

better be explained by other complications of prematurity, rather than the ROP therapy treatments.

**Methods:** Data is being collected both retrospective and prospectively via chart review of 100 preterm neonates. Information evaluated includes gestational age, birth weight, complications of prematurity that are known to increase risk for ROP and Bayley III scores through 2 years as available.

**Results:** Preliminary data includes untreated control group ( $n = 16$ ) and therapy group ( $n = 22$ ). Of the therapy group, 15 infants had bevacizumab monotherapy and 7 had laser plus bevacizumab. The results show that while those infants treated with therapy are younger ( $25.40 \pm 4.36$  therapy group vs  $27.49 \pm 3.15$  control group,  $P = 0.010$ ) and smaller ( $0.71 \pm 0.28$ , therapy group vs  $0.87 \pm 0.32$  control group,  $P = 0.049$ ) as compared to the untreated control group, the groups were not significantly different in incidence of chronic lung disease, intraventricular hemorrhage or the need for postnatal steroids. There were no significant differences in Bayley III subcategories over time, between the two groups. Trends in data indicate that there may be more significant ( $P = 0.007$ ) delays in language in infants who receive laser and bevacizumab therapy, as compared to bevacizumab therapy alone. In addition, there was a significant ( $P = 0.002$ ) trend that infants who received both laser and bevacizumab therapy has lower language and motor categories on the Bayley III as compared to those infants who did not require treatment.

**Discussion:** Infants who are more likely to require ROP treatment tend to have more independent risk factors for neurodevelopmental delays. In this pilot study, which is the first to compare ROP therapy to controls who do not receive therapy, there does not appear to be differences in short term neurodevelopmental outcomes associated with bevacizumab monotherapy treatment. Anti-VEGF therapy seems to be safe in the short-term, however, a longitudinal study is necessary to ensure the long-term neurodevelopmental outcomes.

**Conclusions:** In this pilot study, which is the first to compare ROP therapy to controls who do not receive therapy, there does not appear to be differences in short term neurodevelopmental outcomes associated with bevacizumab monotherapy treatment.

#### 060 FLEX-module optical coherence tomography (OCT)—expanding the reach of OCT in evaluating childhood glaucoma.

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**Introduction:** Objective evaluation of glaucomatous optic neuropathy with OCT can be limited by very young age, inability to cooperate, or technical challenges. The HRA+OCT Spectralis with Flex module (FLEX-OCT, Heidelberg, Germany) allows supine imaging under anesthesia. This is the first study to describe its use and feasibility in imaging childhood glaucoma.

**Methods:** Childhood glaucoma patients undergoing examination under anesthesia and/or surgical intervention were included in this ongoing prospective study. FLEX-OCT imaging of the posterior pole was performed. Images were analyzed for peripapillary retinal nerve fiber layer (pRNFL), Bruch membrane opening (BMO), and macular pathology.

**Results:** FLEX-OCT successfully imaged 60 affected eyes in 41 of 47 (87.2%) enrolled patients (mean age,  $5.0 \pm 5.0$ ; range, 0.06-22.5 years). Imaging failure (8 eyes [11.8%]) was attributed to imager-learning, media opacity, and technical factors. We evaluated the pRNFL global thickness, BMO, and macular appearance for 60, 40, and 51 affected eyes, respectively (mean image quality, 23.3 dB). Results were directly comparable to similarly-aged controls (mean pRNFL global thickness,  $83.4 \pm 33.1 \mu\text{m}$  vs  $107.6 \pm 10.3 \mu\text{m}$ ,  $P < 0.001$ ; mean BMO,  $1602 \pm 349 \mu\text{m}$  vs  $1525 \pm 212 \mu\text{m}$ ;  $P = 0.55$  for affected vs control eyes, resp.).

Macular pathology, present in 14 of 51 macular scans (27.5%), included abnormal foveal pit, epiretinal membrane, localized schisis, and paracentral acute middle maculopathy.

**Discussion:** FLEX-OCT allowed high-quality image acquisition and analysis comparable to tabletop OCT in patients who otherwise could not be imaged.

**Conclusions:** The future clinical application of FLEX-OCT is broad. Further studies may improve clinical management and understanding of childhood glaucoma-related pathophysiology.

