MINOR PROCEDURES
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Today’s Agenda

Digital block
Subungual hematoma
Ingrown toenail management
Nail removal
Abscess I & D
Indication for Digital Blocks

- Patients with crush injuries
  - Need x-rays
  - Need extensive wound exploration
  - Tendon injuries requiring evaluation
- Multiple lacerations in same digit
- Multiple foreign bodies in same digit
- Partial or total nail removal
Local Anesthetics

• **Mechanism of action**
  • Infiltrate tissue and diffuse across neural sheaths and membranes
  • Interfere with neuronal depolarization
    • Prevent Na influx
    • No action potential, no nerve impulse

• **Onset of Action**
  • Technique of injection, concentration, total dose
  • Knowledge of anatomy is important
  • Injection between dermis and subcutaneous tissue = immediate anesthesia

• **Duration of action**
  • Increased with epinephrine
    • *Do not use epinephrine in fingers, toes, nose, penis, ears*
  • Increased with long acting anesthetics such as Bupivicaine and Marcaine
Wound Anesthesia

GOAL = Reduce Pain and Anxiety

• Type of anesthetic used
• Needle size 27 or 30-gauge
  • Inexperienced – start with 25-gauge
  • 25-gauge or 27-gauge ½-inch needle
• pH - buffering
• Temperature of solution
• Speed and depth of injection
Three Major Techniques for Digital Block

- Dorsal surface
  - Indicated when only the nail is involved
  - Aberrant anatomy may make the technique less than optimal
- Web space
  - Need larger volume of anesthetic
  - Less control of instillation
- Medial/lateral
  - Focused area of instillation
  - Volume parameters exist
Dorsal Surface
Dorsal Surface
Web Space
Medial/Lateral Approach
Technique

• Gather equipment
  • 25 to 30-gauge needle, 1/2 inch
  • 4cc lidocaine max dose
  • Do not use Epinephrine !!!!!
• Identify landmarks
• Insert needle until you strike bone
• Draw back before injecting
• Inject, angle, inject, angle, inject
• No more than 2cc max per side in a large digit in an adult (so much less in smaller individuals)
• Dependent extremity - wait 10 – 20 minutes
• Go back to perform procedure !!
Subungual Hematoma
Subungual Hematoma
Subungual Hematoma

• Collection of blood under the nail
• Result of trauma
• Painful due to pressure of the fluid under the nail
• If left untreated, may result in damage to the nail bed
Indications for Subungual Hematoma Release

• Pain management

• Avoid permanent deformity of nail due to nail bed injury
Equipment

• Hand-held cautery (optimal) or
• paperclip and heat source (lighter or open flame)
• Hemostat (if paperclip technique)
• Antibiotic ointment
• Antimicrobial solution
• Dressing
Equipment Alternative

• Paperclip heated to red-hot with a lighter or other heat source

• Benefits
  • Readily available equipment

• Limitations
  • Length of time to heat paperclip
  • Rapid cooling which caused “drag” when removing
Procedure

- Explain procedure to patient
- Emphasis painless nature of procedure
- Advise patient about smell of burning nail
- Clean nail with antimicrobial
- Dry thoroughly
- Use heat source to trephinate nail
Post Procedure
Allow Hematoma to Drain

- May soak in antimicrobial with small amount hydrogen peroxide
- Apply small amount antimicrobial ointment
- Band-Aid
Patient Instructions and Follow-Up

• Soak the finger 2-3 times daily for 2 days in warm water with pinch of salt
• Apply antimicrobial ointment to open nail for 2 days
• Watch for signs of infection
• Warn patient there may be permanent nail deformity as a result of the initial injury
AND NOW...SUBUNGAL HEMATOMA RELEASE THE MOVIE
Ingrown Toenail Management and Toenail Removal
Indications for Nail Management

- Onychomycosis (nail fungus)
- Recurrent ingrown toe or finger nail
- Pain
- Nail deformity
- Nail trauma
- Foreign body under nail
Indications for Nail Management

• Ingrown toenails (unguis incarnatus) are a common toenail problem
• Occurs when the proper fit of the toenail into the lateral or medial nail groove is altered.
• Various causes include:
  • cutting the toenails at an inappropriate angle (rounded instead of flat)
  • accumulation of debris under nail
  • congenital malformation of the great toenail (an autosomal dominant trait)
  • curling or deformity of nail due to trauma or excessive length
  • the great toe is the most commonly involved.
Pathophysiology

