Anesthetics in Cosmetic Medicine

Aesthetic Extender Symposium
October 31 – November 3, 2013
Boca Raton, Florida

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Gold Skin Care Center, Tennessee Clinical Research Center
Nashville, TN USA

Academic Appointments

- Assistant Clinical Professor
  - Dept. of Medicine, Division of Dermatology, Nashville, TN USA
  - Vanderbilt University School of Medicine
  - Vanderbilt University School of Nursing

- Adjunct Assistant Professor
  - Meharry Medical College
  - School of Medicine, Nashville, TN USA

- Visiting Professor of Dermatology
  - Huashan Hospital, Fudan University (Shanghai Medical University), Shanghai, China (12/06)
  - The First Hospital of China Medical University, Shenyang, China (11/08)
  - Guangdong Provincial People’s Hospital, Guangzhou, China (7/13)

- Visiting Professor of Plastic Surgery
  - First People’s Hospital of Foshan, University …Foshan, China (07/12)

Anesthesia

- Local anesthesia is analgesia to a particular area or field of interest without causing any impairment of consciousness or impairment
- Most of our procedures
- Though considered safe, the agents used in local anesthesia may rarely cause various systemic side effects with significant morbidity and mortality
- The techniques of local anesthesia have expanded to include tumescent anesthesia
- Need to be aware of these molecules and the different local anesthesia techniques

Procedures Requiring Local Anesthetics

- Light and light-based procedures
  - Hair removal
  - Tattoo removal
  - Treatment of vascular and pigmented lesions
  - Ablative skin resurfacing
- Cosmetic injectables
  - Dermal filler injections
  - Botulinum toxin injections
  - Chemical peels

Anesthesia - History

• Cocaine was the first local anesthetic – isolated by Albert Niemann in 1860
• Carl Koller in Vienna pioneered its use in ophthalmology in 1884
• Halstead innovated infiltrative anesthesia and nerve blocks
• Procaine was the first synthetic local anesthetic to be synthesized in 1905 by Alfred Einhorn, a German chemist
• Lidocaine, the most popular local anesthetic, was synthesized in 1943 by Nils Lofgren, a Swedish chemist
• Bupivacaine and prilocaine were introduced in 1957 and 1959
• All designated with names ending in "caines", after cocaine

Anesthesia - Pharmacology

• Local anesthetic agents consist of a hydrophobic aromatic ring, an intermediate chain, and a hydrophilic tertiary or secondary amine moiety

• Potency, duration of action and toxicity of local anesthetics is directly proportional to the hydrophobicity of the agent
• Local anesthetics are classified as an ester (-COO-) or amide (-NH-) based on intermediate linker
• Esters include cocaine, procaine, chloroprocaine, benzocaine, tetracaine and amides of lidocaine, prilocaine, bupivacaine, mepivacaine, and ropivacaine
Factors Influencing the Potency of Local Anesthetics

- Chemical Properties
- Charge of the Local Anesthetic
- Local Vasculature
- Dosage
- Mixture
- Type of Nerve
- Tachyphylaxis

Lidocaine is the prototype of amide anesthetic also the most commonly used.

- It works fast, lasts long, and is potent.
- Concomitant use with epinephrine prolongs the duration of action and enhances the safety when higher doses are used in tumescent anesthesia.
- It is metabolized in the liver and the metabolites generated can contribute to the cardiovascular and CNS toxicities which can be seen.

- Anxiety, tinnitus, dysgeusia, tingling and numbness of lips and tongue, dizziness, diplopia, nystagmus, twitching and later seizures, coma, and respiratory distress.
- Cardiovascular depression may also occur.
Topical anesthesia preparations –

- Lidocaine 2-10%
- Benzocaine
- Tetracaine 2%

Maximal safe doses for topical anesthesia for 70K adult is 300 mg for lidocaine and 50 mg for tetracaine

Peak anesthetic effects are 2-5 minutes for lidocaine and 3-8 minutes for tetracaine

Duration of effect are 30-45 minutes for lidocaine and 30-60 minutes for tetracaine

Eutectic mixture of local anesthetics (EMLA) is a formulation containing prilocaine 2.5%/lidocaine 2.5% or lidocaine 7%/tetracaine 7%

