Acne In The Pediatric Population

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Speaker Disclosures

• Industry Relationships:
  – Advisory Board, Speaker Bureau:
    • Galderma, Pierre-Fabre, Promius, Ranbaxy, Top MD, Valeant
  – Research:
    • Astellas (Apples Long-Term Safety Study)
  – Shareholder:
    • TopMD, Inc.
Outline

• **Basics:**
  – Epidemiology
  – Impact on QOL
  – Acne Imposters

• **Updates:**
  – Diet & Acne
  – Acne Categorization

• **Therapy:**
  – Topicals
  – Oral Agents
  – Hormonal Therapy
  – Isotretinoin
  – Acne Guidelines

• **Case Lessons**
The Basics of Acne
Prevalence/Epidemiology

• Estimated 45 million people in the United States have acne vulgaris, with a prevalence of approximately 85% in the population 15-24 years of age.

• The disease is more common and more severe in males than in females – but typically lasts longer in females.

• The direct cost of acne may exceed $1 billion per year in the United States.
Acne is a Chronic Disease

- Most (70%) cases are *mild*, but 30% are more *severe* – need management over years of treatment

- The major therapeutic goals in the treatment of acne vulgaris are to
  - Resolve existing lesions
  - Suppress development of new lesions
  - Prevent scarring

Family Dynamics

• Who is really there for the appointment?
  – Child vs Parent vs Both
  – Adherence and compliance will be dependent upon this

• Measure the psychosocial impact
Impact on QOL
Experiences of Teens With Acne

- Low self-confidence/hypocrisy: 71%
- Embarrassment: 64%
- Most difficult aspect of puberty: 55%
- Difficulty finding dates: 43%
- Difficulty making friends: 24%
- Difficulty in school: 21%
- Difficulty getting job: 7%

N = 1006 teens surveyed

Perception of Grading
Physician Vs Patient

• Often times, we see “mild” cases that the child and/or parent wishes to pursue the “strongest” meds off the bat

• We also see “severe” cases that the child and/or parent feel is quite “normal” or “part of being a teen” and doesn’t require treatment
Females may present with scarring acne that they cover up with make-up.

Hair may cleverly cover moderate-severe acne in both males and females.
Acne: Differential Diagnosis

• **Main Diagnoses:**
  – Keratosis pilaris
  – Periorificial dermatitis
  – Pseudo-acne of nasal crease
  – Angiofibromas

• **Other Diagnoses:**
  – Drug-induced or steroid-induced acne/folliculitis
  – Rosacea
  – Flat warts
  – Molluscum
  – Milia (infants)
  – Miliaria (infants)

Keratosis Pilaris

- Spiny, flesh colored bumps representing excess keratin entrapped around the hair follicle

- Location:
  - Cheeks, upper arms, and thighs

- Reassurance is all that is necessary
Periorificial Dermatitis

• Inflammatory papules and patches

• Location:
  – Perioral, periocular and perinasal

• Etiology:
  – Idiosyncratic response to a variety of factors
  – Possible triggers may include exposure to topical nasal, ophthalmic, aerosolized steroids
Pseudo-Acne of Nasal Crease

• Preadolescent patients presenting with chronic red papules

• A prominent nasal crease composed of milia

• Acne-like lesions develop likely in part due to the rupture of the milia

Updates In Acne
Pathophysiology

1. Propionibacterium acnes (\textit{P. acnes}) proliferation

2. Abnormal desquamation of follicular epithelium

3. Inflammation

4. Sebum production
Diet & Acne?

• Controversial topic

• ? Western Diet associated with more acne due to increased signaling (mTOR)
  – Increased glycemic load: Increased Insulin
    • Can stimulate sebocytes
    • Suppression of SHBG, which raises androgens
  – Increased dairy consumption
    • Insulinotrophic dairy proteins and others

Supplements & Acne?

