INTRODUCTION

Therapeutic contact lenses are indicated for the treatment of corneal diseases, successfully replacing ocular bandage which is unaesthetic, difficult to tolerate and impair binocular vision.

Therapeutic contact lenses can be made of:

- Hydrogels
  - low water content 38 – 45%
  - mid-water content 45-55%
  - high water content 67-80%
- extra thin glyceryl methacrylate lens: giant papillary conjunctivitis was considerably reduced
- silicone elastomer lenses: extremely high oxygen transmissibility, less vascularisation
- silicone hydrogel (1,2,3,7,10).

The advantages of the therapeutic contact lenses made of silicone hydrogel are:

- High oxygen supply - limit hypoxic stress in overnight wear, no vascularisation
- Low dehydration – good post lens tear film
- Good surface wettability – less deposits

Disadvantages of silicone hydrogel lenses are:

- Relatively small diameter
- The topic medication must not contain preservatives
- Extended wear – risk for microbial keratitis, infiltrates

We use therapeutic contact lenses for next purposes:

1. Pain relief
   - Edemato-bulbous keratopathy
   - Recurrent corneal erosion or corneal ulceration after corneal foreign body
   - Herpetic keratopathy
   - Corneo – conjunctival burns

2. Improving corneal re-epithelization
   - Recurrent corneal erosions
   - Exposure keratopathy
   - Corneal burns
   - Chronic corneal ulcerations
   - Neurotrophic keratopathy

3. Tectonic effect
   - Descemetocel after corneal ulceration
   - Corneal – and corneoscleral laceration without endocular membrane issue

4. Permitting binocular vision
   - All cases

Indications of the therapeutic contact lenses are:

A. MEDICAL DISEASES:
   1) Conjunctival diseases: pemphigus, Stevens Johnson syndrome
   2) Corneal diseases:
      - epithelial: superficial punctate keratitis, filamentary keratopathy, keratitis sicca, corneal abrasion, recurrent corneal erosion, corneal-conjunctival burns
      - stromal: profound corneal sterile ulcerations;
      - endothelial: aphakic/ pseudophakic bullous keratopathy, Fuchs’ endothelial dystrophy

B. SURGICAL DISEASES:
   - small penetrating corneal wounds
The aim of the paper is to show the advantages of wearing TCL, when and in what kind of medical and surgical corneal conjunctival diseases we use TCL and also the complications of using them.

MATERIAL AND METHOD

We have studied a number of 55 patients which had worn a monocular therapeutic contact lens for different corneal diseases. The cases were hospitalized in our Clinic and we review their files during the hospitalization and the follow up documents.

RESULTS

We have taken in discussion the type of the disease, the associated topical treatment, how long the TCL has been worn and the complications occured.

The TCL were good tolerated, hurrying the recovery of the corneal ulceration and permitting the topical application of eye wash ,ointment and allowing the binocular vision.

The use of therapeutic contact lenses needs the evaluations of risks, benefits and therapeutic alternatives for every patient (5).

Fig.no.1: Types of corneal diseases

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Genus pathologic</th>
<th>Number of cases</th>
<th>Associated therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Herpetic keratitis</td>
<td>120</td>
<td>Anti-infl, NSAI, cycloplagia, cornea, trofig, antibiotic(s).</td>
</tr>
<tr>
<td>2.0</td>
<td>Neurotrophic keratitis</td>
<td>20</td>
<td>NSAI, cycloplagia, cornea, trofig, antibiotic(s).</td>
</tr>
<tr>
<td>3.0</td>
<td>Pseudophakic, edematous and ulcerated bullous keratitis</td>
<td>150</td>
<td>NSAI, cycloplagia, cornea, trofig, antibiotic(s), hyperosmotic agents, amniotic membrane.</td>
</tr>
<tr>
<td>4.0</td>
<td>Recurrent corneal erosion and corneal depositions after corneal foreign body</td>
<td>100</td>
<td>NSAI, cycloplagia, cornea, trofig, antibiotic(s), hyperosmotic agents.</td>
</tr>
<tr>
<td>5.0</td>
<td>Descemetocele after corneal ulceration</td>
<td>20</td>
<td>NSAI, cycloplagia, cornea, trofig, antibiotic(s).</td>
</tr>
<tr>
<td>6.0</td>
<td>Small corneal full and corneo-scleral lacernations without irid suture</td>
<td>30</td>
<td>Antibiotic, cycloplagia, cornea, trofig.</td>
</tr>
<tr>
<td>7.0</td>
<td>Alkaline corneo-conjunctival burns with UV and IR</td>
<td>40</td>
<td>Antibiotic, cornea, trofig, NSAI, hyperosmotic agent.</td>
</tr>
<tr>
<td>8.0</td>
<td>Exposure keratitis</td>
<td>40</td>
<td>Antibiotic, lubricant, NSAI.</td>
</tr>
</tbody>
</table>

In our study, the therapeutic contact lens improved corneal re-epithelization in herpetic keratitis (12 cases). In association, we have administrated antiviral topical medication, NSAI, cycloplagia, cornea trophic and antibiotic medication, known that the therapeutic contact lens incresease the efficiency of aminglicozide in topic aplicition and they amplify the antiviral effect (2,3,4).

In one case, with neurotrophic keratitis we noticed a slight amelioration of symptoms during therapeutic contact lens wearing; in the other case the evolution was unfavourable (perforation).

At the cases with pseudophakic oedematous bullous keratitis we have associated topical hyperosmotic agents (sodium chloride 5%), cornea trophics and beta blockers and the therapeutic contact lenses supressed the pain until the keratoplasty. In one case with pseudophakic oedematous keratitis the clinical symptoms had been relieved in one month. In the case with pseudophakic oedematous bullous kerathopathy the evolution was to corneal ulcer.

Fig. no.1: TCL in herpetic keratitis

The literature shows that half of cases of recurrent corneal erosion appear in epithelial corneal dystrophy and it is indicated treatment for 4 weeks or more with the risk of recurrence lesion after lens removal (2,4). The association of topical treatment with NSAI, antibiotics, and trophics would cause a faster pain relief and an early assumption of activity(1,2,4,10).

For the tectonic effect, the therapeutic contact lenses were used in:

- 2 cases with descemetocele, which were not followed by corneal perforation;
- 6 cases with corneal lacerations without iris herniation;
- 1 case with perforated corneo-scleral wound without herniation
- 1 case with corneal wound- the role of surgical delay until resolution

Fig. no.2: Corneo-scleral wound in supero-temporal area – TCL without suture

Therapeutic contact lenses can be successfully used in refractive surgery, keratoplasty, cross-linking, after amniotic membrane transplantation, after vitrectomy (8,9,10).

We should never forget that we fit TCL on an injured eye and we have to be extremely careful about any complications that may occur:

- corneal edema;
- corneal vascularization;
- corneal infiltrates;
- deposits;
- giant papillary conjunctivitis (extended wear, diabetes, corticosteroids);
- hypopion (1,4,8,10).

The complications are related to patient status (the severity of disease, dry eye, topical steroids, compliance, hygiene, general health, motivation) and lens (hypoxia, deposition, mecanical trauma, poor fit, extended wear).

CONCLUSIONS

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1. Soft lenses are preferred because of the large diameter, supple nature, low movement amplitude and enhanced comfort.
2. Silicone hydrogel lenses, available since 1999 and approved for therapeutic use, became the first choice because of very high oxygen transmissibility, lower on-eye dehydration and good comfort and coverage of the eye surface.
3. TCL are offering great benefits in ocular surface pathology.
4. Reducing pain, avoiding ocular patch, restoring binocularity, TCL is improving the quality of life for our patients with ocular disorders.
5. Therapeutic contact lenses were used for their tectonic effect in 10 cases: descemeticel (2 cases), perforant corneal wounds without hernation (8 cases).
6. For pseudophakic edematous-bullous keratopathy, therapeutic contact lenses supressed the pain until the keratoplasty.
7. Therapeutic contact lenses are becoming a necessity for monofocalic patients with corneal disorders.
8. Therapeutic contact lenses are an effective adjuvant therapy and in some cases are the first choice in ocular surface disease.

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OCULAR SURFACE DYSFUNCTION AND CATARACT SURGERY

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Abstract: The ocular surface, in a strict sense, consists of the cornea and conjunctiva which are covered by the tear film. In an anatomical, embryological and also functional sense, the ocular annexes, lacrimal gland and the lacrimal drainage system also belong to the ocular surface. This description includes the source and the eventual drainage of the tear film that is of utmost importance to the structural and functional integrity of the ocular surface. The ocular surface is vulnerable to potential environmental insults by the nature of its anatomic location. Its proper functioning is dependent of systems that contribute to its anatomical and physiological integrity. Of these, the most important is the tear film. The most frequent pathology that affects the ocular surface is the dry eye or keratoconjunctivitis sicca. Associated symptoms maskerade numerous other pathologies. The purpose of this paper is to make an analysis of the ocular surface disorders, from an anatomical and pathological point of view, the diagnosis methods and their dysfunction in different pathologies. The dry eye can significantly compromise the patient’s quality of vision, even after routine cataract surgery. If the dry eye is not diagnosed and treated prior to cataract surgery, serious implications for the surgical outcome could appear. A poor quality of the ocular surface affects topography and keratometry, so it may affect also the accuracy of pseudoak power calculations, the axis and degree of astigmatism. Before surgery, the patient should be informed about the possible increase in dry eye symptoms. Fortunately, a dry eye treatment starts to work quickly and maximizes postoperative visual acuity, quality of vision and patient satisfaction.

Keywords: ocular surface; cataract surgery; dry eye

Cuvinte cheie: suprafaţă oculară; chirurgia cataractei; ochi uscat.

Rezumat: Suprafaţa oculară este alcătuită din cornea şi conjunctivă, acoperite de filmul lacrimal. Din punct de vedere anatomic, embriologic şi funcţional, anexele oculare reprezintă de glandele lacrimale şi sistemul de drenaj lacrimal aparţin de asemenea suprafeţei oculare. Această descriere include atât sursa de secreţie, precum şi mecanismul de drenaj al filmului lacrimal, acesta fiind de mare însemnătate în menţinerea integrităţii structurale şi funcţionale a suprafeţei oculare. Suprafaţa oculară este vulnerabilă faţă de mediul înconjurător prin natura localizării anatomic. Funcţionarea ei în bune condiţii depinde de elementele care îi asigură integritatea anatomicofiziologică. Dintrucase, cel mai important este filmul lacrimal. Cel mai frecvent proces ce afectează suprafaţa oculară este reprezentat de ochii uscat sau keratoconjunctivita sicca. Simptomatologia asociată acestei afezigii mizează numeroase alte patologii. Scopul lucrării este de a descrie suprafaţa oculară din punct de vedere anatomic şi fiziopatologic, metodele de diagnostic şi disfuncţia acesteia în diverse patologii. Ochiul uscat poate compromite semnificativ calitatea vederii chiar şi după o intervenţie chirurgică îmbunătăţită pentru cataractă. Dacă această afezione nu este diagnosticată şi tratată anterior chirurgiei cataractei, evoluţia postoperatorie poate fi serios afectată. O suprafaţa oculară de slabă calitate influenţează rezultatele topografice, keratometrice şi implică calculea cu acurateţe a puterii implantului cristalinian, axul şi gradul astigmatismului. Anterior intervenţiei chirurgicale, pacientul trebuie să fie informat cu privire la posibilitatea a simptomelor de ochii uscat. Din fericire, tratamentele pentru ochii uscat actionează rapid şi maximizează acuitatea postoperatorie, calitatea vederii şi satisfacţia pacientului.