EMLA has been used safely on mucosal surfaces

<table>
<thead>
<tr>
<th>Age and weight</th>
<th>Maximum preload</th>
<th>Maximum additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5 months or ≤ 6 kg</td>
<td>1 g [10 mL]</td>
<td>10 g</td>
</tr>
<tr>
<td>&gt; 6 months and ≤ 10 kg</td>
<td>10 g</td>
<td>20 g</td>
</tr>
<tr>
<td>&gt; 10 years and ≤ 30 kg</td>
<td>30 g</td>
<td>60 g</td>
</tr>
</tbody>
</table>

Lidocaine and Tetracaine 7%/7%

Used as a Topical Anesthetic for Filler Injections

Phase 3 Study SCP-40-05
**Study Overview**

- **Objective:** To evaluate the efficacy and safety of lidocaine and tetracaine 7%/7% cream (LT cream) for induction of local dermal anesthesia for dermal filler injections in adults
- **Study design:**
  - Randomized, double-blind, placebo controlled, paired study
  - 70 subjects at 3 investigational sites
  - Treatment
    - LT cream vs placebo
    - 30 minute application applied concurrently to similar treatment areas

**Assessments**

- **Efficacy**
  - Primary endpoint: Subject-reported pain intensity was assessed using a visual analogue scale (VAS)
  - Secondary endpoints
    - Investigator-assessed pain intensity was evaluated using a 4-point categorical scale
    - Subject and investigator preference questions
- **Safety**
  - Tolerability assessments (erythema, edema, blanching)
  - Adverse events (immediate and delayed – up to 72 hours after drug application; AEs)

**Main Inclusion/Exclusion Criteria**

- **Inclusion criteria**
  - Male and female subjects, 18 years and older
  - Subject elected to undergo dermal filler injection in the face
- **Exclusion criteria**
  - Subject with known sensitivities, allergies or contraindications to lidocaine, tetracaine or other local anesthetics of the amide or ester type or to any components of the test materials

**Demographics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total n=70</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender, n (%)</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Female</td>
<td>67 (96)</td>
</tr>
<tr>
<td><strong>Age, y</strong> Mean ± SD</td>
<td>50.5 ± 8.9</td>
</tr>
<tr>
<td>Median</td>
<td>50.0</td>
</tr>
<tr>
<td>(Min, max)</td>
<td>(27.0, 70.0)</td>
</tr>
<tr>
<td><strong>Race, n (%)</strong></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>66 (94)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (3)</td>
</tr>
<tr>
<td><strong>Fitzpatrick skin type, n (%)</strong></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>5 (7)</td>
</tr>
<tr>
<td>II</td>
<td>12 (17)</td>
</tr>
<tr>
<td>III</td>
<td>31 (44)</td>
</tr>
<tr>
<td>IV</td>
<td>14 (20)</td>
</tr>
<tr>
<td>V</td>
<td>7 (10)</td>
</tr>
<tr>
<td>VI</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

Abbreviations: y, years; SD, standard deviation.
Fillers: Subject Mean VAS Scores

Visual Analog Scale

LT Cream*: 24.2 mm
Placebo: 37.4 mm

*P < .0001 vs placebo

Data on file. Fort Worth, TX: Galderma Laboratories, L.P.

Fillers: Subject and Investigator Assessment

Adequate Anesthesia (N = 70)

Subject

Investigator

66*
43

79**
51

LT Cream
Placebo

*P = .0052
**P = .0013

Safety Assessments

- No to mild erythema, edema, and blanching occurred in both treatment groups
- 16 AEs were reported during the study
  - 1 AE (erythema) in the placebo arm was considered related to the study treatment
- The procedure was stopped due to intolerance of pain in 1 subject in the LT cream treatment group.