• Silverberg (2012) reported case series of 5 teen athletes in which whey protein supplements precipitated mod-severe acne
  – Conclusion: whey protein may be the fraction of dairy products that promote acne formation.
  – Aside: cow’s milk contains 20% whey; 80% casein

• Simonart (2012) reported similar case series of 5 patients on supplements
  – Conclusion: Observations are in line with data supporting the effects of milk/dairy products as enhancers of insulin/insulin-like growth factor 1 signaling and acne aggravation.
  – Further prospective studies are required

## Acne Categorization By Age

<table>
<thead>
<tr>
<th>Acne Type</th>
<th>Age Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal</td>
<td>0–6 weeks</td>
</tr>
<tr>
<td>Infantile</td>
<td>0–1 year</td>
</tr>
<tr>
<td>Mid-childhood</td>
<td>1–7 years</td>
</tr>
<tr>
<td>Preadolescent</td>
<td>7–12 years</td>
</tr>
<tr>
<td>Adolescent</td>
<td>12–19 years</td>
</tr>
</tbody>
</table>

*“Mid-childhood acne is the most likely time to have an underlying endocrine abnormality*
Infantile Acne

Two classic scenarios
1. Later onset of true acne at 2-3 months of age (more common)
2. Persistent neonatal acne (less common)

• Etiology:
  – Sebaceous gland hyperplasia (transient)
    • It is a rare sign of underlying androgen excess

• Usually males
  – Likely due to testicular testosterone
Infantile Acne


- **Findings confirm previous observations:**
  - Predominance of **males**
  - Average age at appearance of lesions (**6–13 months**)
  - Localization of the lesions predominantly on the **cheeks**
  - Average duration (usually **resolved by 3 years**) but persisting to puberty in exceptional cases
  - In our series, as in the literature, there is **no evidence** of an **endocrine** or **iatrogenic** cause of IA.
  - Clinical signs of virilization increase the likelihood of etiologies such as adrenocortical tumor, congenital adrenal hyperplasia, and gonadic tumors.
  - In fact, IA is **rarely associated with endocrinopathy**—unlike pre-pubertal acne—which justifies systematic etiologic assessment
    - However, some authors recommend hormonal assessment in severe or very prolonged cases

- **Findings also confirm the importance of family history in IA**
# Subsets Of Acne In Pre-Adolescent Children

<table>
<thead>
<tr>
<th>Factor</th>
<th>Infantile</th>
<th>Childhood</th>
<th>Endocrine-Assoc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>&lt;18 mos</td>
<td>&gt;18 mos</td>
<td>Anytime</td>
</tr>
<tr>
<td>Sex predominance</td>
<td>Male</td>
<td>Female</td>
<td>None</td>
</tr>
<tr>
<td>Primary Lesion</td>
<td>Mixed</td>
<td>Comedones</td>
<td>All types</td>
</tr>
<tr>
<td></td>
<td>(comedonal, inflamm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution</td>
<td>Cheeks only</td>
<td>Forehead, nose, cheeks</td>
<td>Face, chest, back</td>
</tr>
<tr>
<td>Avg. Height (%)</td>
<td>&lt;50%</td>
<td>&gt;75%</td>
<td>Typically advanced</td>
</tr>
<tr>
<td>Avg. Body Mass index</td>
<td>&gt;20</td>
<td>15</td>
<td>Typically high</td>
</tr>
<tr>
<td>Assoc. Clinical findings</td>
<td>None</td>
<td>May have advanced signs of puberty</td>
<td>Always have advanced signs of puberty</td>
</tr>
<tr>
<td>Possible pathogenesis</td>
<td>Testicular &amp; adrenal secretion</td>
<td>Accel. adrenarche possible early sign of PCOD</td>
<td>Underlying endocrinopathy</td>
</tr>
</tbody>
</table>
Severe, early-onset or abnormal Hx/PE

**Personal Work-Up:**

- DHEA-S, testosterone, ACTH, prolactin, 17-OH, LH/FSH, Bone age

**THEN if abnormal**

- REFER TO ENDO
Unique Situations
Sports & Acne

• Acne association with anabolic steroids

• Flares may be associated with helmets, chin straps, shoulder pads, etc.
Drugs & Pediatric Acne

