



Study of Fungal Corneal ulcers in North Karnataka Population – Retrospective study

Abhishek Kulkarni¹, Sayed Nooruddin (Corresponding Author) ²

1. Assistant Professor, Department of Ophthalmology Khaja Banda Nawaz Institute of Medical Sciences Kalaburgi-585102, Karnataka
2. Junior Resident, Department of Ophthalmology Khaja Banda Nawaz Institute of Medical Sciences Kalaburgi-585102, Karnataka.

Abstract

Background: Fungal Corneal ulceration is more severe than bacterial ulcers and fungal organism (bacilli) will be late to expose hence it causes delayed to diagnose and has to be confirmed by microbiological support.

Method: 40 Patients of fungal corneal ulcers aged between 20 to 60 years were studied. Examination was done by slit lamp Bio microscope, visual acuity by smellers chart, Findus examination CBC, HbsAg, Microbiological test by scraping cornea, Fungal Culture was done by using saborouds dextrose agar medium. The fungal ulceration of cornea was managed by topical and systemic fungal therapy in severe cases surgical approach was done. It included Debridement of ulcer, penetrating Keratoplasty, optical penetration, conjunctival flap.

Results: The highest size of ulcer was 61-100 square mm and least size was <20 Sq. mm. The most prevalent organism was 14 (35%) Fusarium followed by 11 (27.5%) Aspergillus flavus. The highest visual acuity was 20 (50%) at weeks followed by 13 (32.5%) was PLR, PR + HM. The successful healing on 45th day of treatment was 32 (80%).

Conclusion: This pragmatic approach to fungal corneal ulceration with 80% successful outcome will be helpful to ophthalmologist to treat such patients efficiently as cornea is a vascular and transparent covering of Eye ball.

Keywords: Biomicroscope, Snellens Chart, Fluorescein staining, Debridement, Keratoplasty conjunctival flap.

Introduction

Fungal keratitis is more virulent and damaging than bacterial keratitis. Ocular trauma by vegetative matter, topical steroid use and use of contact lens are the associated risk factors of fungal keratitis ⁽¹⁾. The genera that, commonly cause infections of the cornea include fusarium, aspergillus, curvularia, bipolaris and Candida. Most of the currently available antifungal medications have certain limitations ⁽²⁾. Such as poor bioavailability and limited ocular penetrations under such circumstances therapeutic penetrating keratoplasty, is required to heal the ulceration of cornea ⁽³⁾.

Although cataract remains the major cause of reversible visual fungal infections is severe than bacterial infections ⁽⁴⁾, delayed diagnose of fungal infections have less effect of drugs. Hence it is imperative to be aware of the clinical manifestation or presentations of fungal corneal ulcer to promptly suspect its presence and confirm with laboratory investigations and implement optimal treatment. Hence attempt was made to evaluate the clinical features and laboratory investigations. Primarily dealt with medications but in severe or non-responding cases surgical innervations was un-avoidable to cure the corneal ulceration.

Material and Method

40 (forty) patients aged between 20-60 years visited to ophthalmology department of Khaja Bandanawaz teaching and general Hospital Kalaburgi-585105 Karnataka were studied.

Inclusion Criteria: Corneal ulcer patients either positive 10% KoH preparation and/or positive fungal culture.

Exclusion Criteria: Patients with undergone eye surgery immune compromised patients were excluded from study.

Method: Examination of anterior segment and corneal ulcer was done with the help of slit lamp Bio-micro scope. Visual acuity was recorded by using snellen's chart, Fundus examination, Fluoresce in Staining, Routine Blood exam and complete haemogram, RBS, HIV, HBS Ag, Microbiological test was done by corneal scrapping, Fungal Culture was done by using sabo-raud's dextrose agar medium.

Depending on the severity of ulceration patients were classified as Medical and a surgical Majority of patients belonged to middle socio-economic status Medical Management was carried out by tropical antifungal Natamycin 5% Eye suspension were used hourly for the first 48 hours them decreased to 2 hourly tropical therapy was continued at least 3rd hourly for 2 weeks after healing the ulcer. Along with above drugs topical Cycloplegic like atropine 1% Eye drops was used initially 8th hourly and then taped according to the response. Antiglucoma medication like topical timolol male ate 0.5% eye drops and acetazolamide 250mg tablets were prescribed wherever necessary.

