CHAPTER | 1

Differential Diagnoses

Almost all dermatology patients have a primary or underlying disease that causes secondary infections. These infections must be eliminated and prevented but will recur rapidly unless the primary disease is identified and controlled.

Most skin cases seen in a veterinary practice can be successfully managed if two essential questions can be answered: (1) What are the secondary infections? and (2) Why are these secondary infections there?

Essential Questions

1. What are the infections?
   - Folliculitis
     - Pyoderma
     - *Demodex*
     - Dermatophyte
   - Pododermatitis
     - Bacterial
     - Yeast
   - Otitis
     - Bacterial
     - Yeast
   - *Malassezia* yeast dermatitis
2. Why are they there?
   - Allergies
     - Atopy
     - Food allergy
     - Scabies
   - Endocrinopathy
     - Hypothyroidism
     - Cushing's

After the origin of a patient's dermatosis is known, it is a simple matter of therapeutic follow-through to resolve the problem.

Recognition of basic patterns allows a practical approach to most of the common skin diseases.

Ten Clinical Patterns

What are the secondary infections? (always secondary)

1. **Folliculitis:** Folliculitis is the most common "pattern" of disease mimicking other patterns. However, it is common for it to be concurrent with other disease patterns (e.g., yeast dermatitis). The *major* differentials to consider for folliculitis are superficial staphylococcal pyoderma or bacterial folliculitis, demodicosis, and dermatophytosis. Pyoderma is the mostly likely cause in the dog, with demodicosis a close second if not a concurrent factor. Juvenile-onset demodicosis may affect the patient in a symmetric fashion. A good rule of thumb is to consider all dermatologic patients to have folliculitis until proven otherwise and then search for predisposing underlying diseases (e.g., allergy, endocrinopathy, cornification disorder or defect).
2. **Pododermatitis:** Always scrape the dorsal pedal surface when it is alopecic because both demodicosis and allergic skin disease may cause pododermatitis; steroids are not appropriate for the former. Hemorrhagic bullae are manifestations of deep pyoderma; therefore, they should be cultured. A lesion on the paw pads is usually an indication to biopsy. P3 digit amputation is rarely needed to make a diagnosis of symmetric lupoid onychodystrophy because the history with typical clinical findings is sufficient for a firm tentative diagnosis.

- *Single paw*: trauma, foreign body, infection (e.g., bacteria, yeast), localized demodicosis, cutaneous horn, neoplasia, arteriovenous pedal fistula
- *Multiple paws*: infection (e.g., bacteria, yeast, hookworms, distemper, leishmaniasis), generalized demodicosis, allergic skin disease, split paw pad disease, palmar or plantar interdigital comedones and follicular cysts, autoimmune- or immune-mediated dermatosis (e.g., pemphigus foliaceus, vasculitis, symmetric lupoid onychodystrophy or onychomadesis), dermatomyositis, metabolic dermatosis (e.g., hepatocutaneous syndrome, zinc-responsive dermatosis, nasodigital hyperkeratosis), and sometimes neoplasia (e.g., cutaneous lymphoma, subungual small cell carcinoma or melanoma in heavily pigmented dogs)

3. **Otitis:** Because the ear is just an extension of the skin, a good dermatologic examination of the skin may provide clues (other "patterns") about potential causes of ear disease. Resolution of otitis externa is achievable if primary causes are identified and managed. Similarly, otic cytology should be used on every case to initially determine the infection(s) present, as well as monitor response to therapy during reexaminations. By and large, correctly administered topical antimicrobial treatments (volume and duration) are more effective for infected canals than systemic therapy. Rigid palpable canals (ossified) are usually beyond medical resolution and would be better removed (total ear canal ablation and bulla osteotomy).

   Is the pinna or canal affected?
   - *Pinnae*: trauma, aural hematoma, sarcoptic mange, fly bite or strike hypersensitivity, allergic skin or ear disease, ear margin seborrhea or dermatosis, vasculitis or other autoimmune dermatoses, neoplasia
   - *Otitis externa*: facets and differentials (chart below)

4. ***Malassezia* yeast dermatitis:** The pattern is characteristic of *Malassezia* yeast, but any chronic pruritic skin disorder may resemble it, including folliculitis (superficial pyoderma, demodicosis, dermatophytosis), ectoparasitism, and allergic skin disease. Yeast dermatitis is often overlooked as a cause of pruritic skin disease. The author's favorite way to find yeast is with the use of acetate tape cytology. Just the finding of a single yeast from representative lesions is significant (yeast hypersensitivity?) and warrants topical or systemic (or both) treatment based on the severity of pruritus. However, if cytology is "negative" for yeast when confronted with this pattern, assume they are there, treat accordingly, and search for predisposing underlying diseases (e.g., allergy, endocrinopathy, cornification defect).

