Skin disease is the underlying cause for a substantial proportion of patient visits in veterinary practice. In general practice, the most common skin diseases include pruritic, allergic, and parasitic skin diseases and nondescript inflammatory skin diseases that may or may not be infectious. Autoimmune, hormonal, and depositional skin diseases are less common.

When initial treatments fail in animals with skin disease, clinicians will frequently perform a skin biopsy, hoping to obtain a definitive diagnosis. However, only a minority of skin biopsy specimens provide a definitive diagnosis on the basis of histologic appearance alone. This reality of less specific diagnoses for skin biopsies can be frustrating for both clinicians and pathologists. For clinicians, they often do not receive the information needed for effective management of the disease. For pathologists, they often do not receive the contextual information needed to interpret their histologic findings well. Not surprisingly, the same frustrations arise in human medicine.1 An understanding of the diagnostic process for skin disease and what dermatopathology can and cannot do will alleviate some of the frustration and difficulties surrounding submission of skin biopsy specimens. Clinicians should have a clear understanding of the information required for biopsy interpretation and reasonable expectations for the outcome of this diagnostic test.

Diagnosing Skin Disease

The diagnosis of skin disease is a multifaceted exercise that involves history, physical examination, and appropriate laboratory testing. All three components are of equal importance. For skin disease, relevant aspects of the history include complete signalment; initial complaint; age of onset, duration, and seasonality of clinical signs; absence or presence and intensity of pruritus; diet; home environment; travel history; drug history and current drug status; and response to attempted treatments. The physical examination should include an accurate assessment of the type and distribution of primary skin lesions and any associated systemic abnormalities. It is important to identify and distinguish macules, papules, nodules, scale, crust, pustules, and other primary skin lesions.

Appropriate laboratory testing is the third leg of the diagnostic triad. Although histologic examination of appropriate biopsy specimens can play an important role in my experience and that of others, only about 20% of skin biopsy specimens yield a syndrome-specific diagnosis on the basis of histologic examination alone without additional context. Clinicopathologic testing, bacterial and fungal culture, and examination of skin scrapings also have an important role in ruling differential diagnoses in and out.

Dermatopathology in Veterinary Medicine

The American College of Veterinary Pathologists does not offer subspecialty board certification in dermatopathology. Thus, in contrast to human medicine, there are no board-certified veterinary dermatopathologists. There are selected veterinary pathologists who have demonstrated expertise in dermatopathology through consistent publication and experience, and there are a few selected board-certified veterinary pathologists who are also certified as specialists in veterinary dermatology. Although some veterinary pathologists may have a special interest in skin, their only approach to credentialized specialization in skin pathology is pursuit of dermatology board certification. In most laboratories, skin biopsy specimens are examined by general board-certified veterinary pathologists, most of whom are not clinical dermatologists. Board-certified pathologists are qualified to assess and interpret gross and histologic lesions in skin.

Recommendations for Veterinary Practitioners

The intent of the following recommendations is to improve patient care outcomes for veterinarians submitting skin biopsy specimens and for the pathologists examining those specimens. Notably, what holds true for skin biopsy specimens also holds true for any biopsy specimens. History, physical examination findings, and results of laboratory testing provide the interpretive context pathologists use when examining any tissue specimens including skin biopsy specimens.2 By following a few guidelines, clinicians can provide the information pathologists need for provision of clinically useful information.

Commentary

Frustrations, requirements, and expectations of skin biopsy for diagnosing skin disease

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Gather and communicate clinical information in a logical and organized fashion

Obtain and communicate all of the needed historical information. Perform a detailed physical examination and accurately record objective findings. For skin lesions, a good camera with a ring flash can provide objective information.

State the history in a progressive fashion from initiation of the problem to current status. An adequate dermatologic history cannot be communicated in 2 or 3 phrases on a standard laboratory requisition form. It should be recorded on a separate page in organized, legible prose to provide a logical train of clinical reasoning. If a failure of previous treatments is the reason for the biopsy, the clinical reasoning behind the biopsy becomes substantially more important. All history information is needed because much of this information impacts how histologic lesions are interpreted. For example, ongoing pruritus or corticosteroid administration can substantially alter the histologic appearance of skin and affect how lesions are interpreted. Inflammation can be muted by ongoing corticosteroid administration. A history of chronic dermatitis is not sufficient for interpretation of skin biopsy specimens, but is frequently the only information provided.

