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*Compliments of  
H. V. Würdemann*

THE USE OF TRICHLORACETIC  
ACID.

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BY DR. STANISLAUS v. STEIN,

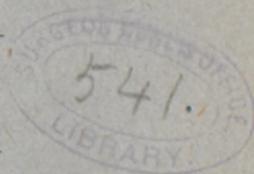
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## THE USE OF TRICHLORACETIC ACID.

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[Since the publication of Gleitsmann's articles<sup>1</sup> upon the use of trichloroacetic acid two years ago, I<sup>2</sup> have been in the habit of using this application in much the same manner as is recommended in the following translation of an article by Dr. v. Stein. In some thousands of applications I have yet to learn of re-active inflammation or erysipelas following its use. It renders potential cauterization safe even when abundant causes of infection exist, and galvano-cauterization, in conjunction with the after application of trichloroacetic acid, may be resorted to with impunity where otherwise we would dread the possibility of septic infection. In several instances where I have neglected its use I have had severe reactive inflammation and in two cases facial erysipelas after potential cauterization, but have always had uniform rapid healing where it has been applied. The same may be said of its use as indicated by the author after chromic cauterization, which I have now used with satisfactory results for over one year.—H. V. Würdemann.]

(The following is translated from Dr. v. Stein's article in the *Monatsschrift für Ohrenheilkunde*, January, 1894):<sup>3</sup>

The excellent caustic and astringent qualities of trichloroacetic acid upon mucous membranes, which I first wrote about in a previous article (1889), have since been corroborated by a number of observers. Some additional good therapeutic properties of this acid which I have had occasion to note during the last two years have been little, if at all, considered by others.

1. I showed in my first article that a solution of

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<sup>1</sup> "A New Method to Lessen Reaction after Galvano-Cautery," Gleitsmann in *Annals Ophth. and Otol.*, January, 1892.

<sup>2</sup> "Cauterization in Hypertrophic Rhinitis," Würdemann in *Annals Ophth. and Otol.*, July, 1892.

<sup>3</sup> "Ein weiterer Beitrag zur Anwendung des Acidum trichloroaceticum," Von Stanislaus von Stein, *Monatsschrift für Ohrenheilkunde*, Jahrg. xxvii, No. 1. Berlin.



trichloroacetic acid of the strength of 1:500-2000 kept all suppurative processes in abeyance for a week. Therefore I recommended the same to cure acute rhinitis in the first stage, to secure disinfection of the eschar after galvano-cauterization and after bloody operative procedures.

In coryza I have noticed that a half teaspoonful of a 1 per cent. solution dropped lukewarm in either side of the nose, two to four times a day, produced an abundant secretion of mucus and improvement of the subjective symptoms. Since using this as a prophylactic method, I have seldom observed consecutive ear inflammation in those patients who usually had the same during the fall and spring of the year. I would explain this favorable result both by the anti-bacteriologic action of the acid and by the imprisonment of the microorganisms in the coagulated secretions. Accordingly, I sought for other agents more stimulating to the mucous membranes of the nose, and found a satisfactory one in uranium acetate.

R. Uranii acetici . . . . . 0.05  
Aquaë dest . . . . . 10.00

M. S. A couple of drops lukewarm in each side of the nose two to three times a day.

2. Weak solutions of trichloroacetic acid used in the nose in simple atrophic rhinitis for a considerable time sometimes produce such a decided hypertrophy of the turbinated membranes that it may become necessary to cauterize them in order to secure free breathing. No other medicine of which I am cognizant produces such a remarkable effect, and thus this agent is particularly applicable in the treatment of ozena.

3. In true ozena I now apply much stronger solutions than I did at first; *i.e.*,  $\frac{1}{2}$  to 10 per cent. The odor is not so quickly nor so safely abolished by any other medicinal agent as by the acid. Here it is certainly a specific. Sometimes I combine it with iodine (glycerin-kalii-iod. pur.), especially in syphilitic cases.

