On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

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VISION EXPO

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- Spencer Johnson has no financial interests to disclose

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Laser Therapy and Advanced Procedures

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Selective Laser Trabeculoplasty

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Selective Laser Trabeculoplasty

- Indications:
  - Ocular Hypertension (can SLT be used as first-line therapy?)
  - Desire to reduce number of topical medications
  - Topical medications not effective
  - Non-compliance with topical medications

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Selective Laser Trabeculoplasty

- Determining who is a good candidate:
  - Higher vs. lower pre-treatment IOP
  - Current topical regimen

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Selective Laser Trabeculoplasty

- Major Studies on SLT vs. drops:

- 2004 Lai, et. al.
- 2005 Nagar, et. al.
- 2006 McIlraith, et. al.
- 2009 Nagar, et. al.
- 2012 Katz, et. al.
- 2019 Gazzard, et. al.

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Selective Laser Trabeculoplasty

- Five studies were analyzed by Li, et. al. and published in 2015

- "Conclusions: Both SLT and topical medication demonstrate similar success rates and effectiveness in lowering intraocular pressure in patients with open-angle glaucoma."

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Selective Laser Trabeculoplasty

- Gazzard et. al., 2019, *Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT)*

- At 36 months, 74.2% of patients in the selective laser trabeculoplasty group required no drops to maintain intraocular pressure at target

- Glaucoma surgery was required in 11 patients in the eye drop group, but none in the SLT group

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Selective Laser Trabeculoplasty

- Gazzard et. al., *Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT)*
- "Interpretation: Selective laser trabeculoplasty should be offered as a first-line treatment for open angle glaucoma and ocular hypertension, supporting a change in clinical practice."

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Selective Laser Trabeculoplasty

- At the 2018 ARVO Meeting, Gandolfi et. al. presented the long term results of their low power SLT vs conventional SLT and ALT study
- Group 1: 360° low power SLT (0.4 mJ, 50-60 spots), repeated annually
- Group 2: 360° conventional SLT, (70-80 spots, power increased from 0.5 mJ stepwise until an "air-bubble" was obtained; then, the power was lowered by one energy step) to be repeated PRN
- Group 3: 360° ALT, (50 m spot, 0.5 – 0.8 W, 70-90 spots) performed once, with no re-treatments allowed

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Selective Laser Trabeculoplasty

- Gandolfi et. al.:
- 10 years after treatment, percentage of each group that did <u>not</u> require medication:
  - 58% (Group A)
  - 25% (Group B)
  - 23% (Group C)

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Selective Laser Trabeculoplasty

- Gandolfi et. al.:
- Meantime to medication was:
  - 6.2 years (Group A)
  - 3.2 years (Group B)
  - 2.8 years (Group C)

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Selective Laser Trabeculoplasty

- Gandolfi et. al.:
- Conclusions: An SLT low-power treatment / re-treatment schedule, timed yearly, performed better than both a conventional SLT PRN schedule and an ALT in
  - (a) delaying the need for medications and
  - (b) medication requirement to control IOP in OAG eyes

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Selective Laser Trabeculoplasty

- In light of these finding, a pair of multicenter randomized trials to evaluate outcomes of SLT performed annually at low energy are currently in the pre-enrollment phase
- These trials—collectively named the Clarifying the Optimal Application of SLT Therapy (COAST) trial—were funded in late 2020 by NEI to compare standard versus low-energy primary SLT and annual versus pro re nata (PRN) repeat SLT

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Selective Laser Trabeculoplasty

- Advantages of SLT as a first-line treatment
  - Better compliance, leading to less IOP fluctuation
  - Patient convenience
  - Overall cost to the healthcare system

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Selective Laser Trabeculoplasty

- SLT vs. Latanoprost 1 year cost comparison:
- CPT 65855, bilateral code, Medicare reimbursement: $250.53
- Latanoprost 2.5 ml: $61.99
- Approximately 14.6 bottles per year for bilateral therapy: $905.05

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Selective Laser Trabeculoplasty

- Consider:
  - SLT as first-line therapy
  - Low-power SLT repeated annually

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Selective Laser Trabeculoplasty

- Pre-procedure
  - IOP
  - Gonioscopy with focus on:
    - Most posterior structure seen in each quadrant
    - Degree of pigment in the trabecular meshwork
  - Brimonidine ~ 20 min prior to procedure

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Selective Laser Trabeculoplasty

