My Method for Approaching Skin Biopsies

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Disclosure

- Royalties from Health Press, Inc
  - Fast Facts: Diagnosing Cutaneous T-Cell Lymphoma (P Haun and J Scarisbrick)
Quick Audience Survey:

A) Medical Student
B) Dermatology Resident
C) Pathology Resident
D) Dermpath Fellow
E) NP/PA in Dermatology
F) Practicing Dermatologist/Dermatopathologist
Remember...

- Don’t make it too difficult

- Pattern recognition
  - You are becoming a master of this skill

- All of these conditions exist clinically

- Utilize your knowledge from clinic while studying path and vice versa
  - What will the biopsy look like of this eruption?

- Learn the vocabulary of dermatopathology
Inflammatory Dermatopathology

Pick an approach/algorithm/process
- Stick to It!
- We all do it—some of us are just quicker than others

Low Power Magnification=High Power Thinking

Read the slide like a book—tell the biopsy’s story
- Stratum Corneum>Epidermis>Dermis>Subcutis
- Architecture/Pattern
- Cell Types
My Approach

1st Question: Method of Biopsy
- Punch = Inflammatory
- Shave/Excision = Neoplastic
My Approach

- **2nd Question: Inflammatory vs. Neoplastic**
  - Can be one of the most difficult questions
  - Overlap can occur

- **3rd Question: Anatomic Site**
  - Can give a great deal of information—*again, go back to your clinical training*
  - Assists in ruling in/ruling out certain conditions
  - Can tie together a difficult histopathology case
Patterns

- Superficial Perivascular
- Superficial and Deep Perivascular
- Nodular
- Diffuse
- Vasculitis
- Intraepidermal Vesicular

- Subepidermal Vesicular
- Folliculitis/Perifolliculitis
- Fibrosing
- Panniculitis
- Alopecia
- “Others”
  - Depositions
  - Infestations
  - DDx Patterns
Superficial Perivascular

- No Epidermal Change
- Interface
  - Vacuolar
  - Lichenoid
- Spongiotic
  - Spongiotic
  - Psorasiform
  - Lichenoid
- Psoriasiform
  - +/- Lichenoid

Ackerman, et al. Histologic Diagnosis of Inflammatory Skin Diseases. 2nd Ed. 1997
Superficial and Deep Perivascular

*Similar Patterns to SPV*

- No Epidermal Involvement
- Interface
  - Vacuolar
  - Lichenoid
- Ballooning
- Spongiotic
- Psoriasiform
<table>
<thead>
<tr>
<th>Superficial Perivascular</th>
<th>Superficial and Deep Perivascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Skin Differential</td>
<td>Polymorphous Light Eruption</td>
</tr>
<tr>
<td>Urticaria</td>
<td>Pernio/chilblains</td>
</tr>
<tr>
<td>Dermatophyte</td>
<td>Arthropod assault</td>
</tr>
<tr>
<td>Atopic Dermatitis</td>
<td>Fixed Drug Eruption</td>
</tr>
<tr>
<td>Allergic/Irritant Contact</td>
<td>DLE</td>
</tr>
<tr>
<td>Lichen Planus</td>
<td>Mycosis Fungoides/LyP</td>
</tr>
<tr>
<td>PLEVA</td>
<td>Lichen Striatus</td>
</tr>
<tr>
<td>Erythema Multiforme</td>
<td>B-cell lymphoproliferative d/o</td>
</tr>
<tr>
<td>Dermatomyositis/Lupus</td>
<td>Necrobiosis lipoidica</td>
</tr>
<tr>
<td>Psoriasis</td>
<td></td>
</tr>
<tr>
<td>Syphillis</td>
<td></td>
</tr>
<tr>
<td>Prurigo/LSC</td>
<td></td>
</tr>
</tbody>
</table>
Nodular

Look for the cell type

- Lymphocytes
- Neutrophils
- Mixed Neuts/Eos
- Histiocytes
  - Sarcoidal
  - Tuberculoid
  - Palisaded
  - Suppurative
Diffuse