- Corticosteroids (regular)
  - Pityrosporum folliculitis
- Anabolic steroids
- Testosterone/Estradiol
- Anti-gonadotrophic (Danazol)
  - Used in kids for anaplastic anemia; also endometriosis
- Calcineurin blockers
- Anticonvulsants (aromatic)
  - Phenytoin, carbamazepine,

- Psychotropic Meds:
  - Lithium
    - More folliculitis-like
  - Aripiprazole (Abilify)
- Epidermal Growth Factor blockers
  - Cetuximab
- Others
  - Isoniazide, azathioprine, cyclosporine
Syndromes & Pediatric Acne

- **Androgen-Steroids**
  - CAH (congenital adrenal hyperplasia)
  - SAHA
    - Seborrhea, acne, hirsutism, androgenic alopecia
- **Fibroblast GF (FGFR2)**
  - Apert syndrome
    - This leads to follicular hyperkeratinization and sebaceous gland hypertrophy in acne
- **Insulin-Resistance:**
  - PCOS
  - Hyperandrogenism and insulin resistance, AN (HAIR-AN)
- **Auto-inflammatory:**
  - SAPHO
    - Synovitis, acne fulminans, pustulosis, often psoriasis, hyperostosis, osteitis
  - PAPA
    - Pyogenic arthritis, PG, acne
Cousins of Acne

- Strong FH of acne often means familial risk for:
  - Dissecting scalp cellulitis
  - Hidradenitis Suppurativa
Other Rare Syndrome & Acne

• Costello syndrome

• Hyerborrone Dermato-cardiocutaneous syndrome (BDCS)
Treatment Of Acne
Therapy Based on Pathogenesis

- **Increased sebum production**
  - Hormonal Therapy
  - Spironolactone
  - Isotretinoin

- **Follicular hyperkeratinization**
  - Topical Retinoids
  - Isotretinoin

- **Bacterial proliferation**
  - Topical Antibiotics
  - BPO
  - Oral Antibiotics
  - Isotretinoin

- **Inflammation**
  - Oral Antibiotics
  - Corticosteroids
  - Topical Retinoids
  - Isotretinoin

Topical Retinoids

• **Therapeutic effects**
  – Normalize keratinization
  – Break up comedones/help prevent new comedonal formation
  – Some anti-inflammatory effects
  – Increase cell turnover

• **Side effects**
  – Cutaneous erythema, peeling, stinging/burning, dryness and edema are typical side effects seen with retinoids. Most are dose-dependent
  – Possible photosensitivity
## Comparison of Topical Retinoids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Preg Ctg</th>
<th>Photostable</th>
<th>Compats w/BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tretinoin (Generic; Retin-A®; Atralin®)  Various %</td>
<td>C</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Adapalene (Differin® and generics) 0.1%/0.3%</td>
<td>C</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tazoratene (Tazorac® 0.05%/0.1% Cream and Gel)</td>
<td>X</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

BP = benzoyl peroxide
BPO: A Topical Antimicrobial

- **BPO has antibacterial, anti-inflammatory and comedolytic activity**
  - BPO appears to exert its **bactericidal** activity indirectly not by direct interaction with the cell

- **Powerful oxidizing agent**
  - Its release of highly reactive oxidized intermediates alters the follicular micro-environment and disrupts cellular functions

- **Side effects include**
  - Skin irritation
  - Allergic or irritant contact dermatitis
  - May bleach clothing

In addition, BPO 2.5% gel reduced the anaerobic population by 97% after twice-daily treatments for 1 week, and by 99% after 2 weeks (n=10).

