Approach to non-scarring alopecia

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My approach to the alopecia biopsy

• Determine adequacy of the biopsy
• Find the isthmus level
• Perform counts
  • Anagen, catagen/telogen
  • Terminal, vellus
• Comment on status of follicular units, sebaceous glands
• Note the degree of inflammation and fibrosis, if any
• Note other signs of scarring, if present
• Request additional sections and special stains, if needed
For non-scarring alopecia

• Determine adequacy of the biopsy
• Find the isthmus level; request levels if necessary
• Confirm that follicular units are intact
• Perform counts
  • Anagen, catagen/telogen
  • Terminal, vellus
• Non scarring alopecia is all about counts, cycle and size!
Adequacy (or lack thereof)
- Infundibulum
- Isthmus
- Inferior
- Bulb
Finding the isthmus level

• Hair follicles
  • Dark blue – matrix
  • Hair shaft
  • Inner root sheath layers
  • Outer root sheath
• Look around – fat, dermis, eccrine coils, smooth muscle
For non-scarring alopecia

- Determine adequacy of the biopsy
- Find the isthmus level; request levels if necessary
- Confirm that follicular units are intact
- Perform counts
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- Non-scarring alopecia is all about counts, cycle and size!
How to perform counts

- Finding the level is crucial
- Total number of hair follicles
  - Smaller follicles will be transected closer to their base
- Catagen and telogen hair follicles look different than anagen
- Abnormal hair follicles can exist in non-scarring alopecia
- Know normal follicular anatomy
Vellus hair follicles

- Less than 0.03 mm
- Smaller than IRS
- Will be cut closer to their bulbs than larger HFs
- Normal T:V ratio is 7:1
Diagrammatic representation of the scalp hair cycle

Published in Expert Reviews in Molecular Medicine by Cambridge University Press (2002)
Telogen
What are normal counts?

- Total number of HFMs depends on race:
  - Caucasians 36
  - Taiwanese 21, 28 (25)
  - African Americans 21
- The normal T:V varies but is ~ 7:1
- Approximately 7% of hair follicles are in catagen/ telogen
Common non-scarring alopecias

• Diffuse
  • Telogen effluvium
  • Androgenetic alopecia (male and female pattern hair loss
  • Alopecia areata

• Patchy
  • Alopecia areata
Telogen effluvium (TE)

- Patients complain of acute onset of hair shedding
- Typically no decrease in volume
- If severe, can cause bitemporal thinning
Androgenetic alopecia

- Common, prevalence increases with age
- Inherited sensitivity to normal androgens
- Progressive shortening of anagen occurs
- Terminal hairs decrease in size (miniaturization)
## Isthmus hair counts in a 4mm punch biopsy

<table>
<thead>
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<th></th>
<th>CONTROLS</th>
<th>CTE</th>
<th>AGA</th>
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<tbody>
<tr>
<td># follicular units</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>total # hairs</td>
<td>40</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td># terminal hairs</td>
<td>35</td>
<td>35</td>
<td>23</td>
</tr>
<tr>
<td># vellus hairs</td>
<td>5</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>T:V ratio</td>
<td>7:1</td>
<td>9:1</td>
<td>1.9:1</td>
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<tr>
<td>% in telogen</td>
<td>6.5%</td>
<td>11%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Whiting DA  J Am Acad Dermatol 1996
Alopecia areata - patchy

- Autoimmune disease that targets the hair follicle
- Often in children and young adults
- Variable in extent
- Typically patchy
Alopecia areata - diffuse

• AA incognita
  • Resembles AGA
  • Much more abrupt
• Biopsy findings depend on duration of the lesion

Whiting. Arch Derm 2003
Histopathology of alopecia areata

- Acutely
  - Shift out of anagen
  - Peribulbar inflammation
  - Lymphocytes in fibrous tracts
- Over time
  - Tiny anagen hair follicles
  - Abnormal follicular structures and proportions
  - Dilated follicular orifices
  - Pigment casts
Alopecia areata without the bees

- Peribulbar inflammation was found in
  - 66% Diffuse AA
  - 50% Ophiasis and universalis
  - 27% Patchy AA

Other features of AA
- Shift to catagen/telogen: 66% 100%
- Dilated follicular infundibulae: 58% 33%
- Lymphocytes in fibrous tracts: 35% 33%
- Peribulbar inflammation: 27% 66%
Pigment casts in alopecia

• In 308 transverse scalp biopsies in one year
• Pigment casts found in:
  • Non scarring
    • Trichotillomania 100% (7/7)
    • Alopecia areata 72% (21/29)
    • “Friction” 1 case
  • Scarring
    • Dissecting cellulitis 100% (4/4)
    • CCCA 14% (4/28)
Trichotillomania

- Recurrent urge to pull hair
- Included in OCD chapter in DSM-5
- Onset in late childhood, M>F
- Unusual patterns of hair loss with broken hairs of differing lengths
Trichotillomania

- Study on 66 scalp biopsies:
  - Catagen follicles in 74%
  - Pigment casts in 61%
  - “Torn away follicles” in 21%
  - Trichomalacia in 12%
- Changes can be focal
- Most diagnostic within 2 months after onset
Thank You!

Kalani Honua, Puna, HI