A New Era in the Management of Atopic Dermatitis: How Will Emerging Targeted Therapies Be Selected in Practice?

Pathways to Biologic Therapy for Atopic Dermatitis: Which Patients and When?

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Recent Updates in Atopic Dermatitis: What Will the Clinical Data Mean for Practice?

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Distinguish which patients may benefit from biologic therapies, having optimised traditional management strategies in AD, which patients may be eligible for biologic therapy, and the latest clinical data evaluating biologics for the management of moderate or severe AD.

Upon completion of this activity, participants should be better able to:
• Distinguish which patients may benefit from biologic therapies, having optimised possible outcomes with current standard care
• Describe recent clinical data evaluating new or emerging targeted therapies for moderate or severe AD
• Discuss the future clinical implications of data evaluating new or emerging targeted therapies and how evolving treatment strategies may apply to everyday practice

Target Audience
This activity has been designed to meet the educational needs of dermatologists, allergists, immunologists and other clinicians involved in treating patients with atopic dermatitis.

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Pathways to Biologic Therapy for Atopic Dermatitis: Which Patients and When?

The Patient’s Journey Through the Atopic Dermatitis Treatment Armamentarium

<table>
<thead>
<tr>
<th>Intensity of Disease</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recalcitrant, severe AD</td>
<td>Skin hydration, emollients, avoidance of irritants, identification and addressing of specific trigger factors</td>
<td>Low-mid potency TCS and/or TCI</td>
<td>Mid-high potency TCS and/or TCI</td>
<td>Systemic therapy or UV therapy</td>
</tr>
<tr>
<td>Moderate to severe AD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild to moderate AD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry skin only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

First, Consider Possible Triggers

<table>
<thead>
<tr>
<th>Allergens</th>
<th>Confirm with skin tests and in vitro tests for specific IgE antibodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific foods</td>
<td>Dust mites</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Irritants/nonspecific triggers</th>
<th>Confirm by patch testing; recommend avoidance; recommend temperature and humidity control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harsh soaps, detergents</td>
<td>Wool and other abrasive fabrics</td>
</tr>
<tr>
<td>Extremes or transitions in temperature, humidity</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infections</th>
<th>Treat appropriately</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial (S. aureus)</td>
<td>Viral (eczema herpeticum, molluscum contagiosum)</td>
</tr>
<tr>
<td>Fungal (Malassezia, dermatophyte)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation(s): AD: atopic dermatitis; TCI: topical calcineurin inhibitors; TCS: topical corticosteroids; UV: ultraviolet.  

Luz Fonacier, MD: This is Luz Fonacier from NYU Winthrop Hospital and SUNY at Stony Brook, New York, in the United States. In this first presentation, I will be discussing the patient’s journey through the atopic dermatitis (AD) treatment armamentarium. This topic has gained importance because use of dupilumab for moderate or severe AD was approved in the United States by the FDA in March 2017, and is likely to be approved in Europe in late 2017. Therefore, we need to understand how biologics will fit in our current treatment algorithms, and for which patients they will likely be used.

In this presentation, we will discuss the management of moderate to severe AD through stepwise optimisation of our therapies, as suggested by current guidelines, from identification of triggers and basic moisturisation, then stepping up to the topicals, UV therapy, and when it is time to consider systemic treatment, including a biologic.

Abbreviation(s): IgE: immunoglobulin E.  

First of all, it is important to identify possible triggers of AD. These may be patient-specific allergens, nonspecific irritants, and/or infections. Skin tests and in vitro tests for specific IgE antibodies can confirm food and environmental allergens, and patch testing can identify contact allergens. Avoidance of common nonspecific irritants that may trigger the itch-scratch cycle should be counselled, as well as control of environment to avoid increased pruritus related to heat, humidity, and perspiration.
Optimising AD Skin Care: Choosing the Right Moisturiser

- Effectiveness is directly linked to patient adherence
- Therefore, cosmetic acceptance of a moisturiser is crucial

