F028: Self-Assessment: High Yield Hair Cases

Jeff Donovan MD PhD FRCPC FAAD
Dermatologist, Vancouver
office@donovanmedical.com

Objectives

Following this session, the attendee should be able to
- Recognize important features from a patient's history and scalp exam to suggest a diagnosis of hair loss
- Recognize important features of a scalp biopsy
- Choose appropriate treatments

Conflicts of Interest

- None

1. Trichoscopy of the crown in a 28 year old male is shown in the photo. This male may be at increased risk for which of the following?

A. Prostate cancer
B. Metabolic syndrome
C. Skin cancer
D. All of the above

He et al 2018

- Meta-analysis of 15 studies.
- A slight but statistically significant association was observed for vertex baldness (RR 1.24, 95% CI 1.05-1.46) but not for other types of baldness

Wen-Qing et al, 2016

- One of the first prospective study to report the associations between male pattern baldness and risk of incident skin cancer
  - Increased risk of both SCC and BCC.
  - Increased risk for SCC and melanoma of the scalp

Vertex Balding and Prostate Cancer


Androgenetic Alopecia and Skin Cancer

Wen-Qing et al. Male pattern baldness and risk of incident skin cancer in a cohort of men. Int J Cancer 2016; 139; 2671-2678
2. Trichoscopy of a 25 year old male of Afro-Caribbean descent is shown. Which of the following treatments should be considered as a first-line treatment?

A. Tofacitinib  
B. Adalimumab  
C. Isotretinoin  
D. Prednisone

Defect of keratinization may be important to the pathogenesis. A 2018 study by Lee et al showed that approximately 37% of patients treated with isotretinoin achieved remission.


3. A 56 year old female presents with eyebrow loss and scarring alopecia of the frontal hairline. Trichoscopy shows perifollicular scale. Which of the following statements regarding perifollicular scale is most accurate?

A. Greater amounts of perifollicular scale may be associated with greater inflammation on histology  
B. Perifollicular scale is more common in the sideburns than the frontal hairline  
C. Perifollicular scale correlates with disease duration  
D. All of the above
Good correlation between the amount of scale present around hair follicles and the degree of inflammation present under scalp.


4. What is the most likely organism isolated from the crown in this male patient with 4 month history of scalp burning, tenderness and hair loss?

A. S. aureus
B. Candida albicans
C. Malassezia spp.
D. Varicella zoster virus

Folliculitis decalvans

Staphylococcal Super antigens
  Bind MHC II
  Activate T cells
  Release Cytokines
  Destroy Hair Follicles
5. A 22 year old healthy male presents with concerns about increased hair shedding over the past 1 year. He is asymptomatic. Blood tests are normal. No new medications have recently been started. What is the most likely reason for his hair shedding?

A. Telogen effluvium  
B. Androgenetic alopecia  
C. Seborrheic dermatitis  
D. Lichen planopilaris

6. A 34 year old female has developed severe itching and burning in the scalp. Examination shows scalp redness with some redness on the neck, eyelids, face and back. What is the most likely shampoo-related allergen to cause this reaction?

A. Cocamidopropyl betaine  
B. Propylene glycol  
C. Methylchloroisothiazolinone/methylisothiazolinone  
D. Fragrance

7. A 49 year old female presents with significant loss of both eyebrows. Examination shows reduced density without much redness. Blood tests include ferritin 35, TSH 3.1, FSH 26.6. What is the most likely diagnosis?

A. Subclinical thyroiditis  
B. Alopecia areata  
C. Frontal fibrosing alopecia  
D. Polycystic ovarian syndrome
New onset bilateral eyebrow loss in a peri-menopausal or post-menopausal female must be viewed as frontal fibrosing alopecia until proven otherwise.

8. A 31 year old male presents with almost complete loss of hair in both sideburns.

What is the most likely diagnosis?

A. Diffuse unpatterned alopecia (DUPA)
B. Alopecia areata
C. Trichotillomania
D. Frontal fibrosing alopecia

Bilateral loss of side burn hair in a male is consistent with a diagnosis of FFA - until proven otherwise.
9. Which of the following blood tests is most appropriate to order in a patient with alopecia areata?