• The underlying cause of the infection and inflammation is a foreign body reaction.
• A splinter or small piece of the great toenail invades the sulcus and subcutaneous tissue resulting in inflammation of the surrounding area.
• This results in callous formation, edema and perforation into the nail groove as a result of rubbing.
• The nail edge becomes imbedded in the lateral skin fold causing pain, erythema and ultimately, infection.
Stages of Development

• Stage I – tenderness to palpation and with wearing shoes, erythema and slight swelling at the site (paronychia) – conservative management with toenail elevation and wicking

• Stage II – erythema, tenderness with associated suppuration and a small collection of pus – partial toenail removal
History

• Patients have a painful, swollen, and tender toe.
• When infection is present, the patient may have local discharge.
• Important components of the history include a previous history of risk factors for diabetes and arterial insufficiency.
Physical Exam

• The affected toe has all the classic signs of infection: edema, erythema, and warmth.
• Lymphangitis is rare.
• The affected side is readily apparent.
• Inspection for other contributing causes, particularly mycoses, is important.
Diagnostics

• Radiography should be considered when it is necessary to rule out toe fractures (common).

• Radiography should be considered when it is necessary to rule out osteomyelitis (rare)

• Consider underlying diseases

• Fungal infections?
Conservative Management – Stage I

- Position patient comfortably on exam table with flexed knees, feet flat on the exam table
- Explain the procedure
- Thin the middle third of the nail on the affected side by filing the upper surface until you can see the nail matrix
- Stretch and roll the cotton to form a wick
- Gently push the wick firmly under the distal portion of the affected lateral nail groove to lift the nail edge using the forceps
- Optional - soak cotton wool in a 60% alcohol or tincture of iodine solution
- Apply antibiotic ointment to the infected cuticle edge
- Tape the cotton wick to prevent displacement (lateral edge; tape between 1st and 2nd toes to prevent irritation, medial edge; tape to the medial aspect of toe to prevent rubbing from shoes. Cover with dressing
Stage II Management Partial Toenail Removal

• Recurrent ingrown nail
• Pain
• Nail deformity
• Nail trauma
• Foreign body under nail
Procedure

- Position patient comfortably on exam table
- Explain the procedure
- Obtain written consent
- Soak the affected foot in an antimicrobial solution

Laser procedures are also available for nail removal
Equipment

- Nail file
- Nail splitter (or sharp scissors)
- Nail elevator (or flat bladed tool)
- Hemostat
- Antimicrobial solution
- Silver nitrate or cautery
- Antibiotic ointment
- Dressing
Partial Toenail Removal

- Prepare a sterile field
- Administer digital block
- When adequate anesthesia is attained (usually 5-20 minutes) wrap rubber band or Penrose drain securely around proximal toe as a tourniquet (optional)
- Thin the middle third of the nail on the affected side by filing the upper surface until you can see the nail matrix
- Loosen and lift the affected nail edge using the periosteal elevator. Introduce and advance the elevator applying upward pressure against the nail (freeing the nail sulcus and eponychium from the nail plate) and away from the nail bed to minimize bleeding and injury
Partial Toenail Removal

- Completely free the proximal nail from the cuticle and expose the germinal tissue of the nail bed for effective removal
- Using the nail splitter or sterile scissors, wedge off a 2mm-3mm section of the affected nail
- Use the nail elevator to free the wedge from the nail bed
Partial Toenail Removal

- Grasp the wedge with a hemostat and in one steady, continuous movement pull the wedge out while simultaneously **twisting toward the affected side of the toe**.
- This continuous, pulling and twisting motion ensures that the wedge will be rolled out from beneath the nail margin.
Partial Toenail Removal

- Examine the nail bed and remove any debris, assess for splinters
- Remove tourniquet – never leave tourniquet in place for more than ten minutes
- Optional – phenol, silver nitrate or cautery may be used to cauterize the matrix where the nail was removed
- Apply antibiotic ointment to nail bed, cover with sterile dressing
Cauterizing Matrix

Post Cautery
Total Nail Removal

- Thin both nail edges, medial and lateral
- Proceed as for partial nail removal using nail splitter (or scissors) *down the center* of the affected nail
- Loosen and remove one side of nail
- Repeat procedure on the other side of the nail
Outcomes

