Basics of Skin Biopsy Techniques

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Conflicts of Interest

• None to disclose
• Will refer to biopsy throughout to mean skin biopsy
Objectives

- Review general principals of skin biopsy
- Review indications for skin biopsy
- Examine different methods of skin biopsy
- Discuss how to choose appropriate biopsy method and site
- Review how to avoid common pitfalls
Indications For Biopsy

• Inflammatory dermatoses of unclear etiology
• Inflammatory dermatoses not responsive to typical treatment
• Concern for presence of malignancy
• Confirmation of suspected etiology
PRE-PROCEDURE PREPARATION
Informed Consent

- As important for biopsy as any other procedure
- Why the biopsy is being performed
- What the procedure entails
- Potential complications of biopsy

https://www.fda.gov/forpatients/clinicaltrials/informedconsent/default.htm
Complications Of Biopsy

- Bleeding
- Infection
- Scar formation
- Recurrence
- Need for further intervention
- Nerve damage
Photographs

• Important for biopsies of suspected skin cancers
• Need two pictures
  – Distant enough from the lesion to capture position of patient
  – Close up enough to characterize lesion of interest
• Photos have been associated with reduced rates of postponed surgeries and decreased wrong-site surgeries
Anesthesia

• Depends upon site
  – Infiltration
  – Ring block
  – Nerve block
  – Topical
    • 5mm depth after 2 hours

http://www.podiatrytoday.com/guide-biopsy-techniques
# Amides vs Esters

<table>
<thead>
<tr>
<th>AMIDE GROUP</th>
<th>ESTER GROUP</th>
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<tbody>
<tr>
<td>Lidocaine</td>
<td>Cocaine</td>
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<tr>
<td>Mepivacaine</td>
<td>Procaine</td>
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<tr>
<td>Bupivacaine</td>
<td>Chloroprocaine</td>
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<td>Etidocaine</td>
<td>Tetracaine</td>
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<tr>
<td>Prilocaine</td>
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**TABLE 2. Local anesthetics**
Site Selection

• Choose a lesion with classic clinical appearance
  – Papules: Central portion
  – Annular lesions: Active border
  – Blistering diseases:
    • Intact vesicle/bulla with a shave procedure
    • If cannot obtain intact, biopsy at bulla edge keeping roof attached

• Avoid old lesions with secondary changes
  – Crusts, excoriations, erosions
Considerations In Biopsy

• Choosing appropriate method
  – Size of lesion
  – Suspected clinical diagnosis
  – Site of lesion
  – Clinical setting (outpatient vs inpatient)
PROCEDURE
Methods Of Biopsy

- Shave biopsy
- Punch biopsy
- Excisional biopsy
  - Saucerization
- Curettage
- Tangential cut with scissors
- Narrow incisional biopsy
## Indications By Biopsy Type

<table>
<thead>
<tr>
<th>Biopsy Type</th>
<th>Indications (non-comprehensive)</th>
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| Shave biopsy      | • Raised lesions  
|                   |   - Dermal nevi, benign appearing tumors                                                       |
|                   | • Superficial lesions (seborrheic keratoses)                                                   |
|                   | • Non-melanocytic malignant tumors                                                              |
|                   | • Bullous diseases                                                                             |
| Punch biopsy      | • Superficial inflammatory dermatoses                                                          |
|                   | • Papulosquamous disorders                                                                     |
|                   | • Connective tissue diseases                                                                    |
|                   | • Granulomatous diseases                                                                       |
|                   | • Benign appearing tumors                                                                      |
|                   | • Bullous diseases                                                                             |
|                   | • Vasculitis                                                                                   |
| Excisional biopsy | • Malignant melanoma                                                                           |
|                   | • Atypical pigmented lesions                                                                   |
|                   | • Subcutaneous tumors                                                                          |
Shave Biopsy

- Do not require sutures for closure
- Ideal for superficial lesions that are above the level of the surrounding skin
- Lesions where the pathology should be in the outer layers of the skin
- Not used for pigmented lesions
Shave Biopsy

• Enter the skin tangentially and cut underneath the lesion parallel to the skin
• To the depth of the reticular dermis
• Brought through to the other side of the lesion
• Hemostasis with aluminum chloride or Monsel’s solution
  – Monsel’s solution may leave behind a pigment tattoo
Shave Biopsy
Punch Biopsy

- Ideal for inflammatory dermatoses
  - Allows for evaluation of subcutaneous fat
- Punch biopsy tool cuts circularly to obtain a round plug of skin
- Tools vary in size from <1mm to 10mm in diameter
  - Ideal size for most punch biopsies is 4mm
Punch Biopsy

- Skin is stretched perpendicular to the skin tension lines
- Punch tool is applied to skin and rotated

Punch Biopsy

• Once depth has been achieved, punch tool removed
• Specimen lifted with forceps grasping the peripheral edge, and cut at base with scissors
• Defect can be closed with non-absorbable suture or filled with gel foam if small enough punch is used
Excisional Biopsy

- Ideal for deep inflammatory processes and malignancies where entire depth should be evaluated (melanoma)
- Fusiform excision of a lesion with surrounding clinically normal margins
- Margins depend on lesion suspected
  - Basal cell carcinoma: 4mm for complete removal
  - Melanoma: 5-10mm for complete removal
Excisional Biopsy

- Outline on the skin surface in the orientation of natural skin tension lines
- Length-to-width ratio 3:1
- Excision along outline to the depth of subcutis
- Edges approximated with deep and epidermal sutures
Saucerization Biopsy

- Considered an excisional biopsy
- Ideal for broad pigmented lesions or anatomic locations poorly amenable to excision
- Less time consuming and invasive diagnostic modality than fusiform excision
- Can yield same amount of diagnostic information as excisional biopsy
Saucerization Biopsy

• Shave blade used to enter skin tangentially
• Blade is bent to increase depth of biopsy
  – Reticular (deep) dermis or subcutaneous fat
• Brought through the skin to the other side
Saucerization Biopsy
POST PROCEDURE
PROCESSING
Biopsy Analysis

• Many inflammatory dermatoses
  – Routine permanent section (H&E)
  – Direct immunofluorescence (DIF)

• Direct immunofluorescence highlights pathogenic antibody deposition
  – Autoimmune bullous diseases, vasculitis, connective tissue diseases, scarring alopecias

• If concern for infectious etiology must send for tissue culture

A Note on Fixative

- Inappropriate fixative compromises analysis
- Routine permanent section: 10% formalin
- Direct immunofluorescence: Michel’s solution
- Tissue cultures (bacterial, fungal, acid fast bacilli), gauze with normal saline

Clinical Information

- Provide dermatopathologist with clinical information
- Include previously rendered biopsy findings
- Be as detailed as time and space will allow
  - Age and sex
  - Biopsy site
  - Clinical presentation
  - Favored diagnosis
Pitfalls

- Choosing wrong biopsy site
- Specimen too small
- Specimen with traumatic defects
  - Electrocoagulation
  - Forceps
- Tissue drying prior to placement in fixing solution
- Inappropriate fixative
Conclusion

- Skin biopsy is a valuable bedside diagnostic tool
- Photographs are an important pre-procedure step
- Biopsy site selection should be intentional
- Determining the proper biopsy method depends on an understanding of the underlying pathology
- Specimens must be sent in appropriate fixative
- Clinical information must be provided to the dermatopathologist for optimal analysis
References

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Thank You

• Stephen M. Purcell, D.O.
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• Fellow residents