Much overlap with nodular patterns

Will discuss together
<table>
<thead>
<tr>
<th>Lymphocytic</th>
<th>Neutrophilic and Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphoma</td>
<td>Sweets Syndrome</td>
</tr>
<tr>
<td>Pseudolymphoma/CLH</td>
<td>Leukocytoclastic vasculitis</td>
</tr>
<tr>
<td></td>
<td>GPA/GPA with Eos</td>
</tr>
<tr>
<td></td>
<td>Acne keloidalis/dissecting cellulitis</td>
</tr>
<tr>
<td></td>
<td>Granuloma faciale/erythema elevatum diutinum</td>
</tr>
</tbody>
</table>
## Nodular/Diffuse--Histiocytic

<table>
<thead>
<tr>
<th>Sarcoidal</th>
<th>Tuberculoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Foreign body reaction</td>
<td>- TB and its many flavors</td>
</tr>
<tr>
<td>- Sarcoidosis</td>
<td>- Leishmaniasis</td>
</tr>
<tr>
<td>- Rosacea</td>
<td>- Syphilis</td>
</tr>
<tr>
<td>- Leprosy</td>
<td></td>
</tr>
<tr>
<td>- Lichen striatus</td>
<td></td>
</tr>
</tbody>
</table>
## Nodular/Diffuse—Histiocytic

<table>
<thead>
<tr>
<th>Palisaded</th>
<th>Suppurative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granuloma annulare</td>
<td>Ruptured cyst</td>
</tr>
<tr>
<td>Necrobiosis lipoidica</td>
<td>Foreign body reaction</td>
</tr>
<tr>
<td>Necrobiotic xanthogranuloma</td>
<td>Infection</td>
</tr>
<tr>
<td>Rheumatoid nodule</td>
<td>Infection</td>
</tr>
<tr>
<td>Gout</td>
<td>Infection</td>
</tr>
</tbody>
</table>
Vasculitis

- Small-Medium vs. Large Vessel
- Vessel Type
- +/- Neutrophils
- +/- Fibrin
- +/- Organisms
- Vasculitis vs. Vasculopathy
## Vasculitis/Vasculopathy

### Vasculitis
- Small Vessel
  - Drug
  - Malignancy
  - Infection
  - Literally hundreds of other causes
  - Degos
- Medium-Large
  - GPA
  - PAN
  - Nodular Vasculitis

### Vasculopathy/Occlusion
- DIC
- TTP/ITP
- Coumadin necrosis
- PNH
- Anti-phospholipid Ab
- Cholesterol emboli
- Catheter sheathing
Intraepidermal Vesicular

- Balooning
- Spongiosis
- Acantholysis
  - Upper spinous
  - Mid spinous
  - Suprabasal
- Pustular
  - Intracorneal
  - Subcorneal
  - Spongiotic

**Know you DIF Patterns**
### Intraepidermal Vesicular

<table>
<thead>
<tr>
<th>Ballooning</th>
<th>Sponginosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• HSV/VZV</td>
<td>• ACD/ICD</td>
</tr>
<tr>
<td>• Orf</td>
<td>• Dyshidrosis</td>
</tr>
<tr>
<td>• Vaccinia</td>
<td>• Dermatophyte</td>
</tr>
<tr>
<td>• Nutritional Deficiency</td>
<td>• EM</td>
</tr>
<tr>
<td>• Hand-foot-mouth</td>
<td>• BP</td>
</tr>
<tr>
<td>• EM</td>
<td>• PV</td>
</tr>
<tr>
<td>• PLEVA</td>
<td>• Fixed Drug</td>
</tr>
</tbody>
</table>
### Acantholysis
- **Upper Spinous**
  - Bullous impetigo
  - Pemphigus foliaceous
  - Staph scalded skin
- **Mid Spinous**
  - HSV/VZV

