Common Office Procedures

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Cryosurgery
Shave biopsy
Punch biopsy
Skin anatomy review

- Knowledge of skin anatomy critical to an effective procedure and understanding potential complications
- Epidermal thickness 0.05-1.5mm
- Dermal thickness 0.6-3mm

Cryosurgery

- Use of extremely low temperatures to produce local tissue destruction
- Liquid nitrogen most commonly used professionally
  - Produces much colder temps (-168C) than OTC products (i.e. dimethyl ether -24C)
### Cryosurgery - vehicles

- **Spray-tip canister**
  - Direct contact not needed
- **Cotton-tip applicator**
  - Very precise
  - Small lesions near eyes
  - Children
- **Metallic instrument**
  - Frozen in LN
  - Clamp to skin tag

### Cryosurgery - mechanism

- Heat is transferred away from cells to the LN - causing tissue necrosis
- The freezing causes cell destruction
  - ice crystal formation
  - cell membrane disruption
  - vascular stasis
- Rapid cooling and slow thaw maximizes tissue destruction
Cryosurgery - indications

- Benign lesions - skin tags, seborrheic keratosis, warts, molluscum, keloids, solar lentigines
- Pre-malignant lesions - actinic keratosis
  - Take care to biopsy any suspicious lesion for SCC
- Malignant lesions – superficial basal cell carcinoma, squamous cell carcinoma in situ
  - Used for thin, well defined lesions when other treatments are contraindicated (rare)
  - Require longer freezing times to reach lower tissue temperature

Cryosurgery - technique

- Freeze fast, thaw slowly
  - Better intracellular ice formation is more damaging
- Repeat freeze-thaw cycles for maximal destruction
- General parameters for benign and pre-malignant lesions:
  - 1 to 2 cycles of 3-10 second freeze with 2mm lateral spread

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Temperature range for destruction</th>
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</thead>
<tbody>
<tr>
<td>Melanocytes</td>
<td>-4 to -7 C</td>
</tr>
<tr>
<td>Benign lesions (Keratinocytes)</td>
<td>-25 to -50 C</td>
</tr>
<tr>
<td>Malignant</td>
<td>At least -50C</td>
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Cryosurgery video

Cryosurgery-follow up

- Expected side effects: Pain, edema, erythema, blister and crust formation

- Complications
  - Common: hypopigmentation (mild degree of freezing (-5C) to irreversibly damage melanocytes)
  - Uncommon: scarring, nail dystrophy, alopecia
Cryosurgery

- Relative contraindications
  - Cold sensitivity (i.e. cold urticaria)
  - Ill-defined lesion, location (eyelid), tanned or dark skin
- Post-procedure care
  - Daily cleansing with soap and water
  - Petrolatum ointment
  - Sun protection
  - Healing expected within 1-3 weeks

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Skin Biopsies

- Need to get informed consent
- Risks: Pain, bleeding, infection, scarring and the potential need for additional procedures
- Benefits: Diagnosis and potentially curative treatment

Shave biopsy

- Most common skin biopsy technique
- Diagnostic role - obtain specimen for histologic exam
- Therapeutic role - remove an inflamed or symptomatic skin lesion
  - If the intent is complete lesion removal then the term “shave excision” or “shave removal” is used
Shave biopsy

- Best for epidermal and superficial dermal processes
  - Biopsy of suspected basal cell carcinoma or squamous cell carcinoma
  - Removal of skin tags and other benign exophytic neoplasms

- Local anesthesia used to produce a wheal under the lesion
- Use a 15 blade or single-edged razor blade held semi-curved
- Move through skin in a sawing motion horizontally
  - Entering epidermis to depth of superficial dermis
- Goal is a shallow, saucer-shaped defect with a single intact specimen
- Submit specimen in 10% formalin or Michel’s solution for immunofluorescence
Shave biopsy video

Punch biopsy

- Deeper sampling than shave biopsy
- Diagnostic role - obtain specimen for histologic exam
  - Useful for rashes, dermal or subcutaneous nodules, melanocytic neoplasms
- Therapeutic role - removal of small dermal neoplasms
  - “benign excision” or “punch removal” are best terms
  - Useful for cysts, inflamed dermal nevi