   Why are they there? (the key to preventing relapse of infections)

5. **Pruritus (allergies, mites, fleas):** When confronted with pruritus, *always* exclude infection and parasites first! Many times pruritus is reassessed after controlling for microorganisms before determining the "next step." Atopic dermatitis (AD) is a clinical diagnosis based on the exclusion of other causes of pruritus; "allergy tests" *do not* diagnosis it. If you see pruritic erythroderma, exfoliative dermatitis, plaques, nodules, depigmentation, +/- lesions affecting nonhaired skin, consider cutaneous T-cell lymphoma (CTCL) and biopsy.

   Distribution patterns and differential diagnoses for pruritus:
   - *Dorsum*: pediculosis, cheyletiellosis, flea allergy dermatitis (FAD), +/- AD in terriers
   - *Face, ears, paws, axillae, inguinum, and perineum*: cutaneous adverse food reaction (CAFR), AD
   - *Pinnal margins, elbows, hocks, and ventral trunk*: sarcoptic mange
   - *Rear or perineum*: anal sacculitis, trichuriasis, FAD, CAFR, AD, psychocutaneous disorder
   - *Sparsely haired body regions*: allergic contact dermatitis (rare)

6. **Nonpruritic alopecia (endocrine):** *Always* exclude folliculitis when confronted with alopecia (especially when other typical lesions are present) because it is the most common reason for it and often a resultant feature of other diseases within the pattern of "nonpruritic symmetrical alopecia." Consider an endocrinopathy as a cause of recurring infection when pruritus resolves with infection control. Exclude castration- or neuter-responsive dermatosis, hypothyroidism, and hyperadrenocorticism before considering alopecia X. Many alopecic conditions have breed predilections, so consult a text for a listing of these associations.
   - *Endocrinopathy*: hypothyroidism, hyperadrenocorticism, sex hormone–related dermatoses
   - *Follicular dysplasias*: color dilution alopecia, black hair follicular alopecia, canine recurrent flank alopecia (CRFA), breed-related follicular alopecia
   - *Hair cycle arrest*: Alopecia X, CRFA, defluxions, canine pattern alopecia or baldness

7. **Autoimmune- or immune-mediated skin disease:** Hepatocutaneous syndrome, zinc-responsive dermatosis, dermatomyositis, eosinophilic dermatitis with edema (Well's syndrome), mucocutaneous pyoderma, and some forms of dermatophytosis may mimic this pattern of disease. Skin biopsy is useful to correctly diagnose the disease so a reasonable prognosis can be offered to the client and a treatment plan tailored to the patient can be developed (some autoimmune- or immune-mediated diseases do not require systemic glucocorticoids).

   Distribution patterns and differential diagnoses for autoimmune- or immune-mediated dermatoses:
   - *Face, pinnae, or nasal planum*: pemphigus foliaceus, pemphigus erythematosus, discoid lupus erythematosus, vasculitis, uveodermatologic syndrome, drug reaction, vitiligo
   - *Oral cavity +/- other body areas*: pemphigus vulgaris, subepidermal blistering dermatosis, systemic lupus erythematosus, vasculitis, erythema multiforme, drug reaction
   - *Pads and elsewhere on the body*: basically any of the aforementioned diseases

8. **Keratinization defects:** Exclude *secondary* reasons for a scaling disorder before considering *primary* ones. Some hereditary cornification defects are tardive, not being

recognized until the dog is 2 to 5 years old. Follicular casts are typical of a cornification defect.

- *Primary scaling disorders*: primary seborrhea (usually of spaniels and terriers), ichthyosis, Schnauzer comedo syndrome, ear margin seborrhea or dermatosis, nasal parakeratosis of Labrador retrievers, tail gland hyperplasia, nasodigital hyperkeratosis
- *Secondary scaling disorders*: environmental, nutritional, folliculitis, *Malassezia* dermatitis or otitis, ectoparasitism, leishmaniasis, allergic skin disease, endocrinopathy, follicular dysplasias, hair cycle arrest, sebaceous adenitis, autoimmune- or immune-mediated dermatoses, metabolic dermatoses (e.g., hepatocutaneous syndrome, zinc-responsive dermatosis, vitamin A–responsive dermatosis), neoplasia

