Oculofacial Plastic Surgery 2019

A Decade to Remember, 2010-2019

Program Directors
Richard C Allen MD PhD and Jeremiah P Tao MD

In conjunction with the American Society of Ophthalmic Plastic and Reconstructive Surgery

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The American Academy of Ophthalmology

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2019 Oculofacial Plastic Surgery Subspecialty Day Planning Group

On behalf of the American Academy of Ophthalmology and the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS), it is our pleasure to welcome you to San Francisco and **Oculofacial Plastic Surgery 2019: A Decade to Remember, 2010-2019.**

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Oculofacial Plastic Surgery 2019 Contents

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2019 Oculofacial Plastic Surgery Subspecialty Day Meeting Learning Objectives

Upon completion of this activity, participants should be able to:

- Identify modern, evidence-based algorithms in oculofacial plastic surgery disease treatment and determine how to effectively apply them
- Introduce into practice the contemporary management of congenital eyelid and orbital disease, orbital inflammatory disease, eyelid and orbital oncology, and orbital trauma
- Evaluate complex orbital and oculoplastics cases to understand treatment outcomes
- Gain familiarity with the practice patterns of experienced oculofacial practitioners and understand differences in preferred practice patterns

2019 Oculofacial Plastic Surgery Subspecialty Day Meeting Target Audience

The intended audience for this program is practicing oculofacial surgeons and comprehensive ophthalmologists from around the world with an interest in oculofacial surgery.

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2019 Oculofacial Plastic Surgery Subspecialty Day CME Credit

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Registrants whose attendance is verified at AAO 2019 will receive an email on **Monday, Oct. 14**, with a link and instructions on how to claim credit online. Attendees can use this link to report credits until **Wednesday, Oct. 30**.

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- CME credit reporting/proof-of-attendance letters
- Onsite registration receipt
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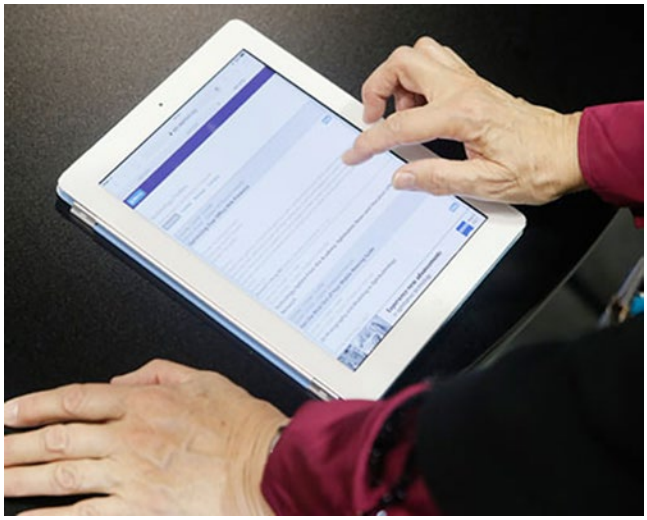
To submit an answer to a poll or ask the moderator a question during the meeting, follow the directions below.



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Oculofacial Plastic Surgery 2019: A Decade to Remember, 2010-2019

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SATURDAY, OCT. 12, 2019

7:00 AM	Continental Breakfast		
8:00 AM	Welcome and Introductions	Richard C Allen MD PhD* Jeremiah P Tao MD	

Section I: The Do's and Don'ts of Starting Your Cosmetic Practice

Moderator: Wendy W Lee MD*

8:05 AM	Making Your Patients Comfortable Before, During, and After Oculoplastic Surgery	John McCann MD PhD*	1
8:20 AM	The Fundamentals of Offering Dermal Fillers in Your Practice	Femida Kherani MD*	2
8:35 AM	Cosmetic Botulinum Toxin: The Basics of Offering This in Your Practice	Jill S Melicher Larson MD*	3
8:50 AM	Laser Resurfacing and Managing Pigmentation Issues	Julie A Woodward MD*	4
9:05 AM	Dermal Filler Complications	Rachna Murthy MBBS	7
9:20 AM	Discussion		
9:25 AM	REFRESHMENT BREAK and AAO 2019 EXHIBITS		

Section II: Pediatric Oculoplastics—Much More Than Child's Play

Moderator: Vikram D Durairaj MD*

9:55 AM	Managing Dacryocystocele and Dacryocystitis in the Pediatric Patient	William R Katowitz MD	8
10:10 AM	Pediatric Endoscopic Procedures	Angela M Dolmetsch MD*	9
10:25 AM	Frontalis Flap for Congenital Ptosis	Antonio Augusto Velasco Cruz MD	11
10:40 AM	Evaluation and Treatment of Vascular Malformations of the Orbit	Daniel B Rootman MD MSc	14
10:55 AM	Discussion		

Section III: Changing Paradigms in the Treatment of Orbital Disease

Moderator: Cat Burkat MD FACS*

11:00 AM	Are You AT the Table or ON the Menu?	Philip R Rizzuto MD FACS	16
11:05 AM	Fine-Needle Aspiration Biopsy for Orbital Tumors	Eva Dafgard Kopp MD PhD	18
11:20 AM	Help! The Neurosurgeon Wants Me to Assist in Skull Base Surgery	S Tonya Stefko MD	20
11:35 AM	Computerized Perioperative Planning and 3-D Printed Implants in the Repair of Complicated Periorbital Fractures	Paul D Langer MD*	21
11:50 AM	Treatment of Orbital Blowout Fractures: Rethinking Dogma	M Reza Vagefi MD	22
12:05 PM	The Use of Steroids in Orbital Cellulitis	Roman Shinder MD	23
12:20 PM	Discussion		
12:25 PM	LUNCH and AAO 2019 EXHIBITS		

* Indicates that the presenter has financial interest. No asterisk indicates that the presenter has no financial interest.

Section IV: Tearing—Much More Than Just a Watery Eye

Moderator: Michael T Yen MD

1:25 PM	When to Suspect Systemic Disease in Patients With Nasolacrimal Duct Obstruction	Rachel K Sobel MD	24
1:40 PM	Is Endoscopic DCR Now the Standard of Care?	Ronald Mancini MD	25
1:55 PM	Corneal Neurotization	Steven M Couch MD	26
2:10 PM	Case Presentations		
2:25 PM	Discussion		

Section V: New Procedures in Your Toolbox for Eyelid Reconstruction

Moderator: Dan Georgescu MD

2:30 PM	Eyelid Reconstruction: Techniques You Can Depend On	Mark J Lucarelli MD FACS	27
2:45 PM	Is Urinary Bladder Matrix "Magic Dust"?	Mark A Alford MD	28
3:00 PM	Tightening It Where It Counts: Canthal Reconstruction	Anne Barmettler MD	29
3:15 PM	Case Presentations		
3:30 PM	Discussion		
3:35 PM	REFRESHMENT BREAK and AAO 2019 EXHIBITS		

Section VI: Medical Advances That May Put the Orbital Surgeon Out of Business

Moderator: Louise A Mawn MD

4:05 PM	Introduction to Molecularly Targeted Agents	Suzanne K Freitag MD*	30
4:20 PM	Vismodegib and Sonidegib in the Treatment of Basal Cell Carcinoma	Alon Kahana MD PhD*	31
4:35 PM	PD-1 Inhibitors in the Treatment of Eyelid/Orbital Malignancy	Bita Esmaeli MD FACS	32
4:50 PM	Monoclonal Antibodies in the Treatment of Orbital Inflammation	Diego Strianese MD PhD	33
5:05 PM	Controversies in Thyroid Eye Disease	Jonathan C P Roos MA MB BChir PhD	35
5:20 PM	Discussion		
5:25 PM	Closing Remarks	Richard C Allen MD PhD* Jeremiah P Tao MD	
5:27 PM	Adjourn		

* Indicates that the presenter has financial interest. No asterisk indicates that the presenter has no financial interest.

Making Your Patients Comfortable Before, During, and After Oculoplastic Surgery

John D McCann MD PhD

NOTES

The Fundamentals of Offering Dermal Fillers in Your Practice

Femida Kherani MD

NOTES

Cosmetic Botulinum Toxin: The Basics of Offering This in Your Practice

Jill Melicher MD

I. Training Yourself
   A. Meet with your local product reps to strategize on buying product and marketing.
   B. Attend a course outside of or within your community.
   C. Decide what you are comfortable treating.
      1. Know your limitations and comfort level.
      2. Develop a referral strategy for patients and visit their offices to ensure your principles align: laser, intense pulsed light, cosmetic skin care, face lift, rhinoplasty, abdominoplasty

II. Marketing
   A. Internal marketing
      1. Pamphlets
      2. Video promotions in the waiting areas
      3. Product events
   B. External marketing
      1. Social media
      2. Music streaming
      3. Print
      4. Sponsorships
      5. Donations to community events to generate word of mouth advertising

III. Patient Consultation and Education
   A. Anatomy overview
   B. Pros and cons of toxin injection
   C. Basic treatment principles
   D. Injection mapping

IV. Follow-up With Recall and Scheduling
   A. Phone call follow-up
   B. Recall follow-up with prompt scheduling

Laser Resurfacing and Managing Pigmentation Issues

Lasers in the Periocular Area and Management of Periocular Postinflammatory Hyperpigmentation

Julie Woodward MD

I. Vaporize, Not Burn
   A. In less than thermal relaxation time of skin = 1 ms
   B. 10,600 nm: Alma, Candela, Cynosure, DEKA, Energist, Lasering, Lumenis, Lutronic, Quantel, Rohrer, Solta, Syneron
   C. 2940 nm: Alma, Asclepion, Focux Med, Fotona, Con Bio, Palomar, Quantel, Sciton, Aerolase

II. Lasers and E-Based Devices
   A. Incisional laser surgery
   B. Ablative lasers
   C. Nonablative lasers
   D. Vascular lasers
   E. Tattoo lasers
   F. Microfocused ultrasound
   G. Radiofrequency
   H. Intense pulsed light (IPL) or broadband light (BBL)

III. Barbie Is 59
   A. Incisional laser surgery
   B. Ablative lasers
   C. Nonablative lasers
   D. Vascular lasers
   E. Tattoo lasers
   F. Microfocused ultrasound
   G. Radiofrequency
   H. IPL or BBL

IV. Two Types of Practices

V. CO_2 Fluence in J/cm^2

VI. Fractional Histology

VII. One Year Postop: Fractional CO2 / Feathering

VIII. Melanin and Erythema Values Pre- and Postoperatively After Bilateral Transconjunctival Lower Lid Blepharoplasty With Lower Lid Ablative CO2 Laser Skin Resurfacing

IX. Handheld Reflectometer

X. Take-home
   A. Traditional and fractional CO^2 lasers are safe for treatment around the inferior orbital rim in Fitzpatrick skin types I-III.
   B. Minimal and temporary post-laser hyperpigmentation can occur at 4-6 weeks after procedure.