Image from National Cancer Institute
Punch biopsy

- Common punch tools vary from 2mm – 10mm
  - 4mm most common
- Oval-shaped defect is optimal
  - Created by spreading skin perpendicular to relaxed skin tension lines during biopsy
- Push and rotate punch tool to subcutaneous tissue (hub of the punch tool)
- Forceps and scissors used to extricate the specimen

Punch biopsy closure

- Sutures generally provide best closure
  - Nylon or polypropylene monofilament - require removal
    - 3-5 days for face (use 6-0)
    - 7-10 days for scalp and neck
    - 10-14 days for remainder of body
  - Fast-absorbing gut dissolves
- Secondary intention (if less than 4 mm)
- Wound closure strips in non tension areas
- Absorbable sponge product is a good choice for areas that are difficult to suture.
Skin biopsy side effects and wound care

- **Side effects**
  - Pain, bleeding, crusting
  - Secondary infection
  - Delayed healing, especially hands, feet, lower legs in elderly person
  - Scar formation

- **Wound care**
  - Daily cleansing with soap and water
  - White petrolatum ointment + bandage changed daily
  - Sun protection to prevent scarring

Punch biopsy video
### Skin biopsy – bleeding risk

- Caution if severe thrombocytopenia, bleeding disorder or anticoagulant use
  - Biopsy may still be performed but hemostasis may be delayed
  - Lower legs, hands, feet, digits, lips, and scalp prone to bleeding
  - Use anesthetic with epinephrine – except tips or ears, fingers, toes or genital area
  - May need to use aluminum chloride, pressure dressing or absorbable sponge

### Skin biopsy relative contraindications

- History of keloid scarring
- Infection at biopsy site
- Anesthetic allergy
  - More common with esters than amides
  - Often due to a preservative rather than the anesthetic itself
- Options
  - Anesthetic of alternate class in a preservative-free formulation
  - 1% diphenhydramine solution
  - Normal saline
Conclusions

• Knowledge of skin anatomy is critical to successful performance of dermatologic procedures and understanding side effects

• When performing cryosurgery tailor length of freeze and number of cycles to “thickness” of target lesion
  • Freeze fast and thaw slowly for best results

• Shave biopsy is best for epidermal and superficial dermal pathology

• Punch biopsy is best when assessment of dermal (or deeper) pathology is necessary

Office Procedures: Joint Injection Techniques

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Joint Injection Techniques

Objectives

- Injection, Aspiration
  - Indications for each
  - Relative and absolute contraindications
  - Outpatient setting (routine and urgent)
- Safety
  - Site identification and consent
  - Infection prevention
  - Prevent injury or tissue damage
  - Patient comfort
- Technique
  - Effective injection/aspiration
  - Key to success: anatomy

Indications

- Diagnostic
  - Evaluation of synovial fluid
  - Local analgesia
- Therapeutic
  - Improve pain/mobility
  - Adjuvant therapy

Caution

- Introduction of infection/worsen bleeding
- Recurrence
**Indications: Aspiration**

- In setting of injury/trauma, historically:
  - Aspiration to obtain further diagnostic information
  - Hemarthrosis: ligament injury
  - Fat globules: bony injury
- Now essentially a historical use
  - Advances in imaging modalities
  - Avoid risk: injury, infection, or patient discomfort

**Indications: Aspiration**

- Diagnosis of infection or inflammatory arthritis,
  - Gout, RA, Pseudogout, etc.
  - Send aspirate for microbiological or fluid studies
- Management of septic arthritis
  - Serial aspiration
  - Rarely used as part of management strategy
  - Poor surgical candidate
  - May also be used to monitor clinical response
  - Send follow up aspirate for evaluation
Indications: Therapeutic Injection

- Pain or inflammation of joint:
  - Osteoarthritis/ Degenerative Joint Disease
  - Rheumatoid Arthritis or other inflammatory arthropathy
- Tendonitis/Tenosynovitis/Bursitis:
  - Use Caution - may result in tendon injury
  - Inject bursa or tendon sheath
  - Rotator cuff tendinopathy/subacromial bursitis
  - Trigger finger, DeQuervain’s tenosynovitis
  - Greater Trochanter, pes anersinus, other

Indications: Therapeutic Injection

- Enthesopathies
  - Lateral epicondylitis (Tennis elbow)
  - Medial epicondylitis (Golfer’s elbow)
  - Achilles or Plantar fasciitis (caution)
Contraindications:

