PERSPECTIVES IN VETERINARY MEDICINE

The Pattern Approach to Dermatologic Diagnosis

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Clinicians are sometimes surprised when they refer an animal with a dermatologic problem to a specialist who rapidly compiles a list of differential diagnoses and pinpoints specific tests to be performed. There is nothing magical about the dermatologist's action! Although dermatologists routinely see various cutaneous lesions, it is their ability to properly identify these lesions that provides the critical information necessary to compile a list of diagnostic differentials and select appropriate testing.

Key to making a diagnosis and treating a previously unseen dermatologic problem is keeping an open mind to the possibility of a novel diagnosis and starting with the usual history taking. After a very thorough history, the basic morphology of cutaneous lesions must be reviewed. Then, the predominant pattern of lesions should be determined and the same algorithmic approach used for any other problem followed.

To make a correct dermatologic diagnosis, clinicians must first be able to recognize primary and secondary lesions and be able to associate them with a predominant morphologic pattern. This column focuses on the evidence that clinicians can *see* during a clinical examination; this evidence is coupled with the patient history to narrow the diagnostic possibilities.

Although seemingly easy, correctly describing a skin condition can be quite difficult. To do pattern diagnosis effectively, descriptions must be precise and accurate. Differentiating a scale from crust or a papule from a plaque, for example, is critical. Without a correct description of the morphologic pattern, accurate diagnosis is usually impossible. Table One provides an easy-to-use list of lesions, their descriptions, and the morphologic pattern associated with each. In summary, approaching each case in three distinct steps will allow the clinician to make a correct diagnosis in most cases (see the box).

How To Make a Correct Dermatologic Diagnosis

Step 1 Determine pattern.
Step 2 Formulate differential diagnostic list.
Step 3 Perform diagnostic testing.

Determine Pattern

Using your knowledge of primary and secondary lesions, carefully evaluate the animal to determine the predominant pattern. This is done by asking a series of questions in a specific order (see the algorithm). Always select the predominant pattern. A dog with profound scaling and three pustules does not have a vesiculopustular disorder; it has an exfoliative dermatosis. A cat with a large, hairless mass on its back has a papulonodular dermatosis, not alopecia. There are eight major categories of predominant patterns.

KEY POINTS

- Most dermatologic problems have a characteristic clinical presentation.
- A differential diagnostic list can often be made by assigning clinical cases into one of eight major categories of predominant lesion patterns.
- Deciding which diagnostic tests to perform becomes more routine if the lesions have been grouped into one of the eight major categories.

Formulate Differential Diagnostic List

Once you have determined the fit between your case and one of the eight major categories, you can create a comprehensive differential diagnostic list from the tables provided here (Tables Two through Nine). Making such a list not only increases your awareness of possible dermatologic conditions but provides an extremely helpful reference that can accompany samples submitted for diagnostic testing (especially biopsies for histopathologic assessment).

Perform Diagnostic Testing

With a pattern diagnosis and differential diagnostic list, the possible diagnoses can be narrowed. With experience, it is possible to prioritize the most likely diagnoses and perform tests accordingly. At first, however, information in Table Ten can be used to create a minimum data base, which will reveal the most common condition associated with a particular presentation. If the minimum data base does not suggest a diagnosis, proceed to the "next step" column in Table Ten. By following this approach, a diagnosis can be made in most cases.