XI. Pigmentary Changes

XII. Pigment Production and Distribution
   A. Melanin is formed in the melanocytes, and then stored in the melanosomes.
   B. There are 32 basal cells per melanocyte.
   C. Melanocytes transfer melanosomes into the keratinocytes.
   D. Eumelanin is responsible for the brown/black pigment in the skin and is the most common form of melanin.

XIII. Anatomy of Hyperpigmentation

XIV. Post-inflammatory hyperpigmentation (PIH)

XV. How They Work

XVI. Lasers

XVII. E devices

XVIII. Chemicals

XIX. UV light

XX. Visible Light – Blue

XXI. Acne, Inflammatory Conditions

XXII. How Do They Work?

XXIII. Hyperpigmentation: Lighteners 30+compounds!

XXIV. Common Antipigment Compounds

XXV. Hydroquinone Risks

Hydroquinone has major limiting factors:

   A. Photosensitizing
   B. Phototoxic
   C. Builds resistance over time
   D. No benefit of long-term incremental use
   E. Risk of side effects; ochronosis
   F. Liver and thyroid cancer in rats

XXVI. Exfoliants Retinoids

A. Vitamin A derivatives

B. 1913: vitamin A discovered (cod liver oil and butterfat)

C. 1943: first published use of retinol in acne

D. 1959: all-trans-retinoic acid (tretinoin) first used to treat acne

E. 1986: Kligman et al; tretinoin on photoaged skin

XXVII. Retinoids

Inhibit melanosome transfer, stimulate keratinocyte turnover.

XXVIII. Tranexamic Acid (TXA)

A. 1979: Anti-fibrinolytic agent and menorrhagia

B. It was noticed that patients treated with TXA for chronic urticaria noticed improvement of their melasma.

C. A synthetic analog of the amino acid lysine

D. Inhibits the transformation of plasminogen to plasmin, which degrades fibrin inhibiting the release of inflammatory mediators, specifically prostaglandins, arachidonic acid

E. TXA types

1. 2% cream
2. 3% serum
3. Oral 325 mg PO b.i.d.

F. Off label, FDA approved for menorrhagia and hemophilia

G. Risk DVT? Contraindicated in thromboembolic disease or embolic disease; case reports (2000 mg); women with pre-existing conditions

H. No laser but pigmentation: Oral TXA 325 mg per day, 4x pigmented corrector, sunscreen

XXIX. Antioxidants

A. Vitamin C

1. L-ascorbic acid – skin
2. Anti-inflammatory, inhibits B-fibroflast growth factor

B. Other antioxidants

1. Vitamin C: aqueous vs. THC lipid soluble; also skin lightener
2. Green tea polyphenols: erythema, number of sunburn cells, immunosuppression, and DNA damage
3. Niacinamide: vitamin B3 and melanosome transfer
4. Idebenone: ubiquinone analog
5. CoffeeBerry, Revale: rich in polyphenols, anti-inflammatory
6. Genistein: from soybeans
7. Resveratrol

XXX. Lignan Peroxidase

A. Mechanism of action of lignin peroxidase as cosmetic lightening agent

Step 1 Oxidation of LiP by hydrogen peroxide

Step 2 Reduction of oxidized LiP by 1 molecule of veratryl alcohol (VA)

Step 3 Oxidation of melanin

Step 4 Inactivation of LiP by change in pH to become a simple glycoprotein

Step 5 Hydrolysis of glycoprotein into amino acids by proteases and other glycosidases naturally present in the skin

B. Lignin peroxidase safety

1. No risk of carcinogenicity → Reverse Mutation Assay
2. Non irritating to eyes → Mucous Membrane Toxicity Test
3. No safety concerns → Acute Dermal Toxicity Study
4. No irritation to naïve skin → Primary Skin Irritation Study
5. No irritation with re-use → Cumulative Irritation Study
6. No irritation to sensitized skin → Human Repeated Insult Patch Test

XXXI. Bleach: Lignin Peroxidase and PIH

Assessment done via clinical grading and mexameter evaluation

XXXII. Sunscreen

Deadly damage around the eye; sun protection is essential.

A. FDA only allows claim of SPF 50.

B. Up to 10% of all skin cancers occur in the eye lid region, while it comprises less than 1% of total body skin.

C. Caucasian

XXXIII. Novel Laser and Energy-Based Devices in Periocular Area
   A. Laser incisions – 10,600 nm
   B. 125-mm handpiece
   C. 0.2 mm

XXXIV. "Laser Blepharoplasty" Realself – 60 – Nearly All Said =
   A. Laser incisions
   B. Precise
   C. Hemostasis
   D. Clear view anatomy
   E. Saves time (staff)

XXXV. Other Uses: Repair Lash Ptosis

XXXVI. RF With Microneedling
   A. RF
   B. RF vs. laser

XXXVII. Festoons
   A. Bleph
   B. Tarsal strip
   C. Laser
   D. Microneedling RF

XXXVIII. Microfocused Ultrasound

XXXIX. Tattoo Lasers - QS or Pico

XL. Vascular Laser

XLI. IPL or BBL

XLII. BBL

Dermal Filler Complications

Applications, Implications, and Complications

Rachna Murthy MB BS

The use of dermal filler in the periocular area is increasing for both functional and aesthetic indications. Hyaluronic acid (HA) fillers dominate this growing multibillion dollar market.

Applications and Implications

These treatments offer an alternative to some oculoplastic surgical procedures. Results are rapid, with minimal downtime and low complication rates. HA is biodegradable and has limited potential for immunogenic reactions. However, patient, product, and procedure selection can influence outcomes.

There has been a paradigm shift in the way fillers are applied, with a move away from the treatment of superficial lines and rhytids to deeper volumization of tissues. However, placing larger volumes in deeper planes also increases the risk of serious complications.

Complications

Fortunately, most adverse reactions are transient and mild. In the periocular area, the product may last significantly longer than the expected filler lifespan and can migrate from elsewhere. Delayed-onset inflammatory reactions to all HA products have been reported. Vascular occlusion is a rare but serious complication. As branches of the ophthalmic artery anastomose with many other arteries in the face, intravascular injection at sites distant from the eye can risk visual loss; cases of blindness secondary to facial filler injections are difficult to treat.

The role of hyaluronidase in cases of vision loss remains controversial because of a paucity of evidence in the medical literature. Although hyaluronidase may be able to cross vessel walls, in vitro studies of fresh human post-enucleation optic nerve specimens have confirmed that hyaluronidase cannot penetrate the optic nerve to reach HA embolus in the central retinal artery.

HA fillers are an important addition to the armamentarium of the oculofacial surgeon, and their use in the aesthetic field is likely to continue to rise. Armed with knowledge of facial anatomy, safe injection planes, and means of minimizing and treating complications, oculoplastic surgeons will continue to find them a safe and effective treatment modality.

Selected Readings

1. Tan P, Kwong TQ, Malhotra R. Non-aesthetic indications for periocular hyaluronic acid filler treatment: a review. *Br J Ophthalmol*. 2018; 102:725-735.
2. Heydenrych I, Kapoor KM, De Boulle K, et al. A 10-point plan for avoiding hyaluronic acid dermal filler-related complications during facial aesthetic procedures and algorithms for management. *Clin Cosmet Investig Dermatol*. 2018; 11:603-611.
3. Mustak H, Fiaschetti D, Goldberg RA. Filling the periorbital hollows with hyaluronic acid gel: long-term review of outcomes and complications. *J Cosmet Dermatol*. 2018; 17(4):611-616.
4. Funt D, Pavicic T. Dermal fillers in aesthetics: an overview of adverse events and treatment approaches. *Clin Cosmet Investig Dermatol*. 2013; 6:295-316.
5. Chatrath V, Bannerjee PS, Goodman G, Rahman E. Soft-tissue filler-associated blindness: a systematic review of case reports and case series. *Plast Reconstr Surg Glob Open*. 2019; 7(4):e2173.
6. Beleznay K, Carruthers JDA, Humphrey S, Carruthers A, Jones D. Update on avoiding and treating blindness from fillers: a recent review of the world literature. *Aesthet Surg J*. 2019; 39(6):662-674.

Managing Dacryocystocele and Dacryocystitis in the Pediatric Patient

William R Katowitz MD

I. Causes of Nasolacrimal Duct Obstruction (NLDO) in Pediatric Patients
   A. Congenital NLDO (CNLDO)
   B. Acquired
II. Timing of Surgical Repair
   A. Types of CNLDO
   B. Dacryocystocele
   C. Dacryocystitis
III. The Presence of an Intranasal Cyst
   A. Risk factors
   B. Treatment
IV. The Approach to an Infected Tear System in Pediatric Patients
   A. Neonatal dacryocystitis
   B. Pediatric dacryocystitis
V. Surgical Advances
   A. The microdebrider
   B. The bone aspirator
VI. A Treatment Algorithm for Pediatric CNLDO, Including Dacryocystoceles and Dacryocystitis

Pediatric Endoscopic Procedures

Endoscopic Lacrimal Surgery in Children

Angela Maria Dolmetsch MD

Introduction

Nasal endoscopy is a very useful adjunct in pediatric lacrimal surgery, and it certainly has shed light on our understanding of the physiopathology of congenital nasolacrimal duct obstruction (CNLDO). A common problem, CNLDO is reported to occur in 5% to 20% of newborn infants and is frequently associated with prematurity. It can be unilateral or bilateral, and there doesn't seem to be any gender predilection. Spontaneous resolution occurs in 95% of infants. However, intervention is usually required for persistent symptoms.

Background

Traditionally, CNLDO has been managed in a stepwise approach, with massage for the first 6 months to a year of age. If this fails, a blind probing is performed around the age of 1. If tearing persists, a second blind probing or a balloon catheter dacryocystoplasty is performed. If the child continues to tear, intubation is considered. If this fails, a dacryocystorhinostomy (DCR), external or endoscopic, is performed, usually around the age of 5. Several studies have shown that 80%-90% of children with CNLDO will have spontaneous resolution by the age of 1 with Crigler massage alone. Therefore, this is definitely recommended as a first step.

If massage is ineffective, probing under general anesthesia is usually considered after 1 year of age. It is not recommended before 12 months, not only because of the likelihood of spontaneous resolution but also because of the adverse effects of general anesthesia in infants younger than 1 year of age, such as ADHD and learning disabilities. Office probing is not recommended because of pain and false passages. However, there are exceptions to delaying surgical intervention, such as acute nonresponsive dacryocystitis with multiple hospital admissions, which carries a risk of systemic infection in very young infants or respiratory distress associated with large nasal mucoceles.