**Class** | **Mode of Action** | **Biological Similarity** | **Examples**
--- | --- | --- | ---
Humectants | Attract and hold water in the skin | NMF in corneocytes | Glyceral, alpha hydroxy acids, hyaluronic acid, sorbitol, aloe
Oclusives | Form hydrophilic film to retard TEWL but needs to be applied on damp/wet skin | Interellular lipid bilayer | Carnauba wax, lanolin, mineral oils, olive oil, petrolatum, silicone
Emollients | Smooths skin; lubricates stratum corneum by filling cracks between desquamating corneocytes | Natural lipids found on skin and sebum | Collagen, colloidal oatmeal, elatoin, glyceryl stearate, shea butter

**Abbreviation(s):** NMF: natural moisturising factor; TEWL: transepidermal water loss.

**Reference(s):** Adapted from: Giam YC et al. Asia Pac Allergy. 2016;6:120-128. Adapted by L. Fonacier, oral communication, April 2017.

Occlusive moisturisers with ceramide-rich lipids can improve skin barrier function and reduce the severity of AD. But the effectiveness of this basic therapy is linked directly to patient adherence. Therefore, cosmetic acceptance of a moisturiser is crucial, and patient preferences should always be taken into consideration when choosing a treatment for AD.

The Mainstay of AD Treatment: Topical Corticosteroids

**Potency** | **Class** | **Topical Corticosteroid**
--- | --- | ---
Ultra high | I | Clobetasol propionate, difluoromethane dichloride
High | II | Fluticasone propionate, triamcinolone acetonide, hydrocortisone valerate, betamethasone valerate, betamethasone valerate, diflucinolone acetate
Medium | IV | Hydrocortisone valerate, mupirocin, calcipotriol, tazarotene, calcitriol
Low | VII | Hydrocortisone valerate, diflucinolone acetate, methylprednisolone acetate

**Abbreviation(s):** SCORAD: Scoring Atopic Dermatitis (severity score).


Topical corticosteroids are the mainstay of therapy for patients not controlled with moisturisers alone and their use should be optimised. The potency and side effects of topical corticosteroids are related to saturation of glucocorticoid receptors in different cell types. Intermediate- and high-potency corticosteroids could be used for exacerbations over short periods (1 to 2 weeks), and in non-facial, non-skinfold areas. Low-potency corticosteroids are recommended for maintenance therapy, proactively and intermittently, 1 to 2 times per week on areas that commonly flare.

Bathing, an important part of treatment and maintenance, can prevent AD worsening. Dilute bleach baths taken twice weekly may reduce the severity of AD, especially in patients with recurrent skin infections—and are an inexpensive, relaxing, and gentle therapy to consider. However, further studies are still needed to validate this technique. I personally suggest dilute bleach baths during flares, twice weekly for 2 to 4 weeks.


**Topical Corticosteroids Considerations**

**Vehicle** | **Allergenicity** | **Cost & Prescription Size**
--- | --- | ---
Ointments: More occlusive and better penetration | Based on 2 immune recognition sites: C16/9 and C16/17 | Impacts adherence
Creams: More preservatives; more potential of irritant and allergic reactions
Solutions: Best for scalp and hairy areas | Consider allergic contact dermatitis in patients on TCS who
- Don’t respond
- Worsen
- Initially improve, then flare
Ensure adequate prescription size for the extent of the disease

The treatment’s vehicle plays an important role in absorption and can enhance its efficacy. Generally, ointments are more effective than creams, because the occlusive effect results in better penetration. Ointments also contain fewer preservatives, so the potential for irritation and allergic reaction is lower. Solutions or foams are best used on the scalp or other hairy areas.

Allergic contact dermatitis can be caused by certain topical corticosteroids or their vehicle, and should be suspected in all patients who don’t respond, get worse, or improve initially then flare with continued use.

Cost is an extremely important factor, impacting adherence and compliance. Also, inadequate prescription size is one of the most frequent problems when treating patients with widespread or chronic relapsing dermatitis. The average adult requires at least 840 g of a topical medication to cover the body once a day for a month. Patients become frustrated at both the expense and inconvenience of refilling prescriptions for 15- and 30-g tubes. So clinicians need to prescribe adequate amounts for the extent of the disease.

