Role of Corneal Collagen Cross-Linking in Pseudophakic Bullous Keratopathy: A Clinicopathological Study

Ritu Arora, Aditi Manudhane, Ravindra Kumar Saran, Jawaharlal Goyal, Gaurav Goyal, Deepa Gupta

Ophthalmology. 2013: 120 (12); 2413-18

The aim of this study was to evaluate the clinical and histopathologic changes induced by collagen cross-linking (CXL) in pseudophakic bullous keratopathy (PBK).

This was a randomized, prospective, interventional study. Twenty-four patients with corneal edema resulting from PBK of more than 4 months’ duration and awaiting keratoplasty were enrolled to undergo CXL followed by penetrating keratoplasty. They were allocated randomly into 2 groups of 12 patients each. 12 patients underwent penetrating keratoplasty 1 month after CXL (group A), whereas the remaining 12 patients underwent penetrating keratoplasty 3 months after CXL (group B). The primary outcome of the study was the effect on visual acuity, ocular discomfort (tearing, redness, and pain), corneal haze, central corneal thickness (CCT), ocular discomfort, and histopathologic modifications of corneal stroma at 1 or 3 months after CXL. The corneal buttons underwent histopathologic and Immunofluorescence evaluation.

Mean visual acuity showed a significant improvement after CXL, from 1.925±0.173 before surgery to 1.75±0.296 at 1 month after surgery (P = 0.010), but deteriorated to 1.81±0.23 at 3 months. The mean VAS scores of patients in both groups showed a statistically significant decrease at 1 week &1 month though it showed a worsening trend at 3 months it was still significantly lower than the preoperative values. A trend of reduction in corneal haze was noted in group A and group B after CXL. The effect was maintained in 9 patients in group B at 3 months. The mean central corneal thickness decreased significantly from 846.46±88.741 to 781.0±98.788 mm at 1 month (P<0.01) after CXL, but increased to 805.08±136.06 mm at 3 months. Immunofluorescence microscopy revealed anterior stromal compaction in 7 of 12 patients (58.3%) in group A and in 5 of 12 patients (41.6%) in group B. Staining of keratocyte revealed a relative uniform distribution throughout the stroma an intact epithelium in all samples, suggesting that the epithelium had regrown in all cases after CXL.

In this study it was found that visual analog scales depicting ocular discomfort improved in both groups maximum being at 1 month. Visual analog scale scores at 3months, although greater than those at 1 month, were still lower than the preoperative values. This symptomatic relief probably resulted from CXL-induced stromal compaction and reduced bullae formation. The decrease in CCT could be attributed to the cross linking effect causing compaction in the early period, but the effect was not long lasting, probably because of decreased riboflavin diffusion across the highly edematous corneas.

CXL-induced stromal compaction is more evident in moderate compared with advanced stages of the disease and this probably was the result of reduced riboflavin diffusion into the thicker stroma. A limitation of the study is that patients with early manifestation of PBK were not included. So corneal CXL can be considered as a new tool in the armamentarium for the temporary reduction in corneal edema in patients with bullous keratopathy awaiting keratoplasty.

The Effect of Phacoemulsification on Intraocular Pressure in Medically Controlled Open-Angle Glaucoma Patients

Mark A. Slabaugh, Karin D Bojkian, Daniel B. Moore, and Philip P. Chen


This study was aimed to evaluate intraocular pressure (IOP) after phacoemulsification in patients with medically controlled open-angle glaucoma (OAG), and examine the association of biometric variables to IOP changes.

It was a retrospective case series. Medically well controlled open-angle glaucoma patients without prior incisional glaucoma surgery undergoing phacoemulsification by a single surgeon between January 1997 and October...
2011 were evaluated. Patient charts were reviewed to obtain demographic information, preoperative glaucoma medications, severity and treatment measures, and preoperative and postoperative IOP. Patients were identified who showed lowered or stable IOP at 1 year without any increase in medications or additional laser trabecuoplasty vs those who required additional medications or laser for IOP control, or whose IOP was higher after surgery with the same medication regimen. Additional analysis of patients who had no change in their medication regimen during the year following surgery regardless of their IOP response to phacoemulsification (n = 102) was also assessed.

