

USE OF ALOE IN TREATING LEG ULCERS AND DERMATOSES (1973)

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The use of aloe species for healing by man dates back to thousands of years before the Christian age. Aloe vera, known by the ancient Egyptians, was described in the Ebers papyrus. Drawings of the plant found on the walls of ancient Egyptian temples show that its pulp was used externally for treatment of burns, ulcers and parasitic infections of the skin.

Hippocrates described aloe vera and its medicinal uses.^{1,4} Aloe has been used by the Arabs many centuries for the treatment of wounds.⁴ It was a popular remedy for various diseases in China several thousands of years ago. It is reported that Alexander the Great used aloe gel extensively.⁸

A species of aloe was referred to in the Bible (John 19:39). Many species of aloe are currently recognized in various pharmacopoeias, namely *Aloe perryi* Baker, *Aloe vera linné* (*Aloe barbadensis* Miller), *Aloe spicata* Baker, *Aloe ferox* Lamarck, and *Aloe Africana* Miller.^{2, 6, 17, 18} However, limited chemical, pharmacological and clinical research data on aloe have been recorded in the literature.

It has been used with some success in the treatment of various dermatological conditions,¹³ radiation ulcers,^{7, 10, 15} internal diseases such as peptic ulcer¹ and burns.⁷ There are reports on its use for cosmetic

purposes.⁸ Preliminary reports on the use of aloe vera gel in experimental ulcers in animals were encouraging (Higazy, unpublished data). This stimulated us to evaluate aloe vera gel in the treatment of chronic ulcers and certain other dermatoses in man. Our report deals with its use locally in chronic leg ulcers, seborrhea, acne vulgaris, alopecia (hair fall), and alopecia areata.

Materials and Methods

The material used in our work was the fresh gel extracted from the leaves of aloe plant. Aloe vera contains a bitter substance, aloin, present in the pericycle and gelatinous material forming the pulp of the leaves. Different aloe species have noticeable differences in chemical and physical properties, so that the aloin from one species of aloe may differ markedly from that of another species.

Aloin includes several active ingredients of anthranol structure. Whereas most articles in the literature on aloe concentrate on aloin and its use as a potent cathartic, very little scientific data are available on the gelatinous material. Since aloe varieties respond to Borntrager's test for anthraquinone, it has always been assumed that anthranols or anthranol derivatives constitute its major ingredients which are responsible for its medicinal activity. Investigators have paid no attention to the gel. Therefore, we decided to use it in our investigations.

The gel was prepared as follows: the succulent fleshy leaves were cut trans-

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Fig. 1—*Left*, chronic ulcer on medial left leg before treatment (Case 1). Fig. 2—*Center*, same lesion after six weeks' treatment with aloe vera gel. Fig. 3—*Right*, the lesion after 11 week's treatment, the lower part healed.

versely from the base and left for 48 hours so that the bitter substance would drain off. The leaves were opened and the gel was extracted from the heart of the leaves. It was homogenized and filtered through

muslin, a preservative was added and it was stored under refrigeration.

The crude gel was used as a lotion without further fractionation, within one month of preparation to ensure its stabil-



Fig. 4—*Left*, chronic ulcer on lower back of left leg before treatment (Case 2). Fig. 5—*Center*, after two weeks' treatment with aloe vera gel. Note partial lysis of bridge between the two halves of the ulcer. Fig. 6—*Right*, after seven weeks' treatment. Note complete lysis of bridge and development of new granulation tissue.

ity. Analysis of the gel revealed that it contains carbohydrate, tannins, unsaturated compounds, lipids, steroids, organic acids, chlorides, sulphates, iron, copper, sodium and potassium (Helal and Shalaby, 1969).

Treatment of Chronic Leg Ulcers

Aloe vera gel was applied locally on ulcers three to five times daily as dressing after preliminary cleaning of the lesion by simple washing with 1% citrimide in water, hydrogen peroxide solution, 3% boric acid lotion or simply by water. Gauze dressings were applied on the lesions after being soaked in aloe gel. Antibiotics were occasionally given systemically to counteract infections, as were antihistamines, tonics, etc.

Colored photographs were taken before treatment and at one or two week intervals after treatment to demonstrate the progress of healing and any color change of ulcers or skin around them. Black and white reprints of the photographs were also made. The appearance of the edge and base of ulcers were described as to color, depth, area, epithelialization at the edges as well as granulation tissue at the base, the direction of the healing and development of cicatrices. Cellophane paper was applied on the ulcers and the outline drawn and the area measured by a planimeter type MOM Budapest.