- Procedure
  - Traditional
    - 0.5-1.0 mJ titrated to first seen “champagne bubbles”, 100-120 shots, 360 degrees OU
    - Repeat PRN
  - Low Power
    - 0.4 mJ, 50-60 shots, 360 degrees OU
    - Repeat annually

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Selective Laser Trabeculoplasty

- Post-procedure
  - Brimonidine immediately following procedure
  - IOP check, 20-60 minutes post procedure
  - Oral nsaids prn
  - 1 week – check for inflammation and elevated IOP
  - 6 weeks – monitor treatment efficacy

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Laser Peripheral Iridotomy

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Laser Peripheral Iridotomy

- Indication
  - Acute angle closure
  - History of angle closure
  - Anatomically narrow angles
    - (1) Gonioscopy - trabecular meshwork not visible in 2 or more quadrants
    - (2) Angle measurement with anterior segment OCT is < 15 degrees

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Laser Peripheral Iridotomy

- "Historically, the term narrow angle glaucoma has been used to connote eyes either at risk of impending angle closure or those actually experiencing it. Though this term is still used today, it is more appropriate to speak in current terms of angle closure and assign eyes to one of four categories."

Sowka, Review of Optometry, Dec 2020

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Laser Peripheral Iridotomy

- Category I: pigmented TM not visible for 180^{o}, no PAS, normal IOP, ONH, and VF
- Category II: pigmented TM not visible for 180^{o}, PAS and/or elevated IOP, ONH, and VF
- Category III: pigmented TM not visible for 180^{o}, PAS and/or elevated IOP, ONH damage and/or VF loss
- Category IV: primary angle-closure attack

Sowka, Review of Optometry, Dec 2020

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Laser Peripheral Iridotomy

- Category I: LPI or observation?
- Category II: LPI recommended
- Category III: LPI recommended
- Category IV: LPI recommended

Sowka, Review of Optometry, Dec 2020

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Laser Peripheral Iridotomy

He, et. al., *Lancet* 2019

Laser peripheral iridotomy for the prevention of angle closure: a single-centre, randomised controlled trial

Mingguang He, Yuzhen Jiang, Shengsong Huang, Zeqfy S Chang, Beatriz Munoz, Tin Aung, Paul J Foster*, David S Friedman*

Summary

Background Primary angle-closure glaucoma affects 20 million people worldwide. People classified as primary angle closure suspects have a higher but poorly quantified risk of developing glaucoma. We aimed to assess efficacy and safety of laser peripheral iridotomy prophylaxis against primary angle-closure glaucoma in Chinese people classified as primary angle closure suspects.

Methods In this randomised controlled trial, bilateral primary angle closure suspects aged 50–70 years were enrolled at the Zhongshan Ophthalmic Center, a tertiary specialised hospital in Guangzhou, China. Eligible patients received laser peripheral iridotomy in one randomly selected eye, with the other remaining untreated. The primary outcome was incident primary angle closure disease as a composite endpoint of elevation of intraocular pressure, peripheral anterior synechiae, or acute angle-closure during 72 months of follow-up in an intention-to-treat analysis between treated eyes and contralateral controls. This trial is registered with the ISRCTN registry, number ISRCTN45103095.

Findings Of 13 991 screened individuals, 889 individuals were randomly assigned from June 19, 2008 (889 treated and 889 untreated eyes). Incidence of the primary outcome was 4·19 per 1000 eye-years in treated eyes compared with 7·57 per 1000 eye-years in untreated eyes (hazard ratio 0·53, 95% CI 0·30–0·92; p=0·024). A primary outcome event occurred in 19 treated eyes and 36 untreated eyes with a statistically significant difference using pair-wise analysis (p=0·004). No serious adverse events were observed during follow-up.

Interpretation Incidence of angle-closure disease was very low among individuals classified as primary angle closure suspects identified through community-based screening. Laser peripheral iridotomy had a modest, albeit significant, prophylactic effect. In view of the low incidence rate of outcomes that have no immediate threat to vision, the benefit of prophylactic laser peripheral iridotomy is limited; therefore, widespread prophylactic laser peripheral iridotomy for primary angle-closure suspects is not recommended.

