TOPICAL THERAPY AND SKIN BARRIER REPAIR

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Bathing and other forms of topical therapy are critical parts of our dermatology armamentarium. Today we will focus on two aspects: aggressive bathing for resistant pyodermas and topical skin barrier repair.

A. BATHING FOR PYODERMA

Pyodermas are a common skin disorder in the dog. With the emergence of methicillin resistant Staph pseudintermedius, and the increasing prevalence of infections with these bacteria, our recommendations for canine pyoderma are changing. There is an increased emphasis on finding the underlying cause early and treating it effectively. We place more reliance on topical therapy, sometimes using it as monotherapy. And we are learning to choose our antibiotics wisely in order to reduce the likelihood of resistance. We want to choose best of class, we want to emphasize ease of compliance, and we no longer recommend the use of pulse antibiotics for long term management.

Topical therapy is critical for dogs with pyoderma, particularly those dogs with allergies as their underlying cause. Bathing helps us to improve the antimicrobial barrier of the skin and the use of oral fatty acids and topical lipids may help us repair the defective skin barrier. While bathing has been and will always be the primary approach to effective topical therapy, we have a number of new delivery systems to augment the delivery of effective topical agents. These products can help improve compliance, leading to better results, and they include rinses, sprays, mousses, and leave on lotions. For local use, we have wipes, creams, and ointments.

Topical therapy is my preferred treatment of choice for fold pyodermas. In particular, wipes are great for folds! These can be as simple as baby wipes. We have a number of commercial wipes that are very useful too. These include acetic acid/boric acid wipes with or without hydrocortisone (MalAcetic Wet Wipes, MalAcetic HC Wipes, Dechra), 2% chlorhexidine, 1% ketoconazole, 2% acetic acid (Mal-A-Ket wipes, Dechra, or even better Miconahex-Tris with ceramide complex wipes by Dechra), 4% chlorhexidine in Tris EDTA (Triz Chlor 4, Dechra), and 3% chlorhexidine with climbazole and phytosphingosine (DOUXO by Sogeval). Regular use of wipes can prevent the buildup of sloughed keratinocytes and skin oils that accumulate in folds and serve as medium for bacterial and yeast overgrowth. If surface infection persists long enough, some dogs will develop erosions and ulcers. Cytologies can be very helpful in guiding topical therapy. If cocci alone are found, then 2% mupirocin ointment is a great choice. If mixed bacteria and/or yeast are found, then 1% silver sulfadiazine cream is indicated. For staphylococcal pododermatitis, we have found that mixing mupirocin with Burow’s solution with hydrocortisone (specifically Hydro-Plus brand, Phoenix Laboratories, ½ of 22 gm tube in 2 oz squeeze bottle, then fill to 2 oz with HydroPlus and shake, Karin Beale, unpublished data) is
useful as an antibacterial lotion. With the emergence of methicillin resistant staphylococcal infections, I am trying to reserve the use of mupirocin for those infections.

One topical remedy that has been helpful for use at home for “hot spots” is the DOUXO Calm Gel Spray (Sogeval). This product contains phytosphingosine, hinokitiol, moisturizing factors and anti-oxidants. Phytosphingosine, a precursor of ceramide, one of the major lipids in the skin barrier, has antimicrobial and anti-inflammatory effects. It has been shown to increase the production of ceramides in the skin, thus helping repair the skin barrier. It inhibits inflammatory cytokine production. Hinokitiol, or beta-thujaplicin, is derived from cedar oil, and has been shown to have antibacterial and anti-inflammatory properties. It has been shown to have efficacy in canine Malassezia otitis externa. Calm Gel has been very effective for heavy coat dogs prone to hot-spots. When owners first recognize the early development of these self-traumatic lesions, they can apply this product and gently massage into the skin. It can arrest the development of the lesion, and thus help us avoid using systemic antibiotics and/or steroids as we do for more advanced lesions.

Bacterial overgrowth syndrome, often associated with Malassezia overgrowth, is quite common in many atopic breeds, including the West Highland White Terrier. The use of frequent bathing can help reduce itch and reduce bacterial and yeast overgrowth. Once the microbial overgrowth is controlled, then the frequency of bathing can be decreased. We will discuss the shampoos in more detail shortly, but I have used DOUXO chlorhexidine with climbazole and phytosphingosine (Sogeval) in my own allergic dogs, initially bathing twice weekly then every 2-3 weeks for maintenance. This bathing is part of the multi-modal approach we take to the management of atopic dermatitis.

Another area in which topical therapy is preferred is in the management of the impetigo we see in young puppies. This disease is quite superficial, presenting as subcorneal pustules on the glabrous skin of the abdomen. Rather than use antibiotics, we can wash the abdomens using a 2-3% chlorhexidine shampoo on a washcloth, or a spray or wipe. By reducing the frequent use of systemic antibiotics we can reduce the likelihood of selecting resistant strains.