A. 25 hydroxyvitamin D  
B. 1,25 hydroxyvitamin D  
C. Serum zinc  
D. AM cortisol

Vitamin D Levels and Alopecia Areata


Tsai TY and Huang YC. Vitamin D deficiency in patients with alopecia areata: a systematic review and meta-analysis. J Am Acad Dermatol 2018

10. Which of the following blood tests would be most appropriate to order in a 31 year old female with frontal fibrosing alopecia?

A. IGF-1  
B. Zinc  
C. FSH  
D. Celiac panel

Possible Early Menopause in FFA


In 2014, Vano-Galvan and colleagues from Spain showed that young patients with FFA may also be at risk for early menopause.

11. What is the most appropriate next step?

A. Evaluate 17 hydroxyprogesterone levels on day 3-5 of menstrual cycle.
B. Evaluate LH and FSH levels on day 3-5 of menstrual cycle.
C. Arrange ultrasound of the abdomen.
D. Stop the biotin and repeat blood tests.
It is now recognized that high doses of biotin can interfere with some laboratory tests (specifically immunoassays using biotinylated antibodies).

Depending on the lab test used, abnormal labs could be possible for several tests including:
- Thyroid function tests (TSH, T4, T3)
- Hormone tests (androgens, parathyroid hormone)
- B12
- Other labs (troponin)

12. A 53 year old female with a previous diagnosis of frontal fibrosing alopecia has noticed increasing roughness, bumpiness of her face. Which findings might be expected on biopsy of an affected area?

A. Prominent sebaceous lobules
B. Syringomatous hyperplasia
C. Squamous syringometaplasia
D. Mucinous degeneration

Facial Papules in FFA

Facial Papules: the 2011 Perspective


What causes facial papules in FFA?

<table>
<thead>
<tr>
<th>Author</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donati et al</td>
<td>• Inflammation of vellus hairs</td>
</tr>
<tr>
<td>Pirmez et al</td>
<td>• Only 2 of 13 (15.3%) of biopsies showed vellus hair involvement</td>
</tr>
<tr>
<td></td>
<td>• 11 of 13 specimens (85%) showed prominent sebaceous glands</td>
</tr>
<tr>
<td></td>
<td>• 10 of 13 specimens (77%) showed dilated sebaceous ducts.</td>
</tr>
<tr>
<td></td>
<td>• 12 of 13 samples showed reduction and fragmentation of elastic fibers (Pinkus acid orcein staining)</td>
</tr>
</tbody>
</table>


FFA may not be limited to just perifollicular lichenoid inflammation.
13. A dermatologist is confused whether his patient might have lichen planopilaris or androgenetic alopecia…or even both. A biopsy is performed which shows perifollicular fibrosis and lymphocytic inflammation at the level of the isthmus. The T:V ratio is 3.2 to 1. What additional information from the biopsy would be helpful in making a final diagnosis?

A. No additional information is needed  
B. Density of sebaceous glands  
C. Perivascular inflammation  
D. Stem cell density

### Lichen Planopilaris vs Normal Scalp

- **Lichen planopilaris**
- **Normal Scalp**

### LPP affects central scalp

- Lichen planopilaris

### AGA affects central scalp

- Androgenetic alopecia

### T:V Ratios in AGA vs CTE

<table>
<thead>
<tr>
<th>Hair Loss condition</th>
<th>T:V ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGA</td>
<td>&lt; 4:1</td>
</tr>
<tr>
<td>CTE</td>
<td>&gt; 8:1</td>
</tr>
</tbody>
</table>
Histology of AGA vs LPP

<table>
<thead>
<tr>
<th></th>
<th>AGA</th>
<th>LPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perifollicular fibrosis</td>
<td>May be Present</td>
<td>Typically Present</td>
</tr>
<tr>
<td>Inflammation</td>
<td>Upper follicle</td>
<td>Upper follicle</td>
</tr>
</tbody>
</table>