Lidocaine and Tetracaine 7%/7% Cream
Used as a Topical Anesthetic for Filler Injections for the Correction of Nasolabial Folds

Phase 4 Study
GL/04.SRE.US1098
Study Overview

- Objective: To evaluate the efficacy and safety of lidocaine and tetracaine 7%/7% cream (LT cream) vs BLT ointment for induction of local anesthesia during and after hyaluronic acid (HA) filler injections for the correction of nasolabial folds (NLFs)
- Study design:
  - Randomized, open-label, split-face study
  - 51 subjects at 4 investigational sites
- Treatment
  - LT cream vs BLT ointment (benzocaine 20%, lidocaine 6% and tetracaine 4%)
  - 30 minute concurrent application to opposite sides of the face

Main Inclusion/Exclusion Criteria

- Inclusion criteria
  - Male and female subjects, 30 to 65 years of age
  - Subject willing to undergo dermal filler injections for correction of NLFs
  - Subjects diagnosed with moderate NLFs
- Exclusion criteria
  - Subjects with a dermatologic condition on the face, which interfered with the safe evaluation of the study treatment, damaged, denuded or broken skin at the designated treatment site, and/or had scarring or infection of the area to be treated

Assessments

- Efficacy
  - Primary endpoint: Subject-reported pain intensity was assessed using a visual analogue scale (VAS)*
  - Secondary endpoints
    - Investigator-assessed pain intensity was evaluated using a 4-point categorical scale*
    - Subject and investigator preference questions
- Safety
  - Tolerability assessments (erythema, edema, blanching)
  - Adverse events (AEs)**
- *Taken at needle stick, immediately after, 1 and 3 hours after injections
- **Taken day of injection and 24 hours after injection via telephone

Demographics

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>N=51</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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</tr>
<tr>
<td>Male</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50 (98)</td>
<td></td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>47.8 ± 8.34</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>49.0</td>
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<tr>
<td>(Min, max)</td>
<td>(31.0, 64.0)</td>
<td></td>
</tr>
<tr>
<td>Race, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>50 (98)</td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>Fitzpatrick skin type, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>3 (6)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>4 (8)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>26 (51)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>17 (33)</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>1 (2)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: y, years; SD, standard deviation
Per the CSR the objective also includes 'subject satisfaction with pain management at needle stick' in addition to the efficacy and safety.
**Efficacy Assessments**

- No significant differences at any time point for subjects and investigator
  - Subject reported VAS scores
  - Subject satisfaction and preference survey responses
  - Investigator evaluation of subject pain and adequate anesthesia
  - Independent observer believed that most subjects experienced less pain with LT cream at first needle stick
  - Most subjects reported that the level of pain experienced at the first needle stick was minimal or mild for both treatment groups
  - Independent observer did not note any difference immediately after injection, one hour after injection or three hours after injection

**Tolerability Assessments**

- There was a significant difference in the distribution of erythema severity and edema severity on the day of injection between LT and the BLT comparator

<table>
<thead>
<tr>
<th></th>
<th>LT Cream n=51</th>
<th>BLT Ointment n=51</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day of Injection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>17 (33)</td>
<td>32 (63)</td>
</tr>
<tr>
<td>Very slight</td>
<td>18 (35)</td>
<td>18 (35)</td>
</tr>
<tr>
<td>Well-defined</td>
<td>16 (31)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>( P \text{ value}^{a} )</td>
<td>&lt; .001</td>
<td></td>
</tr>
<tr>
<td>Edema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>42 (82)</td>
<td>50 (98)</td>
</tr>
<tr>
<td>Very slight</td>
<td>9 (18)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Slight</td>
<td>0 (0)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Moderate</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>( P \text{ value}^{a} )</td>
<td>.003</td>
<td></td>
</tr>
</tbody>
</table>

**Adverse Events**

- 3 AEs treatment emergent adverse events (implant site bruising) were reported that were considered unrelated to topical anesthetics
Laser Studies: Study Objectives

- Objectives: To evaluate the efficacy and safety of lidocaine and tetracaine 7%/7% cream (LT cream) in providing local dermal anesthesia for common laser therapies
  - Ablative laser resurfacing (N = 20)¹
  - Nonablative laser resurfacing (N = 54)²
  - Laser hair removal (N = 60)³
  - Laser treatment of vascular lesions (N = 80)³
  - Laser tattoo removal (N = 63)³