Probing is usually a blind procedure with a success endpoint of metal-to-metal contact and/or patent irrigation. Intubation is also performed in a blind fashion, frequently causing damage to the turbinates and delicate nasal structures. DCR is often delayed until the child is older and is most often performed externally, leaving an unsightly scar.

Current Trends in Lacrimal Surgery in Children

Endoscopic-assisted probing and irrigation have many advantages over the traditional method. It allows visualization of anomalies at the level of the Hasner valve that can be corrected at the same time. In this way, no further intervention is required and the number of surgical procedures under general anesthesia is reduced. Additionally, bleeding and damage to the nasal mucosa and turbinates is minimized, and postoperative symptoms are milder. Interestingly, endoscopic-assisted probing can be successful even in children older than 24 months and up to 8 years of age, as has been demonstrated in several studies.

Intubation is generally not necessary. However, when performed endoscopically it is easier and less traumatic. It is recommended if canalicular stenosis is present, if probing is difficult and complete removal of nasal flaps is not possible, or when mild bony stenosis of the NLD is encountered during probing. However, if a bony obstruction or severe bony stenosis is found during probing, the likelihood of success is low, even if intubation is performed. It is preferable to do an endoscopic DCR, which has a success rate of 90%-95%, and avoid another surgical procedure under general anesthesia.

Endoscopic DCR has several advantages over the external technique. There is no visible scar, the lacrimal pump and medial canthal structures are preserved, the procedure is faster with a more comfortable postoperative period, there is minimal bleeding and no bruising. It can also be performed in the presence of acute dacryocystitis and as a simultaneous bilateral procedure. A very nice study published a couple of years ago showed a 95% success rate using a one-stage obstruction-based approach to CNLDO—that is, performing probing, intubation, or DCR according to endoscopic findings.

Conclusions

- If possible, wait after 1 year of age for surgery in CNLDO in children.
- Nasal endoscopy reduces trauma to the delicate pediatric intranasal structures during probing and intubation.
- Nasal endoscopy allows direct visualization of inferior meatus and inferior turbinate anomalies, which can be corrected at the same time.
- The success rate of pediatric NLDO intervention is *not* dependent on the age of the patient. It depends on the type and site of the obstruction (bony or mucosal) visualized endoscopically.
- Endonasal endoscopic DCR is a safe and successful procedure in children and should be performed when bony obstruction is found during probing.
- Treatment of CNLDO should be attempted as a one-step procedure.

Selected Readings

1. Takahashi Y, Kakizaki H, Chang W, Selva D. Management of congenital nasolacrimal duct obstruction. *Acta Ophthalmol.* 2010; 88(5):506-513.
2. Castelo Branco Neto E, Castelo Branco B, Cardoso CC, Carvalho RG, Mota E, Castelo Branco A. [Management of congenital nasolacrimal duct obstruction.] *Arq Bras Oftalmol.* 2009; 72(1):75-78.
3. Ing C, DiMaggio C, Whitehouse A, et al. Long-term differences in language and cognitive function after childhood exposure to anesthesia. *Pediatrics* 2012; 130(3):e476-485.

4. Byrne MW, Ascherman JA, Casale P, Cowles RA, Gallin PF, Maxwell LG. Elective procedures and anesthesia in children: pediatric surgeons enter the dialogue on neurotoxicity questions, surgical options, and parental concerns. *Neurosurg Anesthesiol.* 2012; 24(4):396-400.

5. Galindo-Ferreiro A, Khandekar R, Akaishi PM, et al. Success rates of endoscopic-assisted probing compared to conventional probing in children 48 months or older. *Semin Ophthalmol.* 2018; 33(3):435-442.

6. Alañon-Fernandez MA, Alañon Fernandez FJ, Martínez-Fernández A, et al. [Comparative study of primary intention lacrimal probing with and without nasal endoscopy.] *Acta Otorrinolaringol Esp.* 2014; 65(5):297-301.

7. Theodoropoulou S, Sutherland MS, Haddow K, Blaikie A. Success rates of endoscopic-assisted probing for congenital nasolacrimal duct obstruction in children. *J Laryngol Otol.* 2013; 127(8):794-798.

8. Kashkouli MB, Abtahi MB, Sianati H, et al. A novel one-stage obstruction-based endoscopic approach to congenital nasolacrimal duct obstruction. *Ophthal Plast Reconstr Surg.* 2017; 33(5):350-354.

9. Kominek P, Cervenka S, Matousek P, Pniak T, Zelenik K. Primary pediatric endonasal dacryocystorhinostomy a review of 58 procedures. *Int J Pediatr Otorhinolaryngol.* 2010; 74(6):661-664.

10. Dolmetsch AM, Gallon MA, Holds JB. Nonlaser endoscopic endonasal dacryocystorhinostomy with adjunctive MMC in children. *Ophthal Plast Reconstr Surg.* 2008; 24(5): 390-393.

11. Chan W, Wilcsek G, Ghabrial R, et al. Pediatric endonasal dacryocystorhinostomy: a multicenter series of 116 cases. *Orbit* 2017; 36(5):311-316.

12. Celenk F, Mumbuc S, Durucu C, et al. Pediatric endonasal endoscopic dacryocystorhinostomy. *Int J Pediatr Otorhinolaryngol.* 2013; 77(8): 1259-1262.

Frontalis Flap for Congenital Ptosis

Antonio Augusto V Cruz MD

Introduction

The surgical management of congenital ptosis is difficult, especially when the function of the levator palpebral superioris (LPS) muscle is poor or absent. In these cases the LPS is almost entirely substituted by fatty-fibrous tissue, and the attempts to lift the lid with large amounts of LPS resection is technically difficult and may lead to complications such as contour and lash ptosis.[1]

Frontalis slings have been traditionally adopted as the best alternative to lifting the lid margin when LPS surgery is not possible or has failed. The rationale of the frontalis sling is to use a suspensory material to raise the lid margin and at the same time transmit the contractile action of the frontalis muscle (FM) to the ptotic lid.

A frontalis flap is a third option that has been used mainly by Asian surgeons[2] to manage congenital ptosis. In this surgery the lid is suspended by directly suturing the FM to the tarsal plate.

The Technique

The surgery can be performed in different ways.[2] The technique described here is how we do the procedure in our service.

A conventional lid crease incision is employed to expose the upper border to the tarsus. Next, the orbital septum is opened in order to allow a cephalad dissection on the preaponeurotic plane until the superior orbital rim is reached (Figure 1). At this point, the plane of the dissection changes. The orbital portion of the orbicularis muscle is opened, and the dissection progresses toward the FM in the subcutaneous space. At the brow level, as the skin is separated from the FM, the surgeon is able to recognize the vertical fibers of the FM (Figure 2). There is no need to dissect a large area on the frontal region. We usually stop the FM exposure 10 mm above the upper border of the brow. Two small vertical medial and lateral back cuts are used to release the FM, which is also separated from the underlying retro-orbicular oculi fat. It is important to avoid incising the FM laterally in order to preserve its motor innervation.

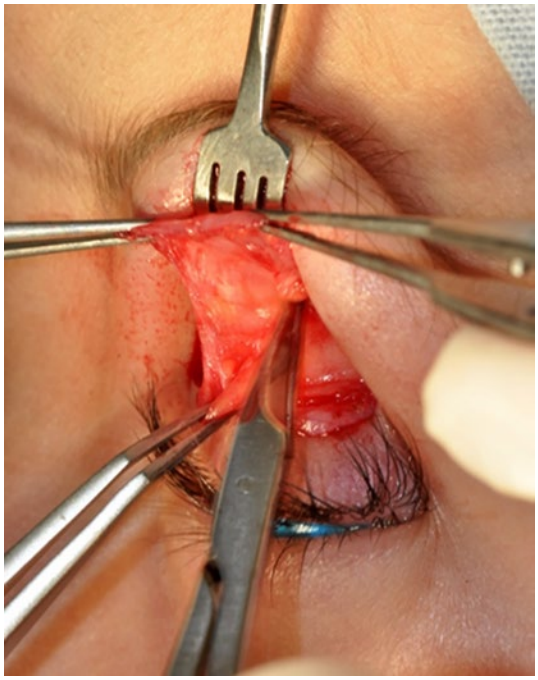

Figure 1. Suborbicularis dissection up to the superior orbital rim level.

Figure 2. Subcutaneous isolation of the frontalis muscle.

The FM flap is then secured to the upper border of the tarsus with 2 or 3 mattress 5.0 nonabsorbable (Mersilene) sutures. Before the sutures are tied, the contour and lid position are checked. We recommend placing the lid margin at the level of the upper corneal limbus.

The short-term outcomes of the procedure are uniformly good. Although a 1- or 2-mm lid drop has been observed in all cases, the patients have nice control of the marginal reflex distance-1 level with minimal amounts of evidence. Lagophthalmos is not common. (See Figures 3 and 4.)

Results: Level of Evidence

Western surgeons have little experience with frontalis advancement flaps. Ramon Medel from Spain is probably the only non-Asian surgeon who routinely employs this procedure to correct congenital ptosis.[3] A literature review shows that from 1988 to 2017, 19 articles have been published, reporting a median number of 37 patients with congenital ptosis operated with frontalis flaps.[3-20] The median or mean follow-up times range from 6 to 64 months. Undercorrection is the main complication reported, with a mean rate of 12.1%.

These data show that the level of evidence of the usefulness of the procedure is based on case series with variable follow-up. There are no data comparing the frontalis flap and a more conventional type of surgery such as silicone of autogenous fascia slings.

Conclusions

Frontalis flaps constitute an interesting option for the management of congenital ptosis with poor LPS function. The procedure is fast and does not require the use of a foreign material or the removal of autogenous tissue at another operation site. However, the rate of undercorrection occurring with time is critical information that is still missing. Since a normal person blinks about 20 times per minute, in any type of ptosis surgery there is a constant downward stress on the lid margin that tends to diminish the suspension effect of the surgery. While in conventional slings the strain induced by orbicularis contraction is applied mainly to the suspensory material used to lift the lid, in frontalis flaps it is the muscle itself that is subjected to this force. The rate of undercorrection with time is a question that needs to be answered.

Figure 3. Left: Unilateral congenital ptosis. Right: Immediate postop with hypercorrection.

