

The exact solution for the centre thickness of spectacle and contact lenses

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The available methods for the exact calculation of centre thickness presuppose that one knows simultaneously both surfaces of the lens and that the lens power is determined afterwards. However, this approach is of secondary importance in practical situations. The issue in daily practice is the determination of the centre thickness of lenses that already have explicit vertex powers. In such cases one can set only one surface. The other has to be calculated follow-

ing the prescription, the known surface and the optical effect of the centre thickness. Exact solution for this problem leads to four expressions, reflecting the number of ways one can treat it. Two of them are complete second-order algebraic equations and the other two, complete third-order algebraic equations. The practical value of the latter is limited by the fact that one cannot always obtain their three roots by pure algebraic procedures.

The effect of topical cyclosporin on conjunctiva-associated lymphoid tissue (CALT)

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Topical cyclosporin A is increasingly being used in the treatment of ocular surface immune-mediated disorders. The availability of the drug in oil-based vehicles or collagen shields has restricted its use because of ocular irritation or blurring of vision. Although topical cyclosporin is being used more frequently, its effect on the immunocompetent cells of the conjunctiva is not known. Our aim was to study the effect of cyclosporin instillation on the immunocomponent cells of conjunctiva-associated lymphoid tissue (CALT) of Lewis rat, using a novel method of topical drug delivery. A suspension of collagen bits impregnated with cyclosporin A was instilled into eyes of Lewis rats for 4 days (group 1) or 8 days (group 2). Control rats (group 3) received the suspension without cyclosporin. Frozen sections of eyelids and conjunctiva were immunostained with the following monoclonal antibody markers: W3/13 (CD3),

W3/25 (CD4, macrophages), OX-8 (CD8), MARD-3 (B cells), ED1, ED2 (macro/monocytes), OX-6 (class II MHC, Ia) and OX-39 (CD25, IL-2 receptor). Intraepithelial (IE) and substantia propria cells for each subset were counted and expressed as numbers per section. By day 8, intraepithelial and substantia propria cells for all the above markers, except B cells, showed a significant reduction in numbers. The *p* values were <0.02 for W3/13 (CD3), W3/25 (CD4), OX-8 (CD8), OX-39 (CD25) (IE only), ED1, ED2 and OX-6 positive cells. Goblet cells of control animals showed strong positive reaction with OX-39 (CD25) antibody. This was completely abolished following 8 days of topical cyclosporin. This study demonstrated that topical cyclosporin A induces a marked reduction in numbers of all subtypes of immunocompetent cells in the conjunctival epithelium and substantia propria.

Recurrence rate of herpetic keratouveitis in patients on long-term oral acyclovir.

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We examined the recurrence rate of herpetic uveitis (HU) in 13 patients (group A) treated prophylactically with long-term systemic acyclovir (600-800 mg/day) and compared it with that of 7 patients with no prophylactic therapy (group B). HU was diagnosed on the basis of a history of dendritic or disciform keratitis accompanied by iridocyclitis and iris atrophy. The study population consisted of 12 men and 8 women with a mean age at onset of uveitis of 52.9 years (range 19-78 years). All patients were followed for at least 8 months. The mean follow-up time of patients on long-term oral acyclovir was 26.0 months. In this group, only one patient experienced a single recurrent episode of uveitis while on 600-800 mg/day of acyclovir therapy; two additional patients had recurrence of HU within 16.2 months after the acyclovir dose was

tapered below 600 mg/day. In striking contrast, 16 recurrences occurred in the 7 patients of group B ($p < 0.05$). Of these, the initial recurrence occurred within an average of 4.3 months following cessation of therapy. There was a significant difference ($p < 0.05$) in the mean recurrence-free interval between patients in group A (24.6 months) and those in group B (3.4 months). Herpetic uveitis is a serious ocular disease in which recurrence of inflammation results in severe ocular complications. The long-term use of oral acyclovir may be of benefit in the prevention of recurrences, and hence may reduce the binding complications of this disease. Efforts at competing a randomized, placebo-controlled trial on this matter by the Herpes Epithelial Disease Study Group were unsuccessful due to insufficient patient recruitment.

A comparative study of the effects of timolol and latanoprost on blood flow velocity of the retrobulbar vessels

AMERICAN JOURNAL OF OPHTHALMOLOGY, 122: 784-9, 1996

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Purpose: To examine the effects of topical timolol and latanoprost on retrobulbar vessel blood velocity in patients with glaucoma or ocular hypertension.

Methods: Nine patients with primary open-angle glaucoma and six patients with ocular hypertension were enrolled for this study. All patients were treated topically with 0.5% timolol or 0.005% latanoprost, using a double-masked crossover design with 3 week washout before administration of each drug. Each patient had a baseline color Doppler imaging ultrasound of the central retinal artery, short posterior ciliary arteries, and ophthalmic artery and two other ultrasound examinations during the 1-week treatment with each drug, performed 12 hours after the first dose of the drug

and 12 hours after the last dose, 7 days later.