Laser Studies: Study Designs

- Ablative laser resurfacing (N = 20)¹
  - Randomized, single-blind study
  - Concurrent 30-minute applications of LT cream and lidocaine 2.5% and prilocaine 2.5% cream (LP cream)
  - Study discontinued prematurely due to limited subjects meeting the enrollment criteria
- Non-ablative laser resurfacing (N = 54)²
  - Randomized, double-blind, placebo controlled
  - Concurrent 30-minute applications of LT cream and placebo


Laser Studies: Subject Mean VAS Scores

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Mean VAS score</th>
<th>Comparator</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ablative laser resurfacing (N=20), mm±SD</td>
<td>25.6 ± 11.5</td>
<td>51.8 ± 14.6</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Non-ablative laser resurfacing (N=54), mm±SD</td>
<td>21.4 ± 18.89</td>
<td>38.0 ± 24.46</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Laser-assisted hair removal (N=60), mm±SD</td>
<td>26.7 ± 21.2</td>
<td>44.3 ± 22.5</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Laser treatment of vascular lesions (n=42; n=38), mm±SD</td>
<td>16.4 ± 19.55</td>
<td>30.9 ± 17.06</td>
<td>.0008</td>
</tr>
<tr>
<td>Laser-assisted tattoo removal (n=62), mm±SD</td>
<td>39.1 ± 25.48</td>
<td>58.6 ± 21.59</td>
<td>&lt; .0001</td>
</tr>
</tbody>
</table>

Abbreviations: VAS, visual analog scale; SD, standard deviation.
¹All studies compared LT cream to placebo except for the ablative laser resurfacing study that compared LT cream to LP cream.
²All studies compared LT cream to placebo.
³Treatment was a 30-, 45-, or 60-minute application. The scores represented here are the mean of 30 min, 45 min, and 60 min score cohorts taken together.
Note: VAS is a scale that assesses a subjects pain intensity; 0 = no pain, 100 = the worst pain that you can imagine. All scores presented represent the subjects that received study drug and were analyzed for efficacy.
Laser Studies: Subject Assessment

**Ablative laser resurfacing (N=20)**
- The most common AEs reported for LT cream and LP cream were erythema (100% for both treatments), application site reactions (70% for both treatments), and skin discoloration (55% for both treatments)
  - All AEs were mild in severity and considered unrelated to study treatment

**Non-ablative laser resurfacing (N = 54)**
- The most common AE reported for LT cream and placebo were erythema (24% and 15%, respectively) and edema (11% and 6%, respectively)
  - 1 subject experienced a serious AE (pain) in the placebo group
  - The procedure was stopped due to intolerance of pain in 1 subject with LT cream and 4 subjects with placebo

*All studies compared LT cream to placebo except for the ablative laser resurfacing study that compared LT cream to LP cream.
*Treatment was a 30-, 45-, or 60-minute application. The scores represented here are the mean of 30 min, 45 min, and 60 min score cohorts taken together.

Note: All scores presented represent the subjects that received study drug and were analyzed for efficacy.


Laser Studies: Investigator Assessment

**Ablative laser resurfacing (N=20)**
- The most common AEs reported for LT cream and LP cream were erythema (100% for both treatments), application site reactions (70% for both treatments), and skin discoloration (55% for both treatments)
  - All AEs were mild in severity and considered unrelated to study treatment

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- The most common AE reported for LT cream and placebo were erythema (24% and 15%, respectively) and edema (11% and 6%, respectively)
  - 1 subject experienced a serious AE (pain) in the placebo group
  - The procedure was stopped due to intolerance of pain in 1 subject with LT cream and 4 subjects with placebo

*All studies compared LT cream to placebo except for the ablative laser resurfacing study that compared LT cream to LP cream.
*Treatment was a 30-, 45-, or 60-minute application. The scores represented here are the mean of 30 min, 45 min, and 60 min score cohorts taken together.

Note: All scores presented represent the subjects that received study drug and were analyzed for efficacy.


