Local anesthesia in Mohs surgery
Advantages

- easy to perform
- quick onset
- intraoperative communication
- low side risks
- treatment of risk patients possible
- very low mortality
Chemical structure

- similar chemical structures, 3 components
- lipophilic aromatic ring portion: diffusion of the anesthetic through membranes → quick onset
- hydrophilic amin portion → longevity
- Intermediate chain
  - „ester-type“
  - „amid-type“
Ideal local anesthetic agent

- strong effect
- quick onset
- long lasting
- low toxicity
- low allergy potency

local anesthetic of amidtype

Lidocaine
Bupivacaine
Mepivacaine
Prilocaine
Ropivacaine
local anesthetic agent

<table>
<thead>
<tr>
<th>Anesthetic</th>
<th>Onset (min)</th>
<th>pKa</th>
<th>Without epinephrine (adrenaline)</th>
<th>With epinephrine (adrenaline)</th>
<th>Maximal recommended dose (mg/kg) for adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Without epinephrine (adrenaline)</td>
<td>With epinephrine (adrenaline)</td>
<td>Without epinephrine (adrenaline)</td>
</tr>
<tr>
<td>Lidocaine</td>
<td>&lt;1</td>
<td>7.7</td>
<td>30–120</td>
<td>60–400</td>
<td>5</td>
</tr>
<tr>
<td>Bupivacaine</td>
<td>2–10</td>
<td>8.1</td>
<td>120–240</td>
<td>240–480</td>
<td>2.5</td>
</tr>
<tr>
<td>Mepivacaine</td>
<td>3–20</td>
<td>7.6</td>
<td>30–120</td>
<td>60–400</td>
<td>6</td>
</tr>
<tr>
<td>Prilocaine</td>
<td>5–6</td>
<td>7.7</td>
<td>30–120</td>
<td>60–400</td>
<td>7</td>
</tr>
<tr>
<td>Etidocaine</td>
<td>3–5</td>
<td>7.7</td>
<td>200</td>
<td>240–360</td>
<td>4.5</td>
</tr>
<tr>
<td>Ropivacaine</td>
<td>1–15</td>
<td>8.2</td>
<td>120–260</td>
<td>Not yet defined</td>
<td>3.5</td>
</tr>
<tr>
<td>Levobupivacaine</td>
<td>2–10</td>
<td>8.1</td>
<td>120–240</td>
<td>Not yet defined</td>
<td>2.1</td>
</tr>
</tbody>
</table>

See Table 3.11 for pediatric dosage.

Surgery of the Skin
Robinson, Hanke et al
Vasoconstrictors

- Adrenaline, Noradrenaline, Phenylephrine
- decrease bleeding
- prolong duration of anesthesia
- minimize the amount of drug injected
- finger, nose, ears
- full vasoconstriction after 7-15 minutes
- 1:100 000
Vasoconstrictors

- since existence of produced Lidocaine with Adrenaline no single case of digital necrosis  
  \(\text{Plast Reconstr Surg 2001; 108}\)

- American podiatric society uses Lidocaine with Adrenalin for many years (200 000 interventions)  
  \(\text{J Am Podiatr Soc 1971; 61}\)
  \(\text{Plast Reconstr Surg 2001; 107}\)
  \(\text{Ann Plast Surg 1998; 41}\)

- call for complications without any new cases  
  \(\text{Plast Reconstr Surg 2002; 110}\)  \(\text{JDDG 2005; 3}\)
Sodium bicarbonate

• reduces the pain on infiltration
  → pH of lidocaine 5.0-7.0
  → however, addition of acidic preservatives lowers the pH to 3.3-5.5 causing more discomfort with injection → 1:5-1:10

• adviseful also in areas of inflammation
Systemic adverse effects

- Psychogenic attacks → vasovagal episodes
  - Increased parasympathetic tone
  - Lightheadness, nausea, syncope,
  - Bradycardia, hypotension
  → Trendelenburg position

- Epinephrine reactions
  flushing, palpitations, malaise, tachykardia
  (but no hypotension!)
Systemic adverse effects