• Short term outcome
  • Serosanguinous drainage should be minimal within 24 hours
  • Pain should be well controlled with non-narcotic analgesia and elevation of the foot

• Resolution
  • Sterile exudate may be present for up to 4 weeks
  • Toe should be fully healed in 4-6 weeks

• Follow-up
  • One week for evaluation
Patient Instructions

• Rest foot and elevate for 24 hours

• Change the dressing in 24 hours, observing for signs of infection including erythema, purulent drainage

• Begin ambulation with open toe shoes or sandals after 24 hours

• Soak toe in warm water for 20 minutes twice daily for four days

• After soaking, carefully dry toe and apply a thin layer of antibiotic ointment to the affected edge of the toe

• Reapply nail packing, if used, after each soaking

• Keep a bandage on the toe until it heals
Patient Instructions

• Take acetaminophen or ibuprofen as directed for pain
• Avoid running or strenuous activity for two weeks
• Wear loosely fitting or open toe shoes or sandals for two weeks
• Call the office if any of the following occur:
  • chills or fever greater than 100 degrees
  • pus or foul smelling drainage increased warmth or red streaks
  • bleeding occurs after the first 48 hours
  • pain not relieved by acetaminophen or ibuprofen
• Return in one week to be checked
• Complete nail re-growth takes approximately 8-12 months in an adult
Complications

• Infection – treat with antimicrobial soaks and appropriate antibiotics (local or systemic dependent on involvement)
• Excessive bleeding – cauterize with hand held cautery or silver nitrate sticks. Refer if not controllable
• Nail re-growth with paronychia– repeat procedure
Documentation

• Consent for procedure
• Neurovascular and neurosensory exam
• Local anesthesia used- type, amount, placement, needle gauge, effect
• Tourniquet placement and removal
• Wound appearance post procedure (amount of bleeding)
• Neurovascular and neurosensory exam repeated
• Discharge instructions explained to patient and/or family
ABSCESS I & D
Abscess

• Localized collection of pus surrounded by inflamed tissue
  • Furuncle
  • Carbuncle
  • Paronychia
  • Pilonidal Cyst
  • Perianal Cyst
Causative Organisms

S. Aureus

MRSA

Strept
Abscesses

- Frequent Areas of Occurrence
  - Extremities
  - Under breast
  - Axillae
    - Hidradenitis suppurativa
  - Buttocks
  - Hair follicles
Hidradenitis Suppurativa

Affects inverse areas of the body (places where there is skin-to-skin contact - armpits, groin, breasts) and where apocrine glands and hair follicles are found.

It is non-contagious and recurrent; typically manifesting as a progression from single boil-like, pus-filled abscesses, or hard sebaceous lumps, to painful, deep-seated, often inflamed clusters of lesions with chronic seepage (suppuration --- hence the name) involving significant scarring.
Hidradenitis Suppurativa

• Three Stages
  • **Stage I.** Solitary or multiple isolated abscess formation without scarring or sinus tracts;
  • **Stage II.** Recurrent abscesses, single or multiple widely separated lesions, with beginning sinus tract formation ("tunneling") and cicatrisation (formation of scar tissue);
  • **Stage III.** Diffuse or broad involvement across a regional area with multiple interconnected sinus tracts, significant cicatrisation and persistent abscesses.
Hidradenitis Suppurativa
Indications for I & D

MUST have fluctuant area
(pus collection) to I & D
Stages of an Abscess

- Induration, warmth, pain
- Fluctuant, increased pain, warmth & cellulitis
- Rupture, leakage, inflammation, cellulitis
Contraindications and Relative Contraindications to I & D

- **Face**
  - Bridge of nose & Corners of mouth

- Palmar space abscesses, or abscesses in the deep plantar spaces

- Abscesses in the nasolabial folds (may drain to sphenoid sinus, causing a septic phlebitis)

- Patients with debilitating disease or immunocompromise
  - Culture
  - Antibiotics

- Generalized Sepsis
  - Culture wound then start antibiotics first before I & D
Contraindications and Relative Contraindications to I & D

Pain Management

If you can not do this with reasonable pain management:
Call surgery, admit and send to OR or SPU
Abscess Treatment Non-Fluctuant