#### 061 A comparison of respiratory outcomes after treatment for retinopathy of prematurity (ROP) with pan-retinal photocoagulation (PRP) or bevacizumab.

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**Introduction:** There are limited data detailing respiratory outcomes following treatment for ROP. We aimed to compare respiratory outcomes after treatment with PRP under general anesthesia to bevacizumab using bedside sedation.

**Methods:** Data on 139 consecutive patients treated for ROP from 2010 to 2018 at one institution were examined. The primary outcome measure was complete return to respiratory baseline 48 hours after treatment. Multivariable regression analysis was performed.

**Results:** 119 patients initially treated with PRP were less likely to return to their respiratory baseline by 48 hours compared to 19 patients initially treated with bevacizumab, odds ratio 0.18 (CI 0.05-0.67), when controlling for birth weight, gender and pre-procedure respiratory support or intubation. For patients treated with laser, a return to respiratory baseline occurred in 47 (39%), 62 (52%), and 93 (78%) at 24 hours, 48 hours and 7 days respectively, compared to 14 (73%), 15 (79%) and 19 (100%) at the same intervals for the patients treated with bevacizumab. Univariate analysis of patients treated with laser showed a significant correlation between not returning to respiratory baseline at 48 hours and lower birth weight, lower gestational age, lower postmenstrual age at treatment, and pre-procedure respiratory support, but no correlation with gender or multiple procedures.

**Discussion:** Infants in both groups were at risk of not returning to their pre-procedure respiratory baseline 48 hours after treatment.

**Conclusions:** Infants treated with bevacizumab using bedside sedation are more likely to return to pre-procedure respiratory baseline by 48 hours than infants treated with PRP under general anesthesia.

#### 062 Adult strabismus surgery outcomes with adjustable and nonadjustable sutures.

Siddharth Bhargava, David Shieh, Dan Liu, Jitka Zabal-Ratner, John W. Simon

**Introduction:** Previous series suggest adjustable sutures (AS) in adult strabismus surgery yield improved ocular alignment, better success rates, and fewer reoperations compared to nonadjustable sutures (NAS). We questioned whether this difference is clinically significant and whether it justifies the added time and discomfort required for AS.

**Methods:** We reviewed all available records of adults undergoing horizontal strabismus surgery by the last two authors between 2000 and 2014. Independently, the two surgeons developed a preference for NAS midway through the study period, permitting a comparison between the two treatment groups. The primary outcome was alignment in primary position two days after surgery and at last follow-up. The secondary outcome was success rate, defined as  $<10^\Delta$  residual or consecutive deviation at last follow-up. Reoperations were deemed failures.

**Results:** We included 175 patients, 57 with AS and 118 with NAS. No significant difference in primary alignment was noted between AS and NAS for esotropia ( $P = 0.60$  early;  $P = 0.17$  final) or for exotropia ( $P = 0.40$ , early;  $P = 0.11$ , final). Success rates were similar ( $P = 0.19$ ), and there was no significant difference in reoperation rates ( $P = 0.19$ ).

**Discussion:** Although we acknowledge limitations in this retrospective study, our results suggest that AS overall were not associated with improved alignment or surgical success in adults with esotropia or exotropia compared to NAS.

**Conclusions:** We believe adjustable sutures may be beneficial in cases involving uncertain restrictive or contractile forces, but we no longer use AS in routine cases.

**063 Socioeconomics of retinopathy of prematurity screening and treatment in the United States.** Shagun Bhatia, Lance Siegel, Rebecca Braverman, Robert Enzenauer, David Granet, Shira L. Robbins

**Introduction:** Retinopathy of prematurity (ROP) screening, an integral part of pediatric ophthalmology, is time consuming and resource intensive. The purpose of this study is to evaluate the socioeconomics of ROP screening and treatment amongst pediatric ophthalmologists in the United States.

**Methods:** An online survey was distributed to pediatric ophthalmologists in the U.S. Survey results were compiled and responses were deidentified and analyzed.

**Results:** A total of 97 responses were collected. Almost half of respondents worked in private practice settings. Over 75% of respondents had a formal contract to perform ROP care, but only 23% had the assistance of an attorney to negotiate their contract. Just over half of respondents felt adequately compensated for their services. The amount of time spent performing screenings and coordinating care varied greatly with about half of respondents spending more than 2 hours per week of administrative time coordinating ROP services. Most respondents enlisted both the hospital and their office staff to coordinate follow-up outpatient care.