In some cases topical antibacterial drops like moxifloxacin 0.3% was used on the basis of Gram's stain report showing evidence of bacterial infection also systemic antifungal therapy included Itraconazole 100mg bid for 15 days. Before starting systemic antifungal therapy Liver function test was done.

Surgical Management: 1) Debridement of the ulcer was performed under topical anaesthesia on slit lamp using Bard parker blade No-15.

2) Therapeutic penetrating keratoplasty – was done in non-healing ulcer when not responded to medical therapy for 4 weeks.

3) Optical penetrating keratoplasty – done in scarred fungal keratatis.

4) Conjunctival flap – The technique was Gunderson's total conjunctival flap. It was done in non-healing superficial ulcers with descemetocele or small perforation.

Duration of study was June-2018 to July-2020

Statistical analysis: Size of the ulcers, types of fungal cultures was classified with percentage. Study of visual acuity and comparison of duration was anal used by chi-square test,. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1

Observation and Results

Table-1: Study of various sizes of fungal corneal ulcers with percentage 25 (62.5%) patients had <20 sq mm ulcers, 03 (7.5%) had 21-40 sq mm ulcers, 8 (20%) had 41-60 sq mm ulcers, 4 (10%) had 61-100 sq mm sized ulcers.

Table-2: Study of fungal cultures in corneal ulcer patients were Aspergillus 3 (7.5%) Aspergillus flavus 11 (27.5%) organism fumigates 1 (2.5%) had cladosporium, 14 (35%) had Fusarium, 1 (2.5%) had Rhizopus, 10 (25%) had no growth of any organism.

Table-3: Study of visual acuity in corneal ulcer patients – In day-1 26 (65%) had PLR, PR+HM an 6th week 20 (50%)
In day-1 4 (10%) and 6th week 7 (17.5%) had CFL-6/60. On 1st day 10 (25%) on 6th week 13 32.5%) patients had 6/36-6/6.

Table-4: Comparison of duration at presentation of healing ulcer. In 1-5 day 9 out 9 got healing (100%). In 6-15, 21 (84%) out of 25 were healed. In 6-45 days 2 (33.3%) out of 6 were healed. Out of 40 patients, 32 (80%) had healing corneal ulcers in the duration of 45 days.

Discussion

The present study of fungal corneal ulcers in North Karnataka Population the size of corneal ulcers were 25 (62.5%) had <20 sq mm, 3 (7.5%) had 21-40 sq mm, 8 (20%) had 41-60 sq mm, 4 (10%) had 61-100 sq mm, (Table-1). The isolations of fungal cultures were 11 (27.5%) had *Aspergillus, flavus* 3 (7.5%) had *Aspergillus fumigates*, 1 (2.5%) had *cladosporidium*, 14 (35%) had *Fusarium*, 1 (2.5%) had *Rhizopus* 10 (25%) had no any growth (Table-2). The visual acuity was – In day 1 26 (65%) and at 6th week 20 (50%) was PLR, PR+HM. In day 1 4 (10%), at 6th week 7 (17.5%) had CF-6/60. In day 1 10 (25%) and at 6th week 13 (32.5%) had 6/36-6/6 (Table-3). In the comparative study, duration of presentation of healing ulcers In 1-5 days out of 9 cases 9 have cured (100%). In 6-15 day out of 25 cases 21 (84.3%) had healing of ulcer. In 16-45 days out of 6 cases 2 (33.3%) had healing of ulcer. The total percentage of healing of fungal ulcer was 32 out of 40 cases. It was 80% It was highly significant P value (P<0.001) with chi-square test $\chi^2 = 9.63$ (Table-4). These findings are more or less in agreement with previous studies ⁽⁵⁾⁽⁶⁾⁽⁷⁾.

The risk factors of the corneal ulcerations were trauma, contact lens wear because large series of contact lens related to fungal keratitis, use of tropical and systemic steroids worsen the fungal keratitis and impair the host immunogenic response to the microbial invasion moreover topical anaesthesia has risk factor for *Candida* keratitis ⁽⁹⁾.

In addition to this herpes simplex infection particularly at the risk for yeast infection corneal transplant and refractive surgery also have been associated with fungal keratitis; contamination of donor corneas is infected by fungal infections in the preservative of tissue before transplantation ⁽¹⁰⁾. In systemic diseases like type-2 DM, chronically ill-patients, HIV and leprosy due to immune suppression keratomycosis in children usually related to trauma with organic matter.