INTRODUCTION

The ocular surface is essential in the mechanism of vision, and it also has an important protective role. This complex structure, consisting of conjunctiva, that coasts the bulbar and the palpebral areas, sclerocornean limbus, corneal epithelium and tear film, functions as a real system to perform the vital roles mentioned above. The anatomical ocular surface is dependent on adjacent structures to carry out its functions (free edge of the eyelids, along with Meibomius glands, cilia and their associated glands, lacrimal system and lacrimonasal duct). Thus, the terminology of “ocular surface system” is more often used. The components of this system are functionally interconnected through epithelial continuity, through innervation and endocrine, vascular and immunological mechanisms, that are working together, synergistically, to achieve, protect and maintain a smooth refractive surface. To support the terminology “system”, one has to remember that the surface epithelium is continuous, without interruptions between

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different anatomical elements, having the same embryological origin (surface ectoderm), and that all the elements composing the ocular surface system contributes to ocular tear film secretion.

The ocular surface is protected by the conjunctival immune system, which uses the innate and adaptive immunological mechanisms present in the tissue and the tear film. Immune protection must meet two different conditions: on the one hand to destroy pathogens that invade OS, on the other hand to limit the inflammatory mechanisms that could be aggressive to the ocular structures. The immune system of the ocular surface forms an eye-associated lymphoid tissue (EALT) that is recognized as a new component of the mucosal immune system.

**DISCUSSIONS**

Evaluation of the ocular surface and the tear film is part of the preoperative protocol of most ocular surgery. Between the ocular surface and cataract surgery there is a bi-univocal relationship: ocular surface pathology influences cataract surgery, and cataract surgery affects ocular surface homeostasis.

Preoperatively, because of the tear film dysfunction existing in ocular surface pathology, there can be changes in keratometry values, in anteroposterior axis values and the degree of the astigmatism, causing errors of biometrics; intraoperative, the ocular surface pathology complicates the surgery by viewing difficulties.

The success of cataract surgery is quantified at present by two elements: visual acuity and postoperative comfort (QoL = quality of life). Disruption of ocular surface integrity during cataract surgery may trigger or exacerbate the symptoms of dry eye. Until recently, all research and studies about the impact of cataract surgery on ocular surface functioning were centered on the corneal endothelium. The appearance of intraocular foldable lenses, the shortening of the operating time and the improving of the fakoemulsification equipment significantly decreased endothelial damage, the postoperative corneal edema occurring in a significant reduced rate. Subsequently, it was found that epithelial damage, with the advent of dry eye after surgery, contributes substantially to the drastic reduction of QoL, even in the presence of a visual acuity of 1/1.

The symptoms of dry eye (conjunctival hyperyemia, tearing, foreign body sensation) occur frequently after cataract surgery. Generally, the causes that generate dry eye after surgery are:

- Surgical trauma itself (by poor lubrication, epithelial defects, lagophthalmos, exposure to light during surgery)
- Exposure to medication (topical anesthetics, topical antibiotics, as benzalkonium chloride-containing preservatives are known to have undesirable effects on corneal epithelium).
- Corneal denervation.

Corneal sensory function is attributed to long ciliary nerves, branches of the ophthalmic division of the trigeminal nerve. These nerves penetrate the limbus predominantly at 3 and 9 o’clock, anatomical distribution that explains the higher sensitivity of the cornea at the nasal and temporal extremities. The physiological role of corneal innervations is not fully understood, but it has been shown that neuromodulation is responsible for maintaining the integrity and regenerating capacity of the corneal epithelium. In addition, it appears that corneal sensitivity is partially responsible for the secretion of tears. This corneal denervation can generate:

- Reduced tear flow
- Reduce frequency of blinking
- Impaired wound healing mechanisms
- Extension of epithelization period
- Reduction of epithelial metabolic activity.

The use of ultrasound during phakoemulsification can affect the corneal structures like the epithelium, stroma, keratocytes, endothelium and nerve plexus. Recent studies didn’t show any correlations between the occurrence or worsening of dry eye symptoms and the amount of energy released during phakoemulsification.

**CONCLUSIONS**

In conclusion, it was proved that cataract surgery can cause or exacerbate dry eye symptoms and that it modifies the values of the tests that assess the tear film (tear breakup time, tear meniscus, Schirmer test). The preoperative diagnosis of ocular surface disease is critical for the accuracy of the keratometry (biometrical measurements) and topographical images.

Preoperatively, patients should be informed about the possibility of exacerbation of the symptoms of dry eye. If symptoms are troublesome, treatment should be prescribed after the surgery with artificial tears +/- corticosteroids, depending on the severity of symptoms. Intraoperatively, the surgeon should limit the exposure to light from the operating microscope. Postoperatively, patients should receive artificial tears and topical corticosteroids for at least two weeks (PHACO study, conducted by William Trattler in 2010).

Due to the increased prevalence of the dry eye signs and symptoms, preoperative or surgically induced, this pathological entity should be treated and monitored both pre- and postoperatively.

The reason for prescribing preoperative treatment for the dry eye is to obtain high quality topographic images, more accurate images with wavefront analyser, more accurate keratometric values (facilitating the choice of an intraocular implant with a correct diopter value). The postoperative therapy is useful for reducing the risk of infection, for improving wound healing and patient comfort.

Dry eye occurrence after cataract surgery may be a clinically significant phenomenon that can have a negative impact on quality of life postoperatively.

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THE RESULTS OF CORRECTING COMPOUND ASTIGMATISM USING THE ALLEGRETTO 400HZ EXCIMER LASER, LASIK TECHNIQUE

D.NICULA 1, CARMEN PRODAN2, L.BRAN3, LIANA IUGA4

Abstract: The purpose of the study is to evaluate the results of correcting the compound astigmatism using the Allegretto 400 Hz Excimer Laser. 20 patients-31 eyes were studied having the diagnostic of compound astigmatism. The Lasik technique was performed in all cases. In all cases, refractometric, keratometric and functional results were improved. The lasik technique offers good predictability and stability in time.

The aim of the study
To evaluate the predictability of surgical correction of compound astigmatism and stability in time

Material and method
20 patients-31 eyes were studied having the diagnostic of compound astigmatism -2.00 si -6.00 D (dk mean -4.00 D) aged between 18 and 45 years (average 26 years). Patients were followed for a period between 3 months and 1 year (mean follow-up 6 months). The technique used was Lasik surgery, which consists in creating a broad flap about 130 µm thick with Rondo microkeratome.

In the case of compound astigmatism laser ablation cause less refringent peripheral meridian, causing bulging in order to equalize its two principal meridians, to bring the cornea closer to physiologic form of spherical cap. Preoperative visual acuity without correction and with optimal correction was evaluated, refraction after cycloplegia, keratometry, corneal topography conducted by HR Pentacamul which allowed exclusion of cases of corneal ectazii (keratoconus, degeneration pellucida).

Criteria for inclusion in the study were: age over 18 years with stable refractive defect of at least 1 year, 1 month without Cl wear preoperative

Exclusion criteria
• Local: dry eye, ocular inflammatory disease
• General: RAA, systemic collagenosis, diabetes, oral contraceptive use

Results and discussions

Most astigmatism values in the study group were between 3 and 5 D. The maximum surgical correction of refractive errors (after cycloplegia) was temted ,that's the reason why, in the first months after the operation, was not obtained in all cases perfect VA, because of pseudomyopia due to a slower relaxation of accommodation in young adults

Postoperative there is a noticeable tendency to equalization of K’s, which remained constant at regular controls at 3,6 months and 1 year. In all cases DK was reduced from 4.05 D statistically significant up to 1.25 D. In 39% of cases ≤ dk 1D (physiological)

Postoperative corrected visual acuity was greater or equal to preoperative visual acuity with correction (was not lost any Sn lines). In 5 cases (16%) showed even an improvement with 1-4 Sn lines of AV (AV surgery fc> AV preoperative)

Keywords: Compound astigmatism, Excimer laser
Cuvinte cheie: Astigmatism mixt, Laser Excimer

Image 1. Km si KM variation

Image 2. dK  evolution
CONCLUSIONS
Surgical correction of compound astigmatism with Excimer laser Wavelight Allegretto 400 Q is a reliable method with high predictability and stability in time. In our opinion anisometropia by compound astigmatism is an indication of choice in patients with good vision or small amblyopia. The key is the correct selection of cases by refraction, keratometry and corneal topography and the achievement of a large flap for good peripheral ablation.

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RESULTS AFTER THREE YEARS IN THE TREATMENT OF KERATOCONUS WITH CROSS-LINKING TECHNIQUE

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¹,²,³ OPTILENS CLINIC, CLUJ NAPOCA

Keywords: keratoconus, crosslinking

Abstract: Purpose: To highlight both the refractometric, keratometric and functional results, 3 years after applying the Crosslinking therapy on patients having keratoconus. Material and Method: 81 patients having different evolutive stages of keratoconus were studied, showing eligibility criteria for the Crosslinking technique. Results: The results showed a decrease both in the K-values, of about 1.5D, and in the ocular refraction. The visual acuity improved with 1,2 or 3 Snellen lines in 70% of the cases. Conclusions: The Crosslinking technique is a modern method of stopping the evolution of keratoconus.

Cuvinte cheie: keratoconus, crosslinking

Rezumat: Scopul: de a evidenția rezultatele refractometrice, keratometrice și funcționale după 3 ani de la efectuarea tehnicii crosslinking la pacienți cu keratoconus. Material și metoda: s-au luat în studiu un număr de 81 de pacienți cu diferite stadii evolutive ale keratoconusului, care au îndeplinit criteriile de eligibilitate pentru tehnica crosslinking. Rezultate: s-au evidențiat reduceri ale K-urilor de ≈ 1,5 D și ale refracției oculare. În 70% - a cazurilor, acuitatea vizuală s-a îmbunătățit cu 1,2 sau 3 linii Snellen. Concluzii: Tehnică crosslinking este o metodă modernă în stoparea evoluției keratoconusului.

INTRODUCTION

Corneal collagen cross-linking (CCL) is the photopolimerisation of the stromal fibrilar tissue, in order to increase their stiffness and resistance to the keratectasia, through the combined action of the photosensibilising substance (riboflavin – B2) with the irradiation of the UV light performed with an illuminator in a solid state of UVA kind.

The mechanism of corneal collagen cross-linking: UVA acts upon the riboflavin which results in the loss of internal chemical balance of the riboflavin molecule causing the eliberation of oxygen free radicals with instability of riboflavin. This creates a stable – linked to two collagen fibrils and strengthening of the cornea.

THE AIM OF THE STUDY

To evaluate the functional results, pachymetry, and keratometric data of the patients with keratoconus, treated with CCL, at 1, 3, 6, 12, 24, 36 months after therapy.

MATERIAL AND METHOD

The group of study was composed of 100 eyes, from 81 patients.

The inclusion criteria were:
- active ocular infection,
- patients with severe dry eye or aphakia.

The ocular exam before CCL consisted in:
- uncorrected and best corrected visual acuity,
- ocular refraction and keratometry,
- slit lamp examination,
- intraocular pressure measurement,
- pachymetry,
- ocular topography (Pentacam),
- endothelial corneal cell count.

Conical Collagen Cross-linking technique had the following steps:

1. Sterile opening in the surgery room of the ophtalmic solution of riboflavin 0,1% - dextran 20% and after the verification of the power of the illuminator UVA array in a solid state CBMX linker with a UVA power meter.
2. Topical anesthesia with Benoxi - 3-4 drops, 15-20min before CCL.
3. The next step is the removal of the corneal epithelium about a diameter of 9mm and instillation of a drop of benoxi.
4. Again the instillation of riboflavin 0,1% every 3 min for 30min before the irradiation.
5. Then irradiation of the central deepithelized cornea through the CMBX linker and instillation of riboflavin 0,1% every 3min – 30min.
6. Instillation of ofloxacin and indocolyr.
7. Therapeutic contact lenses for 3-4 days after the procedure.

Conclusii: Tehnică crosslinking este o metodă modernă în stoparea evoluției keratoconusului.
Follow up after 24, 48, 72h and treated with instillation of antibiotics, steroids and artificial tears for 2.3 months.
Check up at 1, 3, 6, 12, 24, 36 months regarding the visual acuity, keratometry data, spherical equivalent and cylinder.