Topical Antimicrobials

• **Topical Antibiotics**
  – Resistance is a concern with both erythromycin and clindamycin
  – Better if combo w/ BP
    • BP-Clindamycin
    • BP-Erythromycin

• **Topical dapsone gel** *(Aczone®)*
  – Anti-inflammatory and antibiotic properties

• **Retinoid-Antimicrobial**
  – Clindamycin phosphate 1.2%-tretinoin 0.025%
    • *Ziana®*
    • *VeltinTM*
  – Benzoyl Peroxide 2.5%-Adapalene 0.1%
    • *Epiduo® Gel*
Bacterial Resistance in Acne

• *P. acnes* reduction has been correlated with therapeutic efficacy after treatment with antibiotics\(^1\)
  – Resistance to antibiotics has progressively increased

• Multiple studies have confirmed the ability of BPO to
  – Reduce proliferation of *P. acnes*\(^2\)
  – Reduce the proliferation of *P. acnes* already resistant to antibiotics\(^2,3\)

• Extended-spectrum tetracyclines exhibit lowest antibiotic resistance levels\(^2\)

Indications of Oral Antibiotics

1. Failure of topical antibiotics
2. Better reduction of inflammation
3. More long-term control
4. 8-9 yrs of age and older

Choices:
1. Tetracycline
2. Erythromycin
3. Doxycycline
4. Minocycline
5. Others:
   - Bactrim DS
   - Ampicillin
   - Clindamycin
   - Zithromycin
# Tetracycline Family

**Doxycycline**
- 100 mg po QD-BID
- Advantages:
  - Take with meals
- Side Effects: Like TCN
  - More Photosensitivity
    - dose-dependent
  - Epigastric pain/gastritis
    - Especially w/ capsules

**Minocycline**
- 100 mg po QD-BID
- Advantages:
  - Take with meals
  - Decreased resistance compared to all oral antibiotics
- Potential side effects sometimes a concern
Side Effects of Minocycline

Unique To Minocycline:
1. Blue-gray pigmentation in scars (dose-dependent)
2. Allergic reactions
3. Autoimmune hepatitis
4. Lupus-like reactions

Other reactions may occur similar to the other cycline family

Blue-gray pigment after few yrs
Antibiotic Stewardship

• Multidisciplinary initiative promoted by the CDC to ensure that patients receive the right antibiotic, at the right dose, at the right time, and for the right duration

• Goals
  – Optimize antimicrobial therapy
  – Lessen the risk of adverse events
  – Promote therapeutic cost-effectiveness
  – Improve patient outcomes
  – Reduce/stabilize antimicrobial resistance

• Prolonged topical or oral antibiotic therapy for acne vulgaris is best accompanied by the use of BPO to optimize efficacy and mitigate the emergence of less sensitive *P. acnes* strains (SPAUD consensus)

References:
Follow-Up

• When do you see patients back?
  – Initially ~ 2 months

• How long do you continue the topicals??
  – Indefinitely, as long as the acne is active

• How long do you continue the oral antibiotic?
  – Hard question, but it seems longer than I would like—my goal is “several months”
Monitoring of Oral Abx

- Routine monitoring of TCN, minocycline, doxycycline, and erythromycin is **not** supported in the literature
  - I tend to check if on minocycline for long periods

- Serious side effects are mainly idiosyncratic and best detected by history and symptomatology
  - Nausea, vomiting, abdominal pain, or more concerning underlying problems
Back-Up Oral Antibiotics

- Cephalexin
- Zithromycin
- TMP-Sulfa

- Various schedules and regimens used
Post-Inflammatory Hyperpigmentation
“Current Off-Label” Options

• Topical retinoids

• Azaleic acid

• Hydroquinones
  – Concerns re: ochronosis, and carcinogenicity in rodents
  – 2%: OTC, but under FDA review by National Toxicology Program
  – Rx: 4%–6%
Oral Contraceptives

- **Mechanism:**
  - Reduce serum androgens & free testosterone
  - Decrease sebum production

- **Useful after menarche**

- **Try to avoid in premarchal girls because:**
  - Estrogen in the combination contraceptive pill may accelerate epiphyseal closure and affect ultimate height

- **Main Components:**
  - Estrogen and Progestin
    - Avoid progestin-only
Oral Contraceptives

- The FDA-approved choices contain low doses of the estrogen, ethinyl estradiol (EE), combined with differing progestin components
  - Much debate about the risk of blood clots with drospirenone-containing contraceptives
- Ortho Tri-Cyclen
  - Contains norgestimate.
- Estrostep
  - Contains norethindrone
- YAZ
  - Contains drospirenone
    - Risk for blood clots
- Beyaz
  - Contains drospirenone and folate
Spironolactone & Pediatric Acne

