Superinfection Itches for Antibiotics, Barrier Repair

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DENVER — Any child with atopic dermatitis who has increasing pain, erythema, edema, heat, and purulent exudate is superinfected and requires antibiotics and emollients, according to an expert in pediatric dermatology.

A culture is necessary only for prescribing the correct antibiotic.

"I'm here to plead with you that infection is a clinical diagnosis, not a microbiological diagnosis," said Dr. H. Alan Arbuckle, a dermatologist and pediatrician at the University of Colorado, Denver, and Children's Hospital in Aurora, Colo.

"Doing a culture in a superinfected AD kid is worthless if your goal is to make the diagnosis of infection.

"All of these kids are going to be colonized. All are going to be positive. If you tell me the age of the wound, I'll tell you what organisms are in there, because if you look at acute and chronic wounds, they march through a sequential order of which organisms are present," he said. The increasingly relevant purpose of doing a culture on such a child is to direct antibiotic therapy by determining sensitivities of the involved organisms.

"All children with AD are colonized with staph [*Staphylococcus*] and strep [*Streptococcus*], predominantly *Staph aureus* and *Strep pyogenes*," he said at a meeting on pediatric hospital medicine.

Recent research findings provide perspective on the course of severe atopic dermatitis, according to Dr. Arbuckle.

Most pivotally, the evidence is mounting that "the problem in atopic dermatitis is . . . an abnormal barrier function," he said at the meeting, which was sponsored by the Society of Hospital Medicine, the American Academy of Pediatrics, and the American Pediatric Association.

In years past, pediatric dermatologists argued with pediatric allergists over the primary etiology of atopic dermatitis, with allergists arguing that immune dysfunction was to blame.

The issue was put to rest when Japanese researchers discovered that the vast majority of children with atopic dermatitis have a genetic defect in filaggrin, a protein that bundles keratin and provides the "mortar" in the brick-and-mortar type construction of the stratum corneum.

"We kind of had a big kumbaya, kissed, and made up. Dermatologists [had always said], well, there is an immune component, but how did the antigen get there? It got there because [the skin] had an improper barrier," Dr. Arbuckle commented.

Microcracks and microfissures, exacerbated by itching prompted by exposed nerve fibers in the epidermis, open the door to allergens, bacteria, and viruses. Compounding the problem is transepidermal water loss 600 times normal in the skin of children and adults with atopic dermatitis.

"We always knew that atopic kids have higher colony counts even when they aren't superinfected," said Dr. Arbuckle. "[It turns out], *S. aureus* is very adaptable, and upregulates certain adhesion proteins in a very dry environment."

Treatment is imperative in the face of superinfection, because children can harbor a profound bacterial load and develop sepsis, Dr. Arbuckle emphasized.

First-generation cephalosporins are "probably fine" as a first-line choice, but it depends on one's community and culture results, he said.

Once a proper antibiotic is selected, "You've got to restore barrier function. If you don't do this, they're not going to get better," Dr. Arbuckle emphasized.

In Denver's dry climate, he said he prefers petrolatum-based products, the simpler the better to avoid allergic responses. Plain petroleum jelly contains no lanolin or other additives that might cause a reaction. Choose topical steroids in ointment form, because creams often contain propylene glycol, which "stings like Hades," he suggested.

The "biggest failure" of most physicians is undertreatment of pruritus, which is often so severe it can preclude rapid eye movement sleep. Sedating antihistamines should be prescribed for night time and nonsedating antihistamines in the morning.

"Children with atopic dermatitis are perennially, horrifically itchy," he said, noting that he tells residents that if they prescribe an antihistamine as needed, "I will slap you upside the head."

Dr. Arbuckle disclosed no relevant conflicts of interest regarding any product used to treat atopic dermatitis. ■