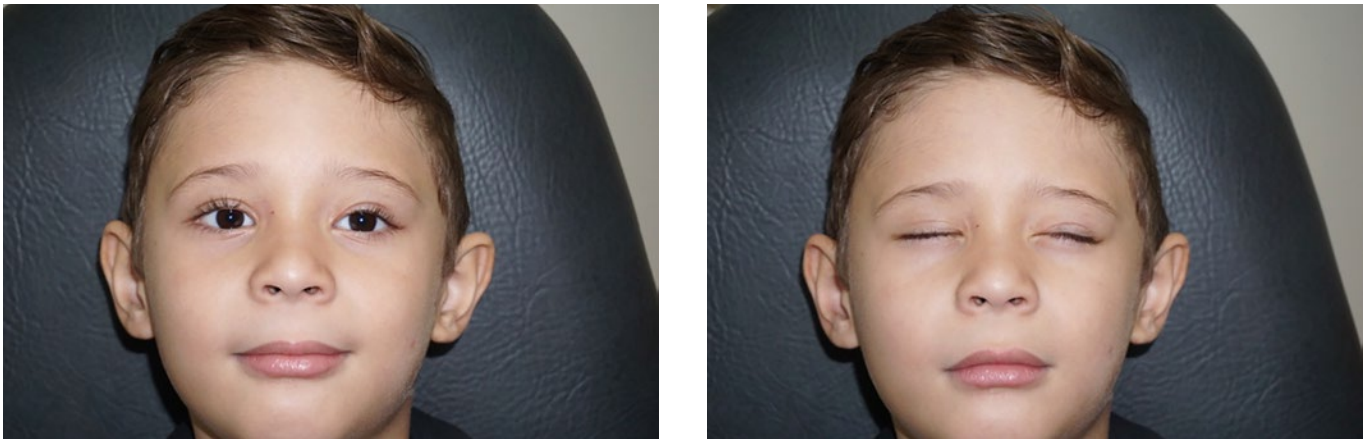

Figure 4. Left: One year after surgery, lid position and contour are acceptable with no lagophthalmos (right).

References

1. Cruz AA, Akaishi PM, Mendonca AK, Bernadini F, Devoto M, Garcia DM. Supramaximal levator resection for unilateral congenital ptosis: cosmetic and functional results. *Ophthalmic Plast Reconstr Surg.* 2014; 30(5):366-371.
2. Cruz AAV, Akaishi A. Frontalis-orbicularis muscle advancement for correction of upper eyelid ptosis: a systematic literature review. *Ophthalmic Plast Reconstr Surg.* 2018; 34(6):510-515.
3. Medel R, Vasquez L, Wolley Dod C. Early frontalis flap surgery as first option to correct congenital ptosis with poor levator function. *Orbit* 2014; 33(3):164-168.
4. Zhou LY, Chang TS. Frontalis myofascial flap from the eyebrow region for the correction of ptosis of the upper eyelid. *Eur J Plast Surg.* 1988; 11:73-78.
5. Han K, Kang J. Tripartite frontalis muscle flap transposition for blepharoptosis. *Ann Plast Surg.* 1993; 30(3):224-232.
6. Park DH, Ahn KY, Han DG, Baik BS. Blepharoptosis repair by selective use of superiorly based muscle flaps. *Plast Reconstr Surg.* 1998; 101(3):592-603.
7. Zhang HM, Sun GC, Song RY, et al. 109 cases of blepharoptosis treated by forked frontalis muscle aponeurosis procedure with long term follow-up. *Br J Plast Surg.* 1999; 52(7):524-529.
8. Park DH, Choi SS. Correction of recurrent blepharoptosis using an orbicularis oculi muscle flap and a frontalis musculofascial flap. *Ann Plast Surg.* 2002; 49(6):604-611.
9. Park DH, Choi WS, Yoon SH, Shim JS. Comparison of levator resection and frontalis muscle transfer in the treatment of severe blepharoptosis. *Ann Plast Surg.* 2007; 59(4):388-392.
10. Pan Y, Zhang H, Yang L, et al. Correction of congenital severe ptosis by suspension of a frontal muscle flap overlapped with an inferiorly based orbital septum flap. *Aesthetic Plast Surg.* 2008; 32(4):604-612; discussion, 613.
11. Bagheri A, Ahadi H, Babsharif B, Salour H, Yazdani S. Direct tarsus to frontalis muscle sling without flap creation for correction of blepharoptosis with poor levator function. *Orbit* 2012; 31(1):48-52.
12. Hou D, Li G, Fang L, Li B. Frontalis muscle flap suspension for the correction of congenital blepharoptosis in early age children. *PLoS One* 2013; 8(1):e53185.
13. Lai CS, Chang KP, Lee SS, et al. The role of frontalis orbicularis oculi muscle flap for correction of blepharoptosis with poor levator function. *Ann Plast Surg.* 2013; 71 suppl 1:S29-36.
14. Nagpal RC, Groover A, Maitreva A, Baradur H. Frontalis muscle flap as sling in servere ptosis. *Asian J Ophthalmol.* 2013; 3:95-100.
15. Park DD, Ramadhan A, Han DG, et al. Comparison of blepharoptosis correction using Muller-aponeurosis composite flap advancement and frontalis muscle transfer. *Plast Reconstr Surg Glob Open.* 2014; 2(8):e200.
16. Zhong M, Jin R, Li Q, Duan Y, Huang L, Yu D. Frontalis muscle flap advancement for correction of severe ptosis under general anesthesia: modified surgical design with 162 cases in China. *Aesthetic Plast Surg.* 2014; 38(3):503-509.
17. Liu HP, Shao Y, Li B, Yu X, Zhang D. Frontalis muscle transfer technique for correction of severe congenital blepharoptosis in Chinese patients: an analysis of surgical outcomes related to frontalis muscle function. *J Plast Reconstr Aesthet Surg.* 2015; 68(12):1667-1674.
18. Song X, Jia R, Zhu H, et al. A modified staged surgical intervention for blepharophimosis-ptosis-epicanthus inversus syndrome: 125 cases with encouraging results. *Ann Plast Surg.* 2015; 74(4):410-417.
19. Li J, Dong C, Liu X, He W. Treatment of children with congenital severe blepharoptosis by frontalis aponeurosis flap advancement under general anesthesia in a single incision. *J Craniofac Surg.* 2017; 28(6):1495-1497.
20. Wang T, Li X, Wang X, et al. Evaluation of moderate and severe blepharoptosis correction using the interdigitated part of the frontalis muscle and orbicularis oculi muscle suspension technique: a cohort study of 235 cases. *J Plast Reconstr Aesthet Surg.* 2017; 70(5):692-698.

Evaluation and Treatment of Vascular Malformations of the Orbit

Daniel B Rootman MD MSc

Introduction

Orbital and periorbital venolymphatic malformations have a wide range of manifestations. A comprehensive understanding of each patient's unique lesion is vital in developing a treatment approach. Important characteristics in this process relate to the classification and vascular composition of the lesion, flow and drainage patterns, anatomic localization, and association with distant components. Options for treatment include sclerotherapy, biologic therapy, embolization, and surgical excision, or some combination thereof.

Classification

The most recent International Society for the Study of Vascular Anomalies (ISSVA) classification, from 2014,[1] emphasizes[2-4] again the distinction between vascular tumors and malformations. The newer classification increasingly recognizes vascular malformations as a spectrum of disease, composed to varying degrees of venous, lymphatic, and arterial tissue in a matrix of combinations. Flow physiology can be complex, with higher and lower flow regions existing in the same lesion.

Lymphatic components are further described in terms of morphology and can be macrocystic (large, individually distinguishable cysts), microcystic (indistinguishable individual cysts), or a combination thereof. They have virtually no flow, and fluid can stagnate for hours or days. Physiology is more critical for a venous component, which can be distensible (dilate with Valsalva), nondistensible, or cavernous.[5] Each has specific implications in the minimally expansile orbit.

Anatomically, lesions may be eyelid limited (draining into the eyelid/facial venous system), orbit limited (draining into normal orbital veins), complex extracranial (draining into facial plexuses), intracranial (draining into the cranial sinuses), or any combination thereof.

Management

Management can be conceptualized in terms of the various tools available and their application to the constituent components of the lesion. Sclerotherapy, biologic therapy, embolization, and surgery can all be combined with varying technical approaches to target aspects of an individual lesion in an anatomically safe and physiologically appropriate manner.

Sclerotherapy

Sclerotherapy involves intralesional injection of an irritant, leading to endothelial damage, thrombosis, and eventual fibrotic closure of the lumen.[6] Sclerotherapy can be utilized in a range of scenarios. Macrocystic lymphatic elements may be approached directly or percutaneously, with cycles of aspiration and impregnation. Microcystic lesions cannot be aspirated, and the tissue is instead flooded with the sclerosant.

Sclerotherapy can also be effective for certain venous lesions. These cases typically require endovascular visualization. Small, successive aliquots of sclerosant with high concentration at the point of injection and dilution downstream can be used for anteriorly located lesions with drainage away from critical structures. Sclerosis of higher-risk components can be performed by controlling outflow via endovenous placement of a balloon catheter in the drainage pathway and direct or retrograde injection of sclerosant. However, vascular elements with higher flow tend to recanalize and recur despite several sessions of sclerosis,[6] often necessitating an alternative treatment strategy.

Biologic therapy

Biologic therapy is an extension of sclerotherapy involving intralesional and/or intravenous infusion of molecules[7] that directly target pathways implicated in the genesis and proliferation of vascular malformations. Vascular endothelial growth factor (VEGF)[5] is one well-known target, and promising initial studies have focused on VEGF inhibition in clinical management.[8-10] There are, however, innumerable targets, including RAS, RAF, MEP, and others,[11] that may prove to be effective targets in the future. Sclerosants and biologics may additionally be combined for synergy.[9]

Embolization

Embolizing agents are chemicals that polymerize or precipitate after intravascular injection within the vessel lumen, obstructing flow. Common materials include cyanoacrylate glue (nBCA)[12] and ethylene alcohol vinyl copolymer (Onyx). Embolized lesions may be embolized and subsequently excised or left in situ.

Embolization can be performed via open direct puncture, percutaneous direct puncture, transvenous access, or a combination thereof. Intraoperative Valsalva can assist in this process by expanding the volume of the lesion, increasing the size of the target.

Surgery

Excision is facilitated by embolization, which reduces bleeding risk and enhances dissection of the polymer-filled lesion. Standard orbital surgical decision making is applied, utilizing whatever access is required to safely remove the lesion.[13] Combined transorbital and transnasal endoscopic approaches can be considered in appropriately selected cases. Debulking, rather than total excision, may be sufficient for symptom control, although there is a risk for recurrence.

Conclusion

A thorough understanding of the composition, flow characteristics, and drainage pathways of each individual vascular malformation is critical to designing a unique treatment plan that addresses the patient's symptoms and targets each component specifically. Management typically involves a combined approach with the endovascular team and the utilization of multiple techniques, including sclerosis, biologic therapy, embolization, and surgery.