**RESULTS**
- The majority was between 20-40 years old (75%)
- Most patients were males (60%).
- The second stage of keratoconus was the most frequent stage (40%).
- The difference between the preoperative and postoperative at 3 years spherical equivalent was 1.04 D. P value was statistically relevant after 3 months. (Fig.1)

**Fig no.1 Distribution of the cases regarding the spherical equivalent**

- The difference between the preoperative and postoperative at 3 years cylinder was 0.52 D.
- P value was statistically relevant after 12 months (Fig.2)

**Fig no. 2 Distribution of the cases regarding the cylinder**

- The difference between the preoperative and postoperative at 3 years keratometric values was 0.7
- P value was statistically relevant at 6 months. (Fig.3)

**Fig no. 3 Distribution of the cases regarding the keratometric values**

- There was an improvement in visual acuity, with and without correction, throughout the study (Fig.4, Fig 5)

**DISCUSSIONS**
Advantages of the Cross-linking are: this is a parasurgical procedure, produces a slowdown of the Kc progression, prevents or delays the need of corneal graft[2], is less invasive and easy to perform; lack of scarring and the easy availability of riboflavin.

Known risks of Cross-linking are: no side effects for the corneal endothelium, lens and retina; post-surgery pain – 24-48h, transient corneal edema and visual haze; does not exclude the possibility of keratoplasty[5].

Riboflavin role is that it has a good stromal penetration, absorption and concentration of UV radiation, it is a photosensibilizing agent for the production of a kind of reactive oxygen and it has endothelial protection[4].

It can be combine with: ICR, intacs, limited PRK topo-guided[7], CKP.

**CONCLUSIONS**
Cross-linking represents a true progress in the treatment of keratoconus and corneal ectasia.
The procedure slows or stops the progression of keratoconus.[3]

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THERAPEUTICAL MANAGEMENT IN A CASE OF OCULAR CHEMICAL BURN

CRISTINA NICULA¹, D. NICULA²

INTRODUCTION

We present the clinical observation of a 38 years old woman working as a labourer in a cosmetic products factory who presented in our clinic with ocular redness, pain, and diminished visual acuity in the right eye.

The patient with an insignificant past medical history mentioned that her condition started suddenly for days prior to the presentation in our service after the accidental contact with a chemical substance (solution for calluses) She presented to the emergency department where she was treated with irrigation, topical antibiotics, NSAID drops, mydriatics and patching.

The clinical exam revealed VA right eye = 1/50 without correction, superior lid oedema, conjunctival congestion, hypotransparent cornea with endo-epithelial oedema, descemetic folds, central corneal deepithelialization with fluorescein staining and miosis. The exam of the posterior pole showed a diffuse illumination of the fundus without observing details. The left eye had a maximum VA without correction and the subsequent exam was entirely normal.

The clinical diagnosis based on the history and the objective exam was RE: corneo-conjunctival chemical burn, grade II with solution for calluses and toxic anterior uveitis.

The evolution under the treatment mentioned before was marked by the persistence of the corneal hypotransparency with subsequent perilimbal and corneal neovascularization. The central corneal erosion had no tendency to heal which led to a corneal ulceration.

Considering the evolution of the case, the new medical strategy aimed the epithelial and stromal repair, limitation of necrosis and elimination of the neovascularization. Topical therapy included antibiotics (Tobramycin 3x1 drops/day), NSAID (Pranoflog: 3x1 drops/day), mydriatics (Mydrium + Neosinefrin), pro-epithelialization ointments (Cornergel), artificial tears (Optive:2x1 drops/day, artificial tears with stem cells) and patching.

The surgical treatment included removal of corneal neovascularization and covering with amniotic membrane. After the abrasion of the corneal surface the neovascular membranes were removed. A perilimbal conjunctival incision was performed followed by the application of the amniotic membrane in the subconjunctival space overlying the cornea and continuous suturing.

Postoperative medical treatment included topical Flumetol (3x1 drops/day). The evolution was marked by the healing of the corneal ulceration with reappearance of the new-vessels. Two separate sub-conjunctival injections with Avastin (2.5 mg/dose) were performed which led to the regression of the neovascularisation in the inferior corneal sector (Fig.1, Fig.2).

At the present moment the patient follows topical treatment with Pranoflog and Optive and a new injection of subconjunctival Avastin is planned.

The visual prognosis is guarded, corneal grafting being the only method of restoring the visual function of the patient.

Fig. no. 1 The aspect of the eye after the first injection

Fig. no. 2 the aspect of the eye after the second injection
CONCLUSIONS

The amniotic membrane represents an excellent source of extracellular collagen and factors to promote epithelialization. The mechanisms involved are prolonging and maintaining the viability of the progenitor epithelial cells, promoting the differentiation of non-goblet epithelial cells and differentiation of Goblet cells, exclusion of inflammatory cells and antiprotease activity, suppression of TGF-beta signaling system and inhibition of differentiation of normal fibroblasts in myofibroblasts.

The clinical effects comprise: promoting epithelialization, maintaining the normal epithelial phenotype, reduced inflammation and diminished vascularization and scarring.

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THE INFLUENCE OF LASER EXCIMER REFRACTIVE SURGERY UPON THE OCULAR SURFACE

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Abstract: The abstract takes into consideration the implications of ocular surface in corneal refractive surgery with Excimer Laser. Dry eye represents the most frequent complication after this surgical technique, but this is transitory. There are taken into consideration etiopathogenetic mechanisms regarding the complication, profilaxy and treatment. Some information are being discussed comparatively to Lasik and PRK technique, dry eye more frequently appearing after Lasik technique. The conclusion of the abstract is that preoperative diagnosis of this pathology implicates a proper preoperative treatment and choosing a right surgical technique.

INTRODUCTION

The corneal refractive surgery with laser Excimer is a procedure frequently used nowadays for the correction of refractive errors. The most used techniques are Lasik (Keratomileusis) and PRK (Photorefractive Keratectomy).

The most common complication of refractive surgical procedure is dry eye, which is in general temporary, but in some cases may be persistent and uncomfortable for the patient. Both surgical procedures disturb the homeostasis of the ocular surface (OS), by decreasing the sensibility of the cornea, the stability of the tear film, decrease production of tears, and corneal epitheliopathy.

Dry eye represents a disturbance in tear film caused by a deficiency of the film or excessive evaporation which causes disturbance of the ocular surface.

Ocular surface is formed by the cornea, conjunctiva and limbus covered by a non keratinized squamous epithelium which constitutes a support for the tear film by preventing its evaporation and also preventing penetration of pathogenic agents.

Primary function of the ocular surface constitutes in assuring a clear vision, contributes in 2/3 of the ocular refractive system, maintain ocular comfort and prevent microbial contamination.

Integrity of OS is determined by the integrity of the corneal epithelium and also by the precorneal tear film. Any dysfunction in either of those 2 factors determines dry eye and epithelial instability.

The tight relationship between the corneal epithelium and tear film is generated by the epithelial-mucin cell interface.

A stable tear film protects the ocular surface and the epithelium participates actively in formation of the tear film. The explanation resides in the fact that goblet cells at the level of conjunctiva secretes mucin (important component in tear film). Corneo-conjunctival nongoblet cells releases under epithelial surface different types of mucin transmembrane assuring humidity. Corneo-conjunctivale epithelium is non-keratinized, but formation of keratin is strongly related to secretion of mucin and together they assure the humidification of the epithelium. Maintaining a healthy OS resides in the defense mechanism of the latter which assures tear film stability like in cellular differentiation.

- The neuroanatomic integrity of the defence mechanism controls the stability of tear film of ocular surface.
  a) Structural factors.
    - Tear film is composed of 3 layers:
      - Mucin (secreted by goblet cells),
      - Aqueous (secreted mainly by lacrimal gland),
      - Lipidic (produced by meibomian gland).

    Initially it was considered that these 3 layers are separated. Through examination by interferometry laser, it was observed that mucin is also present in the other layers therefore coming to the conclusion that this forms a gradient in the tear film so as to permit interaction between the three layers.
  b) Hydrodynamic factors.
    - Although the structure of Tear film is normal without the hydrodynamic factor which is represented by blinking (periodic and complete), it cannot assure stability of the TF.

The two factors of defense mechanism of the OS are integrated with the epithelial structure by 2 neuronal reflex arc:
-afferent pathway, represented by the ophthalmic branch of the Vth nerve, which innervates the cornea.
- efferent pathway, represented by the parasympathetic branch of the Vth nerve and motor branch of the VIIth nerve.

- **Basal secretion versus reflex secretion of tears**

  Tear film contains water, vitamin A, epidermal growth factor (EGF), tumor growth factor beta (TGF-β). A stable TF determines adequate oxygenation of the cornea when the eye is open. Decreased tear will generate dryness of the OS therefore depriving it from growth factor which causes microlesions with blinking. As such the amount of tear is controlled by the tearing reflex derived from the ocular sensibility. This concept is different from the classical concept which says that the basal and reflex secretion belongs to accessory and main lacrimal glands.

- **Deficiency of the aqueous layer of the tear film versus deficiency of the lipidic layer.**

  Blepharitis is associated with a dysfunction of meibomian gland. Lipids from the meibomian gland forms the superficial layer of the TF which stabilises and limits evaporation of the TF. Patients with meibomian gland dysfunction presents a short break up time, increased evaporation and elevated osmolality.

- **Compensatory effect of blinking on an unstable TF.**

  In a normal eye, TF has to be stable in between successive blinking. The blinking rate increases in presence of an unstable TF.

- **Corneal sensitivity and neurotrophic keratopathy.**

  Ocular sensibility is mediated by the Vth nerve and controls integrity of structural and hydrodynamic factors in the defence mechanism of the OS. Deficiency in the corneal sensitivity leads to the deficiency of the aqueous layer of the TF, which causes an improper blinking, prolonged exposure, unstable TF (secondary neurotrophic effect). Corneal denervation has a primary neurotrophic effect on the corneal epithelium. The cornea is the most sensitive ocular organ, then comes the free edge of the lids, then conjunctiva which decreases with age.

- **Tear clearance**

  Tear clearance (TC) is the last step in the reflex arc.

  Reflex arc that generates blinking acts as a pump that removes TF from the tear meniscus into the lacrimal drainage system. Clearance of TF assures refreshment of its components, eliminates debris that can be irritable to the OS and system. Clearance of TF assures refreshment of its components, eliminates debris that can be irritable to the OS and system.

- **Dry eye after LASIK or PRK. Main problems in refractive surgery.**

  All patients presents temporary dry eye after LASIK. Frequency of complication differs from author to author; some sustain a frequency of 60% dry eye up to 1 month postoperative, others had 50% of patients with dry eye up to 6 month after LASIK [Hovanesian si colab]. Other cases presented a 15% frequency of dry eye up to 3 month postoperative. Donnenfeld [1] had a 5% frequency of dry eye until 6 month postoperative.

- **Clinical Dry eye**

  Symptoms of dry eye syndrome are: burning sensation, dryness, foreign body sensation, sometimes ocular pain, blurred vision, photosophobia, astenopia. Suggestive signs of dry eye are: positive staining test, decreased tear break up time, Schirmer test suggestive, decreased visual acuity and corneal sensitivity.

- **Causes of dry eye after LASIK**

  1. The first pathogenic factor is represented by the increased pressure due to the suction ring during flap creation which damage conjunctival goblet cells and compresses the mucinous layer of TF [Albiet].

  2. The second cause is due to alteration of the corneal surface associated with LASIK, which has the consequence of decreasing humidification of cornea by decreasing blinking rate.

  3. TOT in patogenia ochiului uscat post-LASIK pot actiona si edicamentele cu efect epiteliotoxic (antibiotics, nonsteroidal antiinflammatory drug, preservatives-benzalconium chloride) used before, during and after operation.