### Suprabasal
- Darier's
- Grover's
- Pemphigus vulgaris
- Hailey-Hailey

### Pustular
Dermatophyte, Candida, Psoriasis, Impetigo, PF, SSSS, ACD, Dyshidrosis
Subepidermal Vesicular

Look for the Cell Type

- Paucicellular
- Lymphocytes
- Eosinophils
- Neutrophils
- Mixed
- Mast Cells

**Know you DIF Patterns**
## Subepidermal Vesicular

<table>
<thead>
<tr>
<th>Paucicellular</th>
<th>Lymphocytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Epidermolysis bullosa</td>
<td>- EM</td>
</tr>
<tr>
<td>- Burn</td>
<td>- LSetA</td>
</tr>
<tr>
<td>- EM</td>
<td>- PLEVA</td>
</tr>
<tr>
<td>- GVHD</td>
<td>- Lichen Planus</td>
</tr>
<tr>
<td>- PCT</td>
<td>-</td>
</tr>
<tr>
<td>- Amylodosis</td>
<td>-</td>
</tr>
<tr>
<td>- Cautery</td>
<td>-</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>Mixed</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>- Dermatitis herpetiformis</td>
<td>- DH</td>
</tr>
<tr>
<td>- Linear IgA</td>
<td>- BP</td>
</tr>
<tr>
<td>- Bullous lupus</td>
<td>- Linear IgA</td>
</tr>
<tr>
<td>- LCV</td>
<td>- EBA</td>
</tr>
<tr>
<td>- Infection</td>
<td></td>
</tr>
</tbody>
</table>
Folliculitis

Infectious

Acne

Rosacea

Eosinophilic

Mycosis fungoides

Toxic erythema
Perifolliculitis
Discoid Lupus
Lichen planopilaris
Rosacea
Keratosis pilaris
Scurvy
**Fibrosing**

**Fibrosis:**
- Increased fibrocytes
- Thinner collagen bundles

**Sclerosis:**
- Decreased fibrocytes
- Thickened/homogenized collagen
Panniculitis

- Septal (*mostly*)
  - +/- Vasculitis

- Lobular (*mostly*)
  - +/- Vasculitis
## Panniculitis

<table>
<thead>
<tr>
<th>Septal</th>
<th>Lobular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema nodosum*</td>
<td>Nodular vasculitis</td>
</tr>
<tr>
<td>LCV</td>
<td>Sclerema neonatorum</td>
</tr>
<tr>
<td>PAN</td>
<td>Subcutaneous fat necrosis</td>
</tr>
<tr>
<td>GA</td>
<td>Cold panniculitis</td>
</tr>
<tr>
<td>Rheumatoid nodule</td>
<td>Lymphoma</td>
</tr>
<tr>
<td>Necrobiotic xanthogranuloma</td>
<td>Pancreatic panniculitis</td>
</tr>
<tr>
<td></td>
<td>Factitial</td>
</tr>
<tr>
<td></td>
<td>Infection</td>
</tr>
<tr>
<td></td>
<td>Sarcoidosis</td>
</tr>
<tr>
<td></td>
<td>Trauma</td>
</tr>
</tbody>
</table>
Alopecia

- Scarring or not
  - Normal $\approx 6$ follicles per 4mm punch

- Inflammatory or not
  - Cell Types

- Hair counts
  - Catagen
  - Telogen
  - Anagen
<table>
<thead>
<tr>
<th>Inflammatory**</th>
<th>Non-inflammatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Alopecia areata</td>
<td>- Androgenetic</td>
</tr>
<tr>
<td>- Lichen planopilaris</td>
<td>- Telegen effluvium</td>
</tr>
<tr>
<td>- DLE</td>
<td>- Traction</td>
</tr>
<tr>
<td>- Morphea</td>
<td>- Trichillomania</td>
</tr>
<tr>
<td>- Tinea capitis</td>
<td><strong>Late stage disease can have sparse inflammation</strong></td>
</tr>
<tr>
<td>- Folliculitis decalvans</td>
<td><strong>Significant overlap can occur</strong></td>
</tr>
<tr>
<td>- Dissecting cellulitis</td>
<td></td>
</tr>
</tbody>
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- Panniculitis
- Alopecia
- “Others”
  - Depositions
  - Infestations
  - DDx Patterns
- Normal skin
- Massive papillary dermal edema
- Eosinophilic spongiosis
- Deposition/Metabolic
THANK YOU!

Questions: paul.haun@uphs.upenn.edu