Case Reports

Case 1. A 50-year-old merchant who stood during his work had chronic varicose ulcers on the left leg of 15 years' duration surrounded by eczema, otherwise he was in good health. The patient had a large ulcer on the medial surface of about 1400 mm² (Fig. 1) and a smaller one on the lateral surface of the left leg. The ulcers were deep, foul smelling and their bases were dirty and fixed. The margins were irregular.

After one week of treatment with aloe gel, the medial ulcer began to heal with epithelialization more marked at its lower part and proliferation of granulation tissue at the middle part. The ulcer became shallower, and in the patient's own words, there was a great response during that week not achieved by any other line of treatment adopted

before. After four weeks of treatment raised areas of granulation began to appear and the smaller lateral ulcer markedly improved with regeneration of the epithelium. The upper parts of the medial ulcer showed creeping epithelialization and granulation at the edges.

After six weeks, the lateral ulcer completely healed, forming a hard crust of greyish white color. The medial ulcer was progressing well with advancing epithelialization of the edge, and healthy granulation tissue with good vascularization and raised base (Fig. 2). Its surface area became much smaller.

After 10 weeks of treatment the crust on the old lateral ulcer was shed, leaving healthy skin which was glazing. Epithelialization continued to advance inside, and the base was further raised. At 11 weeks the lower part of the medial ulcer completely healed. The upper part remained. The area was much smaller (Fig. 3).

Generally this chronic leg ulcer of 15 years' duration showed regression and noticeable response to treatment with aloe vera. This encouraged us to carry on a further trial on two other patients.

Case 2. A 51-year-old man had edema and pseudoelephantiasis of the left leg and foot with roughness and corrugation of the skin. He had chronic foul-smelling leg ulcers of seven years' duration, a huge one on the back of the left leg of about 5000 mm² area (Fig. 4), and two smaller ulcers on the medial surface of the same leg, an upper and a lower one. Wassermann test was negative. The case was diagnosed as pseudoelephantiasis and chronic leg ulcer secondary to venous stasis and repeated recurrent thrombophlebitis and lymphangitis.

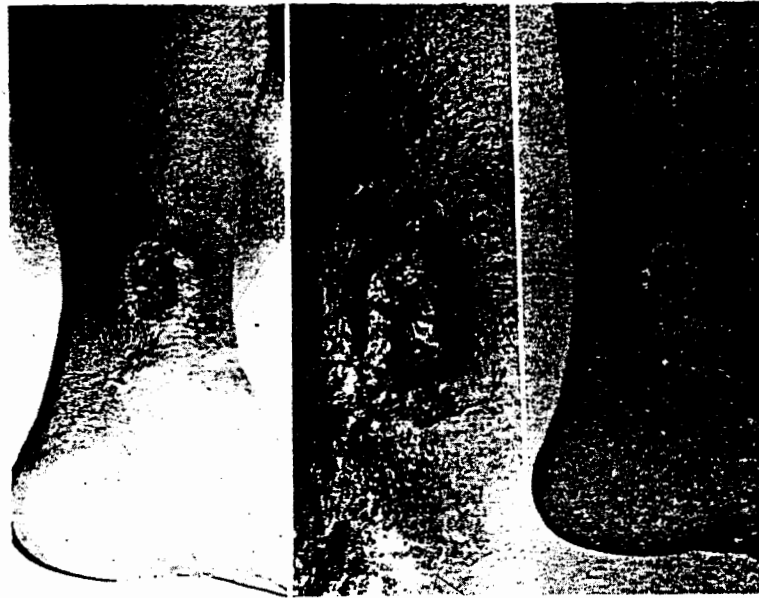
After one week of treatment with aloe gel, the patient complained of throbbing pain when the leg was lowered: the pain was more than that noted by the patient before initiation of treatment. At two weeks the pain abated and the foul odor disappeared. Crusts formed by a bridge dividing the back ulcer into two sections began to disappear, and so the area of the ulcer increased (Fig. 5).

After six weeks of treatment the smaller ulcers healed to a large extent while the larger back ulcer began to epithelialize and showed improvement from the lateral side toward the posterior part.

The surface of the back ulcer showed slight bleeding caused by rubbing of the wound during dressing, which indicated improved vascularization, granulation tissue had raised foci and small yellowish patches of necrotic tissue (Fig. 6). After nine weeks it became shallower. Epithelium from the margin was creeping inside. Discharge and pain were less. Generally the area of the back ulcer increased at first as a result of lysis of necrotic tissue, then decreased by healing.

Case 3. A 22-year-old man had suffered a burn on the medial lower left leg eight years previously; an ulcer developed on the burn site five years ago.