Natamycin was drug of choice as topical agent because it has broad spectrum fungicidal activity and cost effective out of 14 patients 11 (80%) healed with systemic antifungal drugs like Itraconazole Resistant patients treated with surgical corrections.

Summary and Conclusion

Present study of fungal corneal ulcers in north Karnataka Population. Fusarium was the most common species. Small size ulcers responded to prompt topical and systemic therapy. KoH wet mount was an efficient tool to confirm the diagnosis and facilitated for early treatment. Apart from surgical corrections the healing rate was 80%. Despite of several antifungal agents, fungal keratitis continued to have poor visual prognosis because of corneal scar of varying density. This study warrants further mycotic, patho-physiological, genetic, micro-cellular level study because exact pathogenesis of fungal corneal ulcer is still un-clear.



Table – 1**Total No: 40****Fungal corneal study of size of ulcer with percentage**

Sl. No	Size of ulcer (in sq mm)	Number of cases (40)	Percentage
1	< 20 sq mm	25	62.5
2	21-40 sq mm	03	7.5
3	41-60 sq mm	08	20
4	61-100 sq mm	04	10

The largest size was 61-100 sq. mm in 4 (10%) and least was <20 in 25 (62.5%)

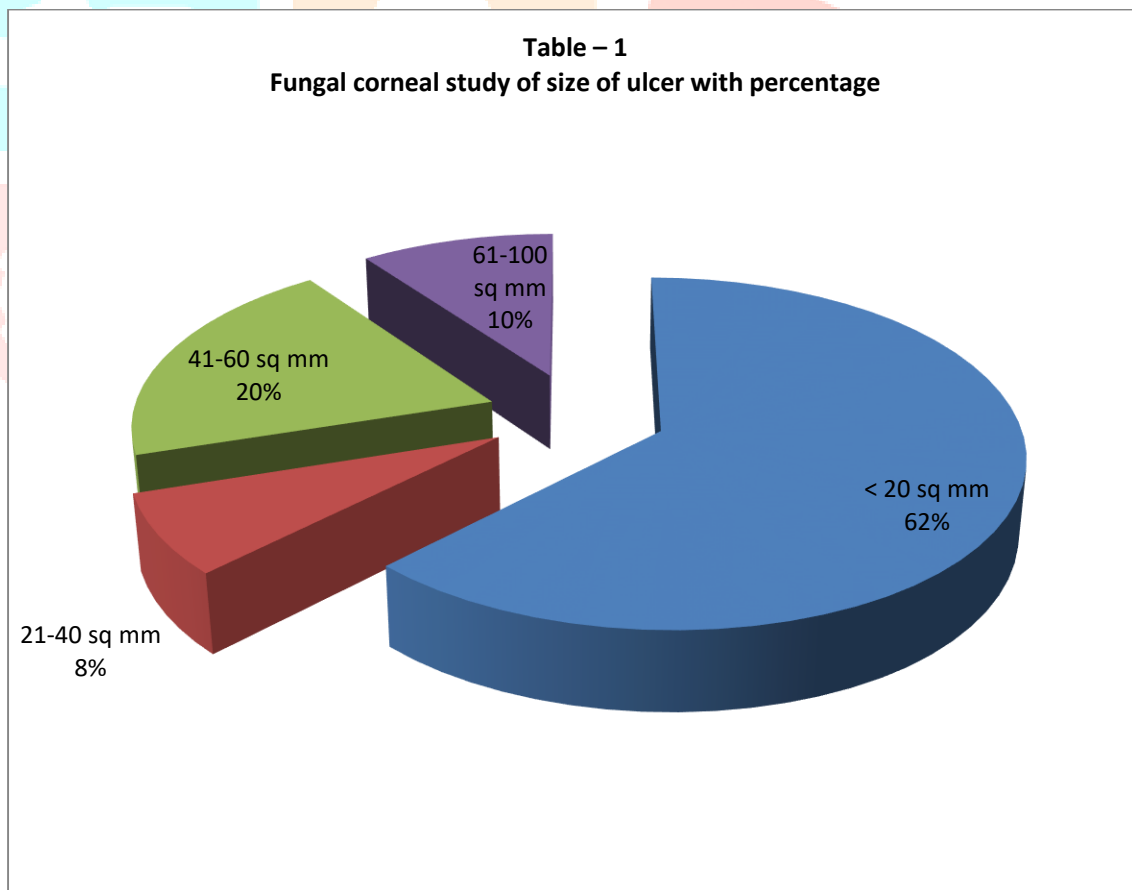


Table – 2**Study of fungal cultures in corneal ulcer patients**

Sl. No	Organism isolated	Number of cases (40)	Percentage (%)
1	Aspergillus flavus	11	27.5
2	Aspergillus Fumigatus	3	7.5
3	Cladosporidium	1	2.5
4	Fusarium	14	35
5	Rhizopus	1	2.5
6	No growth	10	25

Highest prevalence was 14 (35%) Fusarium and least were 1 (2.5%) cladosporidium, Rhizopus respectively

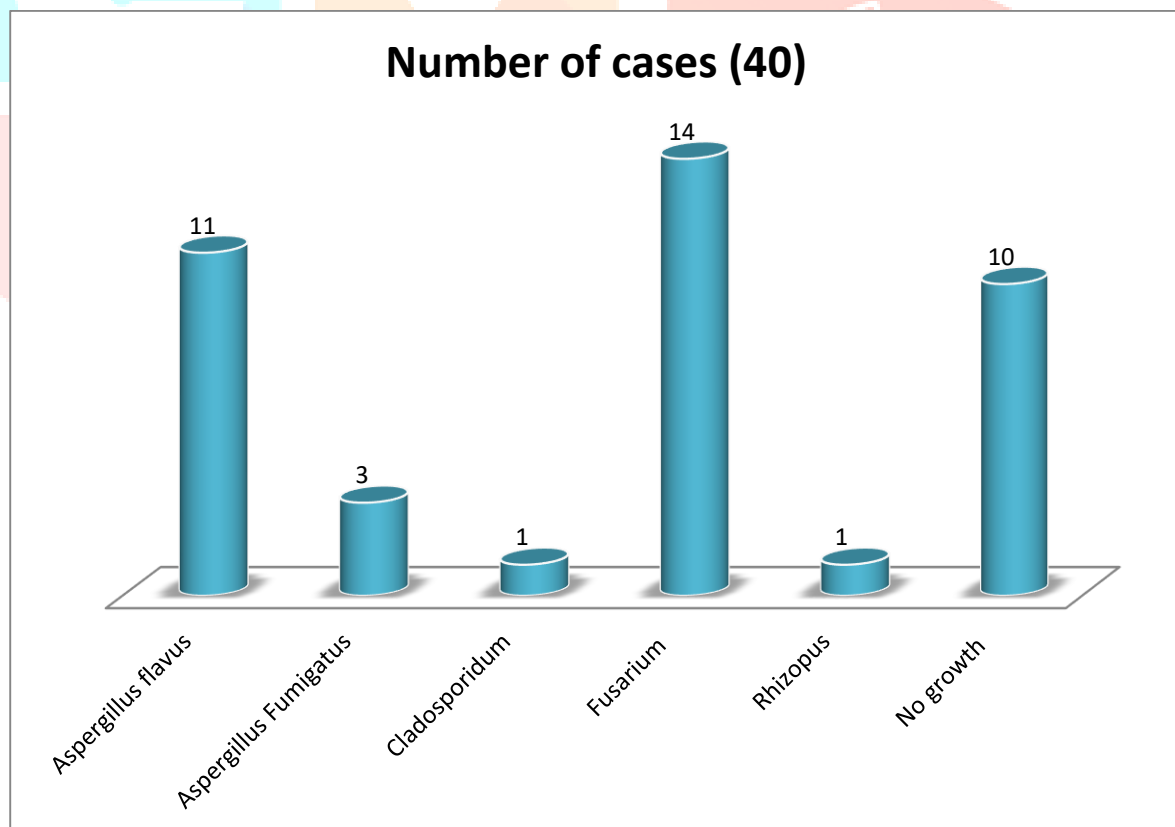


Table – 3**No of patients: 40****Study of visual acuity in fungal corneal ulceration patients**

Sl No	Visual Acuity	Day – 1		At 6 th week	
		Number	Percentage	Number	percentage
1	PLR, PR+HM	26	65	20	50
2	CF-6/60	4	10	7	17.5
3	6.36-6/6	10	25	13	32.5