• Minimal data on its use in the pediatric patients

• Used in females with PCOS

• Fair-good antecdoctal personal experience

• Dosage in Children:
  – Start low dosage at 25-50 mg daily and titrate up to 50-100 mg per day
  – No labs
  – Mention potential ‘virilizing’ side effects to newborn males
  – Often used with OCP

Eichenfeld et al., Pediatrics 131; 2013, S163-186.
Isotretinoin

- **Main Indications:**
  - Nodulocystic acne
  - Scarring acne on conventional treatment
  - Persistent/resistant acne
  - Works on all pathogenic factors

- **IPLEDGE registry is required**

- **Main Concerns:**
  1. Pregnancy prevention
  2. Effect on bones
  3. Controversial association with mood or behavioral issues
  4. Controversial association with inflammatory or irritable bowel disease

- 120-150 mg/kg course
Dosing

- **Cumulative Course:**
  - Aim for 150 mg/kg course

- **Starting dose:**
  - 0.3 mg-0.5 mg/kg/day then gradually advance
  - Lower dosages ideal for more involved patients

- **High dose Regimen:**
  - Controversial topic
  - Several articles and case series looking at using both higher cumulative dosage (200 mg/kg) as well as high daily dosage, in an effort to decrease the need for ‘multiple/repeat’ courses
### Concerns In Teens

- Elevated TG’s
- Elevated LFT’s
- Musculoskeletal complaints
- Mood Swings
- IBD
- Paronychia/Ingrown toenails
- Paradoxical flare and Pseudo-acne fulminans
Elevated TG

• **TG level: 200-300’s**
  - Add OTC fish oil as directed 2-4 tabs per day
  - Cont current isotretinoin dosage

• **TG level > 350++:**
  - Lower isotretinoin dosage, cont fish oil
  - If still elevated—and trending up, cont low dose and add Omega-3-acid ethyl esters (Lovaza) at 4 grams po divided QD-BID
Elevated LFT’s

- **AST elevated**
  \[(ALT \text{ normal or mildly elevated})\]
  - Exercise is most likely explanation
  - Check CK level

- **ALT elevated**
  \[(AST \text{ normal or mildly elevated})\]
  - Differential:
    - Mononucleosis-check EBV titers
    - ETOH usage
    - Idiopathic

*Always repeat LFT’s before doing more invasive testing*
Isotretinoin & Muscles

• Kaymek (2008) and Ladau et al (2001) both report marked hyperCPKemia w/ or w/o muscle-related complaints in isotretinoin-patients with acne is a benign phenomenon
  – Therefore, it is logical to reserve measurement of CPK levels as well as renal tests for cases with severe muscle pain

• We check CPK if patient has elevated AST and ALT together, or have muscle c/o
  – Typically elevated up to 1 wk after heavy exercise

• Some suggest that an oral retinoid and exercise have a synergistic effect on muscle.

• Few reports of isotretinoin & rhabdomyolysis
  – 1 German report of associated with death (2012)

Personal Observations

Creatine & Exercise & Isotretinoin

• Supplements:
  – Creatine monohydrate
  – Creatine ethyl ester

• Background:
  – There are reports of kidney and liver damage in some, but most studies show little or no adverse impact on kidney or liver function from oral creatine supplementation
  – Some have shown temporary increase in serum Cr, but not CK
  – Some newer reports, animal studies and case series showing kidney and liver complications

• Study (2002): College football players over few years:
  – Oral supplementation with Creatine monohydrate had no long-term detrimental effects on kidney or liver functions in highly trained college athletes in the absence of other nutritional

• Personal Observations:
  – I have seen 5 cases of Isotretinoin + Exercise + Creatine with marked elevated LFT’s, w/ or w/o elevated CK, more so than typically with exercise + isotretinoin

High-Impact Competitive Athlete

- Increased complaints about knee, back, hip pain

- Plan:
  - Lower dosage of isotretinoin during peak of season, then increase later
  - Longer course ok

- Examples:
  - Soccer
  - Basketball
  - Cross-country/track
  - Volleyball
  - Lacrosse
  - Dance/aerobics
  - Sometimes football
Bone Effects

• Background:
  – Animal studies show potential risk to bones
  – Hyperostoses are possible in those receiving long-term systemic retinoid therapy for DOC
  – Hyperostosis during retinoid use has been most strongly associated with long-term therapy or chemoprevention, appears to be dose- and duration-dependent

• Hyperostosis appears to be uncommon among those receiving isotretinoin for acne vulgaris.