Consult before biopsying

Board-certified veterinary dermatologists can provide advice on clinical signs, differential diagnoses, and appropriate testing. Most importantly, they can help determine not only what to biopsy but also whether a biopsy is even needed. Dermatologists indicate that they often would not have recommended biopsy for many of the cases for which specimens were collected and submitted by veterinarians. Thus, consultation with a dermatologist can potentially save both money and time.

Generate a relevant list of differential diagnoses

It is critically important for pathologists to know what diseases the clinician is considering on the basis of history and clinical signs and what diseases the clinician would like ruled in or out on the basis of histologic findings. Most skin biopsy specimens do not contain syndrome-specific lesions. Therefore, a differential diagnosis list is vital to the interpretation of histologic findings. Biopsy should be targeted to address specific differential diagnoses on the basis of sound clinical reasoning, which in turn depends on what conditions the primary lesions suggest could be present and what testing is appropriate to rule those specific conditions in or out. For example, histologic examination of skin biopsy specimens is not the most definitive test for hypothyroidism, and there are better diagnostic tests for that disease. Histologic examination of skin specimens is not a useful method for establishing a differential diagnosis list.

Notably, it is the clinician’s role to develop the differential diagnosis list and the pathologist’s role to describe the histologic lesions and offer some guidance on whether those lesions support any of the specific differential diagnoses or rule them out. Occasionally, a specific diagnosis will be rendered on the basis of histologic findings alone. In most cases, pathologists are in no position to develop differential diagnosis lists for patients they have never seen and for which there is only minimal background information. Clinicians must provide this information.

Perform appropriate laboratory testing before biopsying

Before considering biopsy, perform the appropriate clinicopathologic testing dictated by logical clinical reasoning (eg, CBC and serum biochemical analyses, including measurement of thyroxine and cortisol concentrations). Collect appropriate samples for bacterial and fungal culture (even if those samples are simply refrigerated until histologic results come back). Examine the skin with a Wood lamp and perform skin scrapings. It is important for pathologists to know about existing laboratory abnormalities because some systemic diseases are associated with skin lesions (eg, hepatocutaneous syndrome).

Biopsy appropriately

Skin should never be sampled with a laser or electrocautery unit because these methods severely compromise the quality of the specimens. Hair should be rough clipped, not shaved, and enough hair should be left to permit orientation of the specimens. Ideally, skin biopsy specimens are sectioned with the long plane of the hair follicles so that follicular features can be characterized, but this requires that hair shafts can be seen to help orient the sections. Specimens collected with a 6-mm biopsy punch are easier to orient than those obtained with a 2- or 3-mm punch. The site should not be surgically scrubbed or altered in any way. Crust should be included, but ulcers should be avoided because ulcerated skin is dominated by ulcer-related inflammation. Strive to obtain both early and well-developed lesions that are not ulcerated because early and developed lesions are more likely to show the evolution of diagnostic patterns. Multiple specimens are better than one. Finally, handle specimens delicately. Pustules are delicate and rupture with rough handling. Stretch artifact is common with skin biopsy specimens.

Be realistic in expectations

Histologic examination is not the ultimate diagnostic test for skin diseases. In most cases, the diagnosis represents a collaborative effort between the clinician, dermatologist, and pathologist. Pathologists do not and cannot operate in a vacuum, but this is particularly true in dermatologic cases.

Talk to the pathologist

Develop a professional relationship with the pathologist and discuss cases before performing a biopsy and after results are returned. Most pathologists are delighted to discuss clinical cases. Much confusion can be resolved in a 5-minute conversation.
Think before you treat

Antimicrobials and corticosteroids are not always indicated for skin disease. Antimicrobial resistance is a real and substantial problem in both human and veterinary medicine, and there is evidence for cross-species transmission of resistance. Inappropriate antimicrobial use contributes to the problem. Empirical treatments so often administered in veterinary practice have the potential to cause problems. These common treatments are often not indicated at all, and they are occasionally contraindicated. If at all possible, any treatment should be based on a specific diagnosis and should be evidence-based rather than empirical.

Conclusions

Skin disease will continue to be an important clinical problem for veterinarians for the foreseeable future. Pathologists and dermatologists will remain an important part of the diagnostic team. As with any disease, the diagnosis should be approached in a logical and comprehensive manner so that important features are not missed or excluded from consideration. Understanding the role of dermatopathology in the diagnostic process and knowing how to maximize the benefits of skin biopsy will help reduce frustrations for both clinicians and pathologists.

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