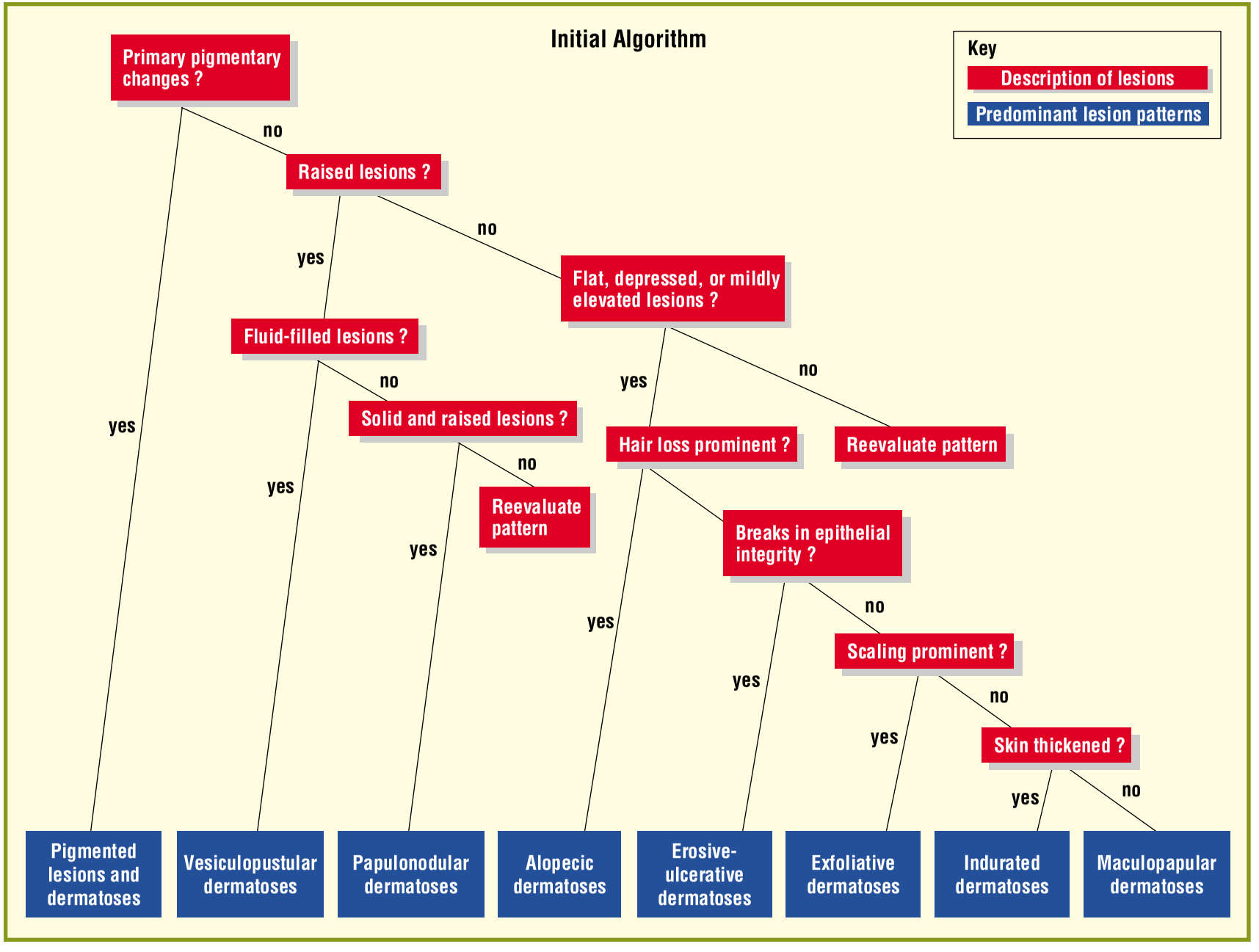
Initial Algorithm
Key
Description of lesions
Predominant lesion patterns
Primary pigmentary changes ?
no
Raised lesions ?
yes
no
Flat, depressed, or mildly elevated lesions ?
Fluid-filled lesions ?
no
yes
no
Solid and raised lesions ?
Hair loss prominent ?
Reevaluate pattern
yes
yes
no
yes
Reevaluate pattern
Breaks in epithelial integrity ?
yes
yes
no
Scaling prominent ?
yes
no
Skin thickened ?
yes
no
Pigmented lesions and dermatoses
Vesiculopustular dermatoses
Papulonodular dermatoses
Alopecic dermatoses
Erosive-ulcerative dermatoses
Exfoliative dermatoses
Indurated dermatoses
Maculopapular dermatoses