Histology of AGA vs LPP

<table>
<thead>
<tr>
<th></th>
<th>AGA</th>
<th>LPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation</td>
<td>Upper follicle</td>
<td>Upper follicle</td>
</tr>
<tr>
<td>Sebaceous glands</td>
<td>Preserved/prominent</td>
<td>Atrophic/reduced</td>
</tr>
<tr>
<td>Lichenoid change</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Elastic Verhoef van Giesen Staining</td>
<td>No follicular scars identified</td>
<td>Follicular scars identified</td>
</tr>
</tbody>
</table>

14. The histology of CCCA may differ from other scarring alopecias in which of the following ways:

A. Inflammation is typically absent in CCCA
B. Fat necrosis is more prevalent in CCCA
C. Sebaceous glands are preserved in many cases of early-staged CCCA
D. Premature desquamation of the inner root sheath is seen

Central Centrifugal Cicatricial Alopecia

Sebaceous Glands in CCCA

- Dina and colleagues studied sebaceous glands density in CCCA and LPP as for patients with non-scarring alopecias.

<table>
<thead>
<tr>
<th></th>
<th>LPP (N=6)</th>
<th>CCCA (N=7)</th>
<th>Non-scarring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are sebaceous glands lost?</td>
<td>Lost in 83%</td>
<td>Lost in only 42%</td>
<td>Lost in 0%</td>
</tr>
</tbody>
</table>

15. A 55 year old female has chronic shedding. A biopsy was obtained and a terminal to vellus ratio of 8:1 is noted. The patient has a variety of scalp symptoms despite the fact that the scalp surprisingly looks completely normal during examination. Which of the following treatments are most likely to help this patient’s shedding?

A. Finasteride
B. Oral Minoxidil
C. Hydroxychloroquine
D. Gabapentin

16. Which treatment is most likely to provide benefit for this patient’s hair?

A. Finasteride
B. Scalp cooling
C. Minoxidil
D. Platelet rich plasma

### T:V Ratios in AGA vs CTE

<table>
<thead>
<tr>
<th>Hair Loss Condition</th>
<th>T:V ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGA</td>
<td>&lt; 4:1</td>
</tr>
<tr>
<td>CTE</td>
<td>&gt; 8:1</td>
</tr>
</tbody>
</table>

### Study of Oral Minoxidil for CTE

*Perera and Sinclair, 2017*

- 36 female patients with CTE were treated with oral minoxidil (range, 0.25-2.5 mg) daily for 6 months.
- Oral minoxidil was found to reduce shedding
- 5 of the 36 women who noted trichodynia (scalp pain) at baseline had improvement at 3 months.


### Types of Hair Loss after Chemotherapy

- **TCIA**: Temporary Chemotherapy Induced Alopecia
- **PCIA**: Permanent Chemotherapy Induced Alopecia
- **ETIA**: Endocrine Therapy Induced Alopecia
Minoxidil for ETIA

Trueb et al, 2018
- Retrospective cohort study of 112 patients with breast cancer who had experienced ETIA
- 37 of 46 treated patients (80%) had moderate or significant improvement in their hair loss with minoxidil therapy


17. His machine provides a method for performing what procedure?
A. Follicular unit extraction (FUE) surgery
B. Follicular unit strip surgery (FUSS/FUT)
C. Stem cell harvesting
D. Platelet rich plasma extractions

Hair Transplantation - Follicular unit extraction (FUE)

18. Which of the following patients is least likely to experience some degree of improvement in hair density with treatment?
A. A 25 year old female with alopecia universalis since age 4 who is now starting tofacitibn
B. A 41 year old male with recent onset dissecting cellulitis now starting isotretinoin and antibiotics
C. A 33 year old female with recent onset discoid lupus now starting triamcinolone acetonide injections, topical steroids and hydroxychloroquine
D. A 49 year old female with newly diagnosed frontal fibrosing alopecia now starting finasteride

Early staged Scarring Alopicias May Show Some Regrowth with Aggressive Treatment

- Dissecting Cellulitis
- Discoid lupus
- Frontal Fibrosing Alopecia
- Central centrifugal cicatricial alopecia (sometimes)
- Lichen planopilaris (less)

Frontal Fibrosing Alopecia Treatment with Finasteride 2.5 mg (at 9 months)

Donovan J. Finasteride-mediated hair regrowth and reversal of atrophy in a patient with frontal fibrosing alopecia. JAAD Case Rep 2015; 1:353-5
19. A 53 year old female with a previous diagnosis of frontal fibrosing alopecia has noticed increasing roughness, bumpiness of her facial skin. Which treatment is likely to be most effective?