Superficial pyoderma, caused by bacterial infection of the hair follicles, is most often treated with systemic antibiotics, but topical therapy should always be a part of the plan. Washing these dogs will help them look, feel, and smell better more quickly, and it will reduce the time these dogs require antibiotics for resolution of the disease. Reduction of the length of time dogs take antibiotics should help prevent selection of resistant strains, and the use of bathing as preventive therapy should reduce the number of antibiotic courses required. It has been shown recently that the use of 2-3% chlorhexidine shampoo imparts antibacterial effects to the hairs that can last up to 7 days after bathing, and that this effect can be augmented by adding in a chlorhexidine conditioner. Furthermore, chlorhexidine has been shown to be superior to ethyl lactate and benzoyl peroxide.

Even some forms of localized deep pyoderma can be treated locally. These include chin furunculosis (canine acne) and the interdigital cyst. These diseases have a complex pathogenesis, of which infection is only part. Much of the inflammatory change is associated with a foreign body reaction to the hairs released into the dermis. The use of benzoyl peroxide
gel or more recently, phytosphingosine (DOUXO Spot-on) have been very helpful. For interdigital cyst, mupirocin can be applied, followed by DMSO gel. These topical products can be kept at home for use when the owners first see the lesions erupt. A topical steroid and DMSO solution (0.01% fluocinolone acetonide and 60% DMSO, Synotic, Fort Dodge).

While the number of patients studied is not high, most studies on topical therapy support the use of chlorhexidine as superior to benzoyl peroxide or ethyl lactate in the management of canine pyoderma. A number of products are available, including those that incorporate antifungal ingredients as well. It is important to note that chloroxylenol has been shown to have poor activity against bacteria. A new product is available which utilizes sodium hypochlorite as the active antimicrobial agent (Top Vet Splash Plus and Top Vet Splash, TopVET Inc.). Our preliminary studies show that this product is very effective in the management of canine pyoderma, even when used as sole therapy. For more information, you can visit the website (http://www.vetsplash.com).

Topical therapy becomes critical when methicillin raises its ugly head. Dogs that repeatedly receive antibiotics for bacterial skin infections are at risk, and once methicillin resistance is diagnosed, the cost of care goes up. We can’t predict which antibiotics will be effective, as some of these infections are very resistant, retaining sensitivity to amikacin and rifampin only. Even when sensitive to chloramphenicol and doxycycline in vitro, infections do not always respond in vivo.

Most dogs’ methicillin resistant staphylococcal infections are caused by MR S. pseudintermedius, not S. aureus. It is therefore critical not to refer to these infections as MRSA. That terminology is restricted to infections caused by the human pathogen. Rather we can refer to the canine infections as MRSP, MRSS, or simply MRS. If truly infected with MRSA, we can assume the infection was acquired from a human colonized or infected with MRSA. Methicillin resistance does not make the canine infections more virulent or more contagious, simply more difficult to treat.

Topical therapy can be used to resolve superficial pyodermas caused by MRS. We have found that daily bathing with chlorhexidine shampoos can do this for most dogs. If owners are willing to put in the labor, the results can be quite dramatic. These baths are often supplemented with bleach rinses. There is no one consensus on the concentration of bleach that is best for topical therapy. Recommendations vary. Bleach baths used for the treatment of MRSA in human atopic dermatitis vary from 0.005% (1000 fold dilution of 5% bleach, or 1/2 cup per 40 gallons of water, or 3 cc per gallon) to 0.05% (30 cc per gallon). Full strength Dakin’s solution is 1:10 dilution or 0.5% which is used for environmental cleanup. Some isolates of MRSA have been shown to be resistant to the lower concentrations so it may be preferable to use a higher concentration. We have no studies to show which concentration is most effective for S. pseudintermedius. A new shampoo containing sodium hypochlorite as the active ingredient is showing promise in the treatment of MRSP in dogs. Baths should be given at least 3X weekly and results may be better if the shampoo is used more frequently particularly if shampooing is used without systemic antibiotics.
Daily bathing is difficult for many clients, particularly if they own large dogs. If they can commit to bathing 2-3 times a week, we may be able to use sprays and lotions in between to augment antimicrobial activity. These could include commercial products such as Vetericyn VF (which we recommend using 2-3 times a day), chlorhexidine sprays (e.g., Tris Chlor 4 spray, DOUXO chlorhexidine/PS spray), or the use of dilute bleach in a spray bottle. My experience, in my part of the country, suggests that the more often we can apply our topical biocides, the more rapidly the dogs will get better.