For the best results it should be applied in the following manner: I begin with a weak solution, 1 to 2 per cent., and use this so long as there is improvement, and afterward using the stronger solutions. It is not proper to begin with a strong solution, as at first many patients are unable to bear them. In many cases the fetor is stopped in a couple of days.

For the application I use a probe 20 cm. long and  $2\frac{1}{2}$  to 2 mm. thick, which is grooved on each end. One of the ends is bent in order to get under the turbinated body better. Upon one of the grooved ends hygroscopic cotton is wound in the form of a bead. For each application a small amount of solution is *dropped* upon the probe, and in this manner the other portion of the solution is kept pure. The hardest part of the treatment lies in thoroughly but gently massaging the medicine into all parts of the nasal passages, and to continue this method until the crusts no longer form. This procedure is done at first two or three times a day, if it causes no irritation. As soon as the fetor is removed and the crusts are softened it should be applied once a day. In a couple of visits, under the direction of the physician, the most uneducated patient learns the necessary manipulations. Hemorrhage is readily stopped by cotton wool tampons. Zinc ointment or ordinary vaselin may be used in the anterior nares of those patients with delicate skin or tendency to eczema.

By the above described treatment, the fetor is always controlled in my patients; the crusts are softened, are without odor, and are easily blown out of the nose. In many cases the procedure should be repeated once a week to guard against a relapse. In none of my cases did the odor return.

4. If a little white of egg or blood serum be precipitated by chromic acid, and another portion by trichloroacetic acid, and the coagulum well washed with water to remove the excess of the acid, it will be remarked that the albumen treated by trichlor-

acetic acid forms a tough membrane while the other is readily broken into pieces.

Upon being kept in Petri's cups, a putrid odor soon arises from the chromic albumen, while the acetic albumen becomes covered over with a moldy scum without odor. In the last case, the putrefactive germs, except when inoculated in a mass, have an unfavorable environment for their development. From this observation I was brought to use trichloroacetic acid for disinfection of operations in the nose, the naso-pharynx and pharynx, in order to procure in this way assured antisepsis. I have used this method in a number of thousand of cases in private practice and the out-patient department of Prof. Osbroumoff's clinic of Moscow, Russia, and always with satisfactory results, in that the subsequent history was free from fever and that the wounds heal quickly without infection, even in those persons in whom the opposite had been previously observed. Only one very nervous student, out of all the patients, complained of chills after the cauterization. Before this, I often had consecutive tonsillitis and feeling of stoppage in the ears after galvanic or chromic acid cauterization of the posterior parts of the turbinated bodies.

Accordingly, after cutting operations, I usually put a crystal of trichloroacetic acid on the edges of the wound, but use it in a different manner upon the galvano-cauterized surface. In the latter instance the burnt part is divested of its water so that the crystals do not liquefy except upon the edges of the burn. I apply here a strongly concentrated solution, (as this acid is very hygroscopic, if the cork of the bottle containing crystals be kept open for a few hours such a solution may be obtained.—*Trans.*)

The end of a silver probe one mm. thick is wound about with a little cotton, wet with the solution and applied several times to the spot. The eschar becomes snow-white and closely adherent. The course of such a galvano-cauterization is without reaction

like that of ordinary trichloroacetic cauterization. The slight pain resultant is of shorter duration though a little sharper than that of chromic acid or the galvano-cautery. Trichloroacetic acid is given the preference indisputably by many observers for all other effects. After the scab drops off, the wound should again be disinfected.

The same satisfactory results follow chromic acid cauterization followed by application of trichloroacetic acid. I must here speak of a peculiarity. If the nasal membranes are but lightly touched by a chromic acid crystal or the concentrated solution, and the superfluous acid removed by a pledget of cotton and the spot again treated by trichloroacetic acid, a deep groove may be made similar to that obtained by galvano-cauterization. The reaction is also but little. The application of the two acids is to be particularly recommended in the case of young children.