**Discussion:** When compared to data from previous studies, it appears that more pediatric ophthalmologists are obtaining contracts for their services. Despite a larger percentage of pediatric ophthalmologists having contracts, the long-term risks and liability remain. Many expend large amounts of time tracking patients and coordinating outpatient care.

**Conclusions:** Our survey highlights that despite increased contractual agreements, concerns for under-compensation, time usage and large liability persist. This calls into question the sustainability of current models for providing ROP services for this vision threatening disease in a most vulnerable population.

**064 Psychosocial functioning in parents of patients with retinoblastoma.** Jana A. Bregman, Mary Louise Z. Collins, Carol L. Shields, Rachel Schewndeman, Chloe Koo, Elizabeth Elimimian, Jennifer Ford

**Introduction:** Prior work has established that parents of children with chronic illness suffer from higher levels of stress. However, few studies have examined the psychological health of parents of patients with ocular conditions, and none in retinoblastoma. This study examines stress, anxiety, and depression in parents of children with retinoblastoma.

**Methods:** Longitudinal, self-reported, study using validated instruments: Parental Stress Index 4 - Short Form (PSI-4), Beck Anxiety Inventory (BAI), and Beck Depression Inventory - II (BDI-II).

Knowledge Assessment (KA) and demographic forms were also administered to each parent (or legal guardian) at study enrollment and at 6 months post-enrollment.

**Results:** Of 121 study participants to date, 60% have children with unilateral disease and 23.7% were diagnosed within 6 months of enrollment. PSI-4 scores were significantly higher in cases of parental depression ( $P < 0.05$  and child developmental delay ( $P < 0.01$ ). A trend toward higher PSI-4 scores resulted with more time since treatment ( $P = 0.058$ ). BDI-II scores were significantly higher in the bilateral group ( $P < 0.05$ ). Overall KA scores were significantly lower in the bilateral group ( $P < 0.05$ ) with a majority incorrectly answering questions regarding risk of second malignant neoplasms and heritability ( $P < 0.05$  for both). An analysis of 6-month data is ongoing and will also be included.

**Discussion:** This study is the first to perform a longitudinal analysis of a comprehensive look at stress, anxiety and depression in parents of children with both newly diagnosed and treated retinoblastoma.

**Conclusions:** Both parent and patient factors impact stress and depression levels in parents of patients with retinoblastoma. Important retinoblastoma knowledge is lacking in certain patient subgroups. Ophthalmologists caring for retinoblastoma patients need to be aware of these risk factors to optimally care for their patients and families.

**065 The changing face of adult strabismus surgery.** Frederick R. Burgess, Alan O. Mulvihill

**Introduction:** Adult strabismus surgery rates increased by 24% in the UK from 2000-2014. This study aims to highlight changes in the subtypes of strabismus being operated on over the past decade.

**Methods:** Retrospective case study. All adults receiving strabismus surgery from 2008-2017 were included. All patients were operated on by one attending surgeon. Case notes were examined for demographic, diagnostic and operative data.

**Results:** A total of 492 operations were performed on 466 patients, with an average year-on-year increase in total number of adult strabismus operations of 16% over 10 years. Consecutive or residual strabismus remained the most common subtype throughout the study period and showed increasing rates as a percentage of all operations. Operative rates proportionately decreased for all other subtypes, except for those with esotropia or exotropia associated with myopia.

**Discussion:** Although the mainstay of adult strabismus surgery remains consecutive or residual strabismus, a new subtype emerged over the study period. That myopia is associated with late-onset esotropia (with lateral rectus weakness) is well known. We identified a subgroup of myopic patients presenting in early adulthood with a decompensating esophoria and diplopia. These patients responded well to surgery and now comprise a significant proportion of our operative workload. The authors hypothesise that use of smartphones and associated sustained convergence are partially responsible for this subgroup.

**Conclusions:** More research is needed into the effect of sustained convergence on those with myopia and esophoria. The nature of strabismus surgery is changing, which has implications for training and workforce planning.

**066 Differences in the microbiome by anatomic site with age.**

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**Introduction:** Recent publications have shown that the ocular surface microbiome (OSM) differs in adults and children. However little is known about how the composition of the microbiome of the