Laser Studies: Safety Assessments

**Ablative laser resurfacing (N = 20)**
- The most common AEs reported for LT cream and LP cream were erythema (100% for both treatments), application site reactions (70% for both treatments), and skin discoloration (55% for both treatments)
  - All AEs were mild in severity and considered unrelated to study treatment

**Non-ablative laser resurfacing (N = 54)**
- The most common AE reported for LT cream and placebo were erythema (24% and 15%, respectively) and edema (11% and 6%, respectively)
  - 1 subject experienced a serious AE (pain) in the placebo group
  - The procedure was stopped due to intolerance of pain in 1 subject with LT cream and 4 subjects with placebo


**Laser-assisted hair removal (N = 60)**
- 3 AEs (stinging sensation, erythema, and edema) reported in the LT cream treatment group
  - All AEs were moderate in severity

**Laser treatment of vascular lesions (n = 42; n = 38)**
- The most common adverse events reported for LT cream and placebo were ecchymosis (57% and 63%, respectively), edema (24% and 29%, respectively), and erythema (38% and 39%, respectively)

**Laser-assisted tattoo removal (N = 63)**
- The most common adverse events reported for LT cream and placebo was erythema (81% for both treatment groups)
  - Most AEs were mild to moderate in severity

Compounded Topical Anesthetics: An Update

- Compounding rules
  - In most states pharmacies are permitted to legally compound prescription medications for a patient based on a physician’s prescription
  - The prescription must be for a specific patient; not for numerous patients
  - Pharmacies are not allowed to mass manufacture or market compounded medications

- Lack of FDA oversight
  - Compounded drugs are not FDA-approved
  - Compounding pharmacies are licensed by a state board of pharmacy and are not required to register with the FDA


FDA Involvement: A History

- December 2006: FDA warning letter
  - The Food and Drug Administration (FDA) warned 5 firms to stop compounding and distributing standardized versions of topical anesthetic creams, which are marketed for general distribution rather than responding to the unique medical needs of individual patients
  - Firms that do not resolve violations in FDA warning letters risk enforcement such as injunctions against continuing violations and seizure of illegal products
  - FDA is concerned about the serious public health risks related to compounded topical anesthetic creams

- Safe Drug Compounding Act of 2007

- October 2012: Fungal meningitis outbreak
  - New England Compounding Center
  - Epidural steroid injections
  - Other drugs may have been contaminated
  - March 2013: FDA planned inspection of ~30 drug compounders

Brand versus Private Label

- The New England Compounding Pharmacy

Current State of Compounding

- Increased FDA scrutiny
- Proposed regulatory changes
  - FDA minimum production standards
  - FDA database of compounded pharmacies
  - FDA regulated labeling
  - Compounding pharmacies required to pay fees and register with the FDA
  - Patient notification that they are receiving a compounded drug
  - US Department of Health and Human Services reports
    - Groups that accredit compounding pharmacies
    - Models that states use to oversee compounded drugs

Considerations

- Direct health risks
  - Unsafe compounded products
  - May be sub- or super-potent
  - Contamination
- Indirect health risks
  - Ineffective compounded drugs


Tumescent Anesthesia Technique

• Step by step

Tumescent Infiltration

Hair Restoration Anesthesia

Tumescent Infiltration

Goals of the Tumescent Technique

• Optimize biochemical and/or biomechanical drug efficacy
• Target drug effects in local tissue compartments
• Maximize drug concentration locally
• Delay systemic drug absorption
• Prolong local or systemic drug effects
• Decrease systemic drug toxicity
• Increase the safe upper limit of drug dosage
• Mechanically expand a targeted compartment
• Benefit from augmented local hydrostatic pressure

Tumescent Anesthesia

• High volume
• Dilute SQ space
• Distended SQ compartment
• MAX serum levels 12-18 hrs.
• Lidocaine serum levels modified by
  • High interstitial pressure in SQ compartment
  • Epinephrine vasoconstrictive effect

Tumescent Technique
Dermatologic Origins of Tumescent

- Preference for local over general
- Naturally appealing to derms
- More likely to have the training and patience to work with awake alert patients
- Distinction between necessary and convenient forms of anesthesia is often disregarded
- Increased
  - Hemostasis
  - Hydrostatic pressure (spreads hair grafts)
  - Prolonged analgesia