Adverse effects from topical corticosteroids are directly related to their potency and duration of use. Local reactions such as striae and atrophy of the skin, telangiectasia, perioral dermatitis, rosacea, and allergic contact dermatitis should be monitored at every visit. Systemic adverse effects are rare, and more important in small children and infants. The physician should address patient fears of steroid side effects to improve adherence.
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*Staphylococcus aureus* organisms on AD skin decreases with prolonged use of topical tacrolimus because of its effective control of skin inflammation.₅,₆

To optimize adherence, it is important to counsel patients about transient localised burning and itching that can occur during the first week of treatment.

In 2006, the FDA issued a black-box warning on the topical calcineurin inhibitors for potential carcinogenicity. However, large observational studies have not found an increased risk.

**When Topical Therapies Fail: Traditional Systemic Management of AD**

<table>
<thead>
<tr>
<th>Medication/Dose</th>
<th>Efficacy</th>
<th>Safety and Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclosporine -150-300 mg/d</td>
<td>53%-95% improvement at 10 d to 8 wk</td>
<td>Renal impairment, hypertension, nausea, headache, infection/Immunosuppression</td>
</tr>
<tr>
<td>Azathioprine 1-3 mg/kg/d</td>
<td>39% improvement over MTX at 12 wk</td>
<td>GI disturbances, liver enzyme abnormalities, blood count abnormalities (ie, lymphocytopenia)</td>
</tr>
<tr>
<td>Methotrexate 7.5-25 mg weekly</td>
<td>42% improvement at 12 wk</td>
<td>Nausea, elevated liver enzymes, Rarely, pancytopenia, hepatic/pulmonary toxicity</td>
</tr>
<tr>
<td>Mycophenolate 0.5-3 g/d</td>
<td>Inconsistent efficacy data</td>
<td>GI symptoms; rarely, haematologic and GU symptoms</td>
</tr>
</tbody>
</table>

**Which Patients Should Be Stepped Up to Systemic Therapies?**

- Inadequate response despite medium- to high-potency topical therapy
- Frequent flares
- Unacceptable AEs
- Intense Symptom Burden
  - Sleep quality
  - Emotional & mental health disturbance
  - Interference with daily activities
- Extensive Lesions
  - Excoriations
  - Infections

**Abbreviation(s):** AE: adverse event; BSA: body surface area.


L Fonacier and JI Silverberg, oral communication, April 2017.

Which patients need to be stepped up to systemic therapies? There are currently no set criteria or guidelines defining poor or non-response, but research protocols and real-life definitions provide some guidance. For example, patients being considered for systemic treatment should have failed to maintain either remission or a low disease activity state, despite medium- to high-potency topical treatment; they may have frequent flares, or unacceptable adverse events.

Other considerations for systemic therapy include patients with extensive disease, with severe lesions, or have areas exhibiting atopic dermatitis that affect function or quality of life; for example, facial eczema is associated with worse quality of life as compared with eczematous dermatitis on the rest of the body.

Pruritus, sleep quality, emotional and mental health disturbance, and disease interference with activities of daily living and work are important quality of life issues to be addressed. There is no generalisable time specified, but research protocols have suggested at least 28 days, or the maximum treatment duration recommended—for example, 14 days for super-potent topical corticosteroids.

I just tend to use clear/almost clear/mild/moderate/severe, and I rate their pruritus and ask them how it disturbs their quality of life—and going through that should be sufficient to determine whether a patient is responding or not responding to their therapy.

**Optimising Systemic Management of AD: Narrowband UVB**

<table>
<thead>
<tr>
<th>Narrowband UVB (311-313 nm)</th>
<th>Efficacy</th>
<th>Safety and Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosed according to minimal erythema dose and/or Fitzpatrick skin type, 3-5 times per week</td>
<td>Short-acting</td>
<td>Similar AEs compared with UVB but milder or less frequent (sunburn, erythema, xerosis, tenderness, and other forms of epidermal photo damage)</td>
</tr>
</tbody>
</table>

**Abbreviation(s):** BB-UVB: broadband UV light B.

Phototherapy is currently recommended by the AAD as a second-line treatment after failure of topical therapy. Although there are several forms of light therapy that have been shown to be beneficial, narrowband UVB has the lowest risk profile and relative better efficacy. However, cost, availability, and practicality may be an issue in some settings.