TABLE ONE

Pattern Diagnosis

Lesion	*Description*	*Pattern Association*
Macule	A circumscribed, flat discoloration of the skin up to 1 cm in diameter	Maculopapular Pigmented
Patch	Macules >1 cm	Maculopapular Pigmented
Papule	A circumscribed, elevated, superficial, solid lesion up to 1 cm in diameter	Maculopapular
Plaque	A circumscribed, elevated, superficial, solid lesion >1 cm; a papule that has enlarged in two dimensions	Papulonodular (plaque)
Wheal	An edematous, transitory papule or plaque	Papulonodular (plaque) Indurated (turgid)
Nodule	A solid lesion with depth; a papule that has enlarged in three dimensions	Papulonodular (nodule)
Vesicle	A circumscribed elevation of the skin up to 1 cm in diameter and containing serous fluid	Vesiculopustular
Bulla	A vesicle >1 cm in diameter	Vesiculopustular
Pustule	A circumscribed elevation of the skin containing purulent fluid	Vesiculopustular
Epidermal collarette	A circular peeling rim of scale	Vesiculopustular
Petechia	A circumscribed deposit of blood or blood pigment up to 1 cm in diameter	Pigmented (red)
Purpura	A circumscribed deposit of blood or blood pigment >1 cm in diameter	Pigmented (red)
Scale	Shedding dead epidermal cells that may be dry or greasy	Exfoliative Maculopapular
Crust	Variously colored collections of skin exudates	Erosive-ulcerative
Excoriation	Abrasion of the skin, usually superficial and traumatic in origin	Maculopapular
Fissure	A linear break in the skin that is sharply defined with abrupt walls	Maculopapular Papulonodular Exfoliative
Erosion	An excavation in the skin limited to the epidermis and not breaking the integrity of the dermoepidermal junction	Erosive-ulcerative
Ulcer	An irregularly sized and shaped cavitation in the skin extending into the dermis	Erosive-ulcerative
Scar	A formation of connective tissue replacing tissue lost through injury or disease	Indurated
Lichenification	A diffuse area of thickening and scaling, with resultant increase in the skin lines and markings	Maculopapular Indurated Exfoliative
Induration	Palpable thickening of the skin	Indurated
Sclerosis	Hardening of the skin	Indurated
Hyperpigmentation	Darkening of the skin	Pigmented (dark) Maculopapular

TABLE TWO

Differential Diagnosis for Pigmented Lesions

Category	*Canine*	*Feline*
Red	Drug eruption Petechiae Purpura Vasculitis Contact dermatoses Lupus erythematosus Photodermatitis Erythema multiforme Skin-fold pyoderma Pyotraumatic dermatitis Histiocytoma Demodicosis Flushing syndrome Lyme borreliosis Hookworm dermatitis	Drug eruption Petechiae Purpura Vasculitis Contact dermatoses Lupus erythematosus Photodermatitis Erythema multiforme Eosinophilic plaque Linear granuloma
White (depigmented)	Lupus erythematosus Albinism Uveodermatologic syndrome Morphea Vitiligo Tyrosinase deficiency	Lupus erythematosus Albinism Waardenburg-Klein syndrome Chédiak-Higashi syndrome Periocular leukotrichia
Dark	Basal-cell tumor Melanoma Postinflammatory change Hypothyroidism Hyperadrenocorticism Growth hormone–responsive dermatosis Acanthosis nigricans Adrenal sex-hormone dermatosis Lentigines Vascular nevi Hemangioma Hemangiosarcoma Organoid nevus Melanocytic nevus Melanoderma and alopecia	Basal-cell tumor Melanoma Postinflammatory change
Skin-colored	Epidermal nevus Scar Papilloma Morphea Sebaceous-gland hyperplasia Callus Sebaceous nevus	Epidermal nevus Scar
Other	Dalmatian bronzing syndrome Acquired aurotrichia Tyrosinase deficiency Waardenburg-Klein syndrome	Xanthomatosis Waardenburg-Klein syndrome Chédiak-Higashi syndrome