Highest visual acuity 26 (65%) PIR, PR+HM on Day -1 but on at 6th week 20 (50%). Least was 4 (10%) CF-6/60 on Day 1, 7 (17.5%) was CF- 6/60 on 6th week

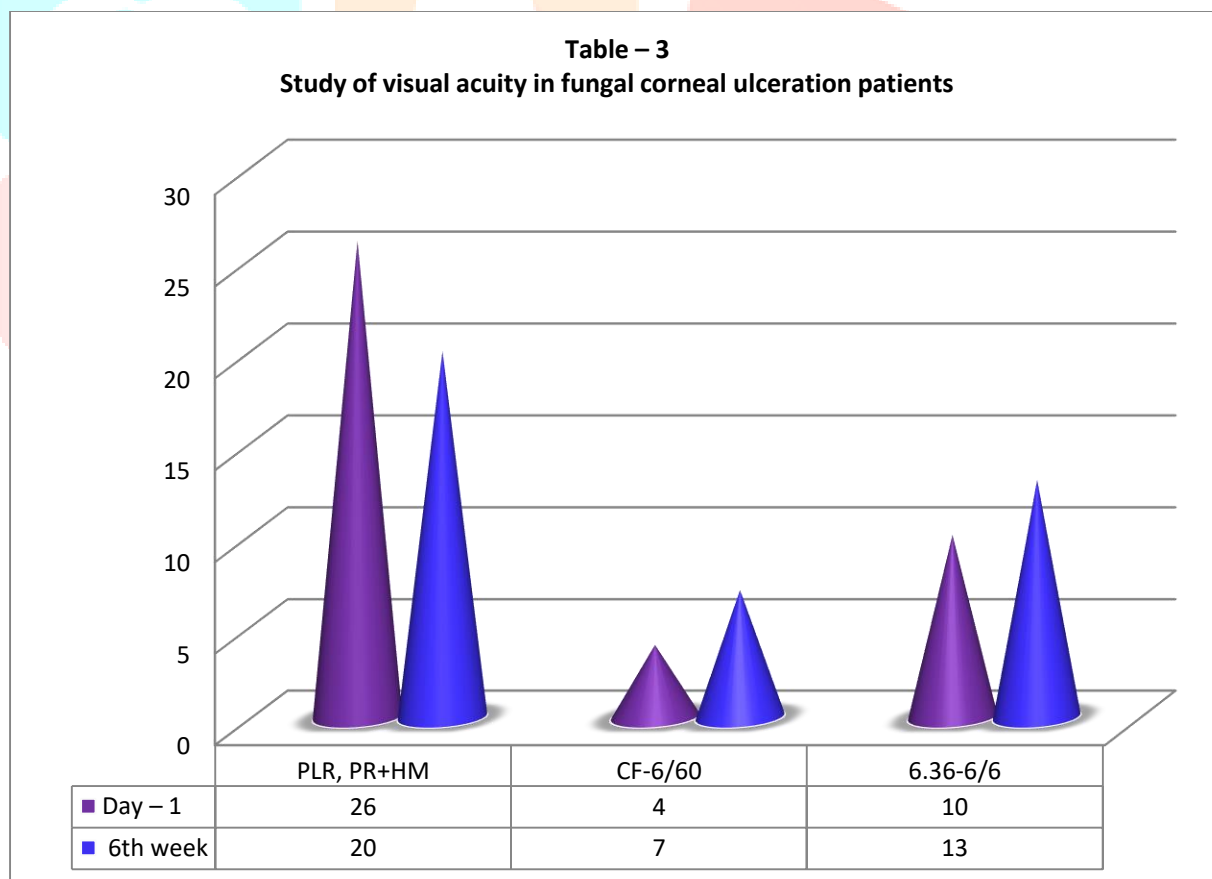
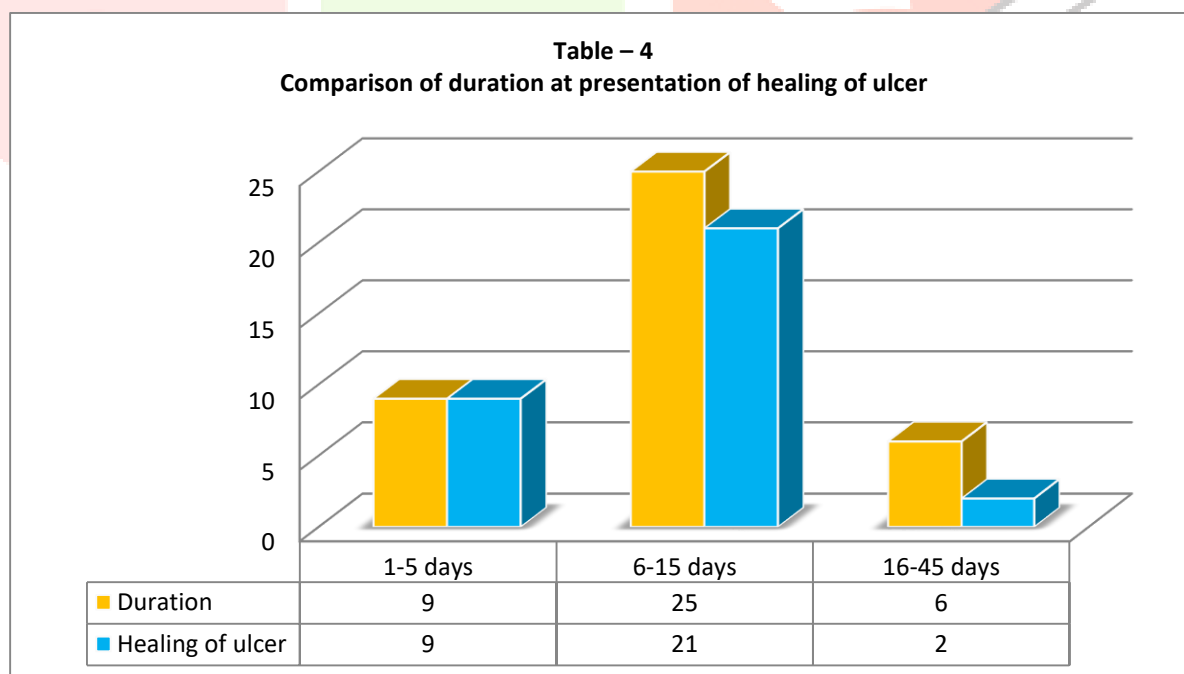