9. **Lumps, bumps, and draining tracts:** Wear gloves when confronted with this pattern of disease because some infectious agents are transmissible to people. Infectious etiologies must be excluded when these lesions are present. Acral lick dermatitis (lick granuloma) is a form of deep pyoderma; tissue culture (deep dermis with epidermis removed) is helpful.
   - *Infectious inflammatory*: bacterial, atypical bacterial, mycobacterial, fungal, oomycete, parasite
   - *Noninfectious inflammatory*: cyst, xanthoma, hygroma, cutaneous histiocytosis, pyogranuloma or granuloma syndrome, sterile nodular panniculitis, perianal fistula
   - *Neoplasia*: benign, malignant
   - *Mineral deposition*: calcinosis circumscripta, calcinosis cutis
10. **Weirdopathies:** Commonly, this pattern is an unusual manifestation of an aforementioned "pattern" or is formed by several overlapping ones. After "folliculitis" has been excluded, skin biopsy (± culture) is usually warranted when confronted with an "oddopathy." Several skin biopsies of representative lesions will help better categorize the disease process—infectious, allergic, autoimmune- or immune-mediated, endocrine or follicular abnormality, cornification defect, congenital, or neoplasia—assuming the proper technique is used and the pathologist is provided a detailed history with clinical findings. Ideally, a dermatopathologist should be sought. Calcinosis cutis often appears as an oddopathy. A patient with an oddopathy might be best examined by a dermatologist.

So, What Is the Solution?

A vast majority of dogs with allergy or endocrine disease have or will have a secondary bacterial or yeast infection. Yeast dermatitis is the most commonly missed diagnosis in general practice dermatology. Bacterial pyoderma is often identified but is usually mistreated with too low doses of antibiotics administered for too short a time. Otitis is now recognized and treated better than it was in years past; however, treatment for otitis that is based on actual documented organism types and relative counts on follow-up evaluations is a rare occurrence.

What Are the Infections?

For *every* dermatitis case *every* time you evaluate the patient, ask yourself, "What are the infections?"

Unless you have microscopic vision, answering this question will require the use of cytology. Unfortunately, most general practices do not routinely perform skin and ear cytology for dermatitis; instead they rely on the doctor's best guess. Sometimes this can be successful (even a broken clock is correct twice a day); however, a more precise method is available. Use of diarrhea and the fecal examination as a comparison and as a model for improvement works well because both skin cytology and fecal examinations involve the use of a microscope, can easily identify the type of infection, and can be performed by trained technical staff.

- So why does your clinic perform fecal examinations?
- When is a fecal examination performed (before the doctor's examination or during)?
- Who performs the fecal examination?
- Does the clinic charge for the fecal examination?

The answers to these questions should be the same for skin cytology: The minimum dermatologic database (skin scrapings, impression smears, tape preps, and otic swabs).

The practical solution for determining the best method by which to answer the question, "What are the infections?" is to implement a minimum database infection screening procedure to be performed by the technician before the veterinarian examines the patient. Every dermatology patient should undergo otic cytology, skin cytology (an impression smear or a tape prep), and a skin scrape at every examination (initially and at every recheck visit). The **three-slide technique** (Figure 1-1) can be performed easily and interpreted by a technician before the doctor completes an evaluation, which is exactly how diarrhea and fecal examinations are handled in most clinics. Moving the cytologic evaluation to the beginning of the dermatology appointment and thereby empowering the technical staff to accomplish the evaluation optimizes the

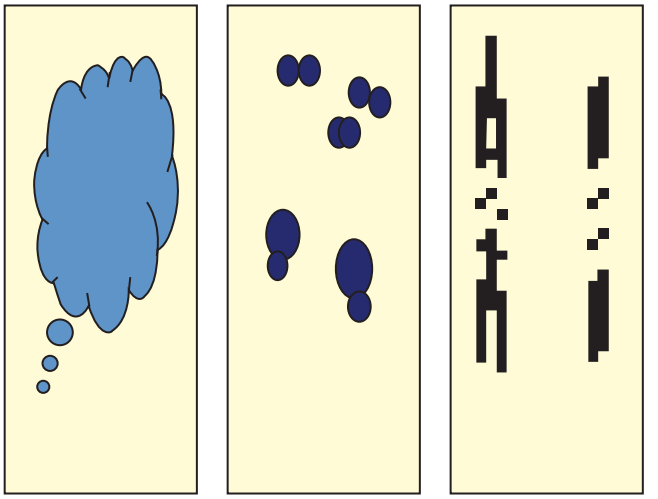

FIGURE 1-1 The Three-Slide Technique. Skin scrapes, cutaneous cytology, and otic swabs.

dermatology appointment and provides essential information in the most efficient manner.

When an owner brings a pet into the clinic for a small hairless spot, it would be appropriate to question the necessity for an otic cytology even when there is no sign of otitis and when the hairless spot is the problem. However, the three-slide technique is most helpful in these exact types of cases. If focal pruritus occurs in a dog and the patient has a secondary otitis (which the technician identified during the infection screen), the veterinarian should more aggressively discuss this and work up the patient for possible allergy. If the patient did not have otitis, the pruritus could be minimized in the hope that it was a short-term problem that is likely to self-resolve.

