pterygium surgery. Br J. Ophthalmol. 88:911–4. [PMCID: PMC1772242] [PubMed: 15205236]

[86] Kria L, Ohira A, Amemiya T. (1996). Immunohistochemical localization of basic fibroblast growth factor, platelet derived growth factor, transforming growth factor-beta and tumor necrosis factor-alpha in the pterygium. Acta Histochem. 98(2): 195–201.

[87] Küçükerdönmez C, Akova YA, Altinörs DD. (2007). Comparison of conjunctival autograft with amniotic membrane transplantation for pterygium surgery: surgical and cosmetic outcome. Cornea. 26(4): 407–413.

[88] Kurian A, Reghunadhan I, Nair KG. (2015). Autologous blood versus fibrin glue for conjunctival autograft adherence in sutureless pterygium surgery: a randomised controlled trial. Br J Ophthalmol. 99(4):464–470.

[89] Lan, A., Xiao, F., Wang, Y., Luo, Z. & Cao, Q. (2017). Efficacy of fibrin glue versus sutures for attaching conjunctival autografts in pterygium surgery: a systematic review with meta-analysis and trial sequential analysis of evidence. Oncotarget, 41487-41497.

[90] Lee SB, Li DQ, Tan DT, Meller DC, Tseng SC. (2000). Suppression of TGF-beta signaling in both normal conjunctival fibroblasts and pterygial body fibroblasts by amniotic membrane. Curr Eye Res. 20(4): 325–334.

[91] Lešin M, Paradžik M, Marin Lovrić J, et al. (2018). Cauterisation versus fibrin glue for conjunctival autografting in primary pterygium surgery (CAGE CUP): study protocol of a randomised controlled trial. BMJ Open. 8(6): e020714.

[92] Lewallen, S. (1989). A randomized trial of conjunctival autografting for pterygium in the tropics. Ophthalmology, 96:1612–4. [PubMed: 2694049].

[93] Liang K, Jiang Z, Ding BQ, Cheng P, Huang DK, Tao LM. (2011). Expression of cell proliferation and apoptosis biomarkers in pterygia and normal conjunctiva. Mol Vis. 17: 1687–1693.

[94] Lin H, Luo L, Ling S, et al. (2013). Lymphatic microvessel density as a predictive marker for the recurrence time of pterygium: a three-year follow-up study. Mol Vis. 19: 166–173.

[95] Lindquist TP, Lee WB. (2015) Mitomycin C-associated scleral stromalysis after pterygium surgery. Cornea. 34(4): 398–401.

[96] Ling S, Liang L, Lin H, Li W, Xu J. (2012). Increasing lymphatic microvessel density in primary pterygia. Arch Ophthalmol. 130(6):735–742.

[97] Liu J, Fu Y, Xu Y, Tseng SC. (2012). New grading system to improve the surgical outcome of multirecurrent pterygia. Arch Ophthalmol. 130(1): 39–49.

[98] Ma DH, See LC, Liau SB, Tsai RJ. (2000). Amniotic membrane graft for primary pterygium: comparison with conjunctival autograft and topical mitomycin C treatment. Br J Ophthalmol. 84(9): 973–978.

[99] Mansour AM. (2017). Regression of inflamed pterygia by frequent high-dose intralesional ziv-aflibercept. Cornea. 36(8): 1002–1005.

[100] Marchetti C, Sidahmed-Adrar N, Collin F, Jore D, Gardès-Albert M, Bonnefont-Rousselot D. (2011). Melatonin protects PLPC liposomes and LDL towards radical-induced oxidation. J Pineal Res. 51(3): 286–296.

[101] Miah, M. R. (2012). A Framework of Global e-Learning for the Advanced Generations. *Asian Business Review*, *1*(2), 145–151. https://doi.org/10.18034/abr.v1i2.135.

[102] Miah, M. R. (2013). A Framework on Internet Banking Services for the Rationalized Generations. *Asian Business Review*, *3*(2), 63–69. https://doi.org/10.18034/abr.v3i2.88.

[103] Miah, M. R. (2018). *Assessment of Environmental Policy Instruments along with Information Systems for Biodiversity Conservation in Bangladesh* (Doctoral dissertation, PhD Thesis. IBEC, UNIMAS, Malaysia. Retrieved from https://ir.unimas.my/id/eprint/24535/.

[104] Miah, M. R. (2020d). *Concept of Cyber Antichrists, Chapter one*. Cyber Dazzal: Sushaysther Ontoray (ed., pp. 1-128). Published by Paprhi Prakash, Sylhet, Bangladesh. Retrieved from https://www.rokomari.com/book/202988/cyber-dazzal---sushaysther-ontoray.

[105] Miah, M. R., & Kar, N. (2017). MIS Practices in Banking Sector: A Case Study on Prime Bank Limited. *Asian Accounting and Auditing Advancement*, *8*(1), 30–44. https://doi.org/10.18034/4ajournal.v8i1.47.

[106] Miah, M. R., Hasan, M. M., Parisa, J. T., Alam, M. S. E., Shahriar, C. S., Akhtar, F., Begum, M., Sayok, A.K., Abdullah, F., Shamsuddin, M.A.S., Rahman, A.A.M.S., Alam, M.S., Tabassum, T., Chowdhury, S.H., Sharif, M.A., Rahman, M.S., Uddin, M.B., Tamim, M.A.K., Nazim, A.Y.M., Hannan, M.A., Uddin, M.J., Uddin, MB., Ghani, M.A., Nipa, N.S., Khan, M.S., Ahmed, G., Hossain, M.S., Rashid, M.M., Beg, M.O., Samdany, A.A., Hossain, S.A.M.I., Selim, M.A., Uddin, M.F., Nazrin, M.S., Azad, M.K.H., Malik, S.U.F., Hossain, M.K. & Chowdhury, M.A.K.. (2022b). Impact of Oscillated Wireless Sensor Networks to Initiate Cardiac Arrest. *International Journal of Internal Medicine*, *11*(1), 1-17. url: http://article.sapub.org/10.5923.j.ijim.20221101.01.html, doi: https://doi.org/10.5923/j.ijim.20221101.01.