  4. Denervation of the cornea, associated with decreased corneal sensibility, is the most frequent cause of post-LASIK dry eye. Intraoperatively the nervous plexus is sectioned by the microkeratome and also nerves in the anterior stroma are affected by photoablation, which will cause diminished corneal innervation. Reduced neuronal feedback to the brain will generate a decrease signal to the lacrimal gland and decreased production of tears. Regeneration of the nerve postoperatively determines rebuilt of corneal sensibility in approximately 6 month which could explain the temporary dry eye.

- **Perpetual self-cycle sensory denervation**

  Ocular surface and lacrimal gland function form a unit, communication between them is made by a loop neuronal reflex. Sensory nerves that innervates ocular surface is connected to efferent nerve from the brain and favours secretion of TF and proteins by the lacrimal gland. Corneal sensivity decreases with reduced production of TF and clearance of TF, favourising apuration of dry eye. As sensory reflex decreases lacrimal gland ability to respond to insults on the OS decreases. Cornea anesthesia (by flap creation and photoablation) accentuates dry eye by reducing afferent nerve pathway between cornea and brain with decreased signals efferent from brain to lacrimal gland.

- **Corneal flap**

  Usually the cornea is the most densely innervated and sensitive epithelial surface in the body. Corneal sensivity is vital for the integrity of corneal epithelium and function of the tear film. Its innervation derives from the long ciliary nerve situated in the suprachoroidal space which ramifies two times before entering the limbus and cornea. Large nerves enter the limbus predominantly at 9 and 3 o’clock which then bifurcates and spreads towards 12 and 6 o’clock. After secondary ramification it runs towards 9 and 3 o’clock.

  Initially, nerves enter the cornea in 1/3th of stromal thickness where it runs anteriorly where it ramifies and form a plexus under Bowman’s membrane innervating the central cornea. Then it penetrates Bowman’s membrane and ends in the cellular layer (epithelium and suprabasal). Due to the fact that the long ciliary nerve enters the cornea at 9 and 3 o’clock, this explains why the corneal sensivity is greatest at temporal and nasal region compared to the inferior region. (Fig.1).

  In vivo confocal microscopy shows that LASIK induces alteration at the level of nerve plexus under Bowman’s membrane, which leads to decreased corneal sensivity. Corneal sensivity is preserved around the hinge and decreases towards the central and peripheral cornea. Because corneal nerves enter predominantly at 9 and 3 o’clock, a superior hinge will cross two major areas of innervation of the cornea, whereas a nasal hinge will intersect only one area.

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Donnenfeld's study [4] states corneal sensitivity loss and presence of dry eye has a low frequency in eyes with a large nasal hinge compared to those with small hinge. Punctate epithelial erosions staining Rose Bengal were seen few days to several weeks after surgery, including patients who did not have preoperative dry eye which usually heals within 6 months postoperative.

**Inflammation**

It is a proven cause of postsurgical dry eye. Chronic inflammation causes decreased production of tears and tear film clearance. Inflammatory response consists of lymphocytes T cell activation from ocular surface and increases molecular adhesion and inflammation, increases inflammatory cytokines in tear film, increased matrix degradation of enzymes in tear film.

**Lasik alternatives**

1. Photorefractive Keratectomy(PRK) consists of deepithelialisation followed by photoliation. The technique affects corneal sensitivity by eradication of subepitelial nerve plexus and decreases circulation of tear film and its stability.

2. Subepithelial Keratomileusis (Lasik). This is used to create a thin flap at the epithelial level, followed by photoliation and flap repositioning. In this technique ciliary nerves, are not sectioned, being destroyed by ablation only at the superficial endings and deep endings are kept. Kanellopoulos et al. [2] showed that there is a decrease loss of corneal sensitivity with PRK and Lasek, than with LASIK.

**Comparative study for Lasik / PRK**

1. The secretion of tear film and its stability

Lee et al. [6] show that a significant decrease in tear film secretion and its instability is greater at patients who underwent LASIK compared to PRK patients 3 months postoperative. Tear Break-up time is significantly decreased in the LASIK group. Nejima et al. [7] proved that both procedures decrease epithelial barrier function, reduce the secretion of tears and stability of tear film. All these changes are more pronounced after Lasik technique.

2. Corneal sensibility

Campos et al. [9] observed that central corneal sensitivity after PRK was recovered faster in the group of patients with lower refractive errors.

3. Femtosecond Laser

   Its advantages are: the predictability of thickness and diameter of the flap, more uniform flap, predictability of the position and dimension of the hinge and decreasing the incidence of complications related to flap.

Wilson et al. [5] shows that there is a lower frequency of dry eye syndrome in using this type of laser, due to weaker suction and thinner flap, with a lower corneal denervation.

**Dry eye prophylaxis after corneal refractive surgery**

A. Preoperative

Is made by screening of patients with dry eye. Suggestive situations for presence of dry eye are: contact lens (CL) intolerance, long term use of CL (rigid), burning sensation, foreign body sensation, ocular dryness, signs of meibomitis, obstruction or closure of meibomian orifice and decreased production of tears. Quantitative and qualitative examination of tear film is necessary: tear break-up time, Schirmer test, conjunctival staining with rose Bengal and fluorescein and corneal staining.

B. Intraoperative

Prophylactic measures have the aim to conserve corneal epithelium and prevention of corneal erosion through: minimum use of anesthetic, the use of glycerin lubricating ointment before the passage of microkeratome, after raising the flap a small amount of carboxymethylcellulose 1% is placed on the corneal surface to prevent desiccation; the instillation of steroids, non-steroidal antiinflammatories, antibiotics (fluoroquinolones) before removing blepharostat. Immediately after surgery the patient is recommended to stay with eyes closed 15 minutes before flap examination.

C. Postoperative

The next postoperative steps are: improving epithelialization, decrease incidence of dry eye and reduce inflammation by instillation of artificial tears after 2 hours (sometimes even without preservative), instillation of steroids/nonsteroidal antiinflammatories drops.

**Treatment of dry eye after corneal refractive surgery**

It consists of artificial tear instillation (for a period of 4-6 months postoperative), punctal plug insertion for the stabilization of OS (in severe cases of dry eye). If there is a meibomian glands affection doxycycline can be prescribed (100 mg/day 14 days). In case of persistent of dry eye, Restazis (cyclosporine) for 6 months is recommended.

**CONCLUSIONS**

1. Lasik and PRK techniques induces temporary dry eye (3-6 months), but they can aggravate a preexisting dry eye or they can be a triggering factor.

2. The dry eye symptoms can create a significant ocular discomfort

3. A special attention should be focused upon preoperative exam towards a positive diagnosis of dry eye syndrome and upon the candidates with high risk for dry eye syndrome.

4. Patients operated with laser should use postoperative artificial tears for a period of 3 to 6 months.

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**Fig. no. 1 Corneal Innervation**


OCULAR SURFACE DAMAGE ASSOCIATED WITH CONTACT LENS WEAR

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Keywords: contact lens, ocular surface

Abstract: In recent years technological advancements have allowed significant improvements of characteristics of contact lenses materials, design methods and modalities of wear. However, contact lenses, themselves or/and the associated solutions, can induce changes to the tear film and ocular surface. The manifestations may be acute or chronic, and the actual cause-mechanic, hypoxic, toxic, allergy – can sometimes be difficult to detect, as the clinical picture is often similar. Examination of eyelids, conjunctiva, cornea and tear film must be done systematically, through simple techniques and the use of dyes and filters, to all the patients, even asymptomatic. Presentation aims to propose a protocol for examining the contact lens wearers through which to identify the possible suffering of ocular surface and signs characteristic of every etiology so therapeutic attitude to be properly adapted to each case, without unnecessary contact lens drop-out.

Cuvinte cheie: lentilă de contact, suprafaça oculară

Rezumat: În ultimii ani progresele tehnologice au permis îmbunătățiri semnificative ale caracteristicilor materialelor lentilelor de contact, designului și modalităților de purtare. Cu toate acestea, lentilele de contact, prin ele însele sau prin soluțiile de întreținere asociate, pot induce modificări ale filmului lacrimal și ale suprafeței oculare. Manifestările pot fi acute sau cronice, iar cauza – mechanică, hipoxică, toxică, alergică – poate fi uneori grea de depistat, tabelul clinic fiind adresă asemănătoare. Examinarea pleoapei, conjunctivei, filmului lacrimal și a corneei trebuie făcătă sistematic, prin tehnici simple și folosirea de coloranți vitali și filtre, la toți pacienții, chiar dacă sunt asimptomatici. Prezentarea urmărește să propună un protocol de examinare a purtătorilor de lentile de contact prin care să se depisteze eventuală suferință a suprafeței oculare și semnele caracteristice fiecărei etiologii, astfel încât atitudinea terapeutică să fie corect adaptată fiecăruia caz în parte, fără a renunța nejustificat la purtarea lentilelor de contact.

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invasive break-up time (NIBUT). Observation of distortion or break of reflected mires can be done by keratometer mires or Keeler Tearscope. Normal values are about 30 seconds and in dry eye NIBUT is less than 15 seconds. It is found to be repeatable and more precise than tear break-up time (TBUT). Pre-lens NIBUT is always lower than pre-conrenal NIBUT.

**Lens Deposits** - Deposit types can be categorised as follows: tear related (protein, lipid, jelly bumps and inorganic deposits), non tear related (Fungi). Lens discoloration can be created by mercurial deposits, cigarette residues and surface contamination from make up or lotions. Proteins appear like a semi opaque or translucent film and are seen more often in hydrogel contact lenses, while lipids appear to have a greasy, smooth and shiny appearance and are seen in silicon-hydrogels. Other deposits may look like jelly bumps, in this cases lipids, protein and occasionally calcium salts are involved. Contact lens defects are often seen in soft contact lenses, especially in beginners, on lens margin or on the inner surface.

**Lids** - We have to examine first the lid margins for blepharitis, meibomian gland dysfunction and chronic lid disease and then ever the upper lid to check for conjunctival redness (intensity and location) and papillae (location, shape, size and number). In the assessment of cause and management of the condition grading systems can be very useful.

**Conjunctiva** - Conjunctival redness can be diffuse or focal and is important to know if it is of recent appearance, with intermittent or permanent character. Limbal hyperaemia can have different causes: most often CL material – hypoxia (it is well known now the effect of SiH lenses on reduction in limbal redness when refitting hydrogel wearers due to insufficient oxygen –(4) and it is accompanied by neovascularisation in chronic cases, but also mechanical trauma (tight lens, edge shape and lens modulus), allergy, infection, toxic reaction, have to be considered.

Central cornea - Central cornea may show signs of hypoxia such as: microcysts, vacuoles, corneal clouting, folds, striae and neovascularization, endothelial polymegathia and even stromal oedema. Inflammation may be also expressed by infiltrates that may appear as unilateral or bilateral, singular or multiple, isolated or confluent, with peripheral or central location and of different size. They may be associated with redness, erosions, anterior chamber reaction. Corneal ulceration may be present, with specific signs and symptoms when infected.

**Dyes** - The most popular and useful dye used in contact lens practice is Fluoresceine, with low and high molecular weight. It helps in assessment of tear film stability and quality and integrity of ocular surface. Fluorescein tear break up time (TBUT) is more invasive (destabilises tear film and may cause reflex tearing) but is useful for screening new wearers. The normal values are about 20 seconds and in dry eye are lower than 10 seconds. There are also other dyes we can use for staining. Rose Bengal steals red or degenerated epithelial cells of cornea and conjunctiva, also mucus threads, stains also areas poorly protected by tear film. Recent evidence questions selectivity as it may also stain healthy cells and it stings, so its use in practice is limited. Lissamine Green stains degenerated cells and dead cells in a bluish-green color, enhanced with red filter. It is equally as effective as Rose Bengal, stings much less and does not stain skin so it is more recommended for use.