A. Topical hydrocortisone valerate  
B. Topical pimecrolimus 
C. Oral finasteride 2.5 mg 
D. Oral isotretinoin

20. A 42 year old female has recently developed 6 coin shaped patches of alopecia areata. Her past medical history includes psoriasis and current medications include adalimumab which was started 8 months ago. Which of the following diagnostic and treatment options would be appropriate to discuss with the patient?

A. Obtain blood tests TSH and 25 hydroxy-vitamin D 
B. Consider starting steroid injections 
C. Consider stopping adalimumab 
D. All of the above
Most common TNF-inhibitor implicated is adalimumab followed by infliximab and etanercept.

Hair loss can occur with a matter of months to many years after the TNF inhibitor is started.

Onset may occur fastest with adalimumab (6.8 months average) compared to over 1 year with the other 2 agents.

The degree of hair loss varies greatly from patchy type AA to alopecia totalis and universalis.

21. Use of low level laser therapy (LLLT) might be considered in which of the following situations?
A. 25 year old female with androgenetic alopecia
B. 45 year old female with lichen planopilars
C. 51 year female having just completed chemotherapy
D. All of the above

LLL for AGA: The Meta-Analysis


Potential Benefits of LLLT for LPP (N=8)

- 2017 study examined the benefits of LLLT for lichen planopilars.
  - 8 patients (3 M; 5 F; Patients had LPP for an average of 3-4 years
  - A laser helmet based device with 246 LEDs was used
  - Interestingly, all patients had a reduction in symptoms, redness and scaling and there was a decrease in the LPPAI after 6 months.
  - An increase in hair thickness was also measured.


22. A 27 year old female with lichen planopilars recently started hydroxychloroquine 400 mg daily last week. The patient is healthy and her current weight is 112 pounds. She will be seen by the eye doctor tomorrow. Assuming the eye examination is normal, current recommendations would support which of the following outcomes?
A. Continue at 400 mg daily and see back in 6 months
B. Continue at 400 mg daily and see back in 5 years
C. Reduce to 200 mg daily and see back in 5 years
D. Reduce to 200 mg and see back in 6 months

Risk of Retinopathy with Hydroxychloroquine

<table>
<thead>
<tr>
<th>Years of Treatment</th>
<th>Risk of Retinopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 years</td>
<td>1 %</td>
</tr>
<tr>
<td>10 years</td>
<td>2 %</td>
</tr>
<tr>
<td>20 years</td>
<td>20 %</td>
</tr>
</tbody>
</table>
23. A 5 year old with low iron is started on iron supplementation with a liquid iron syrup. Her parents are using a total of 100 mg of elemental iron. Her current weight is 40 pounds (18 kg). 8 weeks into treatment the child has stained teeth. What is the appropriate next step?

A. Decrease the dose to a more age appropriate level  
B. Take with milk  
C. Brush the teeth with baking soda  
D. All of the above

A 51 year old woman on finasteride 2.5 mg presents to clinic with concerns about the medications she is using. She had previously used Spironolactone 100 mg daily for several years but stopped recently due to hypotension. She was told by another physician that these medications cause breast cancer. She has no personal or history of breast cancer.

What of the following is an accurate response to the patient regarding breast cancer risk?