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See Comment page 1573

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Laser Peripheral Iridotomy

He, et. al., *Lancet* 2019

- 889 bilateral primary angle closure suspects aged 50-70 years were enrolled
- One eye of each patient was selected for treatment, and the other remaining untreated

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Laser Peripheral Iridotomy

He, et. al., *Lancet* 2019

- The primary outcome was the incidence of primary angle closure by eyes by 72 months, defined as the composite of three study endpoints:
- (1) intraocular pressure measurements above 24 mm Hg on two separate occasions; or
- (2) development of at least one clock hour of peripheral anterior synechiae in any quadrant; or
- (3) an episode of acute angle closure

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Laser Peripheral Iridotomy

He, et. al., *Lancet* 2019

- Incidence of an angle closure event:
- 4.19 per 1000 eye-years in treated eyes
- 7.97 per 1000 eye-years in untreated eyes
- This correlates to a 47% risk reduction in treated eyes, however:
- The rate of developing any angle closure endpoint in primary angle closure suspects' eyes was 1% per year

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The impact of pharmacological dilation on intraocular pressure in primary angle closure suspects

Article in Press: Accepted Manuscript

Lanhua Wang MD, Wenyong Huang MD, Xiaotong Han MD, Chimei Liao MD, Ling Jin MS and Mingguang He MD, PhD

American Journal of Ophthalmology. Copyright © 2021

ABSTRACT

Purpose

: To assess changes in intraocular pressure (IOP) 1 hour after pharmacological dilation in eyes treated with laser peripheral iridotomy (LPI) and untreated fellow eyes of primary angle closure suspects (PACS).

Design

: Randomized, fellow-eye controlled trial

Methods

: A total of 889 PACS participants aged 50 to 70 years with LPI in one randomly selected eye and a fellow untreated eye were included. All participants underwent comprehensive examinations before and at 2 weeks, 6 m, 18 m, 36 m, 54 m, and 72 m after LPI. IOP was measured using Goldmann applanation tonometry before and 1 hour after pharmacological dilation.

Results

: The mean pre-dilation IOP in the untreated eyes was 14.8±2.7 mmHg, which increased to 16.4±2.7 mmHg after pharmacological dilation (p <0.001). The treated and untreated eyes had similar pre-dilation and post-dilation IOP (all p >0.05). The average post-dilation IOP elevation was 1.5 mmHg in the treated eyes and 1.6 mmHg in the untreated eye without significant differences (p =0.802). Lower pre-dilation IOP (p <0.001), smaller AOD500 (p =0.001), smaller ARA500 (p =0.030), smaller TISA500 (p =0.043), and larger Iarea(p <0.001) were associated with post-dilation IOP elevation 5 mmHg and greater. Three untreated (1.04 per 1000 pupil dilation) and one treated eye (0.34 per 1000 pupil dilation) developed acute angle closure (AAC) after dilation during the 72 m follow-up.

Conclusions

: Post-dilation IOP elevation is similar among treated and untreated eyes, and the risk of developing AAC is very low even among PACS. Routine LPI before pupil dilation for PACS people is not recommended.

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Laser Peripheral Iridotomy

Azuara-Blanco, et. al., *Lancet* 2016

Effectiveness of early lens extraction for the treatment of primary angle-closure glaucoma (EAGLE): a randomised controlled trial

Augusto Azuara-Blanco, Jennifer Burr, Craig Ramsay, David Cooper, Paul J Foster, David S Friedman, Graham Scotland, Mehdi Javanbakht, Claire Cochrane, John Norrie, for the EAGLE study group

Summary

Background **Primary angle-closure glaucoma is a leading cause of irreversible blindness worldwide. In early-stage disease, intraocular pressure is raised without visual loss. Because the crystalline lens has a major mechanistic role, lens extraction might be a useful initial treatment.**

Methods **From Jan 8, 2009, to Dec 28, 2011, we enrolled patients from 30 hospital eye services in five countries. Randomisation was done by a web-based application. Patients were assigned to undergo clear-lens extraction or receive standard care with laser peripheral iridotomy and topical medical treatment. Eligible patients were aged 50 years or older, did not have cataracts, and had newly diagnosed primary angle closure with intraocular pressure 30 mm Hg or greater or primary angle-closure glaucoma. The co-primary endpoints were patient-reported health status, intraocular pressure, and incremental cost-effectiveness ratio per quality-adjusted life-year gained 36 months after treatment. Analysis was by intention to treat. This study is registered, number ISRCTN44464607.**

