

Aloe Vera Gel In Peptic Ulcer Therapy: Preliminary Report

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At this time both the medical and surgical procedures employed in the management of peptic ulcer are directed principally to the control of the peripheral gastric secretory mechanism. Satisfactory clinical methods are available for achieving such control, but the very variety of these methods suggests to some degree that scientific certainty is still lacking. As Allen¹ puts it, "Present therapy is directed primarily at the physiologic sequela and not the physiologic stimulus."

Some interesting work from the Ukraine² has been directed to a "wound hormone" present in plant tissues, whose function it is to accelerate the healing of injured plant surfaces. In experimental studies, artificially induced skin lesions in rats and rabbits responded as favorably as injured plants to this substance. In either plants or animals the reparative response was effected systemically by injection of the wound hormone, but the effect was much more rapid and complete by topical application. Co-factors, particularly glutamic acid, aid substantially in the more vigorous and prompt repair of a wound or sore. Possibilities for the therapeutic application of these substances in medicine are stressed by the researchers; they include mention of ulcers of such diverse pathogenesis as cutaneous leishmaniasis (protozoan), dendritic keratitis (viral), and peptic (acid-pepsin secretory imbalance).

A safe and effective source of such "wound hormone" is Aloe vera gel, according to Freytag.³ If the gel is recovered from the fresh Aloe vera parenchyma and separated from its cellulosic matrix, it can be emulsified with heavy liquid petrolatum to produce an elegant preparation with minimum distaste to the great majority of patients. It appears that an effective dose amounts to from 2 to 2 1/2 fluid drams of the cellulose-free gel. This amount can easily be incorporated in a tablespoonful of emulsion which, therefore, becomes a single dose.

To ascertain whether or not Aloe vera gel be helpful clinically in the management of peptic ulcer, we used its emulsion in a group of patients with peptic ulcer as essentially the sole medication, except for the occasional administration of Pro-Banthine in instances in which overwhelming distress indicated the need for the immediate restraint of hydrochloric acid secretion. Twelve patients diagnosed clinically as having peptic ulcer, and having unmistakable roentgenographic evidence of duodenal cap lesions, were treated with the Aloe vera gel emulsion. Preliminary findings were most encouraging.

All these patients had recovered completely by the end of 1961, so that at this writing at least 1 year has elapsed since the last treatment, and in some instances a much longer interval has elapsed. Usually, such unmistakable lesions are accompanied by exacerbations of distress once and more often twice a year under any form of medical treatment, but no such episodes were experienced in this series of cases. If exacerbations of symptoms are interpreted as signals of attempted recurrence, it follows that over the length of time indicated the medication must have delayed reappearance of ulcer activity. This also was confirmed by roentgenographic examination, which gave evidence of complete healing.

Table I - Response Of Patients With Duodenal Ulcer To Aloe Vera Gel Emulsion

Case No.	Sex	Age	Result Of Treatment	
1	Male	24	Clinical recovery; no recurrence	*The patient had suffered from duodenal ulcer, on and off, for 20 years. She improved on Aloe vera gel medication but subsequently died of cardiac failure without, however, ever again suffering from gastric distress.
2	Male	28	Clinical recovery; no recurrence	
3	Male	38	Clinical recovery; no recurrence	
4	Male	40	Clinical recovery; no recurrence	
5	Male	40	Clinical recovery; no recurrence	
6	Male	54	Clinical recovery; no recurrence	
7	Male	67	Clinical recovery; no recurrence	
8	Female	27	Clinical recovery; no recurrence	
9	Female	41	Clinical recovery; no recurrence	
10	Female	56	Clinical recovery; no recurrence	
11	Female	60	Clinical recovery; no recurrence	
12	Female	84	Clinical recovery*	

Inflammation of the mucosa of the first and second portions of the duodenum occurs in individuals subjected to emotional upset and tension encountered in various forms of gastritis (hypertrophic, for example) and especially in peptic ulcer. Clinically, the beginning symptoms are practically indistinguishable from those of peptic ulcer, and the diagnosis rests on the roentgenographic demonstration of spasm and irritability of the duodenal cap without the ability to demonstrate an ulcer fleck. This condition appears to be increasing, especially among the younger set, although no age group is exempt. Since the treatment is the same as for peptic ulcer, Aloe vera gel emulsion was used in a series of six patients with

clinically diagnosed duodenitis. Duodenal irritability and spasm were elicited roentgenographically, but there was no evidence of an ulcer fleck.