Results: Both topical timolol and topical latanoprost significantly reduced the intraocular pressure. The only significant change observed in the retrobulbar blood velocity with timolol was a reduction of end diastolic velocity in the ophthalmic artery 12 hours after the first dose, accompanied by a trend toward a decrease in the peak systolic velocity and an increase in the resistance index in the same vessel. No change in blood velocity was observed with latanoprost.

Conclusions: Topical timolol and latanoprost significantly reduced the intraocular pressure in ocular hypertensive and glaucoma patients without creating substantial hemodynamic changes in the retrobulbar vessels.

Scanning laser Doppler flowmeter study of retinal and optic disk blood flow in glaucomatous patients

AMERICAN JOURNAL OF OPHTHALMOLOGY, 122: 775-83, 1996

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Purpose: To examine blood flow in the retina and optic nerve head of patients with primary open-angle glaucoma.

Methods: Retinal and optic nerve head blood flow of glaucoma patients and control subjects of similar age and gender were measured in arbitrary units with the Heidelberg Retina Flowmeter, a scanning laser Doppler flowmeter (Heidelberg Engineering, Heidelberg, Germany). A total of 33 glaucoma patients and 29 control subjects were included in this study. Microvascular blood volume, flow, and velocity were analyzed in four areas of the retina approximately 100 μm from the edge of the optic disk (two temporal, one superior, and one inferior), in one area of the neuroretinal rim, and in the lamina cribrosa.

Results: The glaucoma patients had significantly decreased blood volume, flow, and velocity in one temporal

retinal area ($P < 0.06$) and in blood volume in the inferior retinal area ($P = .04$). They also had significantly decreased blood volume, flow, and velocity in the lamina cribrosa ($P < .0004$), which also had more areas the investigators judged to be avascular compared to control subjects ($P < .0001$). No differences between glaucoma and control subjects in the blood flow measurements of the neuroretinal rim were found.

Conclusion: These findings suggest that glaucoma patients tend to have less blood volume, flow, and velocity in the lamina cribrosa and upper temporal peripapillary retina. The temporal area below the horizontal, corresponding to the papillomacular bundle, did not show this difference. The findings may be significant in the pathogenesis of primary open-angle glaucoma.

Vortex or whorl formation of cultured human corneal epithelial cells induced by magnetic fields

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The terms "vortex keratopathy" and "hurricane keratopathy" describe two similar conditions affecting the corneal surface. In the former, a vortex or whorl pattern is seen on the corneal surface and is due to the deposition of substances such as pigment, iron or drugs in the epithelial cells. In the latter, a similar pattern is presented by migrating epithelial cells but, unlike the former, the pattern is rendered more visible by fluorescein staining. Both represent the migratory pattern of normal epithelial cells which is

otherwise not visible due to the slow rate of epithelial turnover and migration. The whorl pattern has a clockwise predisposition in the majority of cases and is hypothesized to be due to the influence of ocular electromagnetic fields on the migrating epithelial cells. In this study we tested *in vitro* the effect of static magnetic fields on corneal epithelial cells. We were able to reproduce dramatic vortex or whorl patterns in response to magnetic fields, but without preferential migration towards the North or South Pole.

Cytomegalovirus antigenemia in acquired immunodeficiency syndrome patients with untreated cytomegalovirus retinitis

AMERICAN JOURNAL OF OPHTHALMOLOGY, 122: 847-52, 1996

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Purpose: To determine the frequency of cytomegalovirus (CMV) viremia in patients with acquired immunodeficiency syndrome (AIDS) and untreated CMV retinitis using conventional cell culture isolation and the sensitive CMV antigenemia assay.

Methods: We examined 24 AIDS patients with ophthalmologic diagnosis of untreated CMV retinitis and 24 AIDS patients without present or past retinitis (control patients) from three medical centers between September 1992 and March 1994. Cytomegalovirus antigenemia was detected by an indirect peroxidase staining in 300,000 cytocentrifuged neutrophils, using a mixture of murine monoclonal antibodies directed against the pp65 lower matrix protein of CMV.

Results: Positive antigenemia was demonstrated in eight (33.3%) of the 24 retinitis patients and in none of the 24 control patients ($P < .001$). Only two of the eight antigenemia-positive patients had a concurrent positive CMV isolation from blood leukocytes by conventional cell culture assay.

Conclusions: These results emphasize the risk of extraocular disease in AIDS patients with CMV retinitis because the virus is often present in peripheral blood leukocytes. The CMV antigenemia assay may be a simple and rapid means of identifying those patients with unilateral retinitis at highest risk of developing CMV retinitis of the fellow eye or of visceral CMV disease if intravitreal injections or implants are used as sole treatment for CMV retinitis.

