

## Summary

The authors have presented a case history of a patient with the presenting symptomatology of an ichthyosiform dermatosis associated with squamous cell carcinoma of the larynx.

At the initial presentation of the patient, following a comprehensive history and physical, the authors believed that the ichthyosiform dermatosis could possibly be an outward manifestation of an internal systemic derangement. Therefore, various laboratory and radiographic studies were undertaken. An outstanding feature of the blood studies was a marked eosinophilia. Several of the more common disorders causing marked eosinophilia include Addison's disease, allergic reactions, parasitic infections, and various neoplastic diseases. Therefore, the authors believed it necessary to refer the patient to a primary care facility for further evaluation and testing, whereupon, squamous cell carcinoma of the larynx was discovered.

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## Topical Anti-Inflammatory Activity of *Aloe vera* as Measured by Ear Swelling

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Previous studies have shown that *Aloe vera* effectively reduces edema and inflammation and improves wound healing.<sup>1</sup> Adjuvant-induced arthritis was prevented and regressed by the topical application of *Aloe*.<sup>2</sup> *Aloe vera* contains acetylsalicylic

acid, aloctocin A, and magnesium lactate, which block the inflammatory substances prostaglandin and thromboxane.<sup>3,4</sup> It possesses the enzyme bradykinase, an inhibitor of the tissue hormone bradykinin, which is a potent vasodilator. Also, the vitamin E found in *Aloe* stabilizes free radical formation, which inhibits inflammation. Vitamin C also promotes wound healing.<sup>5</sup> The antiedemic activity of *A. vera* was recorded by the authors in normal and diabetic animals in small doses.<sup>6,7</sup>

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Current steroidal and nonsteroidal anti-inflammatory drugs provide relief of local inflammation, but the effectiveness is limited by severe side effects. Aloe's remedy range extends from burns to infections to ulcers. Gottlieb mentioned that commercial *A. vera* preparations must have a concentration of 70% Aloe to have healing power and anti-inflammatory activity. *Aloe vera* gel is approved by the FDA for treatment of inflammation but the dosage to be used is still in question. The authors attempt to determine the topical activity of decolorized (with anthraquinones) *A. vera* over a dose-range of 0.25% to 5% as measured by the croton oil-induced swelling of the mouse ear. This assay provides an effective way of measuring the topical biological activity of *A. vera* for clinical use.

## Materials and Methods

Adult female ICR mice (20 to 30 gm; 10 animals/group) were given 25  $\mu\text{g}/\mu\text{l}$  croton oil topically on both surfaces of the right ear. The concentration of croton oil in acetone was 2.5 mg/ml. The irritant was applied by means of a Hamilton<sup>11</sup> syringe. The left ear remained untreated (acetone alone did not induce any changes in ear weight) and served as a control. The peak swelling occurred 6 hr later, at which time the ear swelling was measured by obtaining a 6-mm Baker<sup>12</sup> punch biopsy from the inflamed and control ears of ether-anesthetized mice. The ear tissue was weighed to the nearest 0.01 mg. The difference in weight between the inflamed and control ear represents the degree of swelling for each group. Each group of animals had its own internal control. Topical application of 0.25%, 1%, and 5% decolorized *A. vera* (anthraquinones removed) was applied 30 min after croton oil to minimize nonspecific interaction between the irritant and *A. vera*. Ear weight differences for each group were recorded and the percentage of inhibition of swelling was obtained from each Aloe test group.<sup>13</sup> The ears were placed in 10% formalin and stained with hematoxylin-eosin. The Student's t-test was used to determine significance for each test group.<sup>10</sup>

## Results and Discussion

Topical administration of 25  $\mu\text{g}/\mu\text{l}$  croton oil produced a 20.2% increase in punch biopsy ear weight over 6 hr. Topical administration of 0.25%, 1%, and