[107] Miah, M. R., Hasan, M. M., Parisha, J. T., Chowdhury, S. H., Sayok, A. K., & Uddin, M. B. (2023). A Unique Revolutionary Journey across the Globe to Discover the Novel Coronavirus. *International Journal of Research -GRANTHAALAYAH*, *11*(4), 84–100. https://doi.org/10.29121/granthaalayah.v11.i4.2023.5137.

[108] Miah, M. R., Hasan, M. M., Parisha, J. T., Huda, M. B., Sher-E-Alam, M., Kiew Sayok, A., Rahman, M. S., Sharif, M. A., Uddin, M. B., Chowdhury, S. H., & Bhuiyan, M. A. (2023b). Misuse of Advanced Satellite Technology to Accelerate Man-made Flash Floods. *International Journal of Research -GRANTHAALAYAH*, *11*(3), 160–171. https://doi.org/10.29121/granthaalayah.v11.i3.2023.5058.

[109] Miah, M. R., Hasan, M. M., Parisha, J. T., Sayok, A. K., Uddin, M. B., Chowdhury, S. H. & Miah, M.M.U. (2023a). Impact of High Radio Frequency Satellite Oscillations on Initiating Earthquakes. *International Journal of Research -GRANTHAALAYAH*, *11*(5), 129–197. https://doi.org/10.29121/granthaalayah.v11.i5.2023.5142.

[110] Miah, M. R., Khan, M. S., Rahman, A. A. M. S., Samdany, A. A., Hannan, M. A., Chowdhury, S. H., & Sayok, A. K. (2020a). Impact of Sensor Networks towards Individuals Augmenting Causes of Diabetes. *International Journal of Diabetes Research*, *9*(2), 1-10. doi: https://doi.org/10.5923/j.diabetes.20200902, url: http://article.sapub.org/10.5923.j.diabetes.20200902.02.html.

[111] Miah, M. R., Mustaffa, M. S., Jayos, S., Ibrahim, N. H., Bujang, S., Saili, J., & Sayok, A. K. (2019). Towards Stimulating Tools for Advancement of Environmental Conservation through Promoting of Psychological Instruments. *Journal of Sustainable Development*, *12*(4), 196-224. doi: https://doi.org/10.5539/jsd.v12n4p196.

[112] Miah, M. R., Rahman, A. A. M. S., Khan, M. S., Hannan, M. A., Hossain, M. S., Shahriar, C. S., Hossain, S.A.M.I., Talukdar, M.T.H., Samdany, A.A., Alam, M.S., Uddin, M.B., Sayok, A.K. & Chowdhury, S. H. (2021a). Effect of Coronavirus Worldwide through Misusing of Wireless Sensor Networks. *American Journal of Bioinformatics Research*, *11*(1), 1-31. url: http://article.sapub.org/10.5923.j.bioinformatics.20211101.01.html. doi: 10.5923/j.bioinformatics.20211101.01.

[113] Miah, M. R., Rahman, A. A. M. S., Sayok, A. K., Samdany, A. A., & Hannan, M. A. (2021). How to fight the COVID-19 global crisis. *World Journal of Environmental Research*, *11*(2), 31–38. https://doi.org/10.18844/wjer.v11i2.5855

[114] Miah, M. R., Sayok, A. K., Sarok, A., & Uddin, M. B. (2018a). Applications of Biological Diversity Information Systems towards Conservation at Lawachara National Park in Bangladesh. *Malaysian Journal of Medical and Biological Research*, *5*(2), 93-104. https://doi.org/10.18034/mjmbr.v5i2.457.

[115] Miah, M.M., Hasan, M.M., Parisha, J.T., Alam, M.S., Sayok, A.K., Rahman, M.S., Sharif, M.A., Uddin, M.B., & Chowdhury, S.H. (2023d). Innovative Policy Approach to Environmental Resource Management Through Green Banking Activities. *American Journal of Economics*, 13(2), 35-51. Retrieved from http://article.sapub.org/10.5923.j.economics.20231302.01.html. doi: 10.5923/j.economics.20231302.01.

[116] Miah, M.R. & Shamsuddin, M.A.S. (2012). Impact of Environmental Education Technology in Secondary Educational Institutions: A Study in Chittagong City Area. *Asian Journal of Applied Science and Engineering*. 1(1), 44– 51.

[117] Miah, M.R. & Shamsuddin, M.A.S. (2012a). A Framework of National Environmental Education: An Insight at Secondary Level Urban Schools. *Journal of General Education*, l (2), 1–10.

[118] Miah, M.R. & Shamsuddin, M.A.S. (2013). Assessing of Teaching Learning through Environmental Education in Secondary Level: A Closer Outlook in Urban Areas. *NAEM Journal*, 8 (16). 05-12.

[119] Miah, M.R. (2013). Enhancing Food Security through Acclimatized Species Domestication in the Haor Region. *ABC Journal of Advanced Research*, 2(1), 49–65.

[120] Miah, M.R. (2020b). Cyber Dazzal: Barrier to good health (version Bangla language). Book on Contemporary Issues. Paprhi Prokash. 1-128. ISBN: 9789845860413. Retrieved from https://www.rokomari.com/book/202988/cyber-dazzal---sushaysther-ontoray.

[121] Miah, M.R. (2020c). Corona virus wide-reaching through sensor technology, Chapter 18. Cyber Dajjal: Obstacle to good health. Paprhi Prakash, Rangmahal Tower, Bandar Bazar, Sylhet, Bangladesh, 115-121. ISBN: 978-984-586-041-3. url: https://rokomari.com/book/202988/cyber-dazzal---sushaysther-ontoray (Bengali language).

[122] Miah, M.R. (2022j). Environmental Conservation Instruments: Dynamic Policy and Advanced Technology. LAMBERT Academic Publishing. 1-388. ISBN: 9786205490129. Retrieved from https://isbnsearch.org/isbn/9786205490129. https://www.amazon.co.uk/Environmental-Conservation-Instruments-Advanced-Technology/dp/6205490129.