**Staining** - The location and aspect of the conjunctival staining may be connected to the contact lens and/or ocular dryness. We may find also two particular aspects: conjunctival splits (linked to the contact lend edge) and Lid Pararel Conjunctival Folds (LIPCOF). The folds border the posterior lid margin, are graded according to number and height, relative to the tear meniscus and are linked to the risk of dry eye symptoms. We may also find lesions at the lid wiper, which is that portion of the marginal conjunctiva of the upper eyelid that wipes the ocular surface during blinking. In dry eye patients, decreased natural lubrication causes an increased coefficient of friction, resulting in lid wiper irritation and damage. This correlates to worsening discomfort and ocular surface damage and is called “lid wiper epitheliopathy”. (5) Corneal staining may be isolate or coalescent and recorded by location, extent, depth and shape. It has become apparent that certain combinations of SiH material, lens solutions and patient can result in micro-punctate, diffuse corneal staining. The optimal time where corneal staining can be seen is 2-4hours after insertion. Superior epithelial arcuate lesions (SEALS) is connected to a mechanical injury to the corneal epithelium, characterised by an arc-like lesion in the periphery of the superior cornea. Inferior corneal staining is a result of inadequate palpebral occlusion or higher tear film evaporation and is associated with dryness. Localised staining may be associated with the presence of a foreign body or a lens defect. Punctal fluorescence can occur on the corneal surface in case of mucin balls formation (in silicon-hydrogel contact lenses with high modulus), but it is just pooling of the dye in small depressed areas, and should not be considered staining. In case of a corneal ulcer, depth of the lesion going the Bowman membrane, the diffusion of the dye can be seen in the stroma, without a clear border.

**Other investigations** - Corneal topography, aberometry and specular microscopy may add informations about unwanted orthokeratological effect and corneal warpage consecutive to contact lens wear.

**CONCLUSIONS**

Most of these signs have been organised by different authors in contact lens grading schemes. For most cases in routine practice a 5 point scale will suffice. Increased specificity can be obtained by adding a + or – to any scale. These scales can be used for most conditions to evaluate the severity, record the findings and suggest the type of action required.

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CORNEAL REFRACTIVE THERAPY
CASE PRESENTATION

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Keywords: orthokeratology, myopia

Abstract: Corneal refractive therapy (CRT) is a method of correction of small and medium levels of myopia by means of rigid gas permeable lenses with special design, worn during the night. Capillary forces induce a controlled redistribution of the superficial epithelial cells, altering the anterior shape of the cornea and restoring vision. In this way a good vision is maintained during the day, without spectacles or contact lenses. Recent studies show a favorable action on progression of short-sightedness, so it began to be used more in the case of children and teenagers. The therapy being non-invasive and reversible, the high oxygen permeability of contact lens materials, the relatively short period of time of use (about 8 hrs/24) and in an environment easily controlled from the point of view of hygiene, with low risk of contamination, the lack of any corrections during the day, make it very attractive both for parents and children who manage to learn quickly the technique and maintenance rules. Presentation of one case will serve as a model for fitting protocol.

INTRODUCTION

Corneal refractive therapy (CRT), also known as Orthokeratology or Corneal Reshaping Therapy, is a method of correction of small and medium levels of myopia by means of rigid gas permeable lenses with special design, worn during the night.

Mechanism of action - The rigid lens has a reverse geometry design on the back surface. During the night, due to the light pressure of the eyelids and the special design, capillary forces induce a controlled redistribution of the superficial epithelial cells, altering the anterior shape of the cornea and restoring vision. As a result the patient experiences unaided good vision during the day. (1) The procedure is completely reversible, can be applied from 6 years of age and has no superior age limit.

Recent studies: Pauline Cho, (LORIC Study -2005) (2), Walline et al (CRAYON Study - 2007)(3) and Jacinto Santodomingo-Rubido, (MCOS Study-2009)(4), show a favorable action on progression of short-sightedness (relative peripheral hyperopic defocus can cause myopia to progress, even in the absence of central vision), so it began to be used more in the case of children and teenagers.

THE PURPOSE OF THE STUDY

To evaluate the ease of fitting and the child and parents interest and acceptance of this new method of visual correction.

MATERIAL AND METHOD

Since March 2011 were fitted 10 cases, age 7-14, with myopia of 0.5-6D ( average -2.5), and a maximum of 1.5 with-the-rule astigmatism.

The patients were fitted with Paragon CRT lenses, that have received FDA certification since 2002 for correcting myopia of less than 6 spherical diopters , with a maximum of -1.75 dioptries of with-the-rule astigmatism. Lenses are made from a material with a high oxygen permeability (Paflufocon), approved for over-night wear. The lens fit is simplified by a protocol that takes into consideration three elements of the lens: BC (base curve), RZD (return zone depth) and LZA (landing zone angle).

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Fitting process includ initial examination (refraction, vision correction, slit lamp examination, corneal topography, intraocular pressure, retinal examination), followed by initial contact lens fitting and evaluation, and patient training. Next visits check maintenance of centration, full vision correction and corneal integrity. (first morning, after one and two weeks, one, three, six, nine and 12 month). Lenses have to be replaced annually and disinfected daily.

The case to be presented is RM, female patient of 10 years old, with mild myopia in both eyes, interested in freedom from spectacles during day time, sports and also myopia control.

RESULTS
At initial examination, visual acuity was 20/20 in both eyes with correction of -3.75 D in the right eye (RE) and -2.75 D in the left eye ( LE). Keratometric reading of the flat meridian were 42.85 in RE and 43.04 in LE. First selection of lenses according to the scale: RE - CRT 87 525 33, LE - CRT 86 525 33.

Visual acuity with CRT contact lenses was similar with the one with full correction (as required of a good fit) and over-refraction was 00/-0,26x67 in the RE and 00/ +0,26x67 in the LE.

Lenses showed a good centration, movement of 0.5 mm and a proper fluorescence pattern with dye, that means a 3mm central aplanation zone, regular ring, good edge lift.

The patient was able to understand the instructions very quickly and to perform the technique of handling and care about the contact lenses.

The patient returned for check-up in the next morning with the lenses on the eye. Visual acuity recorded after first night with the lens was 20/20 in both eyes, lenses were centered, moved freely on blinking, epithelium intact. Vision without the lenses was 20/20 in RE with -1,00D and LE with -0,50 D. Topography showed good centration.

At one week and the same at one month, visual acuity reached20/20 without correction, refraction was 00/-0,25x28 in RE and 00/-0,25x2 in LE, vision was stable for 10 hours per day at 1 week and 12 hours per day at one month. Corneal topography, the tangential map, shows the characteristic changes of the ocular surface – central aplanation and the ring of epithelial expansion. In the Figure 1 can be seen the initial aspect and in Figure 2 the results at one month, (after stabilisation period), RE and LE.

Figure no.1 Hartă tangențială  Figure no 2. Tangential Map
1 day 1 Month

CONCLUSIONS
The fitting process is simple and results build up quickly. The therapy being non-invasive and reversible, the high oxygen permeability of contact lens materials, the relatively short period of time of use (about 8 hrs/24) and in an environment easily controlled from the point of view of hygiene, with low risk of contamination, the lack of any corrections during the day, make it attractive both for parents and children. Children learn very easy how to handle and take care of their lenses.

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INTRODUCTION

Keratoconus is the most common corneal dystrophy, with prevalence of about 1 in 2000. The disease is non-inflamatory, bilateral, asimetric and it is characterised by a progressive conic thinning of the paracentral cornea. That results in a high irregular astigmatism and corneal scarring of the basal membrane. It appears as a genetic autosomal recessive disorder in 10% of the cases, others being sporadic cases. The cause is multifactorial and still under research by molecular studies.(1) It is suspected a genetic predisposition to altered citokines in cornea. Anormal levels of degradative protease activity lead to dissolution of Bowman layer and epithelial basement membrane. It may be triggered by hormonal changes, eye rubbing, allergy, contact lens wear and may be associated with other general (atopic diseases, Downs Syndrome, Ehlers-Danlos Syndrome, Marfan Syndrome, Turner Syndrome, Craniofacial dysostosis, Osteogenesis imperfecta) and ocular conditions (Vernal keratoconjunctivitis, Aniridia, Ectopia lentis, Leber disease, Retinitis pigmentosa). Mean age of onset of the disease is 16 years (6-40), progression about 10-20 years, aging having a stabilising effect on cornea thinning.(2) Men and women proportion is variable between authors. Clinical features are bilateral, asimetric corneal thinning (cone shape- paracentral) and scarring, that generates progressive myopic irregular astigmatism. Patients often describe vision disturbances as "goast images".Diagnosis is often missed or late, leading to important visual disability in teens and young adults.

THE PURPOSE OF THE STUDY

Approach to the patient with keratoconus should include counselling, methods for stabilizing progression of the disease and visual recovery. Easier access to the corneal topography and the introduction of collagen crosslinking technique should reduce the number of candidates to keratoplasty, as well as the necessity of rigid contact lenses and corneal rings, dedicated to more advanced cases. The purpose of...
this study is to evaluate the visual correction and associated therapies used in the past five years.

**MATERIAL AND METHOD**

A retrospective analysis of patients with keratoconus in evidence at SC EURO-OPTICS SRL office in the past six years (2006-2011), in terms of visual correction and the therapeutic methods applied. The majority of patient were previously diagnosed with the disease and sent for topography, pachymetry and for vision correction. Every case was evaluated by anamnesis (onset, progression of myopic astigmatism, vision correction and other treatments), autorefractometry, slit lamp examination (thinning and protrusion of para central cornea, Fleisher ring, Vogt lines, increased nerve visibility, Munson sign, scattering and corneal hydrops in advanced cases), Keratometry, Topography, Pachymetry, intraocular pressure, retinal examination.

The management of the cases included counselling (avoid eye rubbing, use allergy medication if needed and lubrication, antioxidants). Vision correction was achieved by spectacles, soft contact lenses (toric or special silicon-hydrogels), rigid gas permeable contact lenses (RGPs), alone or in combination with a soft contact lenses (piggy-back system). The RGPs used were from Soflex (SKI, OP8 models) and Menicon (Rose K2) and soft lenses only silicon hydrogels (Oasys, Air Optix and Biofinity). For those that could not wear RGPs were inserted corneal rings in another clinic. Few cases required keratoplasty in one eye, which was performed abroad. (lamellar -DALK, penetrating- PK). Treatment of progressive cases was done by collagen crosslinking with riboflavin and UVA light (C3-R).

**RESULTS AND DISCUSSIONS**

There were 53 patients with keratoconus, with ages ranging between 16 and 49 years, of which 38 men and 15 women (Graph nr.1). One case was associated with Down Syndrome and one with Stargardt disease.

**Graphic no.1 Distribution by gender**

![Graphic no.1 Distribution by gender](image1)

The classification was made according to Amsler-Krumeich grading system:

- **Stage I** - Eccentric steepening, Myopia and astigmatism≤5D, Mean central K readings≤48D
- **Stage II** - Myopia and astigmatism 5-8 D, Mean central K readings≤53D, Absence of scarring, Minimum of corneal thickness≥400μm
- **Stage III** - Myopia and astigmatism 8-10 D, Mean central K readings≤53D, Absence of scarring, Minimum of corneal thickness 300-400μm
- **Stage IV** - Refraction non-measurable, Mean central K readings≥55D, Central corneal scaring, Minimum corneal thickness 200 μm.

According to the classification system 18 eyes were stage I, 78 eyes stage II, 8 eyes stage III and 2 eyes stage IV (Graph nr.2).

Vision correction was accomplished in 9 cases by spectacles, in 6 cases with soft contact lens, and in 44 cases with rigid gas permeable contact lenses, 29 of them to both eyes, since most patients were already in advanced stages. (Picture nr.1) 10 patients were fitted with rigid lenses in combination with a soft lens (piggy-back), 6 of them using this way in both eyes. Piggy-back system was used to improve comfort in monocular fits, for the other cases to improve centration or ocular surface protection. Both lenses, soft and rigid gas permeable, were chosen with a high oxygen transmissibility, to avoid hypoxia.