Table II - Response Of Patients With Duodenal Irritability & Spasm To Aloe Vera Gel Emulsion

Case No.	Sex	Age	Result Of Treatment
13	Male	16	Complete recovery
14	Male	22	Complete recovery
15	Female	39	Complete recovery
16	Female	39	Complete recovery
17	Female	40	Complete recovery
18	Female	49	No improvement

Although Case 18 is listed as a failure, the events were these: The patient started Aloe vera gel emulsion treatment and, after a few doses, stopped and never again returned to the clinic. Her record is therefore incomplete in our files. It is assumed that she did not respond to treatment.

Statistically, one in every ten persons may be expected to develop peptic ulcer and appeal to the physician for treatment; but in reality probably great many more persons than this are lightly afflicted, if the evidence gained through gastroscopy is valid indication. The ingestion of an aspirin, a small quantity of mustard, a strong alcoholic beverage, a hot spicy sauce, and many other irritants are known to cause local, superficial inflammation in many people, often resulting in mucosal erosion equivalent to an ulcer. Few and sometimes no symptoms are precipitated beyond a slight burning distress.

Obviously, if these complaints were initiated in individuals without the history of consuming any of a number of irritants such as those mentioned, the disorders would be looked upon clinically as incipient peptic ulcers, on finding hydrochloric acid hypersecretion in the gastric juice. This condition is also increasing in incidence at a fairly rapid rate. In our patients, **it was relieved immediately on the administration of Aloe vera gel emulsion.** So favorable was the response that it created the clinical impression that this medication can certainly delay and perhaps prevent the development of a peptic ulcer.

This evidence sustains the practice of continuing the Aloe vera gel medication in small daily doses for a year or two after the clinically acute stage of the disease has been corrected

by larger and more frequent doses of the same medication. Numerous patients, completely recovered from an acute peptic ulcer episode, are now on preventive treatment, which amounts to a single tablespoonful of Aloe vera gel emulsion taken at bedtime. It is too early to record the ultimate outcome of this procedure, although no recurrences have yet appeared in our patients after 18 months of preventive management in this fashion.

Repeated and sustained satisfaction in the management of peptic ulcer by use of Aloe vera gel emulsion invited further inquiry into the properties of this gel. Every edition of the United States Dispensatory refers to the use of Aloe vera gel as early as 2,300 years ago; to this drug Hindu herbalists ascribed amazing healing powers when it was applied topically to wounds and ulcers of the skin. Until quite recently, western medicine seemingly has ignored these virtues and failed to credit any pharmacologic action to the gel. In 1935 a report appeared indicating the successful management of x-ray dermatitis with ulceration by the use of fresh Aloe vera gel.⁴ Confirmatory reports sustained this original announcement.⁵⁻¹² The use of Aloe vera gel for this purpose has waned, along with the advances in radiologic technology which have lessened the incidence of dermatitic damage. Renewed interest in Aloe vera gel developed with increasing peacetime and military applications of atomic energy, prompting experimental research at the Los Alamos Scientific Laboratory.¹³ Radiodermatitic injury, resulting in ulcers of the skin, responded quickly to Aloe vera gel applications; healing took place in half the time required by untreated controls.

The Ukraine research on the gel brought out new information of considerable clinical import.¹⁴ These workers have extracted a constituent which, on injection, operates systemically to effect the healing of ulcers, presumably because of biogenic stimulation. Oral administration is even more effective. There was a suggestion that the active constituent might be traumatic acid (chemically, 1-decene-1, 10-decarboxylic acid) but this is disputable. Traumatic acid is the hormone known to accumulate at the site of injury in plants, usually accompanying the gums and mucilages that collect in the wound (acacia, cherry gum, tragacanth, and others).