• Premature epiphyseal closure in association with retinoid therapy appears to be a rare and may occur in an asymmetric or generalized fashion

Eichenfeld et al., *Pediatrics* 131; 2013, S163-186.
Mood Swings

• Prior Personal History:
  – Prior to therapy, I prefer getting a written statement for primary care, psychologist, or psychiatrist mentioning OK to start isotretinoin
  – Usually do closer follow-up (often they ‘improve’)
  – Only rare exception is bipolar d/o

• Remains “controversial”, “theoretical”, “potential” assoc.
  – Assoc is antecdotal

• ‘Mood change’-new onset
  – Determine if it is ‘real’
  – Work with primary care
  – Watch closely
  – Primary Issues:
    • Sports, classroom, peer relations, boy/girlfriend
  – Rule out substance abuse!

Eichenfeld et al., *Pediatrics* 131; 2013, S163-186.
Inflammatory Bowel Disease

- Very conflicting data on the “controversial”, “theoretical”, “possible” association

- Most systematic literature-based case reports, case series, and clinical trials likewise revealed no evidence for an association

- An association may exist
  - Ulcerative colitis?
  - Preceding oral abx
  - Inflammatory skin (acne) & Inflammatory gut??

- Depositions and class-action law suits continue (NJ)

Eichenfeld et al., *Pediatrics* 131; 2013, S163-186.
Paronychia/Granulation Tissue
Paradoxical Flare

• It is not uncommon to see a flare of acne, early in the course
  – Males>>>females
  – Younger kids (<15 yr) >> older kids
  – Common for us to start as low as 20-30 mg po qd for 1st month

• Recommendations to help prevent or treat a ‘new’ flare
  – Start low-dose isotretinoin, sometimes as low 20 mg 3x/wk
  – Before or concurrent with isotretinoin, start oral prednisone 1 mg/kg/day for several days, tapering over 2-3 wks+ based upon severity
Severe Truncal Acne

Case 1

Case 2

Case 3
Severe, Inflammed Acne
Mainstay of Therapy

1. **Oral prednisone**--helps reduce the inflammatory lesions and the granulation tissue
   - Important to start either prior to and/or during the first few wks-mos of starting isotretinoin
   - Plan on tapering over several wks
     - May need a 2nd round later or can use intralesional

2. **Low dose Isotretinoin**
   - 10-20 mg/day initially for 1st few months
     - Increasing to perhaps 20-40 mg/day after a few months, or stay low dosage entire course if necessary
Acne Fulminans

**Diagnostic Criteria:**
(Burns/Collville)
1. Sudden onset
2. Severe ulcerating, nodulocysts scarring acne
3. Systemic features w/ fever and polyarthralgia
   - Myalgias, osteolytic lesions
4. No response to abx
5. Favorable response to oral steroids

**Treatment:**
- NSAIDS for arthralgia
- Long oral prednisone course
  - Several weeks to multiple months
- Very low-dose isotretinoin

Acne Fulminans-Like (Pseudo-Acne Fulminans)

• Sudden onset of an inflammatory-ulcerative type of acne without systemic symptoms
  – Clinical severity similar to AF but no systemic issues

• Lesions may be tender and bleed

• Most often w/ isotretinoin tx
Pseudo-Acne Fulminans

• Cause:
  – Hypersensitivity to bacterial agent of P. acnes released during isotretinoin tx
    • Possibly leading to increased neutrophil function and increased nodules and cysts

• Majority are males

• Presence of macro-comedones and use of oral isotretinoin before the onset of the clinical picture.
Pseudo Acne Fulminans-Like