**Summary**

<table>
<thead>
<tr>
<th>Step</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Skin care; trigger avoidance</td>
</tr>
<tr>
<td>Step 2</td>
<td>Low-mid potency TCS/TCI</td>
</tr>
<tr>
<td>Step 3</td>
<td>Mid-high potency TCS/TCI</td>
</tr>
<tr>
<td>Step 4</td>
<td>Systemic or UV Biologic (ie, dupilumab)</td>
</tr>
</tbody>
</table>

- Counsel all patients
- Consider appropriate potency, vehicles, quantity, application and adherence
- Biologic therapy is better tolerated and more efficacious vs traditional systemic agents used in AD

In summary, we need to optimise our current treatment armamentarium, wherein all patients should be counseled for avoidance of triggers, gentle skin care approaches, and optimised moisturising strategies. Optimised topical therapy using the appropriate potency, vehicles, quantity, application, and adherence should be encouraged in all patients.

Patients with an inadequate response to topical corticosteroids or calcineurin inhibitors should be “stepped up” to a systemic treatment. Biologic treatment is a new, more efficacious option, which will be the topic of the next presentation. Thank you for your attention.
Biologics: A New Standard of Care in Systemic Treatment for AD?

**Abbreviation(s):** AD: atopic dermatitis; CCL: chemokine (C-C motif) ligand; CXCL: CXC chemokine ligand; DC: dendritic cells; FFA: free fatty acids; hBD2: human α-defensin 2; IFN-γ: interferon-gamma; IL: interleukin; JAK: Janus kinase; LC: Langerhans cells; FFA: free fatty acids; hBD2: human α-defensin 2; IFN-γ: interferon-gamma; IL: interleukin; JAK: Janus kinase; LC: Langerhans cells; Th: T helper cell; TSLP: thymic stromal lymphopoietin.

**Reference(s):**

Jonathan I. Silverberg, MD, PhD, MPH: Hello, this is Jonathan Silverberg from Northwestern University Feinberg School of Medicine in Chicago, Illinois in the United States.

Welcome to this activity on atopic dermatitis. With one biologic therapy recently approved for moderate or severe atopic dermatitis and several others in the pipeline, it will be important to become more familiar with these therapies’ efficacy and safety profiles. The key thing is recognising who the ideal patient is for this medication. If you have someone with a flare-up for 2 weeks out of the year, they are not the ideal patient. But if you have a patient with chronic, persistent disease where they have daily or almost daily activity—or they have so many unpredictable flares throughout the year—those are patients that require a long-term treatment. So in this next presentation, we will discuss the most recent clinical data and their implications for practice.

This slide is a basic overview of the very complex pathways that are involved in the pathogenesis of atopic dermatitis, and you can refer back to the previous PeerVoice CME activity for more details about these pathways (www.peercme.com/pec17).

**Abbreviation(s):** EASI: Eczema Area and Severity Index; IGA: Investigator’s Global Assessment; NRS: numeric rating scale; QW: every week.


We will first discuss the clinical data for dupilumab, which was recently approved in the United States. In a previous PeerVoice activity, the faculty discussed the phase 3 clinical data evaluating dupilumab as a monotherapy, the so-called

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**Recent Updates in Atopic Dermatitis: What Will the Clinical Data Mean for Practice?**

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**Abbreviation(s):**
SOLO 1 and SOLO 2 studies. We now have follow-up data for both the long-term extension studies, as well as the CHRONOS studies, evaluating dupilumab together with topical corticosteroid treatment.

We will start with the 52-week, open-label extension study. What we see is that patients do quite well and sustain their responses for Investigator Global Assessment (IGA) score of clear or almost clear with a 2-grade improvement. You actually see the slight increase over time in the EASI scores—sustained and even ongoing improvements—and by 52 weeks, about an 89% improvement. And there are considerable improvements in pruritus over time, with about a 62% improvement at around 52 weeks.

When we look at the improvements in pruritus, we see again pretty early improvements sustained all the way out until about 1 year.

Abbreviation(s): BL: baseline; BSA: body surface area; DUP: dupilumab; EASI-75: 75% improvement in EASI; FAS: full analysis set; FAS-52: FAS at time of cutoff; PBO: placebo; Q2W: every other week; SC: subcutaneous; TCI: topical calcineurin inhibitors; TCS: topical corticosteroid.


When we look at the improvements in pruritus, we see again pretty early improvements sustained all the way out until about 1 year.

