CXL: Surgical Technique

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Organized Surgical Approach

- **Surgical Check-List**
  - Eye
  - Patient data
  - Activities by:
    - Attending physician
    - Nurse
    - Surgeon
  - Alert
- Same-day control of clinical situation
- Antipain meds 30 min before CXL

Surgical Approach - Sterility

- **Day Surgery**

- Sterile conditions in the operating suite

  - **Preop disinfection**

  - **Scrub**

  - **Surgical gown and gloves**

  - **Disposable medication**

  - **Single-set surgical instruments**

  - **Patient draping**

Rama P et al. J Cataract Refract Surg 2009; Apr
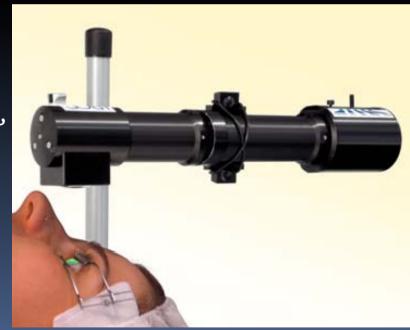
Preoperative Medications

- 2% Pilocarpine drops

  - pilocarpine reduces the thermal and photochemical Ultraviolet A (UVA) light irradiation potentially harmful to the lens and retina

  - amount of light rays reaching the retina is proportional to the square of the pupil diameter

  - i.e., 6 mm pupil = 36 units, 4 mm pupil = 16 units, 2 mm pupil = 4 units

- Topical anesthesia with two applications of 4% lidocaine drops and oxybuprocaine hydrochloride 0.2%

Available UVA Devices

- UV light from a solid-state UVA source

- UV-X ™ System Peschke Meditrade GmbH, Huenenberg, Switzerland

- The UV-X ™ System was developed by Theo Seiler, MD and Eberhard Spoerl, PhD (Zuerich / Dresden).

- Consists in a radiator which emits highly homogenized UV-light at 365 nm and a table mount.

- irradiance is 3 mW/cm^2 or 5.4 J/ cm^2

Available UVA Devices

- UV light from a solid-state UVA source

- VEGA CBM X Linker, Oofta HT, Montegiorgio, Italy

- diode UV-A emitting source with a wavelight of 370 nm, with diaphragm, fixation point, double light aiming system, LCD camera

Standard Surgical Procedure

- Corneal epithelium is abraded in a central, 9-mm diameter area with an Amoils brush.

- Photosensitizing riboflavin 0.1% solution (10 mg riboflavin-5-phosphate in 20% dextran-T-500 10 ml solution) is applied onto the cornea every minute for 30 minutes to achieve adequate penetration of the solution

- Using a slit lamp with the blue filter, presence of riboflavin in the anterior chamber is confirmed before UV irradiation

Surgical Procedure

- A calibrated UVA meter (LaserMate-Q; Laser 2000, Wessling, Germany) is used before treatment to check the irradiance at a 1.0 cm distance. Laser λ 370$\pm$5 nm, Power 3 mW/cm^2 (= 5.4 j/cm^2)

- UV source exposition for 30 minutes
  - leave untreated zone of at least 1.5 mm from the limbus (epithelial stem cells protection)

Surgical Procedure

UV source exposition for 30 minutes

- Do not shorten treatment time

- Do not use home-made solutions

- Surface must remain moist to avoid haze formation

- Riboflavin solution is applied again, but only once every 5 minutes

- Focusing is very important: out-of-focus can result in dangerous or ineffective dosage

Postoperative Medication

- Cyclopentolate 2% eyedrops

- Levofloxacin eyedrops

- Soft bandage contact lens until re-epithelialization is complete.

- Topical levofloxacin 4 times daily for 7 days

- Dexamethasone 21-phosphate 0.15% drops 3 times daily for 20 days

- 0.15 % sodium hyaluronate drops 6 times daily for 45 days

- Oral aminoacid supplement

Postoperative Period

- 1, 3, 6, 12 month-controls

- Complete ophthalmological examination

- Corneal topography – differential maps

- Pentacam

- Haze monitoring

- 0.15 % sodium hyaluronate drops

- CL use is allowed one month after surgery
  if corneal epithelium appears healthy and
  regular

Good Medical Practice

- Accurate preoperative patient information
  (i.e., course of visual acuity)

- Standardized informed consent

- In Italy, one IC for the whole nation,
  approved by the national ophthalmological
  society (SOI)

- Documenting ectasia progression over at least
  6 month-period:
  - Corneal topography
  - Pentacam

Good Medical Practice

- Documenting Surgery

  - Surgical logbook

  - Surgical report

  - Use of product adhesive labels (i.e, riboflavin)

- Documenting follow-up:

  - Visual Acuity

  - Corneal topography – differential maps

  - Pentacam

Thank You For Your Attention !