Tumescent

- Standard dosage of lido with epi is *authoritatively* stated to be 7mg/kg (5-7 mg/kg)
- Based on IV and non-Tumescent SQ administration
- No scientific publication to support for subcutaneous levels
- Now proven to be 55mg/kg slowly in distended sub q space and dilute concentration.*
- Range 35-55 mg/kg


Classic Klein Solution made simple

- 1 Liter Saline
- 1 bottle of 1% Lidocaine (40ml)
- 1 ml of 1/1000 epinephrine
- 10 mEq of HCO3
- Hunstad
  - 1 liter of Ringers
  - No Bicarb

Formulation of the Local Anesthetic Solution for the Tumescent Technique

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
<th>Concentration</th>
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<tbody>
<tr>
<td>Lidocaine</td>
<td>500-1,000 mg</td>
<td>0.05-0.1%</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>5-1 mg</td>
<td>1:2,000,000-1,1,500,00</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>10 meq</td>
<td></td>
</tr>
<tr>
<td>Triamcinolone</td>
<td>10 mg**</td>
<td></td>
</tr>
<tr>
<td>Physiologic Saline</td>
<td>1000cc</td>
<td></td>
</tr>
</tbody>
</table>
Local anesthesia and hemostasis for:

- Liposuction
- Facelift
- Dermabrasion
- Hair transplantation
- Large cutaneous surgeries
- Abdominoplasty
- Flaps
- Skin Grafts
- Excision
- Hemostasis for mastectomies
- Topological transformation of tissues: mechanical elevation of skin from subjacent neurovascular structures.
- Targeted delivery of drugs to peripheral lymphatics
- Cancer chemotherapy and immunotherapy
- Immunotherapy: vaccine delivery for T-cell mediated immunity
- Delivery of radiopaque contrast media targeting lymphatics
- Snake antivenom therapy
- Resuscitation: fluid and electrolyte replacement in trauma, burns, cholera.
- Focal hemostasis and infection prophylaxis in surgical field

<table>
<thead>
<tr>
<th>TABLE 10.6</th>
<th>Common peripheral nerve blocks used in reanimation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nerve</td>
<td>Anatomical landmark</td>
</tr>
<tr>
<td>Median nerve</td>
<td>Anterior axillary fold</td>
</tr>
<tr>
<td>Radial nerve</td>
<td>Middle of the forearm</td>
</tr>
<tr>
<td>Ulnar nerve</td>
<td>Cubital tunnel</td>
</tr>
</tbody>
</table>

*Source: Adapted from Local and Regional Anesthetic Blocks Made Simple by Suchet & al.*
SUPRAORBITAL NERVE

IT EXITS THROUGH SUPRAORBITAL NOTCH LOCATED 27MM LATERAL TO MID-GLABELLAR LINE; HAS MEDIAL AND LATERAL BRANCHES WHICH RESPECTIVELY SUPPLY SCALP AND LATERAL FOREHEAD

Courtesy of Dhepe Nileen, MD

SUPRATROCHLEAR NERVE

IT EXITS FROM A FORAMEN 17MM LATERAL TO MID-GLABELLAR POINT; SUPPLIES MIDDLE PORTION OF FOREHEAD

Courtesy of Dhepe Nileen, MD

SUPRAORBITAL NERVE

IT EXITS THROUGH SUPRAORBITAL NOTCH LOCATED 27MM LATERAL TO MID-GLABELLAR LINE; HAS MEDIAL AND LATERAL BRANCHES WHICH RESPECTIVELY SUPPLY SCALP AND LATERAL FOREHEAD

Courtesy of Dhepe Nileen, MD

SUPRATROCHLEAR NERVE

IT EXITS FROM A FORAMEN 17MM LATERAL TO MID-GLABELLAR POINT; SUPPLIES MIDDLE PORTION OF FOREHEAD

Courtesy of Dhepe Nileen, MD
INTRAORAL APPROACH FOR INFRAORBITAL NERVE

Courtesy of Dhepe Nitesh, MD

Regional Nerve Blocks

Intraoral Approach for Infraorbital Nerve

Regional Nerve Blocks
Conclusions

- Anesthesia very important in dermatology and plastic surgery
- Need to know anatomy
- Need to keep patients comfortable
- Need to understand medicines used

Thank You

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