Abbreviation(s): LOC: last observation carried forward; LS: least squares.


The CHRONOS study is an interesting one: similar inclusion and exclusion criteria to what were used in the SOLO 1 and SOLO 2 phase 3 studies, but this one looks at dupilumab in combination with topical corticosteroids and followed these patients until week 52. We see, again, about 40% of patients achieving the primary efficacy endpoint of that IGA score of clear or almost clear with a 2-grade improvement, and similar results at week 52.
of dupilumab for just a couple of small lesions here or there, and so in that case I would advocate for using topical corticosteroids as needed there, or even for proactive use for prevention of flare-ups, as well.

<table>
<thead>
<tr>
<th>Patients With AEs, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8/8% of Patients)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Combination Therapy1</td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Monotherapy2</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

| Nasopharyngitis | 19 | 23 | 19 | 29.2 |
| URTI            | 10 | 10 | 14 | 8.3  |
| AD              | 46 | 18 | 17 | 6.8  |
| Injection-site reaction | 8  | 15 | 19 | 3.7  |
| Headache        | 6  | 5  | 8  | 10.7 |
| Any herpes infections | 8  | 7  | 7  | N/R  |
| Non-herpetic skin infections | 18 | 11 | 8  | N/R  |
| Conjunctivitis  | 8  | 14 | 19 | 7.6  |

Abbreviation(s): AE: adverse event; N/R: not reported; URTI: upper respiratory tract infection.

There aren’t too many safety concerns with dupilumab. It is not surprising with an injectable medication to see injection-site reactions. We did see significantly higher rates of conjunctivitis up to 52 weeks, compared to shorter-term exposure. It really isn’t until around that 6-month mark where you really start to see this conjunctivitis. The addition of topical corticosteroids causes similar AEs as the previous studies: injection site reactions and the conjunctivitis.

Compared to placebo, we are seeing lower rates of infections across the board, and that is something we want to keep in mind: This is not a broadly immunosuppressing medication, as some of the other available systemic agents.

One question that comes up about the conjunctivitis is: Is this a dose-dependent side effect for reasons that are yet unclear? One of the interesting things to understand is that dupilumab is also being studied for asthma and nasal polyposis, and this conjunctivitis signal actually didn’t show up in those other patient subsets. So it seems to be something unique to atopic dermatitis, but the cause remains unclear.

For right now, there is nothing that we are pre-emptively doing to mitigate this, because we don’t fully understand what it is. For now, I think the best recommendations are to refer to your ophthalmology colleagues and stay tuned to forthcoming studies that will shed light on what the mechanisms of such conjunctivitis are. Because both the studies showed similar efficacy between the dosings, the FDA-approved dose is 300 mg every other week. So this is probably a good thing, because with the every-other-week dosing, we actually do not see as much conjunctivitis.
Abbreviation(s): Q4W: every 4 weeks; RCT: randomised controlled trial; SD: single dose.

Reference(s): Simpson et al. Presented at 25th European Academy of Dermatology and Venereology (EADV 2016). Presentation D3T01.1F.

Let’s move on to some of the other exciting data in the pipeline. What is very intriguing about the lebrikizumab and the tralokinumab data is that the targeting of IL-13 alone seems to really be effective—there has been this ongoing controversy for a while: Is it the IL-4, the IL-13, or both that really makes a difference in atopic dermatitis? And these data suggest that it may be the IL-13 that is most important.

Lebrikizumab is a monoclonal antibody that specifically targets IL-13, and these are just some of the high-level data from the early phase 2 study. They were actually quite bold in thinking that a single dose by itself might be effective enough. It turns out it really wasn’t, but the monthly dosing of 125 mg subcutaneously every month did have significant improvements above the placebo group. Note that the placebo group was using a mid-potency topical steroid twice daily aggressively for the full 12-week trial period, and even with that incredibly aggressive use of topical steroids, still they were able to see some considerable improvements with the monthly dosing of lebrikizumab.

Abbreviation(s): HLT: high-level term; LEB: lebrikizumab; SAE: severe adverse event; SOC: system order classification.

Reference(s): Simpson et al. Presented at EADV 2016. Presentation D3T01.1F.

