

ORIGINAL ARTICLE

A case of suspected contact dermatitis in a juvenile cynomolgus monkey (*Macaca fascicularis*)

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Abstract*Background* A 2-year-old male cynomolgus monkey (*Macaca fascicularis*) presented with vesicular dermatitis exhibiting freshly ruptured blisters, crusts, and papules on the extremities and face.*Methods* Complete blood count, serum chemistry, skin biopsy, skin scrape, and culture of a fresh blister were initially submitted for diagnostics.*Results* Skin biopsy of the affected area revealed a non-suppurative eosinophilic dermatitis with mild thickening of the epidermis. Serum chemistry showed a marked eosinophilia ($1.74 \times 10^3/\mu\text{L}$, 17.4%). All other results were within normal limits. Initial differentials included contact dermatitis, immune-mediated disease such as pemphigus or psoriasis. Repeated blood work and skin biopsies were collected as well as serum for allergen-specific IgE latex and food allergy testing. Herpes B virus was added to the differential list after an oral lesion was noted upon repeated physical examination and samples were collected for testing. Repeat blood work maintained a marked eosinophilia and food allergy testing was within normal limits. Serum IgE for latex was equivocal and a follow-up latex sensitivity test was performed and was within normal limits. Repeated skin biopsies were consistent with acute eosinophilic spongiotic dermatitis with vesicles most likely due to contact dermatitis. No therapy was initiated during the diagnostic period and no etiology was confirmed.*Conclusions* Over time the dermatitis and eosinophilia resolved spontaneously. The animal is currently free of any lesions and maintains an eosinophil count within normal limits.**Introduction**

Allergic contact dermatitis is an inflammation of the skin caused by direct contact of an irritant or allergen that results in a variably pruritic maculopapular dermatitis usually affecting sparsely haired areas of the body. Diagnosis is based on history, clinical signs, and results of patch testing. Although uncommon in companion animals [4], it has been reported in the literature to have an incidence of 5–20% in children [7]. Well-documented cases of skin disease, specifically allergic dermatitis are rarely reported in non-human primate

literature. There have been a few case reports of alopecia, seborrheic dermatitis, psoriasiform dermatitis, psoriasis vulgaris, and latex sensitivity [1–3, 5, 6]. Many of these case reports involve treatment plans that assist in managing clinical signs; however, there are no reported cases of recrudescence of clinical signs without treatment in a cynomolgus macaque.

Materials and methods

A 2-year-old male Mauritian origin cynomolgus macaque arrived at our facility in July 2004 from a



Fig. 1 Photograph of left hand of a 2-year-old cynomolgus macaque with vesicles, crusts, and widespread scaling of hands and feet.

captive-born colony in the United States. Prior to entering the facility each animal is vaccinated for measles, has at least three consecutive negative tuberculin tests, and one negative test for each of the following: Herpes B Virus, Simian T-cell Leukemia Virus type 1, Simian Immunodeficiency Virus, and Simian Retrovirus types 1, 2, 3, and 5 (SRV-1, 2, 3, and 5). During the quarantine period each animal receives a physical examination, treatment and testing for internal parasites, three negative tuberculin tests with a 2-week interval between testing, and serological testing for SRV-1, 2, 3, and 5. During his initial quarantine examination, a 2-cm focal area of hyperkeratosis was noted on the medial bicep of one arm and an area of mild dermatitis was noted on his chin. After release from quarantine, he was relocated to a different campus. He had one behavior acclimation training session for conscious restraint in a chair in the beginning of November 2004. He presented shortly after for an unrelated issue. Upon physical examination, he presented with vesicular dermatitis with some freshly ruptured blisters, crusts and papules on the hands, wrists, feet, inner ankle, face, left medial biceps, and ear pinnae (Fig. 1). The trunk of the body, proximal arms, and legs had no lesions present. Overall, there was little to no excoriation or erythema present on lesions. Initial diagnostic testing included complete blood count and serum chemistry. A skin scraping, skin biopsy, and culture were collected from a fresh blister. A video tape of the animal's behavior was recorded to evaluate for pruritis. The monkey was bright, alert with normal urine and feces, there was no noted lymphadenopathy or fever, and the animal has maintained normal appetite and growth throughout his life.

Results

Initial diagnostic testing revealed a complete blood count with an eosinophilia of 22%, and historically he had an eosinophilia with every complete blood count since the day of arrival. There was no history of dermatitis in his vendor records and it is unknown whether he had an eosinophilia at the vendor. The results of the serum chemistry, skin scrape, and skin culture were within normal limits, and his video recording was initially negative for puritis; however, on repeated video sessions the animal was noted to be mildly puritic towards his hands and feet. He was observed daily by cage side examination; however, the lesions were difficult to observe so a follow-up physical examination was performed 14 days later.