[123] Miah, M.R. (2023c). Discovery of Coronavirus (book). Scientific and Academic Publishing, California, USA. 1-345 [in press]. url: http://www.sapub.org/Book/index.aspx.

[124] Miah, M.R., Alam, M.S., Hasan, M.M., Parisha, J.T., Sayok, A.K., Rahman, M.S., Sharif, M.A. & Uddin, M.B. (2022c). Scientific Environmental Governance to Accelerate Sustainable Biodiversity Management. *Advances in Life Sciences*, 11(1), 1-16. url: http://article.sapub.org/10.5923.j.als.20221101.01.html. doi: 10.5923/j.als.20221101.01.

[125] Miah, M.R., Chowdhury, S.H., Parisha, J.T., Rashid, M.M.,

Hassan, M.M. & Sayok, A.K. (2023e). Impact of Radiofrequency Tracking on Body Surfaces for Acute Exacerbations of Skin Disease. *American Journal of Dermatology and Venereology*, 12 (1), 1-9. url: http://article.sapub.org/10.5923.j.ajdv.20231201.01.html, doi: 10.5923/j.ajdv.20231201.01.

[126] Miah, M.R., Hannan, M.A., Rahman, AAMS., Khan, M.S., Hossain, M.M., Rahman, I.T., Hossain, M.S., Shahriar, C.S., Uddin, M.B., Talukdar, M.T.H., Alam, M.S., Hossain, S.A.M.I., Samdany, A.A., Chowdhury, S.H., Sayok, A.K. (2021b). Processed Radio Frequency towards Pancreas Enhancing the Deadly Diabetes Worldwide. *Journal of Endocrinology Research, 3(1),* 1-20. url: https://ojs.bilpublishing.com/index.php/jer/article/view/2826. doi: 10.30564/jer.v3i1.2826.

[127] Miah, M.R., Hasan, M.M., Hannan, M.A., Parisa, J.T., Uddin, M.J., Uddin, M.B., Rahman, A.A.M.S., Hossain, S.A.M.I., Sharif, M.A., Akhtar, F., Shamsuddin, M.A.S., Alam, M.S.E., Alam, M.S., Abdullah, F., Rahman, M.S., Uddin, M.B., Shahriar, C.S., Sayok, A.K., Begum, M., Hossain, M.M., Khan, M.S., Ahmed, G., Malik, S.U.F., Samdany, A.A., Ghani, M.A., Hossain, M.S., Nazrin, M.S., Tamim, M.A.K., Selim, M.A., Talukdar, M.T.H., Chowdhury, F.T., Rashid, T.U., Nazim, A.Y.M., Rashid, M., Chowdhury, S.H. (2022). Myths about Coronavirus: A Research Defense. *Global Journal of Health Science*, 14(2), 63–112. url: https://ccsenet.org/journal/index.php/gjhs/article/view/0/46717.

[128] Miah, M.R., Hasan, M.M., Miah, M.M.U., Parisha, J.T., Alam, M.S., Sayok, A.K., Rahman, M.S., Sharif, M.A. & Uddin, M.B. (2023f). Innovative Policy to Enable Sustained Conserving of Forest Biodiversity. *International Journal of Agriculture and Forestry*, 13(1), 1-22. url: http://article.sapub.org/10.5923.j.ijaf.20231301.01.html. doi: 10.5923/j.ijaf.20231301.01.

[129] Miah, M.R., Hasan, M.M., Parisa, J.T., Alam, M.S., Akhtar, F., Begum, M., Shahriar, C.S., Sayok, A.K., Abdullah, F., Shamsuddin, M.A.S., Rahman, M.S., Sharif, M.A., Rahman, A.A.M.S., Alam, M.S., Uddin, M.B. and Chowdhury, S.H. (2021h). Unexpected Effects of Advanced Wireless Sensor Technology on Climate Change. *World Environment*, 11(2), 41-82. url: http://article.sapub.org/10.5923.j.env.20211102.01.html, doi: 10.5923/j.env.20211102.01.

[130] Miah, M.R., Hasan, M.M., Parisha, J.T. & Chowdhury, S.H. (2022a). Socioeconomic Impact of the Coronavirus Pandemic with Multiple Factors on Global Healthcare Policy. *Journal of Politics and Law*, 15(4), 242. url: https://ccsenet.org/journal/index.php/jpl/article/view/0/47787. doi: https://doi.org/10.5539/jpl.v15n4p242.

[131] Miah, M.R., Hasan, M.M., Parisha, J.T. & Sayok, A.K. (2022e). Challenges of Legal Instruments for Biodiversity Conservation along with National Parks. *International Journal of Agriculture and Forestry*, 12(3), 79-101. doi: 10.5923/j.ijaf.20221203.03.

[132] Miah, M.R., Hasan, M.M., Parisha, J.T. & Sayok, A.K. (2023g). A Framework on Biodiversity Conservation Related Policy Analysis. *American Journal of Environmental Engineering*, 13(1), 1-12. url: http://article.sapub.org/10.5923.j.ajee.20231301.01.html., doi: 10.5923/j.ajee.20231301.01.

[133] Miah, M.R., Hasan, M.M., Parisha, J.T. & Sayok, A.K. (2023h). A Framework on Biodiversity Conservation Related Policy Analysis. *American Journal of Environmental Engineering*, 13(1), 1-12. Retrieved from http://article.sapub.org/10.5923.j.ajee.20231301.01.html. doi: 10.5923/j.ajee.20231301.01.

[134] Miah, M.R., Hasan, M.M., Parisha, J.T., Alam, M.S., Sayok, A.K., Rahman, M.S., Sharif, M.A., Uddin, M.B. & Chowdhury, S.H. (2022f). Impact of Processed Wireless Sensor Networks on Biodiversity Conservation. *International Journal of Biological Engineering*, 7(1), 1-13. Retrieved from http://article.sapub.org/10.5923.j.ijbe.20220701.01.html. doi: 10.5923/j.ijbe.20220701.01.