Fig. 7—Left, chronic ulcer of lower medial left leg before treatment. Fig. 8—Center, after five weeks' treatment. Fig. 9—Right, progressively decreasing during treatment.



Five months before he came to us it became painful, with pain increasing on standing. He had varicose veins in the leg, with pigmentation of skin around the ulcer.

The ulcer had an area of about 440 mm². It was dirty with purulent effusion and necrotic material at the bottom of the lower part (Figs. 7, 8).

After five weeks of aloe treatment there was good progress of healing of the ulcer and the epithelium moved toward the inside (Fig. 9). The area progressively decreased during treatment.

Discussion

Chronic leg ulcers usually have proved resistant to treatment, a handicap for the patient and a challenge for the doctor. Many drugs have been advised for treatment of chronic leg ulcers and only a very limited number of them has some effect, e.g., pantothenic acid and anabolic agents. Therefore, the introduction of a rapid and efficient healing agent would be a great advance.

A healing agent presumably stimulates normal multiplication of cells or supplies factors necessary for this multiplication. It is of great importance that multiplication of cells should be normal, and this is the critical difference between a healing agent and a carcinogenic agent.

Healing is enhanced by improvement of the circulation to the affected part. It is well known that increasing blood flow in limbs causes an increase in pain in various conditions, e.g., burns and varicose ulcers. Hence raising the limb reduces the pain. In our patients we have noticed increased vascularization of the ulcers as evidenced by reddening and healthy appearance of the granulation tissue. All patients complained of increased pain at the start of treatment, although aloe gel is not irritating, as indicated by lack of irritation of the conjunctivae of rabbits or burnt human skin (unpublished data). It may be suggested that the patient's pain was a result of improvement and overflow of the circulation of the affected area after application of aloe gel. We noticed that the gel helped remove necrotic tissue, paving the way for the growth of healthy granulation. This was especially evident in Case 2 where the bridge between the two halves of the posterior ulcer was broken down by treatment, and this may explain the increase in the posterior ulcer area at the early stage of treatment. We used the rate of healing in

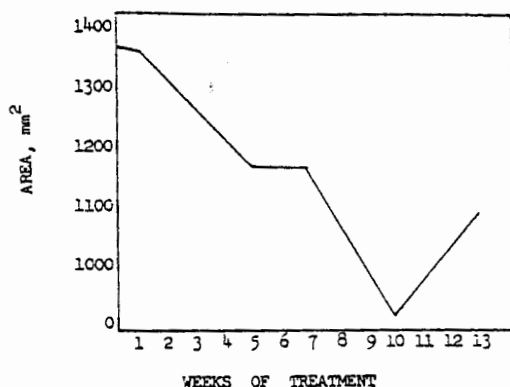


Fig. 10—Progress of healing of left leg ulcer in Case 1, judged by the ulcer area in mm² in relation to duration of treatment.

the patients as a measure of the healing activity of aloe gel, i.e., the patient was a control for himself. The relatively rapid reduction of the area of such chronic ulcers existing for many years is good evidence of healing activity.

It is obvious that the use of controls in such a study is very difficult because of individual variations in the rate of healing. An excellent subject would be a patient having bilateral ulcers treated on one side only. A controlled study of aloe gel healing activity of experimental ulcers in dogs was carried out and results were promising (Higazy, unpublished data).

We believe that the active principle for promoting healing is mucopolysaccharides which are present in high concentration in aloe gel. This may be aided by enzymatic removal of necrotic tissue. A further study including histopathological and biochemical study is being undertaken for further evaluation of the crude preparation and its fractions.

Study of Effect in Seborrhea, Acne and Alopecia

The suggested healing capacity of aloe vera in chronic leg ulcers encouraged us to use it for alopecia and hair fall. We thought of this because of growth stimulation of the epithelium and the probability

that it would have some effect on the cutaneous appendages.

We started with its use in seborrheic alopecia. Seborrheic alopecia needs continuation of treatment for a long period because of the persistence of the seborrheic state, yet many cases respond quickly when the treatment is suitable. We tried aloe vera on three patients having dandruff and seborrhea oleosa. One of them, a man, had complete alopecia of the vertical and frontal region (male pattern). All the patients stated that since they started treatment their scalp oiliness decreased within the first week. Their hair loss decreased and the hair stopped falling by the end of the first month. All three patients with seborrheic alopecia began to have certain degree of hair regrowth and hair regrew even in the completely bald patient, scanty but noticeable. Within three months of treatment two patients had satisfactory result and the bald patient had a slight hair regrowth which he did not experience with any other modality of treatment.