A total of 157 eyes (157 patients) were included in the study. The average preoperative IOP of 16.3 ± 3.6 mm Hg decreased to 14.5 ± 3.4 mm Hg at 1 year (P < .001). Sixty eyes (38%) required additional medications or laser for IOP control within the first year postoperatively, or had a higher IOP at postoperative year 1 without medication change. Among eyes without postoperative medication changes (n = 102), higher preoperative IOP (P = 0.006), and deeper anterior chamber depth (P = 0.015) were associated with lower postoperative IOP.

In this study they found out the single greatest predictor of IOP change was the level of preoperative IOP, also a deeper anterior chamber preoperatively was associated with a greater IOP lowering effect after surgery when controlling for age and preoperative IOP. Though phacoemulsification resulted in a small average decrease in IOP in patients with POAG, a sizeable proportion of medically controlled glaucoma patients with open angles undergoing phacoemulsification experienced an increase in IOP or required more aggressive treatment to control IOP postoperatively. They were unable to detect any additional patient characteristics that might help predict which eyes will or will not obtain an IOP reduction from cataract surgery.

**Strategy for the Management of Uncomplicated Retinal Detachments.**

The European Vitreo-Retinal Society RetinalDetachmentStudyReport1

Ron A. Adelman, Aaron J. Parnes, Didier Ducournau

*Ophthalmology, 2013: 120 (9); 1804-08*

Objective of this study was to analyze the surgical strategy in RRD repair and success and failure in the treatment of uncomplicated rhegmatogenous retinal detachments (RRDs). The optimal treatment of rhegmatogenous retinal detachment (RRD) has been debated for decades. Retrospective and prospective studies in the literature, while demonstrating the overall high anatomic success rate of all methods, do not provide a consensus regarding the best procedure in terms of outcome. This study has the largest report of the treatment of retinal detachment in the literature.

It was a nonrandomized, multicenter retrospective study. One hundred seventy-six surgeons from 48 countries spanning 5 continents provided information on the primary procedures for 7678 cases of RRDs including 4179 patients with uncomplicated RRDs. Reported data included specific clinical findings, the method of repair, and the peri and postoperative complications. Main Outcome Measures were final failure of retinal detachment repair that is detached retina judged to be inoperable (level 1 failure rate), remaining silicone oil at the study’s conclusion (level 2 failure rate), and recurrence of the detachment and need for additional procedures to repair the detachment (level 3 failure rate)

4179 uncomplicated cases of RRD were included. Combining phakic, pseudophakic, and aphakic groups, those treated with scleral buckle alone (n = 1341) had a significantly lower final failure rate than those treated with vitrectomy, with or without a supplemental buckle (n = 2723; P = 0.04). When comparing those who underwent vitrectomy alone (without buckle) with those who underwent a scleral buckle procedure alone, the level 1 failure rate was not statistically significantly different (P = 0.134). In phakic patients, final failure rate was lower in the scleral buckle group compared with those who had vitrectomy, with or without a supplemental buckle (P = 0.028). In pseudophakic patients, the failure rate of the initial procedure was lower in the vitrectomy group compared with the scleral buckle group (P = 3x10-8). There was no statistically significant difference in failure rate between segmental (n = 721) and encircling (n = 351) buckles (P = 0.5). Those who underwent vitrectomy with a supplemental scleral buckle (n = 488) had an increased failure rate compared with those who underwent vitrectomy alone (n = 2235; P = 0.048). Pneumatic retinopexy was found to be comparable with scleral buckle when a retinal hole was present (P = 0.65), but not in cases with a flap tear (P = 0.034).

So to conclude from this study, in uncomplicated phakic eyes, scleral buckle alone can be considered as a good option. However, in pseudophakic eyes, there is no clear winner and the surgeon should consider higher risk of level 3 failure with scleral buckle versus higher risk of level 2 failure with vitrectomy. However, if a vitrectomy is to be
performed, these data suggest that a supplemental buckle is not helpful. There was no significant difference between segmental versus 360-degree buckle. Pneumatic retinopexy may be considered in cases of retinal detachment with grade 0 or grade A PVR and atrophic holes.