References

1. Wassef M, Blei F, Adams D, et al; ISSVA Board and Scientific Committee. Vascular anomalies classification: recommendations from the International Society for the Study of Vascular Anomalies. *Pediatrics* 2015; 136(1):3204-214.
2. Garzon MC, Huang JT, Enjolras O, Frieden IJ. Vascular malformations: Part I. *J Am Acad Dermatol*. 2007; 56(3):353-370; quiz, 371-374.
3. Jackson IT, Carreno R, Potparic Z, Hussain K. Hemangiomas, vascular malformations, and lymphovenous malformations: classification and methods of treatment. *Plast Reconstr Surg.* 1993; 91(7):1216-1230.
4. Mulliken JB, Glowacki J. Hemangiomas and vascular malformations in infants and children: a classification based on endothelial characteristics. *Plast Reconstr Surg.* 1982; 69(3):412-422.
5. Nassiri N, Rootman J, Rootman DB, Goldberg RA. Orbital lymphaticovenous malformations: current and future treatments. *Surv Ophthalmol*. 2015; 60(5):383-405.
6. Hill RH 3rd, Shiels WE 2nd, Foster JA, et al. Percutaneous drainage and ablation as first line therapy for macrocystic and microcystic orbital lymphatic malformations. *Ophthal Plast Reconstr Surg.* 2012; 28(2):119-125.
7. Azzopardi N, Dupuis-Girod S, Ternant D, et al. Dose - response relationship of bevacizumab in hereditary hemorrhagic telangiectasia. *MAbs*. 2015; 7(3):630-637.
8. Atchison EA, Garrity JA, Castillo F, et al. Expression of vascular endothelial growth factor receptors in benign vascular lesions of the orbit: a case series. *Ophthalmology* 2016; 123(1):209-213.
9. Mustak H, Ugradar S, Goldberg R, Rootman D. Bevacizumab and bleomycin combination for treatment of orbital lymphaticovenous malformation recalcitrant to sclerosing therapy alone. *Clin Exp Ophthalmol*. 2018; 46(7):815-816.
10. Sweeney AR, Chappell M, Khorsand DA, et al. Intralesional injection of bevacizumab for the treatment of an apical orbital cavernous venous malformation. *J Neuroophthalmol*. 2016; 36(4):389-392.
11. Greene AK, Goss JA. Vascular anomalies: from a clinicohistologic to a genetic framework. *Plast Reconstr Surg.* 2018; 141(5):709e-717e.
12. Konstas AA, Rootman DB, Quiros PA, Ross IB. Transarterial embolization of a spontaneous intraorbital arteriovenous fistula with n-BCA glue. *Ophthalmic Plast Reconstr Surg.* 2017; 33(3):e63-e64.
13. Rootman J. *Orbital Surgery: A Conceptual Approach*. Wolters Kluwer Health; 2013.

Are You AT the Table or ON the Menu?

Philip R Rizzuto MD FACS

Ophthalmology's goal to protect sight and empower lives requires active participation and commitment to advocacy from every ophthalmologist. Contributions to the following three critical funds are a part of that commitment:

- OPHTHPAC®
- Surgical Scope Fund (SSF)
- State Eye PAC

Please join the dedicated community of ophthalmologists who are contributing to protect quality patient eye care for everybody.

The OPHTHPAC Committee is identifying Congressional Advocates in each state to maintain close relationships with federal legislators to advance ophthalmology and patient causes. At Mid-Year Forum 2019, we honored three of those legislators with the Academy's Visionary Award. This served to recognize them for addressing issues important to us and to our patients. The Academy's Secretariat for State Affairs is collaborating closely with state ophthalmology society leaders to protect Surgery by Surgeons at the state level.

Our mission of "protecting sight and empowering lives" requires robust funding of both the Surgical Scope Fund and OPHTHPAC. Each of us has a responsibility to ensure that these funds are strong so that ophthalmology can be represented "at the table."

OPHTHPAC®

OPHTHPAC represents the profession of ophthalmology to the U.S. Congress and operates to protect you and your fellow ophthalmologists from payment cuts, burdensome regulations, scope-of-practice threats, and much more. OPHTHPAC also works to advance our profession by promoting funding for vision research and expanded inclusion of vision in public and private programs—all of which provide better health-care options for your patients. OPHTHPAC is your federal voice in Washington, D.C., and we are very successful in representing your professional needs to the U.S. Congress.

Among OPHTHPAC's most recent victories are the following:

- Securing greater flexibility in the new Medicare Payment System
- Ensuring proper reimbursement of Medicare Part B drugs
- Blocking onerous administrative burdens on contact lens prescribers
- Preserving access to compounded drugs
- Preventing additional cuts to Medicare

However, ophthalmology's federal issues are a continuous battle, and OPHTHPAC is always under pressure to ensure we have strong political connections in place to help protect ophthalmology, its members, and their patients.

The support OPHTHPAC receives from invested U.S. Academy members helps build the federal relationships that advance ophthalmology's agenda on Capitol Hill. These relationships allow us to have a seat at the table with legislators willing to work on issues important to us and our patients. We also use these congressional relationships to help shape the rules and regulations being developed by federal agencies. Help strengthen these bonds and ophthalmology's legislative support.

Right now, major transformations are taking place in health care. To ensure that our federal fight and our PAC remain strong, we need the support of every ophthalmologist to better our profession and ensure quality eye care for our patients. Invest with confidence in the strongest PAC working to ensure your success as an ophthalmologist.

Contributions to OPHTHPAC can be made here at AAO 2019, online at www.aao.org/ophthpac, or by texting MDEYE to 41444.

At Mid-Year Forum 2019, the Academy and the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS) ensured a strong presence of oculofacial plastics surgeons to support ophthalmology's priorities. Ophthalmologists visited members of Congress and their key health staff to discuss ophthalmology priorities as part of Congressional Advocacy Day. The ASOPRS remains a crucial partner with the Academy in its ongoing federal and state advocacy initiatives.

Surgical Scope Fund

The Surgical Scope Fund (SSF) provides grants to state ophthalmology societies to support their efforts to protect patient safety from dangerous optometric surgery proposals. Since its inception, the Surgery by Surgeons campaign and the SSF, in partnership with state ophthalmology societies, have helped 40 state/territorial ophthalmology societies reject optometric scope-of-practice expansions into surgery.

Thanks to the 2019 SSF contributions from ophthalmologists just like you, SSF has had a successful year, preserving patient safety and surgical standards in state legislatures across the country, including six critical wins in Alabama, Texas, Vermont, Wyoming, Maryland, and Iowa. The 2019 battle is far from over, though. For example, Pennsylvania and Massachusetts are under attack, and California and Illinois are facing threats.

If you have not yet made a 2019 SSF contribution, *contributions can be made at our booth at AAO 2019 or online at www.aao.org/ssf.* If you already have made that 2019 contribution, please go to www.safesurgerycoalition.org to see the impact of your gift.

Dollars from the SSF are critical to building complete cutting-edge political campaigns, including media (TV, radio, and social media), educating and building relationships with legislators, and educating the voting public to contact their legislators. This work helps to secure success in protecting patient safety by defeating optometry's surgical initiatives.

Each of these endeavors is very expensive, and no one state has the critical resources to fight big optometry on their own. Ophthalmologists must join together and donate to the SSF at www.aao.org/ssf to fight for patient safety.

The Secretariat for State Affairs thanks the ASOPRS, which joined state ophthalmology societies in already contributing to

Surgical Scope Fund	OPHTHPAC® Fund	State EyePAC
To protect patient safety by defeating optometric scope-of-practice initiatives that threaten patient safety and quality surgical care	Ophthalmology's interests at the federal level Support for candidates for U.S. Congress	Support for candidates for state House, Senate, and governor
Political grassroots activities, government relations, PR and media campaigns *No* funds may be used for campaign contributions or PACs.	Campaign contributions, legislative education	Campaign contributions, legislative education
Contributions: Unlimited Individual, practice, and organization	Contributions: Limited to $5,000	Contribution limits vary based on state regulations.
Contributions are *100% confidential*.	Contributions above $200 are on the public record.	Contributions are on the public record depending upon state statutes.

the SSF in 2019, and it looks forward to the society's continued support. These ophthalmic organizations complete the necessary SSF support structure for the protection of our patients' sight.

State Eye PAC

It is increasingly important for all ophthalmologists to support their respective State Eye PACs because campaign contributions to legislators at the state level must come from individual ophthalmologists and cannot come from the Academy, OPHTHPAC, or the SSF. The presence of a strong State Eye PAC providing financial support for campaign contributions and legislative education to elect ophthalmology-friendly candidates to the state legislature is critical, as scope-of-practice battles and many regulatory issues are all fought on the state level.

ACTION REQUESTED: Help Ophthalmology Ensure a "Seat at the Table"

Academy SSF contributions are used to support the infrastructure necessary for state legislative/regulatory battles and for public education. State PAC and OPHTHPAC contributions are necessary at the state and federal levels, respectively, to help elect officials who will support the interests of our patients. Contributions to *each* of these three funds are necessary and help us protect sight and empower lives. SSF contributions are completely confidential and may be made with corporate checks or credit cards, unlike PAC contributions, which must be made by individuals and are subject to reporting requirements.

Please respond to your Academy colleagues and be part of the community that contributes to OPHTHPAC, the SSF, and your State Eye PAC. Please be part of the community that ensures ophthalmology has a strong voice in advocating for patients.

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Fine-Needle Aspiration Biopsy for Orbital Tumors

Eva Dafgård Kopp MD PhD

Introduction

Since the early 1960s fine-needle aspiration biopsy (FNAB) has been used in the diagnosis of tumors, and since the 1970s it has been used in Sweden in the diagnosis of orbital tumors.[1] FNAB is a rapid and minimally invasive diagnostic technique. When performed in experienced hands, it is safe and of great value in the diagnosis of different kinds of orbital lesions. It provides considerable advantages; it saves the patient an operating procedure, being performed in an outpatient setting, with rapid recovery and reduction of health-care costs. Further, orbitotomies may be avoided in lesions that can be managed with medical therapies. In a retrospective study of 225 FNABs, the FNAB diagnosis in addition to imaging appearance, clinical appearance, and clinical history provided sufficient information for treatment, and the patient did not require an incisional or excisional biopsy in 54% of the orbital lesions.[2]

With time, the technique and procedure have been refined. While earlier series report a correct diagnosis in 75%-88% of orbital FNABs, the use of immunocytochemistry, flow cytometry, and molecular genetic workup have markedly improved diagnostic accuracy up to 99%.[3] The success rates are higher in palpable lesions than in nonpalpable lesions, but neither the orbital quadrant location, the radiologic appearance (diffuse vs. encapsulated), or the size of the lesion affect the success of FNAB diagnoses.[2]

Procedure

Both superficial and deeper lesions can be biopsied in a strictly outpatient basis. A 27- or 25-gauge (0.4-0.5 mm) needle is used. In more posterior tumors the biopsy is performed under ultrasound[4] or CT guidance. Local anesthesia is not required in adults. The cytopathologist immediately performs staining to determine if the material is adequate. The remaining material can be rinsed in saline to a cell suspension for further techniques such as flow cytometry, immunostaining, and cytogenetic analysis. When necessary, repeat passes may be performed (though usually not more than 2 or 3).