[135] Miah, M.R., Hasan, M.M., Parisha, J.T., Alam, M.S., Sayok, A.K., Sarok, A. & Uddin, M.B. (2023i). Enhancing National Park Information Knowledge to Improve Biodiversity Conservation in Bangladesh: A Study on Policy Perspectives. *International Journal of Plant Research*, 13(1), 1-23. Retrieved http://article.sapub.org/10.5923.j.plant.20231301.01.html. doi: 10.5923/j.plant.20231301.01.

[136] Miah, M.R., Hasan, M.M., Parisha, J.T., Chowdhury, S.H. & Sayok, A.K. (2023j). Misuse of Technology to Exacerbate Democracy in Crisis. *American Journal of Sociological Research*, 13(1), 12-23. url: http://article.sapub.org/10.5923.j.sociology.20231301.03.html. doi: 10.5923/j.sociology.20231301.03.

[137] Miah, M.R., Hasan, M.M., Parisha, J.T., Chowdhury, S.H. & Sayok, A.K. (2023k). Misuse of Technology to Exacerbate Democracy in Crisis. *American Journal of Sociological Research*, 13(1), 12-23. Retrieved from http://article.sapub.org/10.5923.j.sociology.20231301.03.html. doi: 10.5923/j.sociology.20231301.03.

[138] Miah, M.R., Hasan, M.M., Parisha, J.T., et al. Chowdhury, S.H. (2022g). Towards the Misuse of Advanced Wireless Sensor Technology to Enable the Sudden Onset of ARDS. *American Journal of Medicine and Medical Sciences*, 12(6), 616-638. doi:https://doi.org/10.5923/j.ajmms.20221206.05.

[139] Miah, M.R., Hasan, M.M., Parisha, J.T., Sayok, A.K., Alam, M.S. & Chowdhury, S.H. (2022h). Issues and Challenges in Medical Jurisprudence Due to Misuse of Wireless Sensor Technology. *American Journal of Medicine and Medical Sciences*, 12(12), 1277-1291. url: http://article.sapub.org/10.5923.j.ajmms.20221212.23.html. doi: 10.5923/j.ajmms.20221212.23.

[140] Miah, M.R., Hasan, M.M., Parisha, J.T., Sayok, A.K., Sarok, A., Uddin, M.B., Alam, M. S., Rahman, M.S., Miah, M.M.U., Sharif, M.A. & Hossain, M.A. (2023l). Biodiversity Information Systems in Geospatial Applications for Protected Area Management. *American Journal of Geographic Information System*, 12(1), 1-27. Retrieved from http://article.sapub.org/10.5923.j.ajgis.20231201.01.html. doi: 10.5923/j.ajgis.20231201.01.

[141] Miah, M.R., Hasan, M.M., Parisha, J.T., Shahriar, C.S., Sayok, A.K., Chowdhury, S.H. (2022i). Adverse Global Health Impacts Due to the Proliferation of Man-Made Technological Heatwaves. *Resources and Environment*, 12(3), 67-75. url:http://article.sapub.org/10.5923.j.re.20221203.01.html, doi: 10.5923/j.re.20221203.01.

[142] Miah, M.R., Hasan, M.M., Parisha, J.T., Shahriar, C.S., Sayok, A.K., Selim, M.A. & Chowdhury, S.H. (2023m). A Scientific Innovative Approach to Recovery from Dengue Fever. *Public Health Research*, 13(1), 1-14. url: http://article.sapub.org/10.5923.j.phr.20231301.01.html,

doi: 10.5923/j.phr.20231301.01.

[143] Miah, M.R., Hasan, MM., Parisa, J.T., Alam, MSE, Hossain, MM., Akhtar, F., Begum, M., Sayok, AK., Abdullah, F., Shamsuddin, MAS., Rahman, AAMS., Alam, MS., Chowdhury, SH. (2021g). Coronavirus: A Terrible Global Democracy. *International Journal of Applied Sociology*, 11(2), 46-82. url: http://article.sapub.org/10.5923.j.ijas.20211102.02.html, doi: 10.5923/j.ijas.20211102.02.

[144] Miah, M.R., Mustaffa, M.S., Sabil, S., Madihie, A., Saili, J. & Sayok, A.K. (2018). Towards Dynamic Policy for Early Childhood Development Enhanced the Growth of Self-Regulations. *International Journal of Engineering & Technology*, 7(3.30), 251-255. Retrieved from https://www.sciencepubco.com/index.php/ijet/article/view/18251/8231. doi: https://doi.org/10.14419/ijet.v7i3.30.18251.

[145] Miah, M.R., Rahman, A.A.M.S., Parisa, J.T., Hannan, M.A., Khan, M.S., Samdany, A.A., Sayok, A.K. and Chowdhury, S.H. (2021d). Discovery of Coronavirus with Innovative Technology. *Science and Technology*, 11(1), 7-29. url: http://article.sapub.org/10.5923.j.scit.20211101.02.html, doi: 10.5923/j.scit.20211101.02.

[146] Miah, M.R., Rahman, A.A.M.S., Samdany, A.A., & Chowdhury, S.H. (2021e). A Dynamic Scientific Model for Recovery of Corona Disease. *Frontiers in Science, 11(1)*, 1-17. url: http://article.sapub.org/10.5923.j.fs.20211101.01.html. doi: 10.5923/j.fs.20211101.01

[147] Miah, M.R., Rahman, AAMS., Hasan, M.M., Parisa, J.T., Hannan, M.A., Hossain, M.M., Alam, M.S., Alam, M.S.E., Akhtar, F., Ghani, M.A., Khan, M.S., Shahriar, C.S., Sayok, A.K., Begum, M., Malik, S.U.F., Samdany, A.A., Ahmed, G. and Chowdhury, S.H. (2021c). Adverse Effects of Wireless Sensor Technology to Debilitating in Numbness. *International Journal of Virology and Molecular Biology*, 10(1), 12-25. url: http://article.sapub.org/10.5923.j.ijvmb.20211001.03.html, doi: 10.5923/j.ijvmb.20211001.03.

[148] Miah, M.R., Rahman, AAMS., Khan, M.S., Samdany, A.A., Hannan, M.A., Chowdhury, S.H., Sayok, A.K. (2020). Impact of Sensor Technology Enhancing Corona Disease. *American Journal of Biomedical Engineering, 10* (1). 16–26. doi: 10.5923/j.ajbe.20201002.