Limitation of this study has been that it had failure as a primary outcome measure instead of final visual acuity which would have been more enlightening. Another limitation is the short follow-up period. It is likely that level 2 failure rates would fall if the patients were followed up for longer periods. However it is a large scale study with participation of large number of surgeons from 48 countries with wide variety of techniques so that results are applicable to retinal surgeons worldwide.

Strategy for the Management of Complex Retinal Detachments

The European Vitreo-Retinal Society Retinal Detachment Study Report 2

Ron A. Adelman, Aaron J. Parnes, Jack O. Sipperley, Didier Ducournau

Ophthalmology. 2013: 120 (9); 1809-13

Objective of this study was to analyze the outcome of the treatment of complex rhegmatogenous retinal detachments (RRDs). Even though several retrospective and prospective studies have been done in the past no consensus has been reached regarding the optimal treatment of complex retinal detachment in each clinical situation. This is the largest study of its kind in the literature. Here they discuss the results of the treatment of RRDs in those eyes with PVR (grade B or grade C-1), choroidal detachment, significant hypotony, large or giant retinal tears, and macular holes.

Nonrandomized, multicenter, retrospective study. One hundred seventy-six surgeons from 48 countries spanning 5 continents reported primary procedures for 7678 RRDs. Reported data included clinical manifestations, the method of repair, and the outcome. Main Outcome Measures were failure of retinal detachment repair detached retina judged to be inoperable (level 1 failure rate), remaining silicone oil at the study’s conclusion (level 2 failure rate), and recurrence of the detachment or need for additional procedures to repair the detachments (level 3 failure rate).

The main categories of complex retinal detachments evaluated in this investigation were: (1) grade B proliferative vitreoretinopathy (PVR; n=917), (2) grade C-1 PVR (n=637), (3) choroidal detachment or significant hypotony (n=578), (4) large or giant retinal tears (n=1167), and (5) macular holes (n=153). In grade B PVR, the level 1 failure rate was higher when treated with a scleral buckle alone versus vitrectomy ($P=0.0017$). In grade C-1 PVR, there was no statistically significant difference in the level 1 failure rate between those treated with vitrectomy, with or without scleral buckle, and those treated with scleral buckle alone ($P=0.7$). The level 2 failure rate was substantially higher in the group who received a vitrectomy and had a high rate of remaining silicone oil ($P=0.0015$). Vitrectomy with a supplemental buckle had an increased failure rate compared with those who did not receive a buckle ($P=0.007$). Cases with choroidal detachment or hypotony treated with vitrectomy had a significantly lower failure rate versus treatment with scleral buckle alone ($P=0.0015$). Large or giant retinal tears treated with vitrectomy also had a significantly lower failure rate versus treatment with scleral buckle ($P=7\times10^{-8}$). There was no statistically significant difference in level 1 failure rate between tamponade with gas versus silicone oil in all the groups. In the macular hole group vitrectomy alone was used and here too no statistically significant difference in level 1 failure rate between tamponade with gas versus silicone oil was found.

The study results show that in grade B PVR, choroidal detachment, significant hypotony, a large tear, or a giant tear, vitrectomy is the procedure of choice. When grade C-1 PVR is present, no significant difference in the level 1 failure rate is seen when comparing vitrectomy with scleral buckle. Tamponade with either gas or silicone oil was comparable, although level 2 failure was high with silicone oil. In those detachments with grade C-1 PVR or large or giant retinal tears treated with vitrectomy, it seems that a supplemental scleral buckle may not be advantageous and actually may be associated with a higher level 1 failure rate than if vitrectomy alone is performed.

Limitations of this study was the usage of attachment of retina rather than final visual acuity as the primary outcome measure and short follow up time that tend to push up the numbers of level 2 failure. Additional prospective, randomized studies are needed to determine optimal treatment for these types of retinal detachments and to confirm these results.