Trichloroacetic acid may be used alone when the hypertrophy is not great. The most satisfactory results are obtained when the areas to be cauterized are weak in elastic tissue. For this reason, turbinated hypertrophies eligible for this treatment are those which are readily contracted by cocaine. For greater degrees of thickening, the results are more quickly obtained by the galvano-cautery combined with trichloroacetic acid. Acetic acid alone gives less satisfaction in these catarrhs characterized by loose hanging hypertrophied membranes with very abundant flow of mucus, (several handkerchiefs a day) such as is common in children. This may be explained by the fact that the acid becomes weakened by the reaction and loses its (caustic) properties. Chromic acid gives the same result and the secretion may only be controlled by energetic galvano-cauterization, followed by the trichloroacetic acid application.

I take away polyps and polypoid growths by the galvano-caustic loop and afterwards apply acetic acid. For experiment in several patients, the cauterization was done in one side of the nose, and omitted in the

other. In these cases the patients complained of an unbearable pressure on the one side of the nose (not so treated) occasional pains and abundant flow of irritating mucus.

5. An important factor in the use of trichloroacetic acid is that after its use no adhesive inflammation of neighboring portions follows, such as often occurs after chromic acid and galvano-cauterization. This kindly action has allowed me to use the galvano-cautery with after-application of trichloroacetic acid upon growths of the nasal septum in very narrow noses without danger of adhesion, in order to pass in the Eustachian catheter, and also to blow out pus deposits from the antrum of Highmore and the frontal sinus.

The results in inflammations of the pharynx are similar to those obtained in the nose. In deep infiltration of the membranes, trichloroacetic acid acts superficially and slowly. In other forms, healing is quickly obtained. In follicular tonsillitis following upon acute inflammation the swellings are reduced to their former size after two or three cauterizations. In those lacunar tonsillites in which considerable pus is contained deep in the tonsillar crypts, and in which exacerbations occur every few months or in some cases at intervals of years, I carry the trichloroacetic acid crystal upon a fine bulbous-ended and cupped silver sound deep into the crypt. When the mouths of the crypts are greater, I take a fine silver canula three mm. thick in which is contained a piston-like wire with a couple of rings for the fore and middle fingers. To use this pistol-shaped instrument the wire is drawn a little way in and a couple of the crystals laid in the lumen of the canula. Then the bent end is inserted deeply but gently into the crypt and the wire pushed with the thumb on the button. The entire manipulation, even without cocain, is painless as long as the application of the acetic acid is limited to the tonsil. The application is renewed after the disappearance of the white eschar. The

healing is most happy. The submaxillary glands diminish in size and become indolent.

In an old hypertrophic tonsillitis, pharyngitis granulosa and retro-arcualis with proliferation of connective tissue, galvano-cauterization followed by application of trichloroacetic acid is most applicable. The result is always recovery without fever and without reaction. Only during the same day is there difficulty in swallowing.

The application of trichloroacetic acid in the ear is painful but is of use for small granulations. For these cases I recommend resorcin. Chromic acid is better for larger polypi. When its use is followed by a highly putrid discharge this may be rendered odorless by touching the scab accurately with a concentrated solution of trichloroacetic acid. In order to protect the walls of the meatus from harm, it is necessary to smear it well with vaselin and to push in the ear speculum deeply. The excess of acid should be washed out.

(The translator has never used trichloroacetic acid in the ear on account of severe neuralgic pain thereby produced. Polypi and other growths are better removed entire than to be slowly burnt out by acids.)

Dr. v. Stein here describes a set of five fenestrated nose specula of different lengths, the use of which is hardly necessary for any one skilled in exact manipulation. Gleitsmann's applicators for the crystallized acid, and the bent probe or Bosworth applicators wound on the end with a minute quantity of cotton, used under strong illumination by the forehead mirror, the nares opened by the dilating hand speculum, are all that are required in educated hands.

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