• Warm compresses QID for 30 min
• Sitz bath if rectal or perineal
• Pain management!
• Consider antibiotics if:
  • Concern for expanding cellulitis
  • Facial or peri-orbital
  • Other considerations such as location, co-morbidities, etc.
• Return when fluctuant OR at resolution
Abscess I & D

• Ensure appropriate H & P Completed
  • Prior history of abscess
  • Drug injection
  • Allergies
• Informed consent
• Explain procedure
I & D Equipment

- Antiseptic skin cleanser
- Topical anesthetic (ethyl chloride)
- 1% or 2% lidocaine
- Syringe for anesthesia injection
- 25 & 18 gauge needles
- Sterile gauze
- # 11 scalpel
- Sterile drape, gloves
- Hemostat or blunt forceps
- Packing gauze (iodiform or plain)
- Culture
- Scissors
- Tape
Procedure

• Position patient
• Anesthetize area
  • Field block vs. roof vs. topical
• Cleanse abscess & surrounding area
• Drape & glove
• Consider skin lines of tension
Field Block (parallel margin infiltration)
Consider Skin Lines of Tension

- Langer’s lines are lines of tension or cleavage within the skin that are characteristic for each part of the body.
- Consider skin lines of tension when making any elective incision of the skin.
Procedure

• Follow skin lines of tension

• Incise widely over abscess with the #11 blade to the borders of fluctuance cutting through the skin into the abscess cavity. Follow skin fold lines whenever able while making the incision.

• Express pus

• Irrigate

• Break up loculations
Procedure

- Express, irrigate, loculate, express, irrigate, loculate...... Procedure
- Pack with packing tape
- Suture packing if more than one piece
- Dressing
- ? Antibiotics
Follow-Up Instructions

• Return 2 days for packing change
• Observe for signs of Infection
  • Increased drainage
  • Red streaks (lymphadenitis)
  • Increasing pain
  • Fever

• Some PO Antibiotic Choices (always consider MRSA)
  • Clindamycin 300mg TID
  • Doxycycline 100mg BID
  • Keflex 500mg QID
  • Dicloxacillin 250mg QID
  • Duracef 500mg BID
  • Bactrim DS BID

• Pain Management
### Some Antibiotics for MRSA

**Options for oral treatment of methicillin-resistant Staphylococcus aureus (MRSA)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Adult dose</th>
<th>Pediatric dose (children &gt;28 days)*</th>
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<tbody>
<tr>
<td>Clindamycin</td>
<td>300 to 450 mg orally three to four times daily</td>
<td>40 mg/kg per day orally divided in three or four doses</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>1 to 2 DS tablets orally twice daily</td>
<td>8 to 12 mg trimethoprim component/kg per day orally divided in two doses</td>
</tr>
<tr>
<td>Doxycycline†</td>
<td>100 mg orally twice daily</td>
<td>≤45 kg: 4 mg/kg per day orally divided in two doses; &gt;45 kg: 100 mg orally twice daily</td>
</tr>
<tr>
<td>Minocycline†</td>
<td>200 mg orally once, then 100 mg orally twice daily</td>
<td>4 mg/kg orally once, then 4 mg/kg per day divided in two doses</td>
</tr>
<tr>
<td>Linezolid</td>
<td>600 mg orally twice daily</td>
<td>&lt;12 years: 30 mg/kg per day orally divided in three doses; ≥12 years: 600 mg orally twice daily</td>
</tr>
<tr>
<td>Tedizolid</td>
<td>200 mg orally once daily</td>
<td>Insufficient data</td>
</tr>
</tbody>
</table>

The doses recommended above are intended for patients with normal renal function; the doses of some of these agents must be adjusted in patients with renal insufficiency.

DS: double strength (ie, 160 mg trimethoprim with 800 mg sulfamethoxazole per tablet).

* The weight-based pediatric dose should not exceed the usual adult dose. Dosing for neonates is provided separately; refer to UpToDate table on treatment of cellulitis in neonates.

† Not recommended for children <8 years of age.

Procedure Note

- Size & location of abscess
- Identify that abscess is fluctuant!
- Wound preparation & anesthesia
- Drainage amount
- Packing (iodiform or plain, size)
- Antibiotics if given
- Follow-up plan
Discharge Instructions

- Return for fever or signs of infection
- Wound care
- Re-packing instructions if necessary
- Antibiotic instructions
- Pain management instructions
THE END