Following the work of the Ukrainians, Aloe vera gel was submitted to various studies which revealed that:^{2, 3, 13-15}

1. The gel coacervates pepsin in the same fashion that quince seed gel coacervates papain. Coacervated pepsin is reversible and can release its enzyme at the proper electrical charge. In coacervated form pepsin loses its proteolytic effectiveness, but regains it when released. Food reverses the coacervation so that after the administration of the gel the pepsin remains inert so long as the stomach is devoid of food, but on introducing food (particularly protein) the coacervate reverses and the pepsin is set free to digest the nutrients.
2. The gel inhibits the secretion of hydrochloric acid by the parietal cells of the stomach. There is no free hydrochloric acid within the parietal cell; the acid develops at the membrane surface through the interaction of sodium chloride

and carbonic acid catalyzed, it was at one time thought, by carbonic anhydrase. Whatever the mechanism involved in the exchange of sodium and hydrogen ions whereby sodium bicarbonate and hydrochloric acid are formed, the reaction is halted by Aloe vera gel. For example: The injection of histamine (as phosphate) is followed by a prompt increase in gastric flow and acid content. However, if the histamine is dissolved in Aloe vera gel as diluent and injected in that menstruum, there is no change in the amount or acid content of the juice. Since this is true in experimental Heidenhain pouches in dogs, it is clear that the Aloe vera gel affords a systemically operative antisecretagogue capable of offsetting the well known, action of histamine. The inhibition is more marked if the gel is fed orally and the histamine is injected subsequently.

3. The gel is an extraordinary demulcent comprised of mannuronic and glucuronic units combined to form a polymer of high molecular weight. Gastric mucin contains only glucuronic units in its carbohydrate moiety. The uronic acids are natural detoxicants and as they are released by the hydrolytic cleavage of Aloe vera gel they may take part in the healing process by stripping toxic materials of their harmful irritation. Whether or not this occurs, however, the gel is tenacious to a marked degree, in which property it excels over all other known gums including methylcellulose. Unlike methylcellulose, which is biochemically inert, Aloe vera gel is certainly reactive. It serves as a biochemical "bandage" and is protectively helpful in restraining aggravating irritants from reaching the sensitive ulcer.

To the extent that these attributes of Aloe vera gel are operable in the human being in whom peptic ulcer exists, they should meet obvious therapeutic indications with anticipated helpfulness.

In its fresh state the gel is slightly acrid and possesses a somewhat disagreeable odor. Apparently the odor is due to volatile matters which disappear if the gel is subjected to proper processing. Tartness, partly because of free uronic acid that is contained in the gel, is easily compensated by adjusting the pH to any desired level, preferably around pH 6.5 to 6.8. Like gastric mucin, it is a glairy gel that does not altogether appeal to those who have a distaste for thick, mucilaginous products; but this feature is readily overcome by emulsifying the gel with heavy mineral oil.

Almost all patients with peptic ulcer are to some degree constipated. Harsh laxatives are contraindicated. Liquid petrolatum in small doses helps this condition and at the same time protects the gel against degradation such as occurs when it is admixed with an oxidizable oil.

If there is reason to suspect a lowered tissue resistance on the part of the mucosa, it is

probable that measures designed to improve the general health may be helpful. There are no known procedures that satisfactorily benefit the tone of the gastric or duodenal mucosa directly.

Diet is certainly important, though there is no evidence that relates peptic ulcer to any dietetic deficiency requiring special nutritional supplements (such as cabbage juice). Frequent feeding of bland foods; avoidance of mechanical, chemical, or thermal irritants; and the provision of nutrient balance with respect to protein, carbohydrate, fat, mineral, vitamin, and adequate caloric requirements suffice. Innumerable diet lists are available that plan menus achieving this objective.

At best, antacids can only effect neutralization of the acid; they have no control over its excessive secretion. In selecting an antacid the clinician seeks an ideal which does not exist: prolonged neutralization when administered orally in acceptable amounts; no untoward systemic derangements such as alkalosis; absence of delayed secondary stimulation of secretion; no cathartic or constipating effect; no interference with the processes of digestion or absorption; and palatability. Such an antacid has yet to be developed. In the study presented here, antacids were not used at all.

Anticholinergic restraint of acid secretion is directed to the interference with the transmission of nerve impulses mediated by acetylcholine and is based on the concept that vagal hyperactivity is chiefly responsible for the gastric hypersecretion. In some instances Pro-Banthine was prescribed in usual doses at the initiation of treatment. Emotional disturbance needs to be identified and an effort made to guide the patient into a tension-free routine.