Upon re-evaluation, the condition had not improved, and in some areas worsened. There were fresh vesicles, crust, and widespread scaling throughout the lesions. The skin on the hands appeared thickened and there was a new ulcer present on his tongue. Initial differentials included contact dermatitis, immune-mediated diseases such as pemphigus or hypereosinophilia syndrome (a condition in humans), measles and finally Herpes B Virus due to the appearance of the oral lesion noted on the follow-up examination. Blood was collected for a complete blood count and a Herpes B virus titer. Cultures were collected for Herpes B virus testing. The Herpes virus cultures were negative and the animal was vaccinated for measles at the vendor. Skin biopsy histology results revealed severe acute spongiotic dermatitis with vesicles filled with primarily eosinophils (Fig. 2). Our

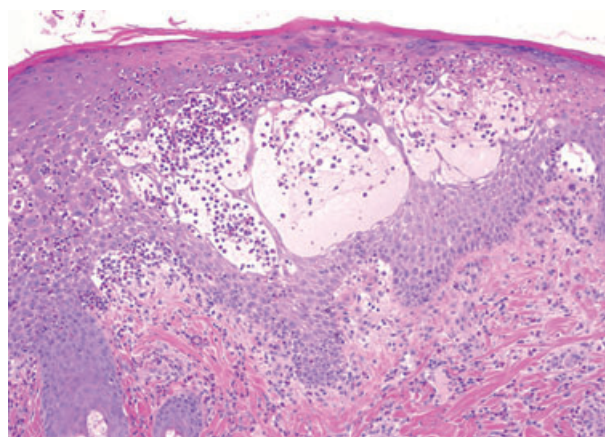


Fig. 2 H&E staining of skin biopsy lesion at 10 × taken of the left ankle of a 2-year-old cynomolgus macaque with vesicles, crusts, and widespread scaling of hands and feet. This slide demonstrates severe spongiotic and eosinophilic intraepidermal vesicular and perivascular dermatitis.

differential list shifted at that time to primarily contact dermatitis, but we additionally wanted to rule out Bullous Pemphigus. Additional skin biopsies were collected; however, the second biopsies were more characteristic of contact dermatitis rather than bullous pemphigus, so pemphigus testing was not pursued.

Contact dermatitis

Allergen-specific IgE testing

Although contact dermatitis can be very common in humans (poison ivy, latex, etc.), it has not been well reported in non-human primates. There is a published report of a latex sensitivity in a rhesus macaque, but other reports were limited [3]. Following the diagnostic plan previously published [3], the initial diagnostic work up for contact dermatitis included allergen-specific IgE testing (IBT Reference Laboratory, Lenexa, KS, USA) on serum from this individual and a same age and sex control animal with no evidence of dermatitis or eosinophilia. The following items were tested to rule out sensitivity: apple, banana, beet root, corn, fish mix, grape, orange, peanut, alfalfa, yogurt, sweet potato, soybean, wheat, whey, yeast, and latex. Both animals tested negative for all food items; however, the results for latex IgE were equivocal for both. Consultation with the reference lab indicated that the rating of equivocal is between negative and low positive.

Latex-specific skin scratch test

Using procedures previously published, a latex-specific allergy test was performed [3]. After clipping the lower back, two 1-cm areas were scarified 5 × in a cross-hatch pattern. Two drops of a latex/saline solution was placed on the scarified area on the left side and two drops of a saline solution were placed on the right side of the back. Observations were performed continuously for the first 30 minutes post-exposure to observe for reaction and/or anaphylaxis and then again at 24 hours, 48 hours, 72 hours and 7 days post-exposure. No differences were seen between the latex and saline areas. The monkey was deemed unsuitable for standard pharmacokinetic studies and was made available for acute use within our colony. During this time additional diagnostic testing for contact dermatitis was discussed. This included but was not limited to patch testing to common materials in the environment such as caging, enrichment, and restraint devices. However, as the animal approached 3 years of age, the dermatitis and eosinophilia resolved (Table 1). No therapy was initiated throughout the diagnostic procedure and to date there has

Table 1 Repeated eosinophil count, percent and actual ($10^3/\mu\text{l}$), over time of a 2-year-old cynomolgus macaque with suspected contact dermatitis

Date	Eosinophil count (%)	Actual eosinophil count ($10^3/\mu\text{l}$)
20 Jul 2004	21.6	2.01
14 Oct 2004	21.4	2.31
04 Nov 2004	22.7	2.60
19 Nov 2004	17.4	1.74
13 Dec 2004	18.2	2.09
14 Feb 2005	19.8	2.04
08 Jan 2005	18.4	1.67
09 Nov 2005	7.0	0.69
28 Feb 2006	4.2	0.27
15 Mar 2006	6.8	0.46
14 Apr 2006	4.5	0.38

been no recrudescence of lesions nor eosinophilia. The animal is currently being utilized for drug pharmacokinetic studies within our facility.

Discussion

Dermatological conditions represent challenges in many species in the laboratory animal field. Active inflammatory dermatitis, such as the presentation in this case, can have an unknown impact on the results of studies when the immune system is in a heightened state. Many of these diseases may also go undetected based on the difficulty of observing the animals in their home cage. In this instance, the animal's eosinophil count was a strong indicator of the level of inflammation and highlights when a routine complete blood count can be a useful screening tool for future animals. Although a definitive causative agent was not identified, contact dermatitis was our primary differential diagnosis for these clinical signs based on repeated skin biopsies. The notable outcome of this particular case was the resolution of clinical signs without initiation of treatment or changing of his environment as the animal aged. It is generally accepted that children can outgrow certain allergies and it is possible that this individual either outgrew or was no longer exposed to the allergen.

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