• **Isotretinoin Goal:**
  - Same goal: 150 mg/kg/day
  - May take 8-12 mos

• Paradoxically, the same drug which may trigger AF or “pseudo-fulminans” is key to treatment, and should be maintained in reduced doses until the stabilization
Pseudo Acne Fulminans
Keys To Management

• Early introduction of oral steroids
  – Often starting at 1 mg/kg/day for few wks, then tapering gradually over 1-3 months depending upon severity and response

• Oral Isotretinoin
  – 0.3-0.5 mg/kg/day, increasing gradually if possible

• Oral antibiotics if secondary infection (No TCN)
Multiple Courses

• Risk group:
  – Younger patients, esp. <14 years of age
  – M>F (own experience)
  – Strong family history
  – PCOS
  – Syndrome-associated acne disorders

• Sometimes 2\textsuperscript{nd} or 3\textsuperscript{rd} course will be similar, and sometimes assoc. with ‘paradoxical’ flares (esp. males)

• How many courses “too many”?
# AARS Guidelines for Mild Acne
## (Comedonal or Inflammatory/Mixed Lesions)

### Initial Treatment

<table>
<thead>
<tr>
<th>Topical combination therapy*</th>
<th>Initial Treatment Inadequate Response†</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPO + antibiotic</td>
<td>Add BPO or retinoid, if not already prescribed</td>
</tr>
<tr>
<td>or</td>
<td>or change topical retinoid</td>
</tr>
<tr>
<td>retinoid + BPO</td>
<td>or change topical combination therapy</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>retinoid + antibiotic + BPO</td>
<td></td>
</tr>
</tbody>
</table>

*Topical fixed-dose combination products available.
†Assess patient adherence.

**Factors To Consider**

<table>
<thead>
<tr>
<th>Previous treatment/history</th>
<th>Managing expectations/side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>Psychosocial impact</td>
</tr>
<tr>
<td>Vehicle selection</td>
<td>Active scarring</td>
</tr>
<tr>
<td>Ease of use</td>
<td>Regimen complexity</td>
</tr>
</tbody>
</table>

Topical dapsone is an additional consideration instead of topical antibiotic.

AARS Guidelines for Moderate Acne
(Comedonal or Inflammatory/Mixed Lesions)

**Initial Treatment**

<table>
<thead>
<tr>
<th>Topical combination therapy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>retinoid + BPO</td>
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<tr>
<td>or</td>
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<tr>
<td>retinoid + (BPO + antibiotic FDC)</td>
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<td>or</td>
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<tr>
<td>(retinoid + antibiotic FDC) + BPO</td>
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**Oral antibiotic**

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<tr>
<td>+</td>
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<tr>
<td>topical retinoid + BPO</td>
</tr>
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<td>or</td>
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<td>topical retinoid + antibiotic + BPO</td>
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Topical dapsone is an additional consideration instead of topical antibiotic.

**Inadequate Response†**

Change topical retinoid and/or change topical combination therapy

and/or

Add or change oral antibiotic

**FEMALES:**
Consider hormonal therapy‡

or

Consider oral isotretinoin‡

*Topical fixed-dose combination products available.
†Assess patient adherence.
‡Consider referral to dermatology

**Factors To Consider**

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BPO, benzoyl peroxide.
FDC, fixed-dose combination.

AARS Guidelines for Severe Acne
(Inflammatory/Mixed and/or Nodular Lesions)

Initial Treatment‡

**Combination therapy***

- Oral antibiotic
  - +
  - topical retinoid + BPO
    - +/-
  - topical antibiotic

Inadequate Response††

- Consider changing oral antibiotic and consider oral isotretinoin
- FEMALES: Consider hormonal therapy

Topical dapsone is an additional consideration instead of topical antibiotic.

*Topical fixed-dose combination products available.
†Assess patient adherence.
‡Consider referral to dermatology

**Factors To Consider**

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BPO, benzoyl peroxide.

Best Reference


• pediatrics.aappublications.org/content/131/Supplement_3/S163.full
Camp Braveskin