However tempting it is scientifically to split such a series of peptic ulcer patients so as to have half on treatment and half on placebo, it is impractical to carry on such a test in private practice. Patients come in to be treated and to obtain the quickest possible relief from their distress. The doctor must dispatch this obligation. Despite this lack of "control" it is obvious that certain interpretations are entirely plausible in the light of the experience presented. These are:

1. In such a series of chronic peptic ulcer cases it would not be expected to experience 100 per cent complete recovery if the sole medication (Aloe vera gel emulsion) were pharmacologically inert, as the indictment of Western medicine has intimated.
2. Disappearance of painful distress related to meals and feedings could not have vanished in every instance if the peptic activity had not been arrested and the corrosive attack of hydrochloric acid inhibited to an unmistakable clinical degree.
3. Some recurrences should have appeared, since treatment of the series was

completed early in 1962 and several patients had had recurrences previously as frequently as 6 months apart.

4. The gratitude expressed by the patients was in each instance so sincere as to leave little doubt about the reorientation of their previously dismal outlook on life. In these cases, the emotional distress seemingly vanished as the ulcer healed, suggesting that the neurogenic facet was ushered in by the peptic disease instead of the usually assumed reverse.

Considerable further evaluation of the Aloe vera gel emulsion as a therapeutic approach to the management of peptic ulcer is certainly desirable, coincident with which the probing of the pharmacologic mechanism involved is worthy of intensive research. Meanwhile, this preliminary study develops outstanding experience. There can be little question that Aloe vera gel emulsion is clinically helpful in the following conditions:

1. Prodromal changes in the gastrointestinal mucosa that strongly suggest incipient ulceration, in which the symptoms are somewhat borderline and the x-ray evidence is noncorroborative.
2. Duodenitis, in which the clinical picture coincides with ulcerative symptomatology and is supported by x-ray evidence of motility changes characteristic of response to ulcerative irritation.
3. Frank instances of ulcers, in which the clinical diagnosis is clear and supported x-ray demonstration of a niche or crater or pathognomonic roentgenographic deformity.

It is not possible to ascribe the benefits derived from the Aloe vera gel emulsion to its excellent demulcent property alone. Other demulcents that are biochemically inert, such as methylcellulose, do not effect clinical recovery when used as the sole therapeutic agent, even if supported occasionally with Pro-Banthine.

In vitro demonstration of the ability of Aloe vera gel to coacervate solutions of pepsin in acid, such as occurs in the gastric juice, and demonstration by Heidenhain pouch of the ability of Aloe vera gel to inhibit gastric parietal cell secretion of hydrochloric acid, favor the belief that these pharmacologic properties must be operative, to a measurable clinical degree, in the successful therapeutic management of peptic ulcer. But whether these properties or other virtues yet to be recognized are responsible for the decidedly beneficial action of Aloe vera gel emulsion in peptic ulcer, there can be little doubt of its utility as a therapeutic agent in this serious disease.

Summary

Clinically, Aloe vera gel emulsion has dissipated all symptoms in patients

considered to have incipient peptic ulcer. Duodenitis, probably representing duodenal ulcer but lacking x-ray demonstration of pathognomonic deformity, treated with Aloe vera gel, resulted in uniformly excellent recovery, except questionably in one patient. In cases of peptic ulcer about which there could be little clinical doubt, and in every instance confirmed by roentgenologic identification of a fleck, niche, or crater with accompanying hypermotile manifestations, Aloe vera gel emulsion provided complete recovery.

It appears that recurrence has been delayed and possibly prevented in cases normally expected to flare up after satisfactory treatment.

Recent research on Aloe vera gel suggests the presence of an active ingredient which, on ingestion or injection, is accompanied by the inhibition of excess hydrochloric acid secretion by the parietal cells of the stomach. If the gel is mixed with artificial gastric juice, the pepsin is coacervated and becomes inert in that state; but a change of pH, as by the introduction of food (protein especially) reverses the coacervate and the pepsin once more exerts its proteolytic capacity. Finally, Aloe vera gel is a saccharide polymer, resembling gastric mucin in its carbohydrate moiety, but it is many times more tenacious than any other commonly known mucilage (methylcellulose, gastric mucin, karaya, or others).

There can be little doubt that the properties ascribed to Aloe vera gel should be therapeutically helpful in the management of peptic ulcer; but whether or not these properties occasion correction of the ulcer-producing process, it is unmistakable that Aloe vera gel, through whatever mechanism, is clinically beneficial in the treatment of this very important disease.

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