Other useful products include mousses (DOUXO chlorhexidine with climbazole and PS, Sogeval) and residual lotions containing chlorhexidine (ResiChlor, ResiKetochlor, Virbac). Nisin wipes (Wipe Out dairy wipes) have been used by many dermatologists to help treat MRS. Nisin, made by the bacterium Lactococcus lactis, is one of a group of compounds called lantibiotic peptides which inhibit bacterial cell wall synthesis by binding to lipid components. This peptide is used as a food preservative and in the prevention of mastitis in cattle. These compounds, and their synthetic derivatives, are under active investigation for use against a number of resistant infections in humans.

An area of great interest in veterinary dermatology is the role of the skin barrier. It is clear that atopic dogs have defects in the skin barrier, characterized by decreases in ceramide levels, and that the application of topical lipids can restore the levels of lipid in the stratum corneum. There are 3 topical lipids available to us for use in dogs. Allerderm Spot-on (Virbac) contains ceramide and fatty acids, DOUXO Spot-on and related shampoos, sprays, mousses, and gels (Sogeval) contain phytosphingosine, and Dermoscent Spot-on (LDCA) contains a mix of essential herbal oils. We have little hard evidence on efficacy of these products, but there is one paper to support the use of each of these products in atopic dermatitis. I have used the ceramide topical product in dogs with recurrent pyoderma, and I believe I see a reduced recurrence rate.

In conclusion, we can say that topical therapy is a critical part of skin care for dogs. There are some thoughts to ponder. Should we take a break from systemic antibiotics and reduce selection pressure on the bacteria? Would the use of cefovecin with its novel pharmacokinetics help prevent the development of MRS? Certainly addressing the underlying cause of pyoderma in dogs is critical. Last, frequent bathing is not only NOT damaging to the skin and coat (when using our newer products) but highly beneficial.

**Useful References**


B. TOPICAL LIPID THERAPY

Topical therapy is enjoying a much-needed renaissance in veterinary dermatology, and it is about time! We have gotten out of the habit of using topical therapy in dogs and cats in the last decade, yet it remains a very helpful treatment modality, particularly in this day of resistant bacterial infections. One of the newer approaches is the application of lipids directly to the skin, to facilitate repair of the skin as well as improve coat and skin quality. We lack hard evidence of efficacy at this time, but anecdotal experience suggests that these products can be quite helpful, although we are still learning how to use them.

The driving force for the use of topical lipids is based on the observations that human patients with atopic dermatitis have skin barrier defects. While the defects are quite complicated and consist of alterations in both structural proteins and lipids, decreased levels of ceramide have been observed and treatment with topical ceramide has been quite effective. Topically applied lipids are believed to help the skin repair itself.

There are two major hypotheses for atopic dermatitis. The traditional “inside-out” view, as proposed by allergists/immunologists, is that all of the abnormalities seen with atopic dermatitis could be attributed to the immunological abnormalities associated with the atopic state. Traditionally, these abnormalities have been reflected by increased allergen-specific IgE, but involve many other dysregulated immune responses. By contrast, dermatologists have proposed that the barrier defects observed in human atopic patients play an active role in the disease, and are not simply the result of an abnormal immune response, the “outside-in” hypothesis. Clearly both are involved, but the lipid defects seen in atopics provide a novel approach to treatment. In fact, ceramide applied topically to pediatric patients was equally effective after 28 days of application when compared to topical fluticasone.(1)

Recent publications suggest that the ceramide composition of the stratum corneum in dogs is quite similar to that in humans.(2-4) Moreover, the application of the prototype for Allerderm Spot-on (Virbac, containing ceramide and fatty acids) was shown to restore the level of lipids in the stratum corneum of atopic dogs to that of normal dogs.(5) This product was introduced recently into the United States. But prior to the use of topical ceramide, many veterinary dermatologists were using the lipid phytosphingosine, a ceramide precursor. Phytosphingosine is the key ingredient in the DOUXO line of products by Sogeval. Phytosphingosine, in addition to having antimicrobial and anti-inflammatory effects, has recently been shown to reduce histamine-dinced scratching in mice and also inhibited the allergic cytokines that follow histamine release.(6)

Currently there are four product lines containing topical lipids: Allerderm Spot-on (Virbac) containing ceramide and fatty acids, Dechra’s shampoos many of which contain ceramides, the DOUXO line (Sogeval) of shampoos, sprays, gels, ear washes, and spot-on, containing phytosphingosine, as well as other ingredients, and the Dermoscent line of spot-on, emollient balm, mousse, and sprays. This last is made from a mix of essential oils derived from hemp, neem, rosemary, lavender, and other plants.
**ALLERDERM SPOT-ON**