TABLE THREE
Differential Diagnosis for Vesiculopustular Lesions

Category	*Canine*	*Feline*
Vesicular	Pemphigus	Pemphigus
	Pemphigoid	Pemphigoid
	Erythema multiforme	Lupus erythematosus
	Dermatomyositis	Epidermolysis bullosa
	Epidermolysis bullosa	Cat pox infection
	Dermatitis herpetiformis	
	Mucinosis	
	Idiopathic ulcerative dermatosis	
Pustular	Demodicosis	Demodicosis
	Bacterial pyoderma	Bacterial pyoderma
	Dermatophytosis	Dermatophytosis
	Subcorneal pustular dermatosis	Abscess
	Sterile eosinophilic pustulosis	Acne
	Lupus erythematosus	Lupus erythematosus
	Acne	FIV infection
	Linear IgA dermatosis	Adverse food reactions
	Adverse food reactions	
	Pemphigus	

TABLE FOUR
Differential Diagnosis for Papulonodular Lesions

Category	*Canine*	*Feline*
Nodular	Parasitoses	Abscess
	Deep pyoderma	Acne
	Atypical pyoderma	Atypical pyoderma
	Dermatophytosis	Dermatophytosis
	Intermediate mycoses	Intermediate mycoses
	Deep mycoses	Deep mycoses
	Lupus profundus	Parasitoses
	Neoplastic	Neoplastic
	Dermoid cyst	Dermoid cyst
	Nodular panniculitis	Nodular panniculitis
	Juvenile cellulitis	Lupus profundus
	Mucinosis	Xanthoma
	Eosinophilic granuloma	Eosinophilic granuloma
	Sebaceous adenitis	Leprosy
	Sterile pyogranuloma	Opportunistic mycobacteria
	Opportunistic mycobacteria	
	Acral pruritic nodule	
	Calcinosis circumscripta	
	Nodular fasciitis	
	Protothecosis	
	Dracunculiasis	
Plaques	Dermatophytosis	Dermatophytosis
	Urticaria	Urticaria
	Lymphoma	Lymphoma
	Bacterial hypersensitivity	Sporotrichosis

TABLE FOUR *(continued)*

Category	*Canine*	*Feline*
Plaques *(continued)*	Lupus profundus	Eosinophilic plaque
	Viral papillomatosis	Mast-cell tumor
	Calcinosis cutis	Linear granuloma
	Calcinosis circumscripta	Vitamin E deficiency
	Histiocytoma	Mucopolysaccharidosis
	Histiocytosis	Xanthomatosis
	Keratoses	Tumoral calcinosis
	Nevi	Nevi
	Lichenoid dermatoses	Lichenoid dermatoses
	Mucinosis	Erythema multiforme
	Erythema multiforme	Papillomavirus infection
	Acanthosis nigricans	Perforating dermatitis
	Dermatitis herpetiformis	
	Urticaria pigmentosa	
	Acral lick dermatitis	
	Malassezia dermatitis	
Vegetative	Mast-cell tumor	Mast-cell tumor
	Cutaneous papilloma	Squamous-cell carcinoma
	Fibroma	Fibroma
	Nevi	Nevi
	Sebaceous gland hyperplasia	
	Transmissible venereal tumor	
	Pemphigus vegetans	

TABLE FIVE

Differential Diagnosis for Alopecia

Category	*Canine*	*Feline*
Focal/multifocal	Demodicosis	Demodicosis
	Bacterial pyoderma	Bacterial pyoderma
	Dermatophytosis	Dermatophytosis
	Alopecia areata	Alopecia areata
	Cutaneous asthenia	Cutaneous asthenia
	Traction alopecia	Traction alopecia
	Morphea	Injection site reaction
	Injection site reaction	Cicatricial alopecia
	Cicatricial alopecia	
Patchy	Demodicosis	Demodicosis
	Cheyletiellosis	Cheyletiellosis
	Lice infestation	Lice infestation
	Dermatophytosis	Dermatophytosis
	Bacterial pyoderma	Drug eruption
	Lupus erythematosus	Lupus erythematosus
	Telogen defluxion	Telogen defluxion
	Protein deficiency	Hyperadrenocorticism
	Drug eruption	
	Sebaceous adenitis	
	Bronzing syndrome	
	Color-mutant alopecia	