• Absolute:
  • Skin infection, contamination, or compromise at injection site
    – May be able to use alternate approach or location
  • Infected joint or bursa
    – Contraindication for Therapeutic injection
    – Indication for Diagnostic aspiration
  • Presence of Joint Prosthesis
    – Consult Ortho or refer patient back to treating surgeon
  • Patient preference/refusal

Contraindications:

• Relative:
  • Anatomic difficulty
    • Severe scarring
    • Ankylosis
    • Deep structure (intra-articular hip)
    • Excessive soft tissue envelope
    • Consider image guidance
  • Coagulopathy
    • depending on strength of indication, may be managed proactively
  • No/Minimal relief from previous
  • Osteoporosis surrounding
  • Uncontrolled diabetes mellitus
Complications:

- Infection
- Reaction (local)
- Steroid flare
- Soft tissue atrophy
- Depigmentation
- Tendon rupture
- Systemic effects
- Direct needle injury

Safety:

Site Identification and Consent

- Informed consent
  - Review procedure, risks and benefits with patient
  - Document! (may be verbal or written)
- Determine correct site - patient agreement
  - Follow your institutional protocol
  - Each site of procedure should be identified
- Alert patient
  - Verbal confirmation of appropriate site
- Non-participating patient—include representative
  - Mark site according to institutional protocol
Safety: Infection Prevention Skin Prep

• Decrease contamination/sterilize skin

• Do not place through non-intact skin!
  • Rash, cellulitis, psoriatic plaque, abrasion, etc.
  • May need alternate technique or delay procedure

• Skin Cleanse with antiseptic
  • Alcohol, Povidone-iodine and/or Chlorhexidine

Safety: Infection Prevention Skin Prep

• Using basic sterile technique to prep:
  • Always wear gloves
  • Scrub field in circular pattern
    • center and moving outward
  • Do not touch field with non-sterile object
  • May use sterile alcohol swab to wipe injection site
  • If hair removal needed - snip or use clipper, not razor
  • Allow alcohol to dry
    • Drying action hydrolyses bacteria to kill
  • Perform procedure immediately to avoid re-contamination
**Safety: Patient comfort**

- Try to make the experience as pleasant as possible
  - Avoid further discomfort or complications
  - Positioning, relaxation, watching, “Needle phobia”
- Use of Analgesics
  - Topical, local
- Accurate, confident injection technique
  - Know your anatomy and equipment
    - Needle and fluid “feel”
  - Difficult to reach target
    - Consider image guidance
  - Reassures patient

**Safety: Infection Prevention**

- Use “no-touch” technique to place needle
  - Important to avoid contaminating “field” by touching prepped area with unsterile object, e.g. glove
  - Use of sterile gloves or sterile drape is optional
    - May require prepping larger field, and help of assistant
    - May be helpful if you need to palpate area for accuracy
- Cover with sterile dressing following injection
  - Compressive wrap optional
Injection Video:
Knee anatomy, Skin prep and Analgesia

Safety:
Avoid injury

- Direct mechanical injury,
  - bone, nerve, soft tissue, cartilage
- Vascular:
  - Intravascular injection, bleeding/ bruising
- Skin compromise:
  - Fistula formation
- Important to know anatomy of the area
- Medication Safety
  - Avoid allergy, side effects
Safety: Medication - Steroid

- Efficacy generally accepted but little evidence
- Systemic side effects
  - Short term:
    - hyperglycemia
      - Persists for variable period following injection
  - Long term:
    - AVN
    - impaired immunity
    - adrenal suppression
- Relatively rare with common injection dosing and occasional use

Safety: Medication - Steroid

- True Allergy uncommon
  - May include allergy to carrier or other component of formulation
  - Still reported- rarely
- Local effects
  - Increased risk of infection
    - Possible increased risk of future periprosthetic infection
  - skin depigmentation
  - tendon attrition/tears
  - Actual effect on joint unknown, difficult to pinpoint
Safety: Medication - Local anesthetics

• Lidocaine, ropivacaine, bupivacaine, etc.
• Allergy
• Toxicity
  • High intra-articular concentration linked to chondrotoxicity
  • CNS and Cardiovascular effects
    • Large dose
    • Inadvertent intravascular injection

Injection/Aspiration Technique

General comments:
• Sterile prep of area
  • Collect needed materials ahead of time
  • Consider aspiration of the area just prior to injection
    • MAY yield fluid, confirming needle tip in “space”
    • Not always successful:
      • Smaller space, Minimal effusion
      • Edematous inflammatory tissue may obstruct needle on aspiration.
    • Safety: confirm that needle is NOT intravascular.
    • No blood return
• Fluid flow
  • Free flow of fluid -> needle reached the target
Injection Setup