Table – 4**Comparison of duration at presentation of healing of ulcer**

Sl. No	Duration at Presentation	Duration	Healing of ulcer	percentage
		Number	Number	
1	1-5 days	9	9	100%
2	6-15 days	25	21	84%
3	16-45 days	6	2	33.3
	Total	40	32	80%
Chi-square test P value		$\chi^2 = 9.63$ $P < 0.001$ (Highly significant)		

Highest rate of healing ulcer duration was on 6-15 days was 21 (84%) and least on 16-45 day was 2 (33.3%).



References

1. Kumar A, Khurana A – Causative fungi and treatment outcome of dematiaceous fungal Keratitis in North India, Indian J. Ophthal 2019, 67, 1048-53.
2. Ragini Tilak, Abhisek Singh, Omprakash – Mycotic Keratitis in India. A five year retrospective study J. Infect Dev. Ctries. 2010, 4 (3), 171-174.
3. Rajesh Sambhavi Kataral – A clinical micro biological study of corneal ulcer at western Gujarat India Acta Medica alranica 2013, 51(6), 399-403.
4. Pradhan L, Sharmo S – Natamycin in the treatment of Keratomycosis correlation of treatment outcome in vitro susceptibility of fungal isolates. Ind. J. of Ophthalmic 2011, 59, 512-514.
5. Matsuda M, Ubels JL – Larger corneal epithelial wound classes at a faster rate. Invest opthal vis. Sci. 1985, 26, 897-900.
6. Soong HK – Vinculin in focal cell to substrate attachments of spreading corneal epithelial cells Arch. Ophthalmol, 1987; 105, 1129-32.
7. Arey LB, Cavode WM – The method of repair in epithelial wounds of the cornea. Anat. Rec. 1943, 86; 75-82.
8. Rosa RH, Miller D – Changing spectrum of fungal keratitis in south Florida Ophthalmology 1992, 69, 744-749.
9. Cheren KC, Meisler DM – Corneal anaesthetic abuse and Candida keratitis Ophthalmology 1996, 103 (1), 37-40.
10. Kloess PM, Stulting RD – Bacterial and fungal endophthalmus after penetrating keratoplasty Am. J. Ophthalm. 1993, 115, 309-310.