Clinical Indications

Lacrimal fossa lesions

Lacrimal gland tumors may be difficult to diagnose by clinical and radiological features only, and misdiagnosis may occur in 20% or more of presumed lacrimal gland pleomorphic adenoma (LGPA). With FNAB sampling it is easy to distinguish epithelial tumors from lymphoproliferative lesions. Incisional biopsies of lacrimal gland lesions have been discouraged for fear that violation of the thin pseudocapsule surrounding the LGPA may cause tumor seeding and later recurrence. The use of FNAB, with minimal compromise of the capsule, is a more attractive form of biopsy prior to complete lacrimal gland excision.

Lymphoproliferative tumors

The role of FNAB in lymphoproliferative disorders is controversial. Our experience indicates that FNAB followed by cytomorphological assessment and ancillary techniques like immunocytochemistry and/or flow cytometry is almost always sufficient for diagnosis. Further, cytogenetic techniques are available for subtyping lymphomas. This technique confirmed lymphoma in 35/37 cases with cytomorphologically suspect orbital lymphoma.[3]

In another retrospective study including 51 orbital FNABs with lymphoproliferative outcome, 44 cases (87%) resulted in a definitive lymphoma diagnosis. A subclassification was yielded in 60%, while the other 40% were all low malignant B-cell lymphomas without a further subclassification (unpublished results). This is reasonable, since most orbital lymphomas are low malignant, primary to the orbit, and treated with low-dose radiotherapy regardless of their subclassification.

Benign lesions

Cytological diagnoses are described in benign lesions such as solitary fibrous tumors, meningiomas, schwannomas, fibrosis, cysts, infectious diseases, granulomatous inflammations, and malformations.[2,3,5,6]

Malignant tumors

FNAB is very helpful in differentiating between a benign and a malignant neoplasm. A variety of malignant tumors can metastasize to the orbit, and immunocytochemistry has been shown to be a helpful adjunct to cytomorphology when tracing the origin of malignant cells. Many primary tumors show characteristic immunoreactivity for antigens and in metastases. However, in primary malignant tumors prior to an exenteration, an incisional biopsy should always confirm the diagnosis.

Limitations

In some benign/reactive lesions, the aspirates may be poorly cellular and may not always allow a conclusive cytologic diagnosis. When a negative FNAB diagnosis is obtained (ie, "inconclusive" or "normal findings") or when the clinical diagnosis does not correspond to the cytologic diagnosis, a re-FNAB or an incisional biopsy should be performed. An incisional biopsy was performed in 27% of the patients in our study where additional material was needed for diagnosis or for classification.[2]

For suspected vascular malformations, FNAB is usually not performed, owing to the risk of hemorrhage and also because the material obtained may be uninformative, often showing only red blood cells. However, these diagnoses can usually be characterized by CT and /or MRI. There can still be an indication to perform FNAB in these types of lesions if imaging and clinical presentation are atypical or do not correspond.

FNAB is less useful when a morphological diagnosis is required in idiopathic orbital inflammation, as greater tissue volumes are required—for example, for an IgG4 diagnosis.

Complications

Potential risks of FNAB, such as globe perforations and damage to other structures, seem to be overstated. Cessation of any type of anticoagulant medication before FNAB of deeper orbital lesions and guidance by CT or ultrasound should reduce potential risks. FNAB is normally not performed for lesions in the posterior third of the orbit owing to the small compartment and higher risk for complication.

Conclusions

Orbital FNAB is a safe procedure, with high diagnostic accuracy. With the current health-care climate of minimally invasive surgery and cost control, FNAB can be considered as an attractive alternative to an orbitotomy in the evaluation and management of orbital lesions.

References

1. Schyberg E. Fine needle biopsy of orbital tumours. *Acta Ophthalmol Suppl*. 1975; (125):11.
2. Wiktorin ACH, Dafgård Kopp EME, Tani E, Söderén B, Allen RC. Fine-needle aspiration biopsy in orbital lesions: a retrospective study of 225 cases. *Am J Ophthalmol*. 2016; 166:37-42.
3. Tani E, Seregard S, Rupp G, Söderlund V, Skoog L. Fine-needle aspiration cytology and immunocytochemistry of orbital masses. *Diagn Cytopathol*. 2006; 34(1):1-5.
4. Timmis A, Touska P, Uddin J, Pilcher J. The role of ultrasound-guided tissue sampling techniques in the management of extra-ocular orbital lesions. *Ultrasound* 2018; 26(3):145-152.
5. Agrawal P, Dey P, Lal A. Fine-needle aspiration cytology of orbital and eyelid lesions [review]. *Diagn Cytopathol*. 2013; 41(11):1000-1011.
6. Krishnamurthy V, Suchitha S, Asha M, Manjunath GV. Fine needle aspiration cytology of solitary fibrous tumor of the orbit. *J Cytol*. 2017; 34(2):104-106.

Help! The Neurosurgeon Wants Me to Help With Skull Base Surgery!

S Tonya Stefko MD

I. What Is the Surgeon Requesting?
   A. Assessment of urgency
   B. Discussion of approach
   C. Surgical help with approach

II. Assessment of Urgency: Streamlined Neuro Exam
   A. Tailor this to specific pathology.
   B. Often include corneal sensation
   C. Assessment of optic discs
   D. Strabismus
   E. Is the poor vision due to cataract, amblyopia, etc.?

III. Discussion of Approach
   A. Always be sure to look at the scan: MRI and CT
   B. Face-to-face or phone discussion
      1. Never cross important neurovascular structure/ around the clock.
      2. You are the advocate for the eye.
      3. You are the advocate for cosmesis.
      4. Does it require more than one approach?
      5. Does it require more than one surgery?
      6. Can you add anything with a transorbital approach?

IV. Surgical Help
   A. Remember, you know this anatomy better than they do. These are all variants of surgery you learned in fellowship.
   B. Be specific about your plan.
   C. Be clear about instrument needs.
   D. Understand how this team works: You will be there early *and* late.
   E. Be clear and generous about billing.

V. Self-review Afterward
   A. Did the patient benefit?
   B. Would I work with this person again?
      1. Trust
      2. Listening
   C. What did I learn?

Computerized Perioperative Planning and 3-D Printed Implants in the Repair of Complicated Periorbital Fractures

Paul D Langer MD

I. Principles and Background of 3-D Printing

II. Uses of 3-D Printing and Computerized Planning in Periorbital Reconstruction

  A. Models to preoperatively visualize defects in comminuted fractures

  B. Guides to precisely realign multiple fragments intraoperatively

  C. Implants to correct postoperative traumatic deformities or defects

III. Advantages and Disadvantages of 3-D Printing in Periorbital Reconstruction

  A. Advantages

    1. Advance knowledge and visualization of defects/deformities

    2. Detailed and exact alignment of comminuted fracture segments

    3. Precise correction of traumatic deformities not previously possible with bone grafts

  B. Disadvantages

    1. Added cost

    2. Time delay required prior to surgery

IV. Future Directions for 3-D Printing

  A. Decreased cost, increased availability, and improved technology will no doubt result in rapid proliferation and adoption.

  B. In-house printing is likely to become standard of care within a decade.

Treatment of Orbital Blowout Fractures: Rethinking Dogma

M Reza Vagefi MD

I. Introduction
   A. Timing of repair
   B. Indications for repair
II. Timing of Repair
   A. Acute repair
   B. Repair within 2 weeks
   C. Delayed repair
III. Fracture Size
   A. Prediction of enophthalmos
   B. Radiologic grading scales
   C. Estimation of fracture size
IV. Degree of Enophthalmos
   A. Numeric value
   B. Aesthetic appearance
V. Conclusions

Selected Readings

1. Amrith S, Almousa R, Wong WL, Sundar G. Blowout fractures: surgical outcome in relation to age, time of intervention, and other preoperative risk factors. *Craniomaxillofac Trauma Reconstr.* 2010; 3:131-136.
2. Beigi B, Khandwala M, Gupta D. Management of pure orbital floor fractures: a proposed protocol to prevent unnecessary or early surgery. *Orbit* 2014; 33:336-342.
3. Burnstine MA. Clinical recommendations for repair of isolated orbital floor fractures: an evidence-based analysis. *Ophthalmology* 2002; 109:1207-1210.
4. Dal Canto AJ, Linberg JV. Comparison of orbital fracture repair performed within 14 days versus 15 to 29 days after trauma. *Ophthal Plast Reconstr Surg.* 2008; 24:437-443.
5. Emery JM, Noorden GK, Sclernitzauer DA. Orbital floor fractures: long-term follow-up of cases with and without surgical repair. *Trans Am Acad Ophthalmol Otolaryngol.* 1971; 75:802-812.
6. Jordan DR, Allen LH, White J, et al. Intervention within days for some orbital floor fractures: the white-eyed blowout. *Ophthal Plast Reconstr Surg.* 1998; 14:379e390.
7. Putterman AM, Stevens T, Urist MJ. Nonsurgical management of blow-out fractures of the orbital floor. *Am J Ophthalmol.* 1974; 77:232-239.
8. Shin KH, Baek SH, Chi M. Comparison of the outcomes of non-trapdoor-type blowout fracture repair according to the time of surgery. *J Craniofac Surg.* 2011; 22:1426-1429.
9. Vicinanzo MG, McGwin Jr G, Allamneni C, Long JA. Interreader variability of computed tomography for orbital floor fracture. *JAMA Ophthalmol.* 2015; 133:1393-1397.
10. Young SM, Kim YD, Kim SW, et al. Conservatively treated orbital blowout fractures: spontaneous radiological improvement. *Ophthalmology* 2018; 125:938-944.