Corneal rings were implanted in 2 cases. 6 of patients needed keratoplasty in one eye, 3 of them penetrating and 3 deep lamellar. (Picture nr.2) After suture removal, spectacles or soft lenses were needed to improve vision.

![Fig. no.1- RGP fit – with fluorescein](image2)

![Fig. no.2- Keratoplasty with separate sutures](image3)

17 of patients with documented progression of the disease, have been the subject of collagen crosslinking with riboflavin and ultraviolet A light, 11 of them in both eyes. Two cases developed a few peripheral corneal infiltrates that were submitted as a result of anti-inflammatory treatment. No decreasing of visual acuity nor progressions of the disease in the treated eyes was found, in the follow-up period of time.

**CONCLUSIONS**

Most of the patients are still diagnosed in stage II of the disease. Vision with rigid contact lenses obtained for these patients is very good. Piggy-back system was used to improve comfort only in monocular fits, for the other to improve centration of the rigid lens or for ocular surface protection. Collagen crosslinking induced no damages in sight and corneal parameters showed no progression of disease during follow-up. Visual recovery after keratoplasty is slow and a majority of patients require optical correction.

**BIBLIOGRAPHY**


MANIFESTĂRI OCULARE ÎN BOALA DE TRANSPLANT
“GREFĂ CONTRA GAZDĂ”

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Keywords: graft-versus-host disease, keratoconjunctivitis sicca

Abstract: Graft-versus-host disease is a complication that can occur after stem cell or bone marrow transplant in which the newly transplanted material attacks the transplant recipient's body. Ocular manifestations are found in a majority of patients and may be the presenting symptom. Most common ocular finding is keratoconjunctivitis sicca, but pseudomembranous conjunctivitis, punctate keratopathy, corneal ulceration and even perforation (in severe cases) can appear as well. Systemic and local therapy may be used to control ocular disease.

Cuvinte cheie: boala de transplant "grefă contra gazdă", keratoconjunctivitis sicca

Rezumat: Boala de transplant "grefă contra gazdă" este o complicație ce poate să apară după transplantul de maduvă osoasă sau de celule stem, situație în care materialul nou transplantat poate să atace corpul celor care primește transplantul. Manifestările oculare apar la majoritatea pacienților și pot să constituie primele semne ale bolii. Cea mai comună formă de prezentare oculară este keratoconjunctivitis sicca, dar apar și conjunctivițe pseudomembranoase, keratopatii punctate superficiale și chiar ulcerări corneene, mergând până la perforație în cazurile severe. Pentru controlul afectării oculare se poate recurge la terapia locală, dar și sistemică.

SCIENTIFIC ARTICLE PREDOMINANT THEORETICALLY

Hematopoietic stem cell transplantation is used to treat a variety of malignancies and hematologic, immunogenic and metabolic disorders. Allogeneic stem cell transplantation can cause graft-versus-host disease (GVHD), which is associated with high mortality and morbidity. GVHD is a direct result of one of the principal functions of the immune system: the distinction of self from non-self. In an attempt to treat patients with severe and life-threatening diseases, immune cells may be transplanted from a non-identical donor to the patient. These donor (graft) cells may recognize patient (host) cells as foreign, thereby initiating a graft-versus-host reaction, which may lead to GVHD. GVHD is primarily a T cell mediated disease but additional cells, such as natural killer cells also underline the development of this complication.

Acute GVHD usually happens within the first 3 months after transplant. Chronic GVHD usually starts more than 3 months after transplant and can last a lifetime. Rates of GVHD vary from between 30-40% among related donors and recipients to 60-80% between unrelated donors and recipients. The greater the mismatch between donor and recipient, the greater the risk of GVHD.

SYMPTOMS

Symptoms in both acute and chronic GVHD range from mild to severe. Common acute symptoms include: abdominal pain or cramps, diarrhea, fever, jaundice, skin rash, vomiting, weight loss. Chronic symptoms may include: dry eyes and dry mouth, hair loss, hepatitis, lung and digestive tract disorders, skin rash, skin thickening.

In both acute and chronic GVHD, ocular complications may occur in 60 to 90 % of patients. All layers of the eye can be affected by ocular GVHD including the eyelid, lacrimal gland, conjunctiva, cornea, vitreous, uveal tract and optic nerve, although posterior segment involvement in ocular GVHD is extremely rare. The ocular surface and lacrimal gland tend to be affected more than other parts of the eye.

OCULAR MANIFESTATIONS

The ocular surface is frequently involved in ocular GVHD. Clinical presentation include: conjunctival hyperemia, chemosis and/or serosanguineous exudates, pseudomembranous conjunctivitis, bilateral episcleritis, superior limbic keratoconjunctivitis or cicatricial conjunctivitis.

Keratoconjunctivitis sicca (KCS), resulting from lacrimal gland dysfunction is a major manifestation of both acute and chronic ocular GVHD. The most common complaints in patients with KCS are: foreign body sensation, ocular dryness and grittiness, mucoid discharge and photophobia. The most important findings at slit lamp examination are: decreased tear meniscus, increased debris in the tear film, superficial punctate keratopathy (with positive fluorescein staining), corneal filament and corneal epithelial defects or ulceration in more severe cases. A mean Schirmer test -in both eyes, without anesthesia- of less than 5 mm is characteristic of the diagnosis.

MANAGEMENT

Most symptomatic treatments for ocular GVHD are aimed at relief of dry eye by lubrication and/or by decreasing tear evaporation, tear drainage or ocular surface inflammation.

For lubrication, the use of preservative-free artificial tears is recommended.

To decrease evaporation, use of warm compresses and eyelid care, avoidance of low humidity and use of eye protection (moisture chamber goggles) should be encouraged. Oral doxycycline can be used to treat meibomian gland dysfunction or associated rosacea.

To decrease tear loss and drainage from the surface of

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Articol intrat în redacție în 28.05.2010 și acceptat spre publicare în 21.06.2010
ACTA MEDICA TRANSILVANICA Martie 2011; 2(1) Rezumat: Boala de transplant "grefă contra gazdă" este o complicație ce poate să apară după transplantul de maduvă osoasă sau de celule stem, situație în care materialul nou transplantat poate să atace corpul celor care primește transplantul. Manifestările oculare apar la majoritatea pacienților și pot să constituie primele semne ale bolii. Cea mai comună formă de prezentare oculară este keratoconjunctivitis sicca, dar apar și conjunctivițe pseudomembranoase, keratopatii punctate superficiale și chiar ulcerări corneene, mergând până la perforație în cazurile severe. Pentru controlul afectării oculare se poate recurge la terapia locală, dar și sistemică.

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the eye, temporary occlusion (silicone plug) or permanent occlusion (thermal cauterisation) of the puncta may provide additional benefit, especially for severely dry eyes.

To decrease ocular surface inflammation, the use of topical corticosteroids is valuable. They are especially useful for the control of an ocular GVHD exacerbation when systemic immunosuppression is being tapered. In addition to early debridement, topical corticosteroids may be used in patients with pseudomembrane formation and cicatricial conjunctivitis.

Ocular surface inflammation may also be decreased with autologous serum. Serum eyedrops are nonallergic, and contain a variety of growth factors, vitamins and immunoglobulins in similar or higher concentrations than natural tears and maintain morphology and support proliferation of corneal epithelial cells.

To control immune response at the ocular surface, topical cyclosporine can be prescribed to reduce conjunctival epithelial apoptosis and protect against goblet cell loss by inhibiting T-lymphocytes.

Systemic treatment such as corticosteroids, tacrolimus (inhibitor of T-lymphocyte activation), cyclosporine (inhibitor of T-lymphocyte activation) and, more recently rituximab (anti-CD 20 monoclonal antibody) also can be used.

Maximizing systemic immunosuppression is not always an appropriate choice because it can lead to serious infection and increased chance of cancer; therefore, topical treatment for ocular GVHD is a better choice, if it is effective. However, systemic immunosuppression must be maximized when ocular GVHD with associated systemic GVHD (in the skin, liver) is not controlled. Therefore, the best approach to the local and systemic management of ocular GVHD is a multidisciplinary approach with close collaboration between the ophthalmologist and the hematopoietic transplantation team.

CONCLUSIONS

GVHD is systemic, so diagnosis and management of ocular GVHD should be approached in a multidisciplinary fashion.

The major manifestation of ocular GVHD is dry eye syndrome. Treatment with artificial tears, punctal plugs and even topical corticosteroids and cyclosporine, depending on severity can slow progression of eye problems.

In the case of pseudomembrane formation, early debridement and topical corticosteroids and cyclosporine use are encouraged.

Many ocular GVHD exacerbations occur during the tapering of systemic immunosuppressive therapy. Attention to topical treatment, especially pulsed corticosteroids and cyclosporine is necessary to avoid serious systemic side effects.

BIBLIOGRAPHY

THE USE OF HUMAN AMNIOTIC MEMBRANE IN ANTERIOR SEGMENT PATHOLOGY

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EURO-OPTICS SRL Bucureşti

Abstract: The aim of this study was demonstre the practical utility and benefits of using human amniotic membrane in anterior segment pathology. HAM is an avascular biological tissue that is used as a corneal graft for corneal and conjunctival recovery in many ocular surface disorders. It has the following properties: antiinflammatory, immunomodulator, antimicrobial, prevents corneal neovascularization and scar formation etc. We studied 60 cases in the Ophthalmology department of the Emergency Academic Hospital Sibiu over a period of 6 year. In these acses using HAM had beneficial effects reducing pain, excessive tearing, photofobia and foreign body sensation. As for pterygium surgery, using HAM + TCL reduces the risk of recurrence and facilitates the postoperative recovery.

Cuvinte cheie: membrana amniotică, lentila de contact terapentică, pterygium, keratopathie, arusuri corneo-conjunctivale.

Rezumat: Scopul acestui studiu a fost de a demonstra utilitatea practică și beneficiile utilizării membranei amniotice umane în patologia oftalmologică a polului anterior. MAU este un țesut biologic avascular ce se utilizează ca grefa pentru reconstrucția corneene și conjunctivale. Prințe propriețățile ei benefice se numără: efect antiinflamator, antimicrobian, antiangiogenic, immunomodulator etc. Am studiat 60 de cazuri din cazuistica Seției Oftalmologie a SCJ Sibiu pe o perioadă de 5 ani. În aceste cazuri utilizarea MAU a avut efecte benefice reducând durerea, lăcrimarea excesivă, fotofobia, senzația de corp străin. În chirurgia pterigionului utilizarea MAU + LCT reduce riscul de recurență și facilitează recuperarea postoperatorie.

INTRODUCTION

Human amniotic membrane (HAM) is a biological, avascular tissue, which has been used in ophthalmology since the 1940s. Today the use of the MAU in ocular surgery is constantly increasing due to the anti-inflammatory, antimicrobial properties, the presence of growth factors, etc. This has led to its use as a corneal graft for corneal and conjunctival recovery in many ocular surface disorders. MAU is formed of a single layer of epithelial cells with a membrane-shaped basal and poorly attached to corionic. It contains collagen type I and V, cytokines, growth factors and protease inhibitors, such as IL-4, 6 and 10. Variable thickness is between 0.02 and 0.5 mm.

Important properties that make it usefull are: stimulates the ocular surface epithelisation, provides support for cell proliferation and migration, reduces inflammation of the ocular surface, prevents corneal neovascularization and scars formation, antimicrobial effect, immunomodulator effect, antiapoptotic effect.

It can be used either as a substrate for replacing damaged tissue of the eye, as a patch, or a combination of both. In corneal pathology it is used for: persistent epithelial defects (such as the herpetic type), stromal ulcers and perforations, thermal and chemical burns, Stevens-Johnson syndrome, edematous keratopathy, total or partial deficiency of limbic stem cells. In case of conjunctival pathology it is used for: the treatment of primary and recurrent pterygium, of symblefaron, in surface reconstruction after excision of tumors and other limbic tumors. It can also be used in case of scleral ulcers and in case of epithelial defects of the lid, reconstruction of lid edge, entropion surgery.