[149] Miah, M.R., Sayok, A.K., Rahman, AAMS, Samdany, A.A., Akhtar, F., Azad, A.K., Hasan, MM, Khan, M.S., Alam, S., Alam, MS., Uddin, M.B., Abdullah, F., Shahriar, C.S., Shamsuddin, MAS., Uddin, M.B., Sarok, A., Rahman, I.T., Chowdhury, S.C., Begum, M. (2021f). Impact of Sensor Networks on Aquatic Biodiversity in Wetland: An Innovative Approach, Geosciences, 11(1), 10-42. url: http://article.sapub.org/10.5923.j.geo.20211101.02.html, doi: 10.5923/j.geo.20211101.02.

[150] Miah, M.R., Uddin, M.M., Parisha, J.T., Shahriar, C.S., Alam, M.S., Chowdhury, S.H., Nazim, A.Y.M., Hannan, M.A., Uddin, M.J., Uddin, M.B., Nipa, N.S., Khan, M.S., Ahmed, G., Hossain, M.S., Rashid, M.M., Samdany, A.A., Hossain, S.A.M.I., Selim, M.A., Uddin, M.F., Nazrin, M.S., Azad, MKH., Malik, SUF., Hossain, M.M., Chowdhury, M.A.K., Tanjil, Y., Talukdar, MTH., Rahman, AAMS., Sayok, A.K., Sharif, M., A., Rahman, MS., Hasan, M.M., Alam, M.S., Uddin, M.B., Patowary, D., Bhuiyan, MRA. & Chowdhury, MTR. (2023n). Uncontrolled Advanced Wireless Sensor Technology to Enable Early Growth of Stomach Cancer. *American Journal of Stem Cell Research*, 5(1), 8-39. url: http://article.sapub.org/10.5923.j.ajscr.20230501.02.html, doi: 10.5923/j.ajscr.20230501.02.

[151] Mitra, S. (2011). Autoblood as Tissue Adhesive for Conjunctival Autograft Fixation in Pterygium Surgery, Poster Presented at the Annual Meeting of the American Academy of Ophthalmology, 22-23 October 2011, Orlando, Fla.

[152] Mohammed I. (2011). Treatment of pterygium. Ann Afr Med. 10(3):197–203.

[153] Moreno-López R. (2004). Estudio comparativo entre escisión de pterigión primario con autoinjerto conjuntival, membrana amniótica y cierre primario [Comparative study between primary pterygium excision using conjunctival autograft, amniotic membrane, and primary closure] Rev Mex Oftalmol. 78:291–297.

[154] Mullins JB, Holds JB, Branham GH, Thomas JR. (1997). Complications of the transconjunctival approach. A review of 400 cases. Arch Otolaryngol Head Neck Surg. 123(4): 385–388.

[155] Natung T, Keditsu A, Shullai W, Goswami PK, Sutureless GPK. (2017). Sutureless, glue-less conjunctival autograft versus conjunctival autograft with sutures for primary, advanced pterygia: an interventional pilot study. J Clin Diagn Res. 11(8): NC04–NC07.

[156] Nepp, J., Abela, C., Polzer, I., Derbolav, A. & Wedrich, A. (2000). Is there a correlation between the severity of diabetic retinopathy and keratoconjunctivitis sicca? Cornea, 19: 487–91.

[157] Nuzzi R, Tridico F. (2017). Efficacy of subconjunctival bevacizumab injections before and after surgical excision in preventing pterygium recurrence. J Ophthalmol. 2017(11): 6824670–6824677.

[158] Nuzzi R, Tridico F. (2018). How to minimize pterygium recurrence rates: clinical perspectives. Clin Ophthalmol. 12: 2347-2362. doi: 10.2147/OPTH.S186543. PMID: 30538417, PMCID: PMC6251440.

[159] Okabe M, Kitagawa K, Yoshida T, et al. (2014). Hyperdry human amniotic membrane is useful material for tissue engineering: physical, morphological properties, and safety as the new biological material. J Biomed Mater Res A. 102(3): 862–870.

[160] Olusanya BA, Ogun OA, Bekibele CO, et al. (2014). Risk factors for pterygium recurrence after surgical excision with combined conjunctival autograft (CAG) and intraoperative antimetabolite use. Afr J Med Med Sci. 43(1): 35–40.

[161] Ordman, L.J. & Gillman, T. (1996). Studies in the healing of cutaneous wound. Arch Surg. 93: 857–928. [PubMed: 954325].

[162] Ozcimen M, Sakarya Y, Goktas S, et al. (2015). Effect of nepafenac eye drops on pain associated with pterygium surgery. Eye Contact Lens. 41(3):187–189.

[163] Özer A, Yıldırım N, Erol N, Yurdakul S. (2009). Long-term results of bare sclera, limbal-conjunctival autograft and amniotic membrane graft techniques in primary pterygium excisions. Ophthalmologica. 223(4): 269–273.

[164] Ozgurhan EB, Kara N, Cankaya KI, et al. (2015). Corneal wavefront aberrations after primary and recurrent pterygium surgery. Eye Contact Lens. 41(6):378–381.

[165] Pan X, Zhang D, Jia Z, Chen Z, Su Y. (2018). Comparison of hyperdry amniotic membrane transplantation and conjunctival autografting for primary pterygium. BMC Ophthalmol. 18(1):119.

[166] Panda, A., Kumar, S., Kumar, A., Bansal, R. & Bhartiya, S. (2009). Fibrin glue in ophthalmology. Indian J Ophthalmol., 57: 371–9. [PMCID: PMC2804126] [PubMed: 19700876].

[167] Paracha Q, Ayoob M, Dawood Z, Mirza SA. (2014). Recurrence rate with use of intraoperative mitomycin C versus conjunctival autograft following pterygium excision. Pak J Med Sci. 30(6): 1243–1246.

[168] Park CY, Choi JS, Lee SJ, Hwang SW, Kim EJ, Chuck RS. (2011). Cyclooxygenase-2-expressing macrophages in human pterygium co-express vascular endothelial growth factor. Mol Vis. 17: 3468–3480.