TABLE FIVE *(continued)*

Category	*Canine*	*Feline*
Patchy *(continued)*	Spiculosis Leishmaniasis Familial benign pemphigus	
Regional	Discoid lupus erythematosus Hypothyroidism Hyperadrenocorticism Growth hormone–responsive dermatosis Adrenal sex-hormone dermatosis Seasonal flank alopecia Hyperestrogenism Hypoestrogenism Pattern baldness Testicular neoplasia Dermatomyositis Follicular dysplasia Toxicity (e.g., thallium) Postclipping alopecia Pinnal alopecia Benign familiar chronic pemphigus Melanoderma and alopecia Waterline disease	Discoid lupus erythematosus Endocrine alopecia Hyperadrenocorticism Psychogenic alopecia Postclipping alopecia Pinnal alopecia Preauricular alopecia Acquired symmetric alopecia Pancreatic paraneoplastic alopecia
Generalized	Dermatophytosis Lupus erythematosus Drug eruption Demodicosis Hypotrichosis Telogen defluxion Postclipping alopecia	Dermatophytosis Lupus erythematosus Drug eruption Alopecia universalis Hypotrichosis Telogen defluxion

TABLE SIX

Differential Diagnosis of Erosive-Ulcerative Lesions

Category	*Canine*	*Feline*
Parasitic	Fleas Demodicosis Sarcoptic mange Leishmaniasis	Fleas Demodicosis Notoedric mange
Microbial	Skin-fold pyoderma Pyotraumatic dermatitis Perianal fistulae Bacterial granuloma Mycetoma Opportunistic mycobacteriosis Septicemia/toxemia Dermatophilosis Candidiasis	Superficial pyoderma Systemic mycoses Cat pox infection Bacterial granuloma Mycetoma Opportunistic mycobacteriosis Septicemia/toxemia Dermatophilosis FIV infection Sporotrichosis

TABLE SIX *(continued)*

Category	*Canine*	*Feline*
Immune-mediated	Pemphigus Pemphigoid Cutaneous vasculitis Toxic epidermal necrolysis Drug eruption Lupus erythematosus Lupoid dermatosis Dermatomyositis Erythema multiforme major	Pemphigus Pemphigoid Cutaneous vasculitis Toxic epidermal necrolysis Drug eruption Lupus erythematosus Erythema multiforme major
Congenital-hereditary	Cutaneous asthenia Epitheliogenesis imperfecta Ectodermal defect Dermatomyositis Familial benign pemphigus Familial vasculopathy Epidermolysis bullosa Acrodermatitis	Epidermolysis bullosa Cutaneous asthenia Ectodermal defect
Miscellaneous	Vesiculopustular dermatoses Thallium toxicosis Burn Contact eruption Cutaneous T-cell lymphoma Metabolic dermatoses Idiopathic erosive dermatosis	Indolent ulcer Bowen's disease Squamous-cell carcinoma Hyperadrenocorticism Vesiculopustular dermatoses Burn Contact eruption Acquired skin fragility

TABLE SEVEN

Differential Diagnosis for Exfoliative Lesions

Category	*Canine*	*Feline*
Patchy	Ectoparasitism Dermatophytosis Drug eruption Pemphigus foliaceus Fatty acid deficiency T-cell lymphoma Pagetoid reticulosis Sjøgren's syndrome Hyperestrogenism Vitamin A–responsive dermatosis Sebaceous adenitis Generic dog food disease Subcorneal pustular dermatosis Chronic maculopapular dermatoses Parapsoriasis Adverse food reactions Hypothyroidism Lupoid dermatosis Leishmaniasis	Ectoparasitism Dermatophytosis Drug eruption Pemphigus foliaceus Fatty acid deficiency Protein deficiency Vitamin A deficiency Vitamin E deficiency Biotin deficiency Lynxacariasis Adverse food reactions Perforating dermatitis

