



FIG. 1.

Conclusion. No evidence was obtained of *in vivo* activity of histaminase in preventing anaphylactic or histamine shock. There is still a possibility, however, that histaminase might act *in vivo* if the release of histamine into the body were slow and small in amount, thus allowing more time for the enzyme to act.

11933

Treatment of Experimental Hydrofluoric Acid Corrosion.

AARON PALEY* AND JOSEPH SEIFTER. (Introduced by W. E. Hambourger.)

From the Department of Pharmacology, Western Reserve University, Cleveland, O.

In the experiments here presented hydrofluoric acid corrosions in rats were infiltrated hypodermically with a 3% solution of calcium gluconate in distilled water.

Adult rats were treated on the lateral aspect of the front paws just below the shoulder or on the lateral aspect of the thigh. The method was to clip but not shave the skin and to apply a drop of 40% hydrofluoric acid on the tip of a wax applicator to a spot of skin 7 mm in diameter. After a variable time interval, 0.5 cc of the calcium gluconate solution was injected subcutaneously under the lesion (or intramuscularly if the skin had sloughed off) in some animals, while in some the lesion was left untreated to serve as controls.

All the lesions, both treated and untreated, eventually healed, but there was a marked difference in healing time between the two groups. The criterion of healing was the complete disappearance

* Crile Scholar, Summer, 1939.

of scab and granulation tissue. The average healing time of 21 untreated lesions is 17.6 days and the median 19 days. In the case of the treated animals a marked break in effectiveness of treatment apparently occurs between 8 and 16 hours. The average healing time of 19 lesions treated within 8 hours is 12.5 days; the average of 10 treated 16 hours or later after application of acid is 16.6 and the median 18 days, or essentially the same as for the controls.

Another criterion of the usefulness of treatment is the incidence of suppuration. Pus was observed in 7 of the untreated animals (or 33.3%) at some time during their course, and these had an average healing time of 19.5 days. Only 3 of the lesions treated within 8 hours suppurated (or 15.8%). If the 7 suppurating burns be eliminated from the control series, the average of the remainder is 16.6 days (as compared to 12.5 for the treated). The effectiveness of treatment cannot then be wholly attributed to increased resistance to secondary infection. A series of 6 lesions were given from one to 5 additional injections at daily intervals. They showed no improvement over those receiving a single treatment, a result consistent with the finding that treatment after 16 hours is ineffective.

Discussion. With very sparing application of the acid a slight lesion was produced. There was a latent period of 10 minutes before the first objective evidence of tissue injury was observed, *viz.*, a gray discoloration at the site of application. Twenty minutes after application of the acid a slight wheal appeared, but at half an hour the skin looked perfectly normal, and not till one hour after the acid did a red spot of hyperemia develop. This became more intense and 48 hours later had an indurated feel. By the fourth day a definite red crust had formed which separated on the sixth day, revealing a practically healed base.

A more severe corrosion was produced with slightly more liberal application of acid. Within 5 minutes the gray zone was visible. At 10 minutes the gray area had a raised white areola about it. At 15 minutes the gray area was very sharply demarcated and the surrounding edema was more extensive and had a pink cast. At one hour the reaction (edema, erythema, and gray zone) appeared to have diminished, but deeper red spots soon appeared on the border of the gray zone. This lesion also progressed through intense hyperemia, induration, and crust formation. On the sixth day the crust came off revealing an ulcer into the subcutaneous tissues with a clean granulating base. A new crust subsequently formed and healing was not complete till the 15th day.

Greater uniformity of lesions could be obtained if they were made severe rather than slight or moderate. Where these appeared of unequal severity, the worse one was chosen for treatment and the other kept as a control, to keep possible errors on the side of conservatism. In severe corrosions the usual gray area appeared, but within one to two hours, sloughing occurred readily, so as to reveal the underlying muscle, covered only by a clear, more rarely a bloody serous exudate. Twenty-four hours later this had apparently condensed to form a hard crust and the skin margins were bound down and indurated. Healing proceeded by granulation under the crust, the final result being in every case a surprisingly insignificant scar.

Conclusions. 1. Infiltration of 3% calcium gluconate within 8 hours after intense application of hydrofluoric acid caused a significant shortening (about 30%) in healing time and a significant reduction (about 50%) in the incidence of suppuration. The latter cannot alone wholly account for the quicker healing. 2. Multiple treatment at 24-hour intervals is no more effective than a single treatment. 3. Rats appear to show a much quicker and less complicated recovery from severe hydrofluoric acid corrosion than humans. 4. The lesions heal characteristically by granulation under a hard crust.

We are indebted to Professor Torald Sollmann for his important suggestions.

11934 P

Rise in Serum Copper Following Oral Administration of Copper Sulfate.

ADOLPH SACHS, VICTOR E. LEVINE, AGNES SCHMIT AND
RITA HUGHES.

*From the Departments of Medicine and Biological Chemistry, School of Medicine,
Creighton University, Omaha, Nebraska.*

In a recent publication¹ we suggested that copper may be transported in the serum. The data presented in this paper support this conception. Using dogs as experimental subjects, we have been able to demonstrate a substantial increase of copper in the serum following oral administration of aqueous solutions of copper sulfate.

¹ Sachs, A., Levine, V. E., Andersen, A. C., and Schmit, A., in press.