Recurrent keratopathy after penetrating keratoplasty for aniridia

CORNEA, 15(5): 457-62, 1996

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Corneal lesions in aniridia include peripheral pannus and epithelial abnormalities that may advance centrally, resulting in the need for penetrating keratoplasty. Three patients with aniridia who underwent repeated corneal surgical procedures (one keratectomy and six penetrating keratoplasties) are described herein. A clinicopathological correlation was performed. In all three patients there was evidence of recurrent pannus and epitheliopathy on histopathological

examination, which correlates with the clinical findings. These findings suggest that the pathophysiology of recurrent aniridia keratopathy may be related to a primary abnormality in the stem cells of the recipient corneal limbus. Aniridic pannus and epitheliopathy recur in grafts after penetrating keratoplasty and threaten the transplanted cornea. The risk of recurrent keratopathy should be considered when recommending a surgical procedure to patients with aniridia.

Monoclonal origin of localised orbital amyloidosis detected by molecular analysis

BRITISH JOURNAL OF OPHTHALMOLOGY, 80: 1013-7, 1996

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Aims: Primary localised orbital amyloidosis is a rare disease. The purpose of this study was to describe two cases of primary orbital amyloidosis and emphasise the value of molecular analysis of immunoglobulin gene rearrangement in identifying a monoclonal population of cells responsible for the amyloid production.

Methods: Charts and biopsy specimens of each case were reviewed. Conventional light microscopy, immunohistochemistry, and polymerase chain reaction (PCR) analysis for immunoglobulin gene rearrangement were performed in both cases.

Results: An unusual presentation of localised primary amyloidosis with bilateral and extensive enlargement of

multiple extraocular muscles was seen in case 1. The presence of amyloid deposits was confirmed by biopsy in both cases. Evidence of a monoclonal population of plasma cells was shown by immunohistochemical analysis in case 2 only. The monoclonal origin of the cells responsible for the amyloid deposition was determined by PCR analysis demonstrating immunoglobulin heavy chain gene rearrangement in both cases.

Conclusions: A monoclonal population of plasma cells responsible for the amyloid deposition was present in these two cases. PCR analysis is extremely helpful in determining monoclonality, a finding that may have important therapeutic and prognostic implications.

Ocular hypertension and primary open-angle glaucoma: a comparative study of their retrobulbar blood flow velocity

JOURNAL OF GLAUCOMA, 5: 308-10, 1996

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Purpose: To compare the orbital blood flow velocities of patients with long-standing ocular hypertension and patients with primary open-angle glaucoma.

Methods: Twenty patients with ocular hypertension were recruited from our clinic and underwent color Doppler imaging evaluation of their retrobulbar vessels. The blood flow velocities and resistance index of their central retinal artery, temporal short posterior ciliary artery, and ophthalmic artery were compared with those of 20 glaucoma patients individually matched for age and level of the highest untreated intra-ocular pressure ever recorded.

Results: Glaucoma patients had significantly lower peak systolic velocity and end-diastolic velocity than did patients with ocular hypertension in their central retinal artery ($p < 0.001$). No significant difference between the groups was observed in the other vessels studied.

Conclusions: Glaucoma patients had lower blood flow velocity in the central retinal artery compared with that of ocular hypertension patients of similar age and level of untreated intraocular pressure. This might be important in the development of glaucomatous damage in those patients.

Various glaucomatous optic nerve appearances A color doppler imaging study of retrobulbar circulation

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Purpose: The purpose of this study was to observe the blood flow velocity in the retrobulbar vessels of patients with glaucoma with different appearances of optic discs.

Methods: Patients with four different disc appearances (focal ischemic discs, myopic glaucomatous discs, senile sclerotic discs, and discs with a generalized enlargement of the cup) were selected from a pool of optic disc photographs. No clinical information from the patients was available during the selection. Color Doppler imaging (CDI) was performed in those patients whose discs clearly belonged to one of the disc patterns. The peak systolic and end diastolic velocity were measured and the resistance index calculated from the central retinal artery, short posterior ciliary arteries and ophthalmic artery.

Results: Color Doppler imaging was performed in 24

patients with focal ischemic discs, 26 patients with myopic glaucomatous discs, 16 patients with senile sclerotic discs, and 16 patients with generalized enlargements of the cup. The patients with senile sclerotic discs had statistically significantly lower diastolic velocity and a higher resistance index in their ophthalmic, central retinal and the mean of the short posterior ciliary arteries sampled. These statistical differences persisted for the ophthalmic artery even after correcting the values for the age differences between the groups.

Conclusions: Patients with senile sclerotic discs seem to have greater circulatory abnormalities in their retrobulbar vessels studied with color Doppler imaging that are compatible with a higher downstream resistance in these vessels. These circulatory abnormalities could be related to the pathogenesis of the glaucoma in these patients.

Enchondroma of the Orbit

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Purpose: To report a documented case of orbital enchondroma.

Methods: A 25 year old woman had an asymptomatic orbital mass. Computed tomographic scan was performed. The mass was surgically removed from the medial wall of the orbit, and the specimen was submitted for histopatho-

logic examination.

Results: The tumor showed typical radiologic and histopathologic appearance of an enchondroma with typical hypocellular lobules of cartilage enclosed by lamellar bone.

Conclusion: Cartilaginous neoplasms in the orbit are extremely rare.