Injection/ Aspiration Technique
Tips and Tricks - Needles

• Use same size needle for injecting/aspirating same fluid each time
  • consistent “feel” for the flow
• Smaller gauge may produce too much resistance to flow:
  • false feeling of not being in the space with injection attempt
  • may yield a false “dry tap” with aspiration attempt
• Larger gauge: flow may feel “too easy” even if not in joint.
• Needle length: Spinal needle for deep structures
  • Larger gauge due to flexibility and resistance to flow (18 or 20g)
Specific Technique: Knee

- Relevant anatomy
  - Joint capsule extends from just below joint line to above patella, including suprapatellar pouch
  - Fibular head is lateral side, below joint line
    - Extra articular
  - Prepatellar bursa DOES NOT communicate with joint normally, Suprapatellar Bursa DOES.

Specific injection technique Knee

- Approach: anterior medial (1)
  - Knee flexed, patient seated
    - Medial femoral condyle
    - Needle aims directly posterior
    - Touch but do not penetrate articular cartilage

- Approach: anterior lateral (2)
  - Knee flexed, patient seated
    - Lateral arthroscopic portal
    - Location corresponds to lateral joint line, just lateral to Patella tendon
    - Aim needle posteromedially to enter femoral notch
    - Fluid should flow freely, otherwise advance slightly and gently apply pressure again
      - Needle may be in prepatellar fat pad
Simulation of Knee Injection with Anatomic Model

Specific injection technique: Knee

- Approach: lateral suprapatellar
  - Knee extended, patient supine
  - Inject suprapatellar pouch from lateral side
  - Palpate IT band (Posterior) and Quad Tendon (Anterior)
  - Insert needle at level just proximal to superior pole of patella
  - Should feel resistance at capsule, then “Pop” through
  - Needle should be able to pivot proximal and distal under patella/quad tendon
Injection of pre-injected Knee with Viscosupplementation

Specific technique: Greater Trochanteric Bursa Injection

- Approaches:
  - Posterolateral “hip” / upper thigh
  - Lateral decubitus with affected side up
  - Can be done with patient standing and leaning over a table
    - Spinal needle sometimes needed for length
      - if large soft tissue envelope
Specific technique: Greater Trochanteric Hip Injection

- Indications
  - Trochanteric “bursitis”
    - Maximally Painful area of posterolateral trochanter
      - may not correspond to physical fluid sac
    - Differentiate from Gluteus Medius tendon insertion
    - Inject point of maximal tenderness
      (NOT G. Medius!)
      Avoid injection of tendon to avoid attritional tear

Specific technique: Greater Trochanteric Bursa Injection
Specific Technique: Shoulder Subacromial Injection

- Relevant anatomy
  - Subacromial bursa is separate from Glenohumeral joint if rotator cuff is intact
  - Lies between the Acromion and the rotator cuff tendons

- Positioning:
  - Seated upright or supine/beach chair
    - Seated position opens up subacromial space due to gravity on arm
    - Note: If there is full thickness Rotator Cuff tear, medication also reaches the Glenohumeral joint

Specific Technique: Shoulder Subacromial Injection

- Diagnostic and/or therapeutic
- Indications
  - Subdeltoid/subacromial bursitis
  - Rotator cuff impingement
  - Rotator cuff tendinopathy
  - Adhesive capsulitis
Specific Technique: Shoulder

Multiple Shoulder injection targets
- Subacromial Bursa
  - Most commonly performed
  - Topic of this instruction
- Acromioclavicular Joint
  - Small joint superior/anterior to GH joint, lateral end of clavicle
  - May be difficult due to osteophytes
- Glenohumeral Joint
  - (Intra-articular Shoulder)
  - Ultrasound guidance

Specific Technique: Shoulder Subacromial Injection

- Palpate the distal, lateral, and posterior edges of acromion
- As prior with aseptic technique
- Needle is inserted just inferior to posterolateral edge of acromion
  - Directed anteromedially
Acknowledgement

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References

• Sterile technique: https://onesource.osumc.edu/departments/PerioperativeServices/Documents/UHRossPolicies/Aseptic%20Technique%20UH.pdf