MAU is harvested from negative patients (liver B and C viruses, HIV, lues), it is separated of the amnion and divided into pieces of 2 x 2 cm. It is placed in plastic containers and stored in an average of 50% glycerol, at -80 ° C for up to 2 years. There is a recent storage method that implies slow drying and dehydration (with rehydration preoperative testing). Postoperative complications include: infection, although rare, is one of the risks associated with this procedure, early desintegration of the membrane, bleeding under the membrane, dislocation as a result of broken sutures.

AIM OF STUDY

The aim of the study is to show the practical utility and benefits of using human amniotic membrane in ophthalmological pathology of the anterior segment.

MATERIAL AND METHOD

Surgical technique

At the time of surgery MAU is defrosted at room temperature and washed in a mixture of BSS and antibiotics. The technique is placing the membrane in contact with the eye with stromal side. In conual use , nonabsorbable suture is preferred (nylon 10-0). In conjunctival use the resorbiabile suture is preferred (vicryl 10-0 and 11-0). At the end of the intervention an LCT is used to stabilize and protect the

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membrane. The sutures and contact lenses are removed after 2-4 weeks. Postop the treatment is made with topical antibiotic and corticosteroids.

**Study group**

Between 2006-2011 in our clinic 60 patients with different ocular surface diseases. They are divided into 2 groups:
- 32 with small pterygium which underwent surgery and application of LCT (without HAM)
- 28 with various disorders that required the use of HAM

**Grafic no. 1. Ocular pathologies that required HAM**

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pterygium</td>
<td>10</td>
</tr>
<tr>
<td>Chemical burns</td>
<td>2</td>
</tr>
<tr>
<td>Lsgoftalmia</td>
<td>2</td>
</tr>
<tr>
<td>Corneal scar</td>
<td>1</td>
</tr>
<tr>
<td>Corneal ulcer</td>
<td>1</td>
</tr>
<tr>
<td>Thermic burns</td>
<td>1</td>
</tr>
<tr>
<td>Edematous-bulous Keratopathy</td>
<td>3</td>
</tr>
<tr>
<td>Neurotrophic Keratopathy</td>
<td>3</td>
</tr>
<tr>
<td>Pemfigus</td>
<td>1</td>
</tr>
</tbody>
</table>

**RESULTS**

If we look at sex distribution we can see a prevalence of women in the first group (18 of 32 cases) and of men in the second group (18 of 28 cases).

The age peak was between 40 and 65 years for the first group and between 40 and 55 years for the second group.

The group of 32 patients presented with small corneal diseases (pterygium) that after surgery only required a therapeutic contact lens without using HAM. These patients had a favourable postop evolution.

The other group of 28 patients required the use of HAM. The evolution of the cases was encouraging and the corneal status was satisfactory at all follow-ups.

**Figure nr. 1. Using HAM + LCT in a large pterygium case**

1.a) Preop aspect

1.b) Postoperative One day

1.c) 2 weeks postop

1.d) 1 month postop

**Figure nr. 2. Using HAM in a case of chemical corneconjunctival burn with simblefaron**

2.a) Preop

2.b) Intraop

2.c) Day 2 postop

2.d) 2 weeks postop
DISCUSSIONS
Although it is a surgical technique with very good results, in some cases such as edematous-bulbous keratopathy it cannot be considered a final solution but it can be a real benefit to these patients before keratoplastic surgery.

CONCLUSIONS
For the cases we studied using Ham is safe, efficient and can be combined with other surgical techniques. Using HAM+TCL facilitates the postoperative recovery and reduces the risk of recurrence after pterygium surgery.

In conclusion HAM represents a relatively cheap solution that can be repeated if necessary and that improves the quality of life of the patients reducing excessive tearing, pain, sensations of photophobia, and foreign material sensation.

BIBLIOGRAPHY
CLINICAL CORRELATIONS IN DRY EYE SYNDROME

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Keywords: dry eye syndrome, OSDI questionnaire, clinical correlations

Abstract: Dry eye has a very diverse and nonspecific symptomatology. Various clinical tests are used in diagnosis of the disease, to determine the severity level of the disease, or to evaluate the effectiveness of the treatment. This paper proposes the evaluation of possible correlations between the severity of symptoms assessed by the OSDI (Ocular Surface Disease Index) questionnaire and different clinical tests used to diagnose dry eye syndrome (BUT, Schirmer test, vital stains).

INTRODUCTION

Dry eye is a multifactorial disease of the tear film and ocular surface and it is characterized by instability of the tear film and possible damage to the ocular surface. It presents an extremely diverse and nonspecific symptomatology. Various clinical tests are used in the diagnosis of the disease, to determine the severity level of the disease or to evaluate the effectiveness of the treatment.

AIM OF THE STUDY

The paper aim is to determine the possible correlations between the severity of the symptomatology, assessed by OSDI questionnaire, and the clinical signs evaluated through a series of tests (BUT, Schirmer test, vital dyes).

MATERIAL AND METHOD

We studied 22 patients diagnosed with dry eye syndrome. The OSDI questionnaire was applied to them; the tear film (Schirmer I test, BUT) and the ocular surface integrity (fluorescein staining) were evaluated.

OSDI questionnaire has 12 questions and includes three subscales:

- A: evaluation of the ocular discomfort (symptoms such as gritty or painful eyes, light sensitivity),
- B - the assessment of visual function (measures limitation in performance of current activities such as reading, computer use, driving),
- C – which evaluate the impact of environmental factors on dry eye (e.g., exposure to wind or air conditioning).

The OSDI score was calculated based on the answers of the patients. It is directly proportional to the severity of symptoms, frequency of the symptoms and their impact on visual function.

RESULTS AND DISCUSSIONS

The results for OD (22 eyes) showed significant correlation between the OSDI scores and Schirmer I test and BUT values. A weaker correlation was obtained between OSDI scores and corneo-conjunctival fluorescein staining. (Fig. 1,2,3)

Schirmer test without anesthesia was performed by inserting a strip of filter paper into the inferior fornix for 5 minutes, and measuring the extent of wetting. A measurement of less than 5 mm of wetting is considered pathological.

Tear film instability was assessed by measuring the BUT. Fluorescein dye was instilled into the inferior fornix. Using the cobalt blue filter and the slit lamp biomicroscopy, the time required for the first area of tear film breakup after a complete was determined. Values of less than 10 mm are considered pathological.

The degree of ocular surface damage was evaluated by measuring the corneo-conjunctival staining after instillation of fluorescein. Oxford grading scheme was used. The Oxford score includes six severity levels, from 0 to V, depending on the intensity of staining. A score higher than 1 is considered pathological.
Figure no. 1 Correlation: OSDI score – Schirmer test OD

Figure no. 2 Correlation: OSDI score – fluorescein staining OD

Figure no. 3 Correlation: OSDI score – BUT OD

Figure no. 4 Correlation: OSDI score – Schirmer test OS

Figure no. 5 Correlation: OSDI score – fluorescein staining OS

Figure no. 6 Correlation: OSDI score – BUT OS

We obtained similar results for OS (22 eyes). (Fig. 4, 5, 6) According to the literature, OSDI values correlate well with BUT and less with Schirmer I test values. (3.4) Our results showed a good correlation between OSDI score and both clinical tests. On the other hand, we didn’t found a good correlation between the fluorescein staining and the symptomatology, contrary to literature data. (5) For the OSDI value we considered only the total score, not the subscales. Apparently, there is a better correlation between a subscale and clinical signs. (3) It seems that a double vital staining with fluorescein and lissamine correlates better with OSDI score. (6)

CONCLUSIONS

- There is a modest correlation between symptoms and clinical signs in dry eye syndrome.
- The most frequently used dry eye diagnostic tests in clinical practice remain BUT, Schirmer test and vital dyes.
- BUT and Schirmer test values correlate better with OSDI scores

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The dry eye syndrome is a multifactorial disease of the tears and ocular surface due to tear deficiency or excessive evaporation. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface. Dry eye is a progressive inflammatory disease with an incompletely understood pathophysiology.

The definition of dry eye disease has been a source of considerable debate. The US National Institute gathered a group of dry eye experts in 1994 and formed a workshop. They defined dry eye as a disorder of the tear film due to tear deficiency or excessive tear evaporation, which causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomfort. (1) This definition incorporated multiple pathophysiological mechanisms while emphasizing their common final expression as ocular surface disease. With new research, which largely elucidated pathophysiological mechanisms of disease, dry eye syndrome definition included the presence of inflammation affecting both lacrimal gland and ocular surface. In 2007, the International Dry Eye Workshop (DEWS), based on recent research outcomes, set the following definition of dry eye:

“Dry eye is multifactorial diseases of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.” (2)

This emphasizes the central mechanisms present in all forms of dry eye disease: hyperosmolarity of tears and inflammation of the ocular surface. The definition also emphasizes key features that define the nature and severity of the disease: tear film instability and ocular surface damage.

PATHOPHYSIOLOGY

Tear production is regulated by neural communication between the ocular surface and lacrimal glands, also known as the integrated lacrimal functional unit. (3) This unit consists of ocular surface afferent sensory nerves, efferent autonomic and motor nerves that stimulate tear secretion and blinking, and the tear secreting glands (main and accessory lacrimal glands, conjunctival goblet cells, and meibomian glands). In dry eye syndrome this communication becomes disrupted, leading to tear hyperosmolarity and a cycle of inflammatory reactions, causing damage to the ocular surface and tear instability.

The initiating factor in this pathologic process is secretory dysfunction of the tear secreting glands caused by multiple factors, including age, hormonal deficiencies (particularly androgen deficiency), use of anticholinergic medications, surgeries that sever the corneal nerves (LASIK), and systemic autoimmune disease. (4,5) This dysfunction of the tear-secreting glands alters the balance of tear film components, leading to abnormal hyperosmolar tears production. Hyperosmolar tears stimulate the production of inflammatory mediators causing damage to the ocular surface and tear instability.

The changes in tear composition promote inflammation on the ocular surface by several mechanisms. First, there is decreased secretion of natural anti-inflammatory factors such as lactoferrin by the dysfunctional lacrimal glands. (6) Second, there is increased production of certain proinflammatory cytokines (IL-1, TNF-α) and proteolytic enzymes, and T-cells infiltration of glandular tissues. (7,8) Third, there is activation of latent inactive cytokines and proteases that are normally present in the tear fluid that serves as an early defense mechanism for the ocular surface. (8,9)

Hyperosmolarity of the tears is a critical stimulus in the inflammatory process. Several studies have shown that exposure of cultured human corneal epithelial cells to hypertonic sodium chloride solution results in an increase in the production of the same proinflammatory factors that have been detected in the conjunctival epithelium and tear fluid of dry eye patients. (10,11) The hyperosmolar media stimulates the production of these inflammatory mediators by activating a group of intercellular signaling molecules called mitogen-activated protein kinases. (10)

The increase in inflammatory mediators in the tear
fluid, conjunctiva and lacrimal glands initiates an inflammatory cascade on the ocular surface. The conjunctival epithelial cells increase the surface expression of cell adhesion molecules (HLA-DR, ICAM-1). These molecules attract and retain inflammatory cells in the conjunctiva. (12) Another pathological change is an increased concentration and activity of matrix-metalloproteinases (MMP) in the tear fluid. (8,9) These enzymes, especially MMP-9, play an important role in maintaining corneal epithelial barrier function, regulating corneal epithelial desquamation. (13) Increased MMPs activity in dry eye affect corneal epithelial barrier function by destroying intercellular junctions.

