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Review

Dermatological diseases in lizards

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ABSTRACT

Lizards with dermatological disease are routinely encountered in veterinary practice and it is often challenging to establish a thorough and adequate case management for these otherwise highly visible conditions. Most skin diseases in lizards are primarily a consequence of environmental stressors such as substandard husbandry and underlying disease, facilitating the onset of mainly secondary bacterial and mycotic dermal infections.

This review provides an overview of common dermatological problems in lizards and aetiology, treatment and prevention are discussed for both infectious and non-infectious conditions. Although investigational approaches may be directed by the primary clinical manifestation of dermatological problems, the importance of a multidirectional approach cannot be over-emphasized. Proper treatment can only be initiated when the correct diagnosis has been made and husbandry issues dealt with. Current information on susceptibility patterns and on the use of appropriate chemotherapeutics in lizards is limited for the treatment of infectious causes of dermatitis.

Introduction

Dermatological problems are one of the most common reasons for veterinary intervention in captive reptiles. This is at least partly attributed to the fact that reptile pet owners readily detect dermal problems due to the ease of visual inspection. In general, most skin diseases in lizards and other reptiles are primarily the result of inappropriate husbandry and feeding, often leading to secondary infection (Hoppmann and Wilson Barron, 2007). Consequently, the condition of a reptile's skin reflects the animal's clinical status and serves as an indication for inadequate environmental conditions or underlying disease (Fig. 1). A few pathogens can also act as primary aetiological agents of dermatitis and septicaemia causing high morbidity and even mortality in certain lizard species (Paré et al., 2006; Hellebuyck et al., 2009b).

Taking into account the overall multifactorial nature of dermal disease in lizards, a good history, assessment of the management and physical examination combined with appropriate sampling and laboratory tests are essential to establish aetiological diagnosis and effective therapy in these patients. There are several excellent references available discussing normal dermal structure and function in lizards (Landmann, 1986; Alibardi, 2003) and a thorough knowledge of these is indispensable.

Clinical approach to dermatitis in lizards

Dysecdysis is one of the most commonly observed disorders of reptile skin and a non-specific clinical finding. However, it often originates from or results in secondary bacterial or mycotic skin infection. Many lizard species shed their skin in patches (Fig. 2) on a cyclical basis, and normal fragmented ecdysis should be distinguished from dysecdysis (Hoppmann and Wilson Barron, 2007).

Dysecdysis may be seen in association with almost every infectious or non-infectious disease. Inappropriate environmental conditions, such as inadequate humidity and temperature, nutritional deficiencies, dehydration and traumatic injuries are common non-infectious causes (Harkewicz, 2002). Moist retreats, as are often proposed for desert dwelling lizards in order to facilitate shedding (Divers, 1996), are not necessary for the well-being of several desert dwelling lizards and may result in decreased integrity of the skin (Hellebuyck et al., 2011). Various systemic diseases, mainly those resulting in hypoproteinaemia and thus inadequate enzyme production, may interfere with the normal shedding cycle (Hoppmann and Wilson Barron, 2007). A common consequence following retention of shed skin in lizards is avascular necrosis or dry gangrene of the digits (Fig. 3) or caudal part of the tail (Hoppmann and Wilson Barron, 2007).

While a wide variety of bacterial and fungal species are frequently isolated from dermatitis in captive lizards, their role as primary causative agents is often uncertain (Hoppmann and Wilson Barron, 2007; Pasmans et al., 2008; Hellebuyck et al., 2009a). Most clinical bacterial and mycotic skin infections in

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Fig. 1. Ischemic epidermal necrosis following vasculitis in a Fiji banded iguana (*Brachylophus fasciatus*) succumbing to renal failure.

Fig. 2. In many lizard species such as this leopard gecko (*Eublepharis macularius*), normal shedding occurs in patches over several days to a couple of weeks.

Fig. 3. Retention of shed skin with constriction of the distal part of the tail in a Solomon Island skink (*Corucia zebrata*).

lizards are secondary to poor husbandry or underlying disease, especially when the integrity of the skin is breached (Harkewicz, 2002; Hellebuyck et al., 2009a) and this should be considered when interpreting microbiological cultures derived from dermal lesions.

Relatively little is known of the normal microbiota of lizard skin and adnexa, and so the selection of clinically important bacterial and fungal isolates from primary cultures is often difficult (Jacobson, 2007). Except for bacterial isolates that resemble known pathogens, only isolates obtained in pure and/or abundant culture should be considered clinically relevant. The association of fungal isolates as the aetiological agent of mycotic dermatitis in lizards should be based on clinical presentation of the dermal lesions combined with the correct morphological identification of the fungal isolate and preferably by demonstrating the presence of hyphae morphologically consistent with the detected fungal agent within histological sections (Jacobson et al., 2000; Bowman et al., 2007; Abarca et al., 2008; Hellebuyck et al., 2010).

Susceptibility testing for antimicrobial agents of the collected isolates is essential in order to establish efficient antimicrobial therapy (Jacobson, 2007; Hellebuyck et al., 2009b). Few studies, however, document antimicrobial susceptibility testing of bacterial and mycotic isolates obtained from diseased or healthy reptiles. Screening for antimicrobial resistance has been performed for several bacterial isolates originating from lizards and other reptile species and the presence of resistant clones has been evidenced. Consequently, captive reptiles may serve as a reservoir for the spread of resistance determinants posing a possible public health concern (Pasmans et al., 2005; Ahmed et al., 2007; Hellebuyck et al., 2009b; Beatriz et al., 2010; Colinon et al., 2010). High minimal inhibitory concentrations (MICs) and acquired resistance to itraconazole were reported for the *Chrysosporium* anamorph of *Nannizziopsis vriesii* (CANV) isolates obtained from bearded dragons (Paré et al., 2005; Van Waeyenberghe et al., 2010). High fluconazole MICs were documented for several fungal isolates from reptiles and *Paecilomyces lilacinus* proved to be resistant to fluconazole and amphotericin B (Paré et al., 2005).

Since dermatitis is a general term used to describe any inflammation of the skin, common lizard dermatological diseases can be broadly classified into infectious and non-infectious. Each of these causes is elaborated and respective treatments will be discussed but it must be noted that treatment of dermal disorders in lizards requires elimination of primary causes and optimization of environmental conditions.

Infectious dermatitis

Viral dermatitis

Papillomatosis has been mostly reported as a clinical presentation of viral dermatitis in several lizard species. Viral particles morphologically similar to those of the families of Herpesviridae and Reoviridae, and viruses resembling members of the former Papovaviridae family have been observed in papillomatous skin lesions in lizards (Schanbel, 1953; Raynaud and Adrian, 1976; Cooper et al., 1982; Greek, 2001; Hernandez-Divers and Garner, 2003; Uğurtas et al., 2008; Literak et al., 2010). Captive as well as free ranging European green lizards (*Lacerta viridis* complex) seem to be particularly susceptible to the development of papillomatous growths affecting the skin of the dorsocranial part of the body (Fig. 4) (Schanbel, 1953; Raynaud and Adrian, 1976; Uğurtas et al., 2008).

Herpes-associated dermatitis was reported in a colony of captive bearded dragons (*Pogona vitticeps*) (Greek, 2001) and cutaneous papillomatosis related to Pox has been described in *Tumpinambis teguixin* (Hernandez-Divers and Garner, 2003). Transmission of these viral infections probably occurs through scratching and biting lesions which may explain the mainly dorsocranial distribution of viral dermatitis following reproductive and combative behaviour (Harkewicz, 2002; Hoppmann and Wilson Barron, 2007).