[169] Peiretti E, Dessì S, Mulas C, et al. (2007). Modulation of cholesterol homeostasis by antiproliferative drugs in human pterygium fibroblasts. Invest Ophthalmol Vis Sci. 48(8): 3450–3458.

[170] Pherwani A, Vakil V, Eatamadi H, Singh R, Dua HS. (2007). Postoperative subconjunctival 5-fluorouracil in the management of recurring pterygium. Br J Ophthalmol. 91(3): 398–399.

[171] Pikkel J, Porges Y, Ophir A. (2001). Halting pterygium recurrence by postoperative 5-fluorouracil. Cornea. 20(2): 168–171.

[172] Pinkerton OD, Hokama Y, Shigemura LA. (1984). Immunologic basis for the pathogenesis of pterygium. Am J Ophthalmol. 98(2):225–228.

[173] Prabhasawat P, Tesavibul N, Leelapatranura K, Phonjan T. (2006). Efficacy of subconjunctival 5-fluorouracil and triamcinolone injection in impending recurrent pterygium. Ophthalmology. 113(7):1102–1109.

[174] Prat D, Zloto O, Ben Artsi E, Ben Simon GJ. (2018). Therapeutic contact lenses vs tight bandage patching and pain following pterygium excision: a prospective randomized controlled study. Graefes Arch Clin Exp Ophthalmol. 256(11): 2143–2148.

[175] Ratnalingam V, Eu AL, Ng GL, Taharin R, John E. (2010). Fibrin adhesive is better than sutures in pterygium surgery. Cornea. 29(5): 485–489.

[176] Razeghinejad MR, Banifatemi M. (2014). Subconjunctival bevacizumab for primary pterygium excision, a randomized clinical trial. J Ophthalmic Vis Res. 9(1): 22–30.

[177] Razmjoo H, Vaezi M-H, Peyman A, Koosha N, Mohammadi Z, Alavirad M. (2014). The effect of pterygium surgery on wavefront analysis. Adv Biomed Res. 3:196.

[178] Reid TW, Dushku N. (2003). Does human papillomavirus cause pterygium? Br J Ophthalmol. 2003, 87(7): 806–808.

[179] Ren Y, Wang C, Lin Y. (2009). Study on topical cyclosporine A in the prevention of pterygium recurrence. Int J Ophthalmol. 9:2240–2241.

[180] Riau AK, Wong TT, Lan W, et al. (2011). Aberrant DNA methylation of matrix remodeling and cell adhesion related genes in pterygium. PLoS One. 6(2):e14687.

[181] Rohrbach IM, Starc S, Knorr M. (1995). Vorhersage von Pterygiumrezidiven Aufgrund Morphologischer und Immunhistologischer Parameter [Predicting recurrent pterygium based on morphologic and immunohistologic parameters] Ophthalmologe. 92(4):463–468.

[182] Rokohl, A.C. & Heindl, L.M. (2022). Pterygium: new insights into risk factors? *Annals of Eye Science*, 7(31). doi: https://dx.doi.org/10.21037/aes-22-30.

[183] Rokohl, A.C., Heindl, L.M. & Cursiefen, C. (2021). Erratum to: Pterygium: pathogenesis, diagnosis and treatment. Ophthalmologe, 118, 179-80.

[184] Rokohl, A.C., Heindl, L.M. & Cursiefen, C. (2021). Pterygium: pathogenesis, diagnosis and treatment. Ophthalmologe, 118, 749-63.

[185] Romano V, Cruciani M, Conti L, Fontana L. (2016). Fibrin glue versus sutures for conjunctival autografting in primary pterygium surgery. Cochrane Database Syst Rev. 12(4): CD011308.

[186] Rosen R. (2018). Amniotic membrane grafts to reduce pterygium recurrence. Cornea. 37(2):189–193.

[187] Sánchez-Thorin, J.C., Rocha, G., Yelin, J.B. (1998). Meta-analysis on the recurrence rates after bare sclera resection with and without mitomycin C use and conjunctival autograft placement in surgery for primary pterygium. Br J Ophthalmol. 82:661–665. [PMCID: PMC1722618] [PubMed: 9797669].

[188] Sandra S, Zeljka J, Zeljka VA, Kristian S, Ivana A. (2014). The influence of pterygium morphology on fibrin glue conjunctival autografting pterygium surgery. Int Ophthalmol. 34(1):75–79.

[189] Sangwan VS, Burman S, Tejwani S, Mahesh SP, Murthy R. (2007). Amniotic membrane transplantation: a review of current indications in the management of ophthalmic disorders. Indian J Ophthalmol. 55(4): 251–260.

[190] Sarnicola, V., Vannozzi, L. & Motolese, P.A. (2010). Recurrence rate using fibrin glue-assisted ipsilateral conjunctival autograft in pterygium surgery: 2-year follow-up. *Cornea*, 29:1211–4. [PubMed: 20697275].

[191] Segev F, Jaeger-Roshu S, Gefen-Carmi N, Assia EI. (2003). Combined mitomycin C application and free flap conjunctival autograft in pterygium surgery. Cornea. 22(7): 598–603.

[192] Shahin MM, Elbendary AM, Elwan MM, Maha M, Amal M, Mohamed M. (2012). Intraoperative subconjunctival bevacizumab as an adjunctive treatment in primary pterygium: a preliminary report. Ophthalmic Surg Lasers Imaging. 43(6): 459–466.

[193] Sharma A, Gupta A, Ram J, Gupta A. (2000). Low-dose intraoperative mitomycin-C versus conjunctival autograft in primary pterygium surgery: long term follow-up. Ophthalmic Surg Lasers. 31(4): 301–307.

[194] Sharma, A.K., Wali, V. & Pandita, A. (2004). Corneo conjunctival auto grafting in pterygium surgery. J Med Educ Res., 6:149–52.

[195] Shenasi A, Mousavi F, Shoa-Ahari S, Rahimi-Ardabili B, Fouladi RF. (2011). Subconjunctival bevacizumab

immediately after excision of primary pterygium: the first clinical trial. Cornea. 30(11): 1219–1222.