In terms of safety, lebrikizumab is similar to what we have seen already with dupilumab. Conjunctivitis is one AE that has emerged with this one as well, and so this may be a class-wide effect—where it is not just IL-4 and IL-13, but IL-13 alone.

Tralokinumab and Mid-Potency Corticosteroids: EASI

Abbreviation(s): SE: standard error.

Reference(s): Wollenberg A et al. AAD 2017. Poster 4496.

Tralokinumab is also an anti–IL-13 monoclonal antibody, and what they found was that the highest dose tralokinumab of 300 mg was significantly better than the placebo group. Note that this is also a combination therapy study where patients were getting the drug plus a mid-potency topical steroid aggressively for an extended period of time.
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**Tralokinumab and Mid-Potency Steroids: Safety**

**Abbreviation(s):** TEAE: treatment-emergent AE; TESAE: treatment-emergent serious AE.

**Reference(s):** Wollenberg A et al. AAD 2017. Poster 4496.

In terms of safety, no major adverse events have come up. But keep in mind that this is a little bit early, and so it is something we will have to watch over time.

**Abbreviation(s):** VAS: visual analogue scale.


**Nemolizumab Monotherapy: Safety**

**Abbreviation(s):** CPK: creatine phosphokinase.


In terms of adverse events, there are some injection-site reactions, higher rates of peripheral oedema, as well as elevations in blood CK levels. But overall, the AEs were quite similar between nemolizumab and the placebo group.

**Using Biologics in Patients With Comorbidities**


An important consideration for using any of these biologics once they are approved, and certainly for using dupilumab now that it is FDA-approved, is really taking into account some of the comorbidities. We know that dupilumab is being tested right now for asthma and nasal polyposis, and while it is not FDA-approved for those yet, the preliminary data have shown that it works quite well. And so there may be some added value of using dupilumab in patients that have a lot of these atopic comorbidities.

Conversely, it is important to recognize that if dupilumab therapy will be discontinued for whatever reason, you don’t just have to observe their skin for atopic dermatitis flare-ups, you also have to observe their airway and make sure that they

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**Nemolizumab Monotherapy: Pruritus and EASI**

**Abbreviation(s):** VAS: visual analogue scale.


Nemolizumab is another intriguing biologic therapy in development, targeting IL-31, which is thought to be the inflammatory mediator of itch in atopic dermatitis. The drug really worked quite well to improve itch overall, but by improving the itch there was also improvement seen in the overall EASI score. The 0.5 mg/kg dosing really seems to work as well as the highest dose, maybe even slightly better, and so this might be the dose to use going forward.

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**Biologic therapies may also help comorbidities of AD:**
- Asthma
- Chronic sinusitis with nasal polyposis
- Potentially other Th2-mediated conditions

However, if biologic therapy is discontinued, comorbidities may flare and cause serious adverse events.

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A New Era in the Management of Atopic Dermatitis: How Will Emerging Targeted Therapies Be Selected in Practice?

are not getting asthma flare-ups [for example, in a patient with comorbid asthma].

| Summary |
|------------------|------------------|
| **Phase 2 clinical trials** | **Phase 3 clinical trials** | **Licensing** |
| Nemolizumab (anti-IL-31) | Lebrikizumab (anti-IL-13) | Dupilumab (anti-IL-4/IL-13) |
| Tralokinumab (anti-IL-13) | Pizartinibab (anti-IL-22) | – FDA: Approved |
| Secukinumab (anti-IL-17) | | – EMA: Pre-registration (filed) |
| Others | | + 89% EASI improvement and 62% pruritus improvement sustained to at least 1 year |
| | | + Concomitant use of topical corticosteroids increases treatment success |
| | | + Key AEs: Injection-site reactions and conjunctivitis |

So in summary, dupilumab is effective and safe for long-term treatment, at least up to 52 weeks, for chronic moderate-to-severe atopic dermatitis. Concomitant use of topical corticosteroids appears to increase treatment success rates, particularly by improving the extent of the disease. Injection-site reactions and conjunctivitis appear to really be the only adverse events related to dupilumab. Other biologics are emerging for the treatment of moderate-to-severe atopic dermatitis, but are further behind in development by several years. Thank you.

**Narrator:** Thank you for participating in this PeerCME educational activity. To obtain your CME certificate, complete the required post-test and evaluation form.
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