Similarly, there is no excuse for mistreating a patient who has demodicosis. Lesions caused by demodicosis can look identical to folliculitis lesions caused by bacterial pyoderma and dermatophytosis. Clinical appearance is not an acceptable criterion for ruling in or ruling out demodicosis. When the technician performs a skin scrape as part of the infection screen, demodicosis can be identified and treated easily and accurately.

Why Are They There?

Infections are always secondary to a primary disease; however, all too often, the patient is not evaluated or treated for the primary disease for three main reasons: (1) only the secondary infections are treated over and over again, (2) the nature of the allergy is confusing, and (3) cheap steroids that have delayed repercussions are accessible.

Why are the infections there? This question should be asked and answered for every dermatology patient if successful outcomes are to be achieved.

Most dermatology patients have allergy or endocrine disease. Through signalment, a good patient history, and recognition of unique patterns of lesions, a prioritized differential list can be formulated quickly.

By knowing the most unique and frequent symptoms associated with each allergic disease, an astute clinician can determine the most likely allergy with approximately 85% accuracy; this rate rivals many other diagnostic testing results for some of the most common assays.

For example, a dog that is foot licking is likely atopic. If the owner reports a seasonal pattern to the podopruritus, then you have a reasonably accurate diagnosis—EASY.

Atopy: foot licking; seasonal; when pruritus first started, typically between 1 and 3 years of age

Food allergy: perianal dermatitis (erythema, alopecia, lichenification); gastrointestinal disease; younger than 1 year old or older than 5 years of age when started; German breeds

Flea allergy: dermatitis predominantly affecting the lumbar region (caudal to the last rib)

Scabies: positive pinnal-pedal reflex (ear scratch test)

Hypothyroidism: large-breed dog that is disproportionately obese for food intake and has a poor hair coat with areas of alopecia over areas of friction

Cushing's disease: patient with a long history of steroid abuse, or small-breed dog with polyphagia, polyuria (PU), and polydipsia (PD), and symmetrical alopecia

AUTHOR'S NOTE

Could clinical dermatology really be this easy?
Yes. Unfortunately, most of us were taught dermatology from the perspective of a NASA engineer who is determined to address and eliminate every possible scenario regardless of how rare its occurrence. Based on any standard of logic, statistics, or common sense, the most likely disease should be addressed first. It is illogical to perform diagnostic tests or therapeutic trials for rare or unlikely diseases as part of the initial dermatologic workup, yet this is exactly how most veterinarians are taught to diagnose atopy: "a diagnosis of exclusion." If a patient is seasonally foot licking, the most likely diagnosis is atopy.

Optimizing owner understanding and compliance: Much of the problem that veterinarians face when treating an allergic patient is the pet owner's lack of understanding and ability to adhere to long-term prevention and treatment protocols. There is great information available regarding cognitive psychology that can optimize the human factors that limit successful outcomes. Here are some suggestions:

1. Have the pet owner complete a patient history form. This allows the client to focus on the details of the skin disease and symptoms and primes the client to listen better and accept the diagnosis and information that will be provided by the veterinarian.
2. Try to avoid a rambling, stream-of-consciousness approach to the discussion of allergy. Many of us have an "automatic" allergy spiel that only confuses the client and dose not focus on the specific problems of the individual patient.
3. Use simplified charts and handouts to organize the diagnosis and treatment phases of the allergy education discussion. These focus the educational message and improve the understanding of the client. Additionally, draw and write on these handouts and give them to the client to review later. This increases acceptance of the message and improves compliance with therapy.
4. Organize the diagnostic testing and treatment options into groups based on the severity of the patient and response to previous treatments (mild patients need a, b, c; moderately severe patients need d, e, f; and severe patients need g, h, i).
5. Assess the risk to the patient and family members for methicillin-resistant *Staphylococcus aureus* (MRS) infections. Families at risk for MRS contagion and zoonosis must be willing to accept aggressive medical management to reduce the risk. All three species of MRS can be transmitted from dogs to people and from people to dogs. If family members have a history of MRS, consider aggressively monitoring the patient with

cultures because dogs can acquire MRS from humans. If family members are immunosuppressed, monitor the patient for MRS *pseudintermedius* and MRS *schleiferi*, which can be a source of contagious infection to at-risk, immunosuppressed people. These patients need the most aggressive diagnostic workup and treatments achievable to protect the entire family from contagion and zoonosis. In these families, avoid the use of steroids or fluoroquinolone antibiotics, which can increase the risk of MRS.

Text continued on p. 12