Findings **Of 419 participants enrolled, 155 had primary angle closure and 263 primary angle-closure glaucoma. 208 were assigned to clear-lens extraction and 211 to standard care, of whom 351 (84%) had complete data on health status and 366 (87%) on intraocular pressure. The mean health status score (0·87 [SD 0·12]), assessed with the European Quality of Life-5 Dimensions questionnaire, was 0·052 higher (95% CI 0·015–0·088, p=0·005) and mean intraocular pressure (16·6 [SD 3·5] mm Hg) 1·18 mm Hg lower (95% CI −1·99 to −0·38, p=0·004) after clear-lens extraction than after standard care. The incremental cost-effectiveness ratio was £14 284 for initial lens extraction versus standard care. Irreversible loss of vision occurred in one participant who underwent clear-lens extraction and three who received standard care. No patients had serious adverse events.**

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Laser Peripheral Iridotomy

Azuara-Blanco, et. al., *Lancet* 2016

- Eligible patients were aged 50 years or older, did not have cataracts, and had newly diagnosed primary angle closure with intraocular pressure 30 mm Hg or greater or primary angle-closure glaucoma
- Patients were assigned to undergo clear-lens extraction or receive standard care with laser peripheral iridotomy and topical medical treatment
- Interpretation: “Clear-lens extraction showed greater efficacy and was more cost-effective than laser peripheral iridotomy, and should be considered as an option for first-line treatment”

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Laser Peripheral Iridotomy

- Consider:
- Monitoring patients with narrow angles and no other risk factors
- Clear-lens extraction for older patients

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Laser Peripheral Iridotomy

- Pre-procedure
  - Brimonidine ~ 20 min prior to procedure
  - Pilocarpine 1%

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Laser Peripheral Iridotomy

- Procedure
  - Pre-treat more pigmented irises with argon laser first
    - 12 shots in a petalloid pattern, total area no more than 1 mm in diameter
    - Able to get through with fewer shots and lower energy later with YAG laser
    - Reduced the risk of hemorrhage
  - PI placement 11 or 1 o'clock vs 3 or 9 o'clock
  - Power
    - 3-4 mJ single pulse
    - Can go as high as 5 mJ triple pulse

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Laser Peripheral Iridotomy

- Post-procedure
  - Brimonidine immediately following procedure
  - IOP check, 20-60 minutes after procedure
  - Pred-forte qid or Durezol bid x 7 days
  - RTC 1 week
    - IOP
    - Check for patency - retroillumination
    - Anterior segment OCT

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YAG Capsulotomy

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YAG Capsulotomy

- Indication
  - Medicare guidelines
  - Decreased acuity
  - Patient symptoms
  - Appearance of capsule

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YAG Capsulotomy

- Pre-procedure
  - IOP
  - Document size and location of the pupil
  - Dilated fundus examination
  - Brimonidine ~ 20 min prior to procedure

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YAG Capsulotomy

- Procedure
  - 1.0-1.3 mJ single pulse
  - Cruciate pattern

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YAG Capsulotomy

- Post-procedure
  - Brimonidine immediately following procedure
  - IOP check, 20-60 minutes post procedure
  - Pred-forte qid or Durezol bid x 7 days
  - 1 week – check for inflammation and elevated IOP, dilate and check for any signs of holes, tears, or detachments, and well as ensuring capsular opening is complete

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Treatment of Neoplasms

- Biopsy suspected malignant lesions
  - Asymmetry
  - Border
  - Color
  - Duration

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Biopsy Technique

- Instill proparacaine in both eyes
- Clean area with isopropyl alcohol to prepare for injection
- Inject anesthetic

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Biopsy Technique

- Clean area with povidone-iodine, with particular emphasis on the lids
- Confirm anesthesia by grasping the skin with tissue forceps
- Excision of specimen
  - Punch biopsy – generally used for flat lesions
  - Westcott scissors – generally used for raised lesions
  - Place specimen in formalin and send to lab

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Excision for Benign Lesions

- Instill proparacaine in both eyes
- Clean area with isopropyl alcohol to prepare for injection
- Inject anesthetic

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Excision for Benign Lesions

- Clean area with povidone-iodine, with particular emphasis on the lids
- Confirm anesthesia by grasping the skin with tissue forceps
- Excise lesions
  - Wescott scissors
  - Radiofrequency unit
- Apply antibiotic ointment to site of lesion, and prescribe antibiotic ointment for use BID for seven days

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Cysts

- Hidrocystoma
  - Cyst of Moll (i.e. apocrine sweat gland hidrocystoma, sudoriferous cyst, cystadenoma)
    - Translucent
    - On anterior lid margin
  - Eccrine sweat gland hidrocystoma – similar to cyst of Moll, but not confined to the eyelid margin

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Cysts

- Cyst of Zeis
  - Yellowish in appearance
  - Found along eyelid margin
- Sebaceous cyst – rarely found on eyelid, may occur at the inner canthus