- Life threatening allergic reactions rare
- More commonly with ester derivates
- No cross reactivity between ester and amide types
- Often reaction to preservative (Methylparabene) and not to the anesthetic itself
Tumescence local anesthesia (TLA)

lat.: “tumescere” = swelling
- subcutaneous
- diluted
- with adrenalin

thanks to Prof. Dr. Matthias Möhrle
Praxisklinik Tübingen - Haut und Venen
Lehrpraxis der Eberhard Karls Universität Tübingen für das Fachgebiet Dermatologie
Tumescent local anesthesia (TLA)

thanks to Prof. Dr. Matthias Möhrle
Tumescence local anesthesia (TLA)

Skin Surgery 0.21% (max 4ml/kg)

NaCl 0.9% / Ringer 500.0 ml
Lidocain 2% 50.0 ml
Ropivacain 1% 20.0 ml
Adrenalin Amp 0.5 ml

thanks to Prof. Dr. Matthias Möhrle
Tumescence local anesthesia (TLA)

Injection:

Thin needles (27, better 30 Gauge)
slow nearly horizontal injection with manually strongly tensed skin

30 G, flow 100-200 ml/h
27 G, flow 200-400 ml/h
24 G, flow 400-700 ml/h

Maximal flow is possible

thanks to Prof. Dr. Matthias Möhrle
Tumescence local anesthesia (TLA)

Advantages

- No buffer needed
- Efficiency equal to 1% Lidocaine
- Slow injection is free of pain
- Low costs, easy to prepare

Disadvantages

- needs more time and space
- changed topography

thanks to Prof. Dr. Matthias Möhrle
Nerve blocks

Advantages
• less local anesthetic agent
• less pain
• longer duration
• topography

Disadvantages
• technical expertise
• no vasoconstriction
• risk of nerve injury/intravascular injection
Supraorbital block (V1)

- N. supraorbitalis
  Foramen supraorbitale
- N. supratrochlearis

\[\downarrow\]

anesthesia of the ipsilateral forehead
Supraorbital block (V1)
Infraorbital block (V2)

N. infraorbitalis
Foramen infraorbitale

↓
anesthesia of ipsilateral
lower eyelid
lateral nose
cheek
upper lip
Infraorbital block (V2)

- Cutaneous route
- Intraoral route
Mental block (V3)

N. mentalis

Foramen mentale

Anesthesia of
ipsilateral lower lip and chin
Mental block (V3)

cutaneous route

intraoral route
Anesthesia of the nose

- N. infratrochlearis
- N. infraorbitalis
- N. nasociliaris

no real block
Anesthesia of the tongue

intraoral block of the N. lingualis

Anesthesia of the ipsilateral tongue
Anesthesia of the ear

- no real block
- N. auriculotemporalis (preauricular side)
- N. auricularis major (retroauricular side)
- auricular branch of N. vagus (retroauricular side)
Anesthesia of the earlobe

Figure 4 Injection for regional anesthesia of the auricle.

Figure 5 Distribution of the five major branches of the facial nerve.
Transthecal block

- effective block for the finger
- no risk of nerve injury
- anesthesia along flexor tendon sheath
- perpendicularly metacarpal injection
- very fast onset
Transthecal block
Take home message I

- Use small diameter needles
- Minimize patient viewing of needle/injection
- Add sodium bicarbonate in normal local anesthesia
- Warm the anesthetic solution
Take home message II

• Inject and infiltrate anesthetic slowly, deep to more superficial
• Minimize the number of punctures
• Reintroduce needle at previously anesthetized areas
• Consider TLA or nerve blocks for larger areas
For a patient 2 criterias define the result of an operation

- Cosmetical result
- Pain before and during the treatment
THANK YOU!
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Ulnar nerve block

Injection inbetween tendon M. flexor carpi ulnaris and M. palmaris longus

- palmar Dig. IV ulnar und Dig. V
- dorsal Dig. III ulnar und Dig. IV/V
Median nerve block

Injection inbetween

M. palmaris longus and

M. flexor carpi radialis

↓

anesthesia

• palmar Dig. IV radial

• Dig. II/III und Dig. I ulnar

• dorsal Dig. I Endphalanx

Dig. II/III/ IV radial

Mid/Endphalanx
Radial nerve block

- Block of Ramus Superficialis/dorsalis N. radialis
- Injection lateral of A. radialis

Anesthesia
- palmar Dig. I radial
- dorsal DigI/II und Dig. III radial