[196] Shera, A.S., Jawad, F., Maqsood, A., Jamal, S., Azfar, M., Ahmed, U. (2004). Prevalence of chronic complications and associated factors in type 2 diabetes. J. Pak. Med. Assoc. 54:54–9.

[197] Shimazaki J, Kosaka K, Shimmura S, Tsubota K. (2003). Amniotic membrane transplantation with conjunctival autograft for recurrent pterygium. Ophthalmology. 110(1): 119–124.

[198] Shusko, A., Schechter, B.A. & Hovanesian, J.A. (2020). Pterygium Surgery Utilizing Limbal Conjunctival Autograft and Subconjunctival Amniotic Membrane Graft in High-Risk Populations. Clin Ophthalmol., 14:2087-2090. doi: 10.2147/OPTH.S243584. PMID: 32801617, PMCID: PMC7399472.

[199] Siak JJK, Ng SL, Seet LF, Beuerman RW, Tong L. (2011). The nuclear-factor κB pathway is activated in pterygium. Invest Ophthalmol Vis Sci. 52(1):230–236.

[200] Sihota R, Tondon R. [editors]. (2003). Parson's Diseases of Eye. 19th ed. India: Butterworth-Heinemann, 2003. Diseases of conjunctiva, 193-4.

[201] Solomon A, Grueterich M, Li DQ, Meller D, Lee SB, Tseng SC. (2003). Overexpression of insulin-like growth factor-binding protein-2 in pterygium body fibroblasts. Invest Ophthalmol Vis Sci. 44(2): 573–580.

[202] Solomon A, Pires RT, Tseng SC. (2001). Amniotic membrane transplantation after extensive removal of primary and recurrent pterygia. Ophthalmology. 108(3): 449–460.

[203] Song YS, Ryu YH, Choi SR, Kim JC. (2005). The involvement of adult stem cells originated from bone marrow in the pathogenesis of pterygia. Yonsei Med J. 46(5): 687–692.

[204] Spaeth, E.B. (1926). Rotational island graft for pterygium. Am J Ophthalmol., 9:649–55.

[205] Stival LR, Lago AM, Figueiredo MN, Bittar RH, Machado ML, Nassaralla Junior JJ. (2014). Efficacy and safety of subconjunctival bevacizumab for recurrent pterygium. Arq Bras Oftalmol. 77(1):4–7.

[206] Sul S, Korkmaz S, Alacamli G, Ozyol P, Ozyol E. (2018). Application of autologous serum eye drops after pterygium surgery: a prospective study. Graefes Arch Clin Exp Ophthalmol. 256(10):1939–1943.

[207] Sun Y, Zhang B, Jia X, Ling S, Deng J. (2018). Efficacy and safety of bevacizumab in the treatment of pterygium: an updated meta-analysis of randomized controlled trials. J Ophthalmol. 2018:4598173–4598179.

[208] Suzuki, T., Sano, Y. & Kinoshita, S. (2000). Conjunctival inflammation induces Langerhans cell migration into the cornea. Curr Eye Res., 21:550–3. [PubMed: 11035535].

[209] Syam PP, Eleftheriadis H, Liu CS. (2003). Inferior conjunctival autograft for primary pterygia. Ophthalmology. 110(4): 806–810.

[210] Tan, D.T, Chee, S.P, Dear, K.B, Lim, A.S. (1997). Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival autografting with bare sclera excision. Arch Ophthalmol., 115: 1235–1240. [PubMed: 9338666].

[211] Tananuvat N, Martin T. (2004). The results of amniotic membrane transplantation for primary pterygium compared with conjunctival autograft. Cornea. 23(5):458–463.

[212] Tang B, Ren H, Liu H, et al. (2016). CCR5 blockade combined with cyclosporine A attenuates liver GVHD by impairing T cells function. Inflamm Res. 65(11):917–924.

[213] Teng CC, Patel NN, Jacobson L. (2009). Effect of subconjunctival bevacizumab on primary pterygium. Cornea. 28(4): 468–470.

[214] Thatte S. (2011). Amniotic membrane transplantation: an option for ocular surface disorders. Oman J Ophthalmol. 4(2): 67–72.

[215] Ti, S.E, Chee, S.P., Dear, K.B. & Tan, D.T. (2000). Analysis of variation in success rates in conjunctival autografting for primary and recurrent pterygium. Br J Ophthalmol., 84:385–9. [PMCID: PMC1723439] [PubMed: 10729295].

[216] Tsai YY, Chiang CC, Yeh KT, Lee H, Cheng YW. (2010). Effect of TIMP-1 and MMP in pterygium invasion. Invest Ophthalmol Vis Sci. 2010, 51(7):3462–3467.

[217] Uy, H.S., Reyes, J.M., Flores, J.D. & Lim-Bon-Siong, R. (2005). Comparison of fibrin glue and sutures for attaching conjunctival autografts after pterygium excision. Ophthalmology, 112: 667–671. [PubMed: 15808260].

[218] Valezi VG, Schellini SA, Hata Viveiros MM, Padovani CR. (2009). Segurança e efetividade no tratamento do pterígio usando infiltração de 5-fluoruracila no intraoperatorio [Safety and efficacy of intraoperative 5-fluorouracil infiltration in pterygium treatment] Arq Bras Oftalmol. 72:169–173. Portuguese.

[219] Varssano D, Shalev H, Lazar M, Fischer N. (2013). Pterygium excision with conjunctival autograft: true survival rate statistics. Cornea. 32(9):1243–1250.

[220] Viani GA, Stefano EJ, de Fendi LI, Fonseca EC. (2008). Long-term results and prognostic factors of fractionated strontium-90 eye applicator for pterygium. Int J Radiat Oncol Biol Phys. 72(4): 1174–1179.

[221] Vichare, N., Choudhary, T., Arora, P. (2013). A comparison between fibrin sealant and sutures for attaching conjunctival autograft after pterygium excision. Med J Armed Forces India, 69: 151–5. [PMCID: PMC3862656] [PubMed: 24600089].

[222] Vrabec MP, Weisenthal RW, Elsing SH. (1993). Subconjunctival fibrosis after conjunctival autograft. Cornea. 1993, 12(2): 181–183.