TABLE SEVEN *(continued)*

Category	*Canine*	*Feline*
Regional	Pemphigus foliaceus Pemphigus erythematosus Discoid lupus erythematosus Hypothyroidism Zinc-responsive dermatosis Tyrosinemia Nasodigital hyperkeratosis Leishmaniasis *Malassezia* dermatitis	Pemphigus foliaceus Pemphigus erythematosus Discoid lupus erythematosus Cheyletiellosis
Generalized	Dermatophytosis Drug eruption Systemic lupus erythematosus Pemphigus foliaceus Keratinization disorders Demodicosis Hypothyroidism Vitamin E deficiency Ichthyosis T-cell lymphoma Metabolic disorders Leishmaniasis Graft-versus-host disease	Dermatophytosis Drug eruption Systemic lupus erythematosus Pemphigus foliaceus Keratinization disorders Cheyletiellosis Hypereosinophilic syndrome Lynxacariasis T-cell lymphoma Metabolic disorders

TABLE EIGHT

Differential Diagnosis of Indurated Lesions

Category	*Canine*	*Feline*
Turgid	Urticaria Angioedema Myxedema Juvenile cellulitis Mucinosis Nephrotic syndrome Urticaria pigmentosa Hookworm dermatitis	Urticaria Angioedema Growth hormone–secreting tumor Mucopolysaccharidosis Relapsing polychondritis Plasma cell pododermatitis
Solid	Cellulitis Bacterial granuloma Fungal granuloma Calcinosis cutis Tumoral calcinosis Scar Neoplasia Amyloidosis Scleroderma Chronic maculopapular dermatoses Sebaceous adenitis	Cellulitis Bacterial granuloma Fungal granuloma Calcinosis cutis Scar Neoplasia Amyloidosis Intermediate mycosis Chronic maculopapular dermatitis

TABLE NINE

Differential Diagnosis of Maculopapular Lesions

Category	*Canine*	*Feline*
Macular	Allergic inhalant dermatitis Food allergy Allergic contact dermatitis Irritant contact dermatitis Drug eruption Bacterial pyoderma Lupus erythematosus Erythema multiforme Alopecia areata Endoparasite infection Ectoparasite infestation Acanthosis nigricans	Allergic inhalant dermatitis Food allergy Allergic contact dermatitis Irritant contact dermatitis Drug eruption Erythema multiforme Endoparasite infection Ectoparasite infestation Lupus erythematosus Alopecia areata
Papular	Parasitic dermatoses Vitamin A–responsive dermatosis Bacterial folliculitis Drug eruption Food allergy Dermatophytosis Comedones/acne Erythema multiforme Hormonal hypersensitivity Dermatitis herpetiformis	Miliary dermatitis Parasitic dermatoses Bacterial folliculitis Drug eruption Food allergy Dermatophytosis Comedones/acne Erythema multiforme Hypereosinophilic syndrome

TABLE TEN

Step-by-Step Approach to Diagnosis

Classification	*Minimum Data Base*	*Next Step*
Pigmented	Histopathology	As per biopsies
Vesiculopustular	Skin scrapings Cytology (e.g., impression smear)	Histopathology Cultures
Papulonodular	Skin scrapings Cytology (e.g., fine-needle aspirate) Histopathology	As per results of minimum data base tests Culture tests
Alopecic		
Focal	Skin scrapings Culture for dermatophytes Trichogram	Histopathology
Widespread	Skin scrapings Culture for dermatophytes Trichogram Complete blood count Biochemistries Urinalysis	Endocrine profiles Histopathology
Erosive-ulcerative	Skin scrapings Cytology (e.g., impression smear)	Histopathology

TABLE TEN *(continued)*

Classification	*Minimum Data Base*	*Next Step*
Exfoliative	Skin scrapings Complete blood count Biochemistries Urinalysis Fungal culture	Histopathology Endocrine profile
Indurated		
Turgid	Complete blood count Biochemistries Urinalysis Fecal tests	Histopathology
Solid	Cytology (e.g., fine-needle aspirate) Histopathology	Complete blood count Biochemistries Cultures
Maculopapular	Skin scrapings Complete blood count Fecal tests	Dietary trial Allergy testing Cultures Histopathology

Figure 1—A dog with regional (nasal) alopecia and associated exfoliative dermatosis. The most likely clinical diagnoses were lupus erythematosus (systemic or discoid), pemphigus (foliaceus or erythematosus), dermatomyositis, zinc-responsive dermatosis, and follicular dysplasia. Minimum data base consisted of skin scrapings, culture for dermatophytes, complete blood count, routine biochemistry, and a trichogram. Only the trichogram showed abnormalities, with telogen hairs predominating. Biopsies were then taken and histopathologic analysis confirmed the diagnosis as dermatomyositis.