A. Studies in women suggest that finasteride and spironolactone increase the risk of breast cancer  
B. Studies in women suggest that finasteride increases the risk of breast cancer but spironolactone does not  
C. Studies in women suggest that neither finasteride nor spironolactone increase the risk of breast cancer  
D. Studies in women have not been done with finasteride but studies with spironolactone would suggest there is no increased risk

**Dose Hydroxychloroquine**

<table>
<thead>
<tr>
<th>WEIGHT OF PATIENT (LBS)</th>
<th>HYDROXYCHLOROQUINE DOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200 mg daily every day of the week</td>
</tr>
<tr>
<td>110</td>
<td>200 mg daily every day of the week</td>
</tr>
<tr>
<td>120</td>
<td>200 mg daily Monday to Friday; 400 mg on weekends</td>
</tr>
<tr>
<td>130</td>
<td>Alternate 200 mg and 400 mg</td>
</tr>
<tr>
<td>140</td>
<td>Alternate 200 mg and 400 mg</td>
</tr>
<tr>
<td>150</td>
<td>400 mg daily Monday to Friday; 200 mg on weekends</td>
</tr>
<tr>
<td>160</td>
<td>400 mg daily Monday to Friday; 200 mg on weekends</td>
</tr>
<tr>
<td>170</td>
<td>400 mg daily Monday to Friday; 200 mg on weekends</td>
</tr>
<tr>
<td>180 and above</td>
<td>400 mg daily</td>
</tr>
</tbody>
</table>

**AAO Screening Guidelines**

*American Academy of Ophthalmology Screening Schedule*

A baseline fundus examination should be performed to rule out preexisting maculopathy. Begin annual screening after 5 years for patients on acceptable doses and without major risk factors.

**Finasteride and Spironolactone and Breast Cancer in Women**

<table>
<thead>
<tr>
<th></th>
<th>Studies on Finasteride and Breast Cancer in Women</th>
<th>Studies on Spironolactone and Breast Cancer in Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of studies to date</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
Spironolactone and Breast Cancer - 1

- McKenzie et al 2017
  - 74,272 patients exposed to spironolactone between 1986 and 2013 using the Clinical Practice Research Datalink from the UK
  - In this study, there was no increased risk of cancer in spironolactone users.


---

Spironolactone and Breast Cancer - 2

- Biggar et al 2013
  - Prescription drug registry used to identify use of spironolactone in a cohort of Danish women (≥20 years old).
  - After studying 2.3 million women (28.5 million person-years), the authors concluded that with respect to breast, uterus, ovarian and cervical cancer, there is no evidence of increased risk with spironolactone or furosemide use.


---

Spironolactone and Breast Cancer - 3

- McKenzie et al 2012
  - The study involved 1,290,625 female patients, older than 55 years and with no history of breast cancer.
  - Total follow-up time of 8.4 million patient years.
  - The data suggested that the use of spironolactone did not increase the risk of breast cancer.


---

25. A 31 year old female with alopecia totalis has experienced partial regrowth with tofacitinib 5 mg twice daily. She has been tolerating the drug quite well and is now considering increasing to 10 mg twice daily. Which of the following side effects could potentially be increased by doubling the dose?

A. Increased risk of hyperlipidemia
B. Increased risk of infection
C. Increased risk of pulmonary embolism
D. All of the above

---

Tofacitinib Dose Dependent Effects

<table>
<thead>
<tr>
<th>DOSE DEPENDENT TOFACITINIB SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Elevation in Cholesterol</td>
</tr>
<tr>
<td>2. Elevation in Creatinine</td>
</tr>
<tr>
<td>3. Herpes Zoster Infections</td>
</tr>
<tr>
<td>4. Serious Infections</td>
</tr>
<tr>
<td>5. Non-melanoma skin cancer</td>
</tr>
<tr>
<td>? Pulmonary Embolism</td>
</tr>
</tbody>
</table>

---

Tofacitinib and Pulmonary Embolism Risk: A Look at study A392133

- Study A392133 was designed to evaluate the safety of tofacitinib in rheumatoid arthritis (RA) patients at two doses (5 mg twice daily and 10 mg twice daily) and compare side effects to patients using a tumor necrosis factor inhibitor (TNFI).
- All RA patients were on stable doses of methotrexate.

RA patients treated with tofacitinib 10 mg twice daily had a statistically and clinically important difference in the occurrence of pulmonary embolism, compared with RA patients in this study who were treated with a TNFI.