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Treatment of Cysts

- Instill proparacaine in both eyes
- Clean area with isopropyl alcohol to prepare for injection
- Inject anesthetic

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Treatment of Cysts

- Clean area with povidone-iodine, with particular emphasis on the lids
- Confirm anesthesia by grasping the skin with tissue forceps
- Make a single linear incision (scalpel or radiofrequency unit) in the cyst respecting the lines of tension of the skin

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Treatment of Cysts

- Drain contents
  - Cyst of Moll – contents are watery and will flow out
  - Cyst of Zeiss or sebaceous cyst – use forceps and apply pressure from the base of the cyst to express contents out of incision
- Destroy the capsule
  - Tissue forceps and Wescott scissors
  - Radiofrequency unit on coagulation mode
- Apply antibiotic ointment to site of lesion, and prescribe antibiotic ointment for use BID for seven days

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Xanthelasma

- Composed of foamy histiocytes with surrounding local inflammation
- Referred to ophthalmology for management

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Hordeolum

- Internal – infection of the Meibomian gland
- External - infection of a gland of Zeiss or Moll
- Treatment
  - Oral antibiotic
  - Warm compresses

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Chalazion (Meibomian cyst)

- Treatments
  - Injection
  - Incision and curettage

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Injection

- Clean area with isopropyl alcohol to prepare for injection
- Inject 0.2 to 0.4 cc of Kenalog 40 into each lesion

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Incision and Curettage

- Instill proparacaine in both eyes
- Instill a few drops of Betadine into the eye being treated and leave for 2 minutes
- Rinse Betadine with sterile saline

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Incision and Curettage

- Clean area with isopropyl alcohol to prepare for injection
- Inject anesthetic
- Clean area with povidone-iodine, with particular emphasis on the lids

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Incision and Curettage

- Confirm anesthesia by grasping the skin with tissue forceps
- Apply a clamp and evert the lid to expose palpebral conjunctiva
- Make a single vertical incision

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Incision and Curettage

- Aggressively remove contents with curette, being sure to destroy the capsule
- Tobradex ointment BID for 1 week

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Blepharospasm

- Verify that a hemifacial spasm is not present
- Botox injections
  - Clean area with isopropyl alcohol to prepare for injection
  - Prepare Botox solution according to manufacturer's directions

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Blepharospasm

- Inject 1.25 Units to 2.5 Units (0.05 mL to 0.1 mL volume at each site)

Botoxmedical.com

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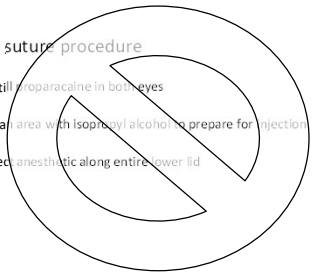
Entropion

- Quickert suture procedure
  - Instill proparacaine in both eyes
  - Clean area with isopropyl alcohol to prepare for injection
  - Inject anesthetic along entire lower lid



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Punctal Occlusion

- Radiofrequency treatment
  - Instill proparacaine in both eyes
  - Clean area with isopropyl alcohol to prepare for injection
  - Inject anesthetic

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Punctal Occlusion

- Radiofrequency treatment
  - Apply 4% lidocaine with a polyvinyl acetal spear sponge (i.e. Weck-Cel sponge) to punctum
  - Confirm anesthesia by grasping the skin around the punctum with tissue forceps
  - Set the power on the coagulation mode of the radiofrequency unit to 4
  - Insert the radiofrequency tip into the punctum and press the foot pedal for 1 or 2 seconds until the tissue constricts and blanches

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Disorders of the Eyelashes

- Trichiasis – misdirection of the lashes
- Distichiasis – growth of lashes from the Meibomian glands

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Treatment

- Traditional epilation – regrowth in approximately 10 weeks
- Radiofrequency follicle ablation – permanently destroys the follicle

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Radiofrequency Follicle Ablation

- Instill proparacaine in both eyes
- Clean area with isopropyl alcohol to prepare for injection
- Inject anesthetic along entire lower lid and then roll anesthetic with a cotton-tipped applicator toward lid margin

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Radiofrequency Follicle Ablation

- Confirm anesthesia by grasping the skin with tissue forceps
- Set the power on the coagulation mode of the radiofrequency unit to 2
- Insert the radiofrequency tip into the hair shaft and press the foot pedal for 1 or 2 seconds

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Thank You

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