Furthermore, in the dry eye syndrome was revealed an increase apoptosis in conjunctival epithelial and glandular cells. (14) Though the mechanism of apoptosis have not been fully elucidated, it may occur as a result of exposure to inflammatory cytokines, such as TNF-α, or due to decreased expression of antiapoptotic proteins, such as BCL-2. The expression of proapoptotic markers (Fas, Fas ligand, APO2.7, CD40, CD40 ligand) by the conjunctival epithelium is increased compared to normal eyes. (14)

CONCLUSIONS

In conclusion, the central pathophysiological mechanisms of dry eye are tear hyperosmolarity and tear film instability. The hyperosmolar tears cause damage to the ocular surface epithelium by activating a cascade of inflammatory reactions at the ocular surface and a release of inflammatory mediators into the tears. Epithelial damage involves cell death by apoptosis, a loss of goblet cells, and disturbance of mucin expression, leading to tear film instability. The tear film instability exacerbates ocular surface hyperosmolarity and completes the vicious circle.

BIBLIOGRAPHY

THE ADVANTAGES OF ACRYSOFT TORIC IOL IMPLANTATION IN PATIENTS WITH CATARACT AND IRREGULAR ASTIGMATISM - CASE PRESENTATION

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Abstract: The irregular astigmatism is that in which different parts of the same meridian have different degrees of curvature. The purpose of this paper is to evaluate the advantages of acrysof toric iol implantation in patients with cataract and corneal irregular astigmatism.

Keywords: Irregular astigmatism, Iol toric Acrisof

Cuvinte cheie: Astigmatismul neregulat este acel astigmatism în care în diferite părți ale aceluiași meridian există diferite grade de curbură. Scopul acestei lucrări este a evalua avantajele implantării cristalinului artificial Acrysof toric la pacienții cu cataractă și astigmatism cornean neregulat.

INTRODUCTION

The irregular astigmatism is that in which different parts of the same meridian have different degrees of curvature.

THE AIM OF THE PAPER

Is to evaluate the advantages of Acrysof Toric IOL implantation in patients with cataract and corneal irregular astigmatism.

MATERIAL AND METHOD

We present 3 cases with cataract and corneal irregular astigmatism – corneal dystrophy, scar after operated pterygium, keratoconus – where was implanted the Acrysof Toric IOL.

CASE 1

Is a female of 65 year old with cataract and corneal dystrophy in both eyes. The UCVA on the right eye was 2/3 and on the left eye was 1/6. The posterior pole was normal. The preoperative refraction wasn’t able to be measure.

The keratometry made with autorefractometer has shown the data below:

- Right Eye: K1 48.37 / 157°, K2 44.75/ 67 ° = 3.62D of corneal astigmatism
- Left Eye: K1 49.50 / 12°, K2 43.12/ 102° = 6.37D of corneal astigmatism

The topography made with Oculyzer has shown the same corneal and an irregular astigmatism in both eyes (fig.1.)

Fig. no.1. The topographic pattern of irregular astigmatism in case 1.

We decide to implant a toric IOL model SN60T9 + 22 D. The surgical technique was the same as in regular cases of cataract with a few little differences relate of:
- Preoperative marking the eye
- Corneal incision - 3 mm at 110 degree
- Capsulorhexis – 5.5 mm, round, central
- IOL in the bag, on 13° axis according to the online calculator of type of the lens and the axis of placement (fig.2.)

Fig. no. 2. The online calculation of type and placement of IOL in case 1

CASE 2

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- ACTA MEDICA TRANSILVANICA Martie 2011; 2(1)
Is a male of 81 year old with cataract and glaucoma in both eyes, and on the right eye was operated from pterygium one year ago. The BCVA on the right eye was 0.4 and on the left eye was 2/3. The IOP under treatment was 16 mmHg in the right eye respectively 15 mmHg in the left eye. The posterior pole has shown an optical nerve excavation with C/D rap 0.8 in right eye, respectively 0.6 in left eye. The preoperative refraction wasn’t able to be measure.

The keratometry made with autorefractometer has shown the data below:

Right Eye – K1 38.87 / 6°, K2 43.37/ 96° = 4.50D of corneal astigmatism
Left Eye – K1 41.62 / 174°, K2 42.12 / 84° = 0.50D

We decide to implant a toric IOL model SN60T8 + 22 D, through 3mm incision at 110 degree, in the bag, on 94° axis, according to the online calculator (Fig.3).

Fig. no. 3. The online calculation of type and placement of IOL in case 2

CASE 3

Is a male B of 63 year old with cataract and keratoconus in both eyes. The BCVA on the right eye was 0.05/50m and on the left eye was 0.05 under correction (-6 D cyl). The anterior pole has shown a corneal leucoma in right eye and a keratoconus stadium 2/3 in left eye (fig.4). The posterior pole wasn’t able to exam. The preoperative refraction wasn’t able to be measure.

The keratometry made with autorefractometer has shown the data below:

Right Eye – don’t measure
Left Eye – K1 43.87 / 171°, K2 50.37 / 81° = 6.50D of corneal astigmatism

The topography made with Oculyzer has shown a 9.1D of corneal astigmatism in left eye and a specific pattern of keratoconic cornea (fig.5.)

Fig. no. 4. The topographic program of keratoconus stage

We decide to implant a toric IOL model SN60T9 + 15 D, through 3 mm incision at 90 degree( to reduce more value of astigmatism), in the bag, on 82° axis, according to the online calculator (fig.6.).

Fig. no. 5. The topographic pattern of keratoconus in case 3

RESULTS

The results were valued in terms of postoperative refraction and visual acuity at 6 weeks postoperative and are present in the below table.

<table>
<thead>
<tr>
<th>CASE</th>
<th>VISUAL ACUITY</th>
<th>POSTOPERATIVE REFRACITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE 2</td>
<td>20/20/20</td>
<td>+2.50/-2.50</td>
</tr>
<tr>
<td>CASE 3</td>
<td>5/20/15</td>
<td>+2.50/-2.50</td>
</tr>
<tr>
<td>CASE 4</td>
<td>12/20</td>
<td>+15/0/15</td>
</tr>
</tbody>
</table>

AMT, vol II, nr. 1, 2011, pag. 35
The postoperative astigmatism was evaluated in comparison with the preoperative and the anticipated astigmatism and is present in the graphic below:

**Fig. nr. 7 Comparison between the postoperatory, preoperatory and estimate astigmatism**

**DISCUSSIONS**
1. The visual acuity was improved in all cases.
2. The refractive target was almost emetropia with a small residual hyperopia under 1.50D.
3. The postoperative astigmatism was in accordance with the anticipated astigmatism in first case (2.75D); in the second case the postoperative astigmatism was reduced from 4.5 D to 2.5 D, but it wasn’t in accordance with the 0.47 D anticipated astigmatism.
   The surprise was in the third case, with keratoconus, where from 9.1 D preoperative topographic astigmatism (but 6.50 D with ARM) and 4.51D anticipated astigmatism we obtained 0.75D.

**CONCLUSIONS**
1. The Toric IOL implantation in this 3 cases got to a better visual acuity, a lower astigmatism and a content patient.
2. The Acrysof Toric IOL represent a solution in irregular astigmatic cases, reducing the astigmatism and restoring a usefully visual acuity to these patients. [1, 2]

**BIBLIOGRAPHY**
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CORRECTION OF KERATOCONUS WITH INTRACORNEAL FERRARA RINGS

C. ROȘCA

Keywords: corneal disease, therapeutic contact lens

Abstract: Therapeutic contact lens become an efficiently adjuvant therapy and in many cases is the first choice of treatment in corneal diseases. The use of therapeutical contact lens improved the pain, eye discomfort and corneal epithelium healing. The therapeutical contact lens are better than the occlusive eye patch, they restore binocular vision, prevent ambliopia in children and allows restoration of the social-professional life. The aim of the paper is to emphasize the indications of therapeutic contact lens and the advantages of using them compared with the eye patch. A therapeutical alternative clearly superior to the occlusive eye patch, the therapeutical contact lens limits the indications of tarsorrhaphy and conjunctival flap.

THE PURPOSE OF THE STUDY
Is to evaluate the functional results obtained by implanting corneal intrastromal rings combined with cross-linking technique in a patient with stage II Keratoconus.

MATERIAL AND METHOD
For achieving the goal of this study was followed the case of a 36 years old male patient, who presented to our service accusing blurred vision, and especially that he was not accustomed to any optical correction in the last two years. Exam shows:
- VOD= 1wt(-0.5x6)
- VOS= 0.6wcs(-3-2.50x170)

Table no. 1 Refractometry and Keratometry

<table>
<thead>
<tr>
<th></th>
<th>OD</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>-0.75 sf/-1 x 137°</td>
<td>-4 sf/-3.5 x 172°</td>
</tr>
<tr>
<td>k</td>
<td>45.5</td>
<td>48.25</td>
</tr>
<tr>
<td>dK</td>
<td>46</td>
<td>50</td>
</tr>
</tbody>
</table>

Following these investigations, including corneal opography was diagnosed OD with stage I Keratoconus and OS Keratoconus stage II.

- On the left eye was performed cross-linking technique:
  - calibration of CBMX linker device
  - topical anesthetic (Alcaina) - 3-4 drops, 15-20min before the CCL
  - disepithelization of a 9 mm diameter corneal surface
  - instillation of anaesthetic drops

  → instillation of 0.1% Riboflavin from 3 to 3 minutes for 30 minutes before irradiation with a UV source
  → irradiation of the 9 mm corneal surface using CMBX linker + 0.1% Riboflavin instillation from 3 to 3 minutes for 30 minutes
  → instillation of Ofloxacine + Indoclyr
  → therapeutic CL for 3-4 days

Fig. no. 1- Keratometry RE

Fig. No. 2 Keratometry LE

Table no. 2 Progress at six months
It was decided the implantation of an intracorneal ring in the left eye. According to the diagrams it will be implanted two 200μm rings on both sides of the meridian of 175˚.

Surgery for implantation of intrastromal ring segments is preceded by preoperative patient preparation. Two hours before the time of surgery, Fluoroquinolone eyedrops are instilled from 30 to 3 minutes.

Anesthesia is topical, using preparations like eyewash as Novesine, Alcaine and Benoxi (oxibuprocaine hydrochloride).

Preoperative corneal pachimetry is mandatory to determine corneal thickness, three measurements are needed of which is chosen the measurement with the lowest value. Also is required that the pachimetry is performed intraoperative to determine the corneal thickness in an optical zone of 5-7mm in the incision area in order to be implanted intrastromal ring segments at 70% of the depth.

The first step in the technique of implantation of Ferrara rings is that the central corneal light reflex is marked under the operating microscope and the patient should still look in to the microscopes light. With the help of the markers and the necessary colorant is defined the 6 mm optical zone. The intraoperative pachimetry performed in order to determine 70% of the corneal depth in this area. Primary incision is made at 70% of the corneal thickness, and then are made two semicircular intrastromal tunnels with two spatulas. Finally are implanted two ring segments and positioned face to face along the meridian of 175˚.

At three months after the implantation of the rings the evolution was as it follows.

It was decided to apply a KERALENS contact lens, -2 sFD, RC 8.6mm, 14.5mm diameter.

Table no. 4 presents progress in 18 months from the contact lens application.

<table>
<thead>
<tr>
<th>Table no. 4 presents progress in 18 months from the contact lens application.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS (cca 6 months)</td>
</tr>
<tr>
<td>ARM</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>dK</td>
</tr>
<tr>
<td>AV without correction</td>
</tr>
<tr>
<td>AV with correction</td>
</tr>
<tr>
<td>Corneal aspect</td>
</tr>
</tbody>
</table>

DISCUSSIONS

Combination of both techniques (implantation of intrastromal rings and cross-linking technique), brought practical improvements by summing the flattening effect of the intrastromal segment rings with the stiffening effect produced by the cross-linking technique.

CONCLUSIONS

1. Intrastromal corneal rings implantation associated with cross-linking technique in the surgery of Keratoconus brings significant improvement of parameters such as keratometry and visual acuity with and without correction.
2. The value of preoperative myopic astigmatism suffers a significant decline in most cases.
3. Corneal topography at 18 months after surgery shows a rearrangement due to the reduction of preoperative myopic astigmatism values.

BIBLIOGRAPHY

1.