The Use of Steroids in Orbital Cellulitis

Roman Shinder MD

I. Introduction
   A. Background and conventional treatment of orbital cellulitis
   B. Background on steroids' anti-inflammatory effects used for other diagnoses
   C. Recent reports describing steroids for orbital cellulitis

II. Description of Prospective Comparative Interventional Study
   A. 43 children, tertiary institution
   B. All started on broad-spectrum IV antibiotics, parents offered IV steroids
   C. IV dexamethasone started on hospital admission, 28 patients
   D. Only IV antibiotics, 15 patients, control group
   E. Steroid group had quicker clinical recovery and shorter hospital stay.
   F. Side effects of steroids were mild and did not require termination of treatment.
   G. No patients getting steroids had recurrence or ophthalmic complications during follow-up.
   H. Relative safety and efficacy of IV steroids concurrent with IV antibiotics on admission

Selected Readings

1. Chen L, Silverman N, Wu A, Shinder R. Intravenous steroids on admission for children with orbital cellulitis. *Ophthal Plast Reconstr Surg*. 2018; 34(3):205-208.
2. Yen MT, Yen KG. Effect of corticosteroids in the acute management of pediatric orbital cellulitis with subperiosteal abscess. *Ophthal Plast Reconstr Surg*. 2005; 21(5):363-366.
3. Pushker N, Tejwani LK, Bajaj MS, et al. Role of oral corticosteroids in orbital cellulitis. *Am J Ophthalmol*. 2013; 156(1):178-183.
4. Davies BW, Smith JM, Hink EM, Durairaj VD. C-reactive protein as a marker for initiating steroid treatment in children with orbital cellulitis. *Ophthal Plast Reconstr Surg*. 2015; 31(5):364-368.

When to Suspect Systemic Disease in Patients With Nasolacrimal Duct Obstruction

Rachel K Sobel MD

Systemic Disease/Secondary Causes in Nasolacrimal Duct Obstruction

- Suspect in patients with bilateral disease
- Suspect in patient with age <50
- Types of secondary causes to consider
  - Radioactive iodine I-131 for papillary thyroid cancer
  - Sarcoid
  - Chronic lymphocytic leukemia
  - Granulomatosis with polyangiitis (GPA)
  - Lichen planus
  - 5-fluorouracil
  - Docetaxel
  - Glaucoma drops
  - Ectodermal dysplasia
  - Down syndrome
  - Apert syndrome
  - Radiation
  - Congenital lacrimal dysgenesis
  - Trauma, naso-orbitoethmoidal
  - Displaced punctal plugs
- Higher rates of revision with secondary causes
- Recommend thorough history and, when indicated, serologic workup to discover systemic causes (CBC with differential, ACE, lysozyme, ANCA)

Table 1. Logistic Regression Comparing Prevalence of Systemic Issues in Bilateral vs. Unilateral, with Age as Covariate

Variable	Odds Ratio (95% CI) of Systemic Issue	*P*-value
Bilateral (vs. unilateral)	2.76 (1.49-5.12)	.001
Age (vs. ≥80)<50		
<50	5.34 (2.21-12.93)	.0002
50 to <70	2.92 (1.27-6.72)	.012
70 to <80	1.79 (0.66-4.84)	.254

Adapted, with permission from Sobel RK et al. 2014.[1]

Reference

1. Sobel RK, Carter KD, Allen RC. Bilateral lacrimal drainage obstruction and its association with secondary causes. *Ophthalmic Plast Reconstr Surg*. 2014; 30(2): 152-156.

Is Endoscopic DCR Now the Standard of Care?

Ronald Mancini MD

I. Advantages and Disadvantages of External Dacryocystorhinostomy DCR
II. Advantages and Disadvantages of Transcanalicular DCR
III. Advantages and Disadvantages of Endoscopic DCR
IV. Endoscopic DCR Technique (Video)
V. Tips for Success in Endoscopic DCR

Corneal Neurotization

Steven M Couch MD

I. Introduction
   A. Anatomy of sensory pathway to the eye
   B. What is neurotrophic corneal disease?
   C. Causes of neurotrophic keratopathy
II. Conservative Management Options
   A. Artificial tears
   B. Topical steroids
   C. Cenergermin
   D. Eyelid surgery (tarsorrhaphy, canthoplasty)
III. Previous Surgical Options for Cure
   A. Craniotomy
   B. Direct nerve transfer
IV. Currently Performed Surgeries
   A. Endoscopic nerve transfer
   B. Nerve grafting (banked and harvested)
V. Our Technique
   A. Two teams, oculoplastics and plastic surgery
   B. Harvested sural nerve graft
   C. Focus on 5/7 nerve palsies
   D. Scleral tunnel implantation

Eyelid Reconstruction: Techniques You Can Depend On

Mark J Lucarelli MD FACS

I. General Considerations
   A. Emphasis on re-establishing/reapproximating the normal anatomy
   B. Robust literature
   C. Useful resources
   D. Emphasis on time-honored mainstays
II. Value of Pre-reconstruction Office Evaluation
   A. Rapport
   B. Risk factors
   C. Unusual situations
   D. Provisional plan
III. Evaluation of the Defect
   A. Subunits
   B. Quantify whenever possible
   C. Photo document
IV. Reconstructive Plan Flows from Precise Assessment of the Defect
   A. Eyelid margin defects
      1. Small defects (25%-35%)
         a. Wedge resection and layered closure
         b. Cantholysis: Internal or external (canthotomy+ cantholysis)
      2. Moderate defects (35%-50+%)
         a. Tenzel semicircular rotation flap: 4 keys to success
            i. Adequate mobilization
            ii. Lateral periosteal support
            iii. Attention to the margin
            iv. Management of the lateral commissure
      3. Large defects
         a. Lower eyelid: modified Hughes tarsoconjunctival flap
         b. Upper eyelid: Leone procedure
         c. Posterior lamellar options
   B. Medial canthal defects: complex contour, lacrimal outflow; tendinous eyelid support
      1. Healing by second intent
      2. Upper lid cutaneous advancement flap
      3. Island pedicle flap
      4. Inverted V→Y cutaneous advancement
      5. Full-thickness skin grafting
V. Summary

Selected Readings

1. Albert DM, Lucarelli MJ. *Clinical Atlas of Procedures in Ophthalmic and Oculofacial Surgery*, 2nd ed. Oxford University Press; 2012.
2. Dutton JJ. *Atlas of Clinical and Surgical Orbital Anatomy*, 2nd ed. Saunders Elsevier; 2011.
3. Harris GJ. *Atlas of Oculofacial Reconstruction Principles and Techniques for the Repair of Periocular Defects*. Lippincott Williams & Wilkins; 2011.
4. Knize DM, ed. *The Forehead and Temporal Fossa: Anatomy and Technique*. Lippincott Williams & Wilkins; 2001.
5. Korn BS, Kikkawa DO. *Video Atlas of Oculofacial Plastic and Reconstructive Surgery*. Elsevier; 2017.
6. Allen RC. Oculoplastic surgery techniques [surgical video]. Eye Rounds.org. https://webeye.ophth.uiowa.edu/eyeforum/video/plastics/index.htm. Last updated 12.11.17.

Is Urinary Bladder Matrix "Magic Dust"?

Mark A Alford MD

I. Introduction

Urinary bladder matrix (UBM) is a non-crosslinked, acellular biomaterial derived from porcine urinary bladder epithelium produced by ACell, Inc. (Columbia, MD). The devices contain multiple naturally occurring growth factors, collagen types, laminin, fibronectin, glycosaminogycans, and elastin, as well as a basement membrane surface to promote epithelial cell growth. The material maintains and supports a healing environment by facilitating remodeling of functional site-appropriate tissue.

UBM is frequently used in complex general surgery and burn patients to promote healing. The material comes in both a powder form (MicroMatrix) and sheets of various thicknesses (Cytal) for reconstruction.

II. Examples and Technique

A. Application

B. Dressing

C. Follow-up

III. Results

IV. Conclusion

ACell UBM, a skin xenograft material, is an effective alternative to granulation, skin grafts, or flaps for periorbital reconstruction. Patients show evidence of defect healing with minimal scar formation. No patients experienced a graft-related complication such as rejection, allergy, or infection. It is particularly effective in younger patients with minimal skin laxity or redundancy.

V. Billing

A. CPT 15275 (application of skin substitute face, eyelids, orbit; 25 sq cm or less)

B. Facility, $98.75; Office, $157.49

C. MicroMatrix (particulate), 100-cc vial, $360

D. Cytal (sheet), 3x3 cm, $86

Tightening It Where It Counts: Canthal Reconstruction

Anne Barmettler MD

I. Why Should We Care About Canthal Disorders?
   A. Tearing, foreign body sensation
   B. Appearance
II. Normal Eyelid and Canthal Anatomy
   A. Lateral
   B. Medial
III. Lateral Canthal Reconstruction
   A. Lateral tarsal strip, periosteal rotation
   B. Lateral tarsal plication
IV. Medial Canthal Reconstruction
   A. Medial tarsorrhaphy
   B. Caruncular recruitment
   C. Triangle suture plication
   D. Medial spindle to medial orbital periosteum

Introduction to Molecularly Targeted Agents

Suzanne K Freitag MD

Monoclonal antibodies and small-molecule inhibitors are novel and powerful tools that are proving to be highly effective in treating a wide range of conditions that affect the eye and ocular adnexa. They are the "magic bullets" that scientists have sought for over a century, and the breakthroughs along the path to their discovery led to a number Nobel Prizes in the 1900s.

Monoclonal antibodies are made by identical immune cells that are clones of a unique parent cell. They have monovalent affinity for a specific antigen epitope. They may be developed to antigens on cell surfaces leading to blockade of cell surface receptors or creation of an antigen-antibody complex on the cell surface, which may serve as a trigger for cell functions or cell death.

Small-molecule inhibitors are low molecular weight substances that enter cells to affect other molecules, such as proteins, which may result in altered cell function or cell death. (They are different from monoclonal antibodies that have a high molecular weight, and are therefore unable to enter cells.) Because of their low molecular weight, small-molecule inhibitors are able to cross the blood–brain and blood–eye barrier, resulting in rapid and effective targeting.

The nomenclature of these substances can be quite confusing, and this topic will be elucidated in the presentation.

Vismodegib and Sonidegib in the Treatment of Basal Cell Carcinoma

Alon Kahana MD PhD

Roughly 5%-10% of all cutaneous malignancies manifest in the periocular region. They are most commonly associated with ultraviolet radiation, which causes DNA mutations through carcinogenic photoproducts. Basal cell carcinoma (BCC) is the most prevalent, comprising 85%-95% of all eyelid malignancies. The standard of care for localized eyelid carcinomas is surgical excision with negative margin confirmation. Keratinocyte carcinomas are most commonly treated with Mohs micrographic surgery, which facilitates margin control with minimal collateral damage to normal tissue. This is especially useful in the aesthetically and functionally sensitive region of the eyelid.

When located in the periocular region, BCC can threaten visual function: eyelid BCC can interfere with protection of the ocular surface, involvement of the lacrimal drainage system can cause epiphora, and invasion into the orbit places at risk the eye itself, along with the muscles and nerves that regulate eye movement and function. Furthermore, orbital invasion, particularly through perineural spread, can lead to central nervous system involvement. Major advances in our understanding of the molecular mechanisms responsible for BCC have led to important new treatment options.