5% decolorized *A. vera* 30 min later produced a 8.7%, 67.4%, and 54.4% inhibition of croton oil-induced ear swelling. The percentage of inhibition recorded by the 0.25% dose of Aloe was not significantly different from the croton oil control ( $p > 0.1$ ), but the percentage of inhibition produced by the 1% and 5% was significant ( $p < 0.01$ ;  $p < 0.02$ ). The punch biopsy ear weight for the four groups of untreated control ears was not significantly different from each other ( $p < 0.05$ ). *Aloe vera* shows a dose-response relationship between the 0.25% and 1% doses, but, thereafter, reached a plateau. The responses obtained by 1% and 5% Aloe are similar ( $p < 0.5\%$ ). This means that the effective anti-inflammatory dose range for topical administration is below 1% since higher doses did not produce a greater response (Table 1). This data proves that commercial preparations need not exceed a concentration of 1%.

The earlier studies provided good results for *A. vera* when treating burns, cuts, and skin ulcers, but the effective dosage, route of administration, and mechanism of action tended to be shrouded in mystery.<sup>3</sup> The authors' laboratory has shown that certain amino acids, vitamins, anthraquinones, and aspirin could account for Aloe's biological activity.<sup>11,12</sup> Since *A. vera* had an anti-fibrosis activity against connective tissue, the authors concluded that Aloe had its primary influence on acute inflammation and that it did not act like a steroid. Furthermore, *A. vera* improved wound healing in small doses in a dose-response fashion. The croton oil-induced ear swelling assay provides a quick, sensitive, accurate method of evaluating the anti-inflammatory activity of *A. vera*. The histology of ear tissue samples confirmed the responses.

## Summary

Topical anti-inflammatory activity of *A. vera* was tested at 0.25%, 1%, and 5% against croton oil-induced ear swelling over 6 hr. A maximum percentage of inhibition of 67.4% was obtained by 1% *A. vera*. An increase in dose did not produce a

Table 1. Inhibition of Croton Oil Ear Swelling Response by Topical *Aloe vera*

Medium	Ear Punch Weight	
	Increase (mg)	Inhibition (%)
Croton oil	4.6 $\pm$ 1.0	
<i>Aloe vera</i>		
0.25%	4.2 $\pm$ 0.4	8.7
1%	1.5 $\pm$ 0.3	67.4
5%	2.1 $\pm$ 0.5	54.4

<sup>11</sup> Hamilton Co. Reno, NV.

<sup>12</sup> Key Pharmaceuticals, Miami, FL.

greater response so that the effective dose-response part of the biological curve is between 0.25% and 1% *A. vera* concentration. Commercial preparations of *A. vera* need not exceed this concentration. The authors believe that this study provides a major breakthrough for Aloe and an effective treatment against inflammation for podiatrists. The authors' ear swelling assay is an accurate and sensitive method of testing the topical activity of anti-inflammatory agents.

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# Avascular Necrosis of an Accessory Sesamoid of the Foot

## A Case Report

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The terms osteochondritis, osteochondrosis, osteonecrosis, aseptic necrosis, and avascular necrosis may be confused and considered synonymous. Osteochondrosis refers to a number of conditions characterized by disorderly enchondral ossification of epiphyseal growth during childhood.<sup>1</sup> Osteochondritis is inflammation of the bone and cartilage.<sup>2</sup> Osteonecrosis, also referred to as avascular necrosis or aseptic necrosis, is the death of a bone or part of bone without signs of inflammation or sepsis, usually as a result of the loss of blood supply to the particular area of bone.<sup>3</sup>

Osteochondrosis, often incorrectly referred to as osteochondritis or osteonecrosis, is a rare pathologic condition found in the human foot. Less rare are sesamoids and accessory sesamoids. However, both conditions occurring together to produce avascular necrosis or osteochondrosis of the sesamoid is unusual. The authors describe such a case diagnosed and treated at Sheridan Park Hospital, and review the literature on this rare condition.

The authors found little in the literature on aseptic necrosis of the accessory sesamoid of the metatarsophalangeal joints of the foot. There is, however, a condition that presents similar signs and symptoms. The condition, osteochondrosis of the first metatarsophalangeal joint sesamoids, also known as Treves' disease,<sup>4</sup> presents equally in males and females 15 to 18 years old (Turlik M: Lecture notes, 1983-1984).

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