Figure 2—A cat with an erosive-ulcerative dermatosis. The most likely clinical diagnoses were hypersensitivity disorders, parasites, microbial infections, and immune-mediated dermatoses. Minimum data base consisted of skin scrapings and impression smears. The skin scrapings were negative, but cytologic preparations revealed a mixed inflammatory cell population of neutrophils, eosinophils, and histiocytes; few microbes were present. Hypersensitivity conditions were considered and a food trial confirmed a hypersensitivity to beef.

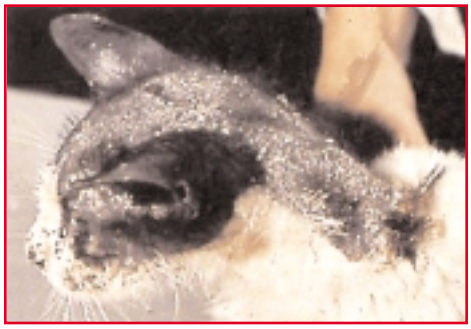

Figure 3—A cat with an exfoliative dermatosis that is most prominent over the top of the head. Minimum data base consisted of skin scrapings and cytologic preparations (impression smears and acetate-tape impressions). The skin scraping was positive for *Notoedres cati.*

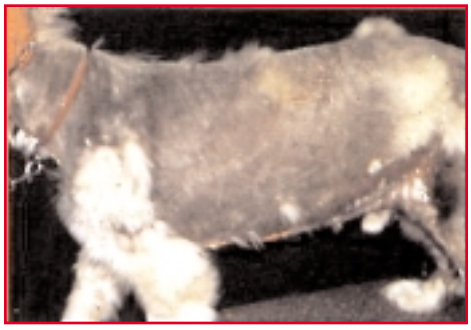

Figure 4—A dog with regional alopecia and associated hyperpigmentation. Minimum data base included skin scrapings, culture for dermatophytes, a trichogram, complete blood count, biochemistries, and urinalysis. The trichogram revealed that telogen hairs predominated. The only other abnormality was an increased serum alkaline phosphatase level. Endocrine profiles confirmed a diagnosis of pituitary-dependent hyperadrenocorticism.

Figure 5—A dog with dermal nodules and plaques (a papulonodular dermatosis). Minimum data base consisted of skin scrapings, cytologic preparations (fine-needle aspiration), and biopsies for histopathologic analysis. The cytologic preparations revealed a mononuclear population of cells, which were presumed to be small lymphocytes. The histopathologic assessment confirmed the diagnosis as cutaneous lymphoma.

Figure 6—A dog with axillary hyperpigmentation (a pigmented dermatosis). Minimum data base consisted of biopsies for histopathologic assessment. The diagnosis was acanthosis nigricans.

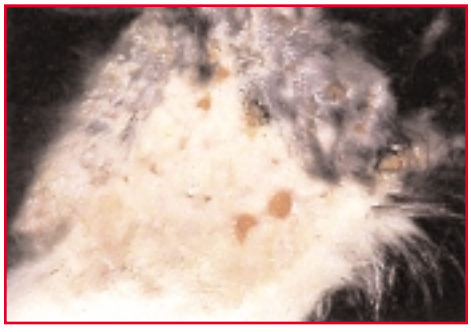

Figure 7—A cat with an indurated (solid) and erosive-ulcerative dermatosis. Minimum data base included cytologic preparations (fine-needle aspiration and impression smears) and biopsies for histopathologic analysis. The cytologic preparations revealed a pyogranulomatous infiltrate with histiocytes and giant cells. The histopathologic assessment confirmed the diagnosis as nocardiosis. The cat had concomitant FIV infection.

Acknowledgment

All photographs in this article are from Nesbitt GH, Ackerman LJ (eds): *Dermatology for the Small Animal Practitioner.* Trenton, NJ, Veterinary Learning Systems, 1991, Plates I, III, VI, VIII, IX, and X.