[223] Wang IJ, Lai WT, Liou SW, et al. (2000). Impression cytology of pterygium. J Ocul Pharmacol Ther. 2000, 16(6): 519–528.

[224] Wu WK, Wong VW, Chi SC, Lam DS. (2007). Surgical management of double-head pterygium by using a novel technique: conjunctival rotational autograft combined with conjunctival autograft. Cornea. 26(9):1056–1059.

[225] Yalcin Tok O, Burcu Nurozler A, Ergun G, Akbas Kocaoglu F, Duman S. (2008). Topical cyclosporine A in the prevention of pterygium recurrence. Ophthalmologica.

222(6): 391–396.

[226] Ye J, Kook KH, Yao K. (2006). Temporary amniotic membrane patch for the treatment of primary pterygium: mechanisms of reducing the recurrence rate. Graefes Arch Clin Exp Ophthalmol. 244(5): 583–588.

[227] Ye J, Song YS, Kang SH, Yao K, Kim JC. (2004). Involvement of bone marrow-derived stem and progenitor cells in the pathogenesis of pterygium. Eye. 18(8):839–843.

[228] Yeung SN, Lichtinger A, Kim P, et al. (2015). Efficacy and safety of patching vs bandage lens on postoperative pain following pterygium surgery. Eye. 29(2):295–296.

[229] Young AL, Tam PM, Leung GY, Cheng LL, Lam PT, Lam DS. (2009). Prospective study on the safety and efficacy of combined conjunctival rotational autograft with intraoperative 0.02% mitomycin C in primary pterygium excision. Cornea. 28(2):166–169.

[230] Yüksel, B., Unsal, S.K. & Onat, S. (2010). Comparison of Fibrin glue and suture technique in pterygium surgery performed with limbal autograft. Int J Ophthalmol., 3:316–20. [PMCID: PMC3340741] [PubMed: 22553582].

[231] Zeng W, Liu Z, Dai H, et al. (2017). Anti-fibrotic, anti-VEGF or radiotherapy treatments as adjuvants for pterygium excision: a systematic review and network meta-analysis. BMC Ophthalmol. 17(1): 211.

[232] Zhang Q, Bao N, Liang K, Tao L. (2018). Adjuvant use of cyclosporine a in the treatment of primary pterygium: a systematic review and meta-analysis. Cornea. 37(8): 1000–1007.

[233] Zhang Z, Yang Z, Pan Q, Chen P, Guo L. (2018). Clinicopathologic characteristics and the surgical outcome of conjunctival granulomas after pterygium surgery. Cornea. 37(8): 1008–1012.

[234] Zloto O, Rosen N, Leshno A, Rosner M. (2017). Very long-term success of pterygium surgery with conjunctival graft. Cont Lens Anterior Eye. 40(4): 267–269.

[235] Reza, M.S., Miah, M.R., Chowdhury, F.T. & Chowdhury, M.A.K. (2023). Common Disease Profiles of Outpatients in Ophthalmology Department of Tertiary Care Hospital. *International Journal of Optics and Applications*, 9(1), 22-30. doi: 10.5923/j.optics.20230901.02.

[236] Chowdhury, M.A.K., Reza, M.S., Miah, M.R., Jahangir, S.M., Chowdhury, M.T.T. & Ahmed, J.U. (2023). Effects of Pharmacological Agents on Glaucoma in Daily Life. *International Journal of Optics and Applications*, 9(1), 1-21. doi: 10.5923/j.optics.20230901.01.

[237] Chowdhury, S.H., Rashid, M., Miah, M.R., Shahriar, C.S. & Tabassum, T. (2021). Effect of Skin Diseases in Modernized Life. *American Journal of Dermatology and Venereology*, 10(2), 13-24. doi: 10.5923/j.ajdv.20211002.01. Retrieved from http://article.sapub.org/10.5923.j.ajdv.20211002.01.html.

[238] Miah, M. R., Sayok, A., Sarok, A., & Uddin, M. B. (2017a). Rain Water Harvesting for Sustainable Biodiversity Conservation at Lawachara National Park in Bangladesh: A Study on Policy Challenges. *OIDA International Journal of Sustainable Development*, 10 (01), 11-26. Available at SSRN: https://ssrn.com/abstract=2911866.

[239] Ghoz, N., Elalfy, M., Said, D. & Dua, H. (2018). Healing of autologous conjunctival grafts in pterygium surgery. Acta Ophthalmologica, e979-e988.

[240] WHO. (2022). Local-level policy recommendations: operationalizing a One Health approach – Political statement of the WHO European Healthy Cities Network. Annual Business meeting and technical conference 2022. World Health Organization- European Region. WHO/EURO: 2023-7060-46826-68259.

[241] Salman, A.G. & Mansour, D.E. (2011). The recurrence of pterygium after different modalities of surgical treatment. Saudi J Ophthalmol. 25(4): 411-5. doi:10.1016/j.sjopt.2010.10.013. Epub 2010 Oct 25. PMID: 23960956, PMCID: PMC3729301.

[242] Parisha, J.T., Miah, M.R., Hasan, M.M., & Begum, M. (2022). Impact of Environmental Pollution along with Technology for Conserving of Biodiversity. *International Journal of Ecosystem*, 12(1), 20-30. url: http://article.sapub.org/10.5923.j.ije.20221201.02.html, doi: 10.5923/j.ije.20221201.02.

[243] Miah, M. R., Sayok, A. K., Sarok, A., & Uddin, M. B. (2017). Towards Dynamic Policy Instruments for Enhancing Biodiversity Conservation in National Parks: A Case Study on Bangladesh and Sarawak, Malaysia. *Borneo Journal of Resource Science and Technology*, *7*(1), 11-30. doi: https://doi.org/10.33736/bjrst.391.2017.

[244] Miah, M.R., Hossain, M.M., Akhter, J. & Pasha, M.K. (2006). Diversity in Timber and Fruit Plants in the Nurseries of Chittagong Metropolitan Area. *Chittagong University Journal of Biological Sciences*, 30(1), 1-10.