We have had the chance to use this topical product in over 60 dogs with atopic dermatitis, including those with recurrent pyoderma. We expected to see improved coat quality and skin quality, as many atopic dogs have noticeably dry skin. What we also observed, however, was a reduction in the rate of recurrent pyodermas for these dogs and in mild atopic dogs, even reduction of itch. It is likely that any dog with dry and scaly skin would benefit from this type of treatment. The product comes in 2 sizes, 2 mls for dogs less than 10 kg and 4 mls for dogs over 10 kg. It is a milky nongreasy odor free liquid that is applied to multiple spots on the body and it can be touched safely by the owner. Initially I have used this product twice weekly for 3 weeks, then weekly for 3 weeks, then every 2-3 weeks. Some of our clients have found that the direct application to early “hot spots” and foci of pyoderma will rapidly resolve the condition. I have found that this topical medication, when combined with Staphage Lysate, will help prevent recurrence of pyoderma in non-atopic dogs as well. A recent publication provides preliminary evidence for efficacy in atopic dermatitis (8), but more work needs to be done. Two excellent webinars are available online for further information (http://www.virbacvet.com/virbac_dermatology/product/allerderm_spot_on/).

**DOUXO**

The Douxo line of shampoos, sprays, ear washes, gels, and spot-on are used enthusiastically by many veterinary dermatologists for a variety of skin diseases. These products are extremely elegant and easy to use. Sogeval has provided guidelines for use which in general promote the idea that twice weekly bathing initially is helpful, followed by the use of the sprays as replacement for the baths. The Seborrhea shampoo is truly remarkable for its ability to treat both dry and oily forms of seborrhea. Many seborrheic dogs which usually need baths 2-3 X per week with traditional antiseborrheic shampoos can be reduced to once every week or two. This shampoo and spray have been very useful in the management of sebaceous adenitis, reducing the labor associated with the topical therapy used for this disease. We have found great use for the DOUXO chlorhexidine shampoo and spray in the management of methicillin resistant staphylococcal infections. We have recommended bathing 2-3X per week, with daily applications of the spray in between baths. I can find only one paper about the use of this shampoo, however (9). The DOUXO Micellar ear cleaner is excellent, and really does a good job of emulsifying waxy exudates. This product is often tolerated by dogs that cannot tolerate other ear cleaners. The DOUXO chlorhexidine PS pads (which also contain a great antiyeast medication called climbazole) have been a welcome product for the cleaning of skin folds and the local treatment of yeast dermatitis in the feet. We have found the DOUXO Calm Gel to be particularly good at arresting the development of hot spots, giving the client an option at home before the lesions become very inflammatory. The Spot-on has many uses as well. It can be spotted onto multiple places on the body for atopic dogs, but it is very helpful in the management of scaly cats, as a local treatment for chin acne in both dogs and cats, and as a treatment for hyperkeratotic noses and calluses. In addition, it has been used in ears twice weekly to help reduce cerumen buildup in ceruminous otitis externa. It is also helpful as a topical therapy for the hyperkeratotic feet seen in older Amazon parrots. This spot-on is also non-greasy and odorless, and safe for owners to touch. More information can be obtained from the Sogeval website, which is currently being enhanced. (http://www.sogevalus.com/derm_phyto.html)
DERMOSCENT

This product line has been used in Europe for the last few years and has recently been introduced into the US. One publication to date has demonstrated some efficacy in the treatment of atopic dogs (7); however, there are a number of case reports and poster presentations made at several meetings. We have our most experience with the Essential 6 topical lipid spot-on and the Bio-Balm emollient. We have also used the Mousse to less extent. These products have a slightly oily feel and a pleasant herbal odor. They are very popular with our client who like “natural” products. They are recommended to be applied once weekly for 2 months then every 2-4 weeks or as needed. We have observed great improvement in coat quality and skin quality in some dogs with scaling disorders. In particular, many of my colleagues enjoy using this product in the treatment of sebaceous adenitis. I have recently started using it as well, and these patients look much less scaly and crusted, with reduced frequency of bathing. There is a topical spot-on product made for horses as well; there are anecdotal reports that it has been useful in the treatment of horses with Culicoides hypersensitivity. We are using the BioBalm for hyperkeratotic noses and calluses, and as treatment for rough dry patches of skin found on other parts of the body. The mousse seems particularly well suited to cats; we have also used it as a gentle cleaning and moisturizing agent for dogs with pemphigus foliaceus. It is the best deodorizer we know following expression of anal sacs! Further information about these products can be found on the Dermoscent website. These products are readily available to the client online, so stocking them in the clinic may not be required. (http://www.dermoscent.com/?lpg=EN)

CERAMIDE Complex is now added to many of the Dechra lines of shampoos as well. This complex contains ceramides 1, 3, and 6, along with cholesterol and fatty acids. We believe that using these types of shampoos over time will help restore the skin barrier.

SUMMARY:

We are still in the early days of discovering how best to use these products. Our sense is that there may be some differences among the three types of products with regard to specific applications and specific diseases. We anxiously await further studies and clinical trials.

REFERENCES