BCC formation has been consistently linked to activation of the hedgehog pathway. The newest and most promising treatments for BCC involve hedgehog pathway inhibitors, namely, vismodegib (Genentech, Inc.) and sonidegib (Sun Pharma), which are approved by the FDA for treatment of locally advanced (both) or metastatic (vismodegib) BCC. These drugs act by binding Smoothened and preventing the activation of hedgehog target genes.

This lecture will focus on the use of hedgehog pathway inhibitors in the treatment of periocular BCC. It will cover indication, timing, adjuvant/neoadjuvant use, histologic considerations, and alternative dosing regimens.

PD-1 Inhibitors in the Treatment of Eyelid/Orbital Malignancy

Bita Esmaeli MD FACS

The discovery of immune checkpoints, specifically programmed cell death protein 1 (PD-1) and cytotoxic T-lymphocyte antigen 4 (CTLA-4), which are proteins found on the surface of activated T-lymphocytes, has revolutionized the management of patients with metastatic melanoma, squamous carcinoma, and several other cancers. Immune checkpoint inhibitors cause a form of "autoimmune" reaction to cancer cells.[1] Immune checkpoint inhibitors have significantly improved survival in patients with metastatic eyelid and conjunctival melanoma, or patients with cutaneous melanoma metastatic to the orbit.[2,3] Immune checkpoint inhibitors also have efficacy in patients with locally advanced recurrent conjunctival melanoma, periocular squamous carcinoma, and metastatic Merkel cell carcinoma.

In this talk, I will review the mechanism of action and the pivotal trials leading to FDA approval of specific drugs in this class. I will also summarize our publications and observations, specifically in orbital, conjunctival, and ocular adnexal cancer patients, and share specific examples from my practice.[4,5] The side effects, both ocular and systemic, will also be briefly discussed.[6]

References and Selected Readings

1. Esmaeli B, Sagiv O. Targeted biologic drugs and immune checkpoint inhibitors for locally advanced or metastatic cancers of the conjunctiva, eyelid, and orbit. *Int Ophthalmol Clin*. 2019; 59:13-26.
2. Ford J, Thuro BA, Thakar S, Hwu WJ, Richani K, Esmaeli B. Immune checkpoint inhibitors for treatment of metastatic melanoma of the orbit and ocular adnexa. *Ophthal Plast Reconstr Surg*. 2017; 33(4):e82-e85.
3. Sagiv O, Thakar SD, Kandl TJ, et al. Immunotherapy with programmed cell death 1 inhibitors for 5 patients with conjunctival melanoma. *JAMA Ophthalmol*. 2018; 136(11):1236-1241.
4. Kandl TJ, Sagiv O, Curry JL, et al. High expression of PD-1 and PD-L1 in ocular adnexal sebaceous carcinoma. *Oncoimmunology* 2018; 7(9):e1475874.
5. Migden MR, Rischin D, Schmults CD, et al. PD-1 blockade with cemiplimab in advanced cutaneous squamous cell carcinoma. *N Engl J Med*. 2018; 379(4):341-351.
6. Sagiv O, Kandl TJ, Thakar SD, et al. Extraocular muscle enlargement and thyroid eye disease-like orbital inflammation associated with immune checkpoint inhibitor therapy in cancer patients. *Ophthal Plast Reconstr Surg*. 2019; 35(1):50-52.

Monoclonal Antibodies in the Treatment of Orbital Inflammation

Diego Strianese MD PhD

Aim/Background

"Orbital inflammation" is a term that may encompass any response of the immune system to a broad array of possible causes, ranging from infectious, structural, autoimmune, autoimmune-like, and idiopathic to neoplastic in origin. Before starting any treatment for an orbital inflammation, it is important to not miss the possible underlying etiology, which can be life threatening. Where clinical and radiological findings of an orbital inflammatory lesion are inconclusive, pathological examination of the tissue biopsy is required to elucidate the diagnosis in a timely manner.

Treatment of orbital inflammation—whether due to "specific" autoimmune diseases or to a "nonspecific" inflammation (so-called idiopathic orbital inflammation [IOI], including the sclerosing variant, recently named as immunoglobulin G4-related disease [IgG4-RD])—has been traditionally based on the administration of steroids. Steroids have been used even to formulate ex juvantibus the diagnosis of IOI.

Recent new insights into the molecular basis of the pathogenesis of many disorders related to the diagnosis of orbital inflammation, particularly in thyroid eye disease (TED), have led to the emerging use of monoclonal antibodies and more specific therapies for those conditions. Interestingly, those advances may consistently change the treatment options and the general recommendations based on the traditional immunosuppressant therapy.

Materials and Methods

Data have been retrieved from the literature by searching on PubMed for the following words: orbital inflammation, orbital IgG4-related disease, thyroid eye disease (TED), granulomatosis with polyangiitis, vasculitis, Churg-Strauss syndrome, polyarteritis nodosa, atypical Cogan syndrome, temporal arteritis, Kawasaki syndrome, Behçet disease, sarcoidosis Sjögren syndrome, systemic lupus erythematous, rheumatoid arthritis, dermatomyositis, giant cell myositis, immunosuppressant, biological agent, immunomodulation corticosteroid, methotrexate, azathioprine, cyclosporine, cyclophosphamide, rituximab, etanercept, adalimumab, tocilizumab, teprotumumab, infliximab, adverse effects, side effects, and complications.

Results

Two types of immunosuppression can be described: nonspecific suppression and specific suppression. In nonspecific immunosuppression, the blocking agent interrupts the autoimmunity interfering with several intracellular pathways of the immune cells, resulting in a wide decrease of the immune response that is not site specific. In specific suppression, the blocking agent restricts the immune system from attacking one or a specific number of antigens.

Nonspecific immunosuppressant

Glucocorticoids

Glucocorticoids have been used for essentially all the autoimmune diseases. Administration of high-dose intravenous steroids can halt lymphocyte recirculation and interfere with inflammation and with the release of autoantigens. Because some of these mechanisms are also involved in physiologic signaling, glucocorticoids might lead to significant side effects.

Cyclosporine

Cyclosporine inhibits calcineurin, preventing the secretion of interleukin-2 by CD4+ T-lymphocytes, and thereby interfering with the expansion of lymphocyte clones.

Azathioprine

A cytostatic agent, azathioprine was the first medication to achieve widespread use in organ transplantation. It inhibits purine synthesis necessary for the proliferation of cells.

Mycophenolate mofetil

Mycophenolate mofetil is an immune modulatory drug that inhibits the proliferation of lymphocytes, interfering with the guanosine metabolism.

Methotrexate

An immunosuppressive drug, methotrexate inhibits dihydrofolate reductase enzyme, leading to the inhibition of the DNA, RNA, and protein synthesis.

Specific immunosuppressant

Rituximab

One of the better-studied biological agents, this anti-CD20 monoclonal antibody targets CD20 on B cells. Rituximab was first developed for the treatment of non-Hodgkin lymphoma, and it is also used in chronic lymphocytic leukemia. It is increasingly being prescribed for the treatment of autoimmune diseases, in many cases as an off-label drug. There are reports describing efficacy for rheumatoid arthritis, granulomatosis with polyangiitis, IOI, and, with contrasting results, in TED.

Tocilizumab

A recombinant humanized monoclonal antibody against the IL-6 receptor, tocilizumab plays an important role in B cell activation and the development of antibody-producing plasma cells. Mainly used in treatment of severe rheumatoid arthritis and juvenile idiopathic arthritis, it has been trialed in patients with active TED refractory to intravenous steroids, with a favorable response. It has also been used for neuromyelitis optica (Devic disease) and giant cell arteritis.

Etanercept

A TNF-alpha receptor blocker, etanercept is FDA approved for rheumatoid arthritis, polyarticular juvenile rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, and plaque psoriasis. It has been found to improve the clinical activity score significantly for those suffering from mild-to-moderate TED; however, 30% had recurrence of TED activity after treatment cessation.

Adalimumab

A fully human monoclonal antibody against TNF, adalimumab may control prominent inflammatory symptoms in TED. It is a medication used to treat rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, Crohn disease, ulcerative colitis, psoriasis, hidradenitis suppurativa, uveitis, and juvenile idiopathic arthritis. Use is generally only recommended in people who have not responded to other treatments. It is used by injection under the skin.

Infliximab

Infliximab is approved for use in Crohn disease, ulcerative colitis, psoriatic arthritis, ankylosing spondylitis, psoriatic arthritis, psoriasis, and rheumatoid arthritis. Infliximab is also prescribed (off label) for the treatment of Behçet disease and sarcoidosis. It has been successfully used in short cases series of steroid-resistant patients with severe TED and compression of the optic nerve.

Teprotumumab

Teprotumumab is a human monoclonal antibody inhibitor of IGF-IR, whose efficacy and safety has been recently assessed in a double-masked, randomized, controlled trial in patients with active, moderate-to-severe TED. Teprotumumab therapy seems to provide clinical benefit in patients with active, moderate-to-severe TED by reducing proptosis and the Clinical Activity Score and by improving the patient's quality of life. No major adverse effects have been reported.

Conclusion and General Recommendation

The spectrum of ocular changes in orbital inflammation is wide and goes to different grades of severity. The range of treatment options also varies, depending upon severity—from nonsteroid anti-inflammatories to high-dose steroid and immunosuppressive agents.

Steroid therapy remains the first-line therapy for most cases of moderate/severe and severe vision-threatening disease. Combination of steroids with azathioprine or cyclosporine may reduce the relapse of orbital inflammation in the long term, and cyclosporine in particular might reduce the need for surgery.

If steroids must be withdrawn because of side effects or because the results are poor, the patient can be started on an alternative immunosuppressive, which traditionally have been an antimetabolite such as methotrexate, mycophenolate, or azathioprine.

On the basis of more recent data, every one of the following biologic agents—rituximab, etanercept, adalimumab, tocilizumab, infliximab, and teprotumumab—has been shown to be effective in different autoimmune diseases causing orbital inflammation; they result in reduction of the inflammatory signs with the possible advantage of preventing relapse of the disease. Teprotumumab in particular seems to be very effective, particularly in preventing severity disease progression in moderate/severe TED, as is rituximab for IOI.

The actual incidence of adverse effects, particularly for the new immunosuppressant agents, has not been fully assessed yet; therefore further study is necessary to better address the risk/benefit ratio.

Controversies in Thyroid Eye Disease

Jonathan C P Roos MA MBBChir PhD

Thyroid eye disease (TED) is a disfiguring disease and conveys a threat to sight and life. Recent TED research has resulted in advances in both monitoring and treatment to reduce acute morbidity and long-term sequelae. With a renewed emphasis on a holistic approach, including aesthetic care for patients, we are seeing a revolution in the management of this disease.

Financial Disclosure

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