Up to that stage we realized that aloe vera has a drying effect on seborrhea when applied locally, and this encouraged us to use it in acne vulgaris. We chose three women between 18 to 25 years having mixed acne vulgaris. They had comedoes, papules, pustules, with some cysts and

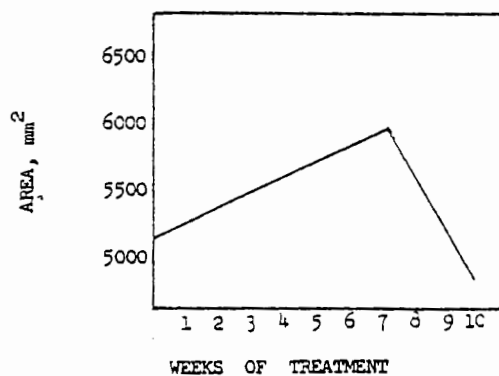


Fig. 11—Progress of treatment of left leg ulcer in Case 2 as judged by measurement of ulcer area in relation to treatment duration.

nodules. In all patients no other line of treatment was adopted. The patients noticed dryness of the face preceding improvement in their acne. Treatment was for one month, at the end of which two of them became entirely free from all acne lesions while one had marked improvement with minimal residual acne lesions.

During a follow-up period of one month slight recurrence happened to all three patients, mainly during the last two weeks. This recurrence was expected as aloe vera medication is topical. In a control patient with the vehicle only no improvement was achieved in any way.

Further trial with aloe vera was carried out on other varieties of alopecia. Three patients with alopecia areata noticed rapid initiation of hair growth; one of them, a boy aged 12 years, had hair growing in the alopecia area within one week. Ten patients with different etiological causes of their hair fall are now being treated and the preliminary reports are encouraging.

No patient treated with aloe vera had untoward reactions. No case of contact dermatitis was reported. No active irritation happened to any of the treated patients with seborrhea, acne vulgaris or alopecia. Control cases were few, one for each disease, but no control patient was affected by the vehicle alone.

Perfume was added to the hair lotion, but the acne lotion was left nonperfumed. While the trial with acne patients was for one month, the duration of treatment of patients with alopecia extended to three months. The follow-up period for all patients was one month with variable degree of recurrence. No recurrence was noticed in the patients with alopecia areata and their hair continued to grow normally.

Summary

Aloe vera proved to have a stimulating effect on the rate of healing of chronic leg ulcers. We believe improvement in three patients treated can be attributed to im-

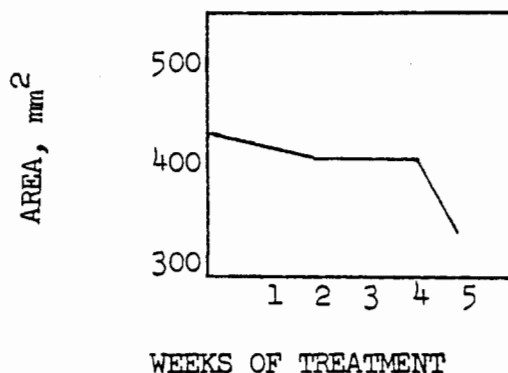


Fig. 12—Progress of healing of ulcer in Case 3 as judged by the area of the ulcer in mm² in relation to treatment duration.

provement in the peripheral circulation which is usually deficient in such patients. The drug appears to stimulate hair growth and drying of seborrheic skin. Improvement was noted after treatment of patients with seborrheic alopecia, acne vulgaris and alopecia areata.

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References

1. Blitz JJ, Smith JW, and Gerard DO: *J Am Osteopath Assn* 62:731, 1963
2. *British Pharmacopeia*. General Medical Council, London, Pharmaceutical Press, 1968
3. Claus EP, Tyler VE: *Textbook of Pharmacognosy*. Philadelphia, Lea and Febiger, 1965
4. Dawoud El Antaki: *Tathkerat Oli El-Albah*.
5. De Navarre MG: *The Chemistry and Manufacture of Cosmetics*, Vol. 2, 2nd. edition, New York, D. Van Nostrand Co., 1962
6. *Egyptian Pharmacopeia*, Cairo, 1953
7. Flagg J: *Am Perfumer Aromat* 74(4):27, 1959
8. Gjerstad G, Riner TD: Current status of aloe as a cure-all. *Am J Pharm* 140(2):58-64, 1968
9. *The Holy Bible: King James Version*. John 19:39
10. Lushbaugh CC, Hale DB: *Cancer* 6:690, 1953
11. Muschler A: *Manual Flova of Egypt*
12. Meftah H: *Ibiau El-Tathkerah fi El Nabatat El Tebbiah Wal Mofradat El Etaria*. 1st ed. Cairo, M. El Halaby, 1953