

MORTON (THOS. S. K.)

Acetanilid as an
antiseptic x x x x x x x



[Reprinted from the Transactions of the Philadelphia County Medical Society, 1894.]

ACETANILID AS AN ANTISEPTIC; WITH OBSERVATIONS UPON ITS USE IN ONE THOUSAND SURGICAL CASES.

By THOMAS S. K. MORTON, M.D.,
PROFESSOR OF SURGERY IN THE PHILADELPHIA POLYCLINIC.

[Read December 26, 1894.]

DURING the past six months I have been employing acetanilid locally in a large number of surgical affections, with results so surprising in some respects as to make it difficult to restrain enthusiasm in commenting upon the antiseptic properties of the drug.

Having noticed mention of the remarkable powers of acetanilid in preventing pus-formation in the articles of Drs. Harrell and Bodamer, I began cautiously to employ the substance, and have since been extending its trial in many directions, until now, my cases having numbered over one thousand, I think myself justified in making some preliminary observations that others may be persuaded to try the drug, so that by multiplying observers and cases we may more early come to know the exact value and limitations of the drug as an antiseptic.

Acetanilid, phenyl-acetanilid, or antifebrin, is a white crystalline material somewhat resembling boric acid, made by the action of glacial acetic acid upon aniline. It is odorless and almost tasteless. Its commercial value is about forty cents a pound, or one-tenth that of iodoform—the drug which it probably is destined to replace. Its physiological effects when administered internally are very well worked out, but interest in its local action is of very recent date.

The first reference to the antiseptic and anæsthetic powers of acetanilid is that of Neuth, who, in the London *Lancet* of April 20, 1889, made a very brief observation that the drug had considerable power as a sedative in dermatology, and was valuable as a curative in all skin diseases associated with irritation, and especially in ulcers.

Francis W. Harrell, in the *Medical News*, October 14, 1893, was



first to call attention to the anti-pyogenic powers of acetanilid, and to the fact that irritation never resulted from its presence in full strength upon the skin or in wounds. He showed that nothing more than the pure powder, liberally applied, was necessary to secure primary union in the dirty, greasy, crushed wounds of miners. He had employed the drug so freely as to convince himself that poisoning by local absorption was impossible.

Dr. George A. Bodamer, of Philadelphia (*Medical News*, March 10, 1894), confirms Harrell in respect to the healing of dirty wounds without the formation of pus in the presence of acetanilid, and states that he has dusted the powder into a large number of fresh wounds, with the result of primary union in all. He concludes that this medicament prevents the development of pus and does not interfere with primary union; that its action upon venereal sores is at least as good as iodoform, and upon syphilitic ulcerations the effect is usually, but not always, good.

Charles H. Castle, of Cincinnati (*Medical News*, March 31, 1894), as a result of observations in two hundred and fifty cases states that pus did not form in a single instance in the presence of acetanilid.

Dr. Woods, of San Francisco (*Journal Amer. Med. Association*, July 21, 1894), quotes twenty cases. He recommends acetanilid for external hemorrhoids, also as a suppository after hemorrhoid operations. A dilute solution in alcohol and water he has used as an injection in gonorrhœa with very satisfactory results. He considers its curative effects upon burns as simply wonderful, but reports a severe case of poisoning arising from dusting the pure drug over a burn of an entire leg in the granulation stage. Locally the granulations became dry and shrunken, and no pus formed for forty-eight hours after the acetanilid was withdrawn. His conclusions are that it is odorless, antiseptic, desiccant, hemostatic, stimulant, and a perfect substitute for iodoform.

Woods quotes (without reference) M. E. Knowles, of Montana, as stating that fistulæ rapidly close under injection of peroxide of hydrogen followed by acetanilid, and K. P. Wasilevich recommending the drug for venereal sores.

J. Abbott Cantrell, of Philadelphia (*American Therapist*, December, 1894), reports excellent results from the use of acetanilid in irritative and septic skin disorders.

The action of acetanilid upon wounds, especially granulations, when used in full strength, is to produce intense dryness, blueness, and to check at once and prevent the formation of pus. Upon

extensive granulating surfaces and chronic ulcers a slight burning sensation is at first perceived, which is rapidly succeeded by a sedative or anæsthetic effect. If used in sufficient quantity, a thin scab of acetanilid, combined with the wound secretions, forms, under which healing very rapidly progresses. If a very large surface is exposed to the action of the undiluted drug, toxic symptoms promptly supervene in susceptible individuals. It is probable that children and the aged are more sensitive to its absorption than are vigorous middle-aged persons. It is also probable that anemia might follow too prolonged application of large quantities of the substance, because of its destructive action upon the red blood-corpuscles. This, however, I have not seen. The powder does not stick to wounds or hold dressings fast, as a rule; but, when it does so, alcohol causes instant release by dissolving the drug.

Under no circumstances does acetanilid irritate the skin or wounds, even when used beneath impervious protectives or antiseptic poultices.

What may be the best vehicles for applying acetanilid must yet be proved. Upon most of my cases the pure powder was used from a dusting-box. This, while usually safe, I think has been an unnecessary waste, for very recent experiments in dilution have shown me that a $\frac{1}{2}$ of 1 per cent. mixture with cosmoline was sufficient to arrest suppuration and secure rapid healing in an extensive septic scald. All pain vanished after the first application.

Where absorption of the drug has been desired it has been used either pure or mixed with an easily absorbed agent, such as lanoline. When employed for purely local effect in ointment form I have usually prescribed a drachm to the ounce of cosmoline.

Acetanilid dissolves in 5 volumes of alcohol, in 20 volumes of ether, and in 200 volumes of water. It is soluble in liquid cosmoline to the extent of 40 grains to the ounce. In chloroform it very freely dissolves. What powders will prove best as diluents remains to be proved, but boric acid does not appear to interfere with its action.

By diluting a saturated alcoholic solution of acetanilid with water the drug will be thrown out of solution in the shape of fine crystals, and will remain perfectly mixed in suspension long enough to permit of its use in this form as an injection for abscesses, carbuncles, in gonorrhœa, etc.

I have used acetanilid gauze in many cases where iodoform gauze would previously have been indicated. This gauze was made after the glycerin and soapsuds formula for iodoform gauze of a strength

of 10 per cent. by the nurses at the Pennsylvania Hospital. At present the J. Elwood Lee Company, of Conshohocken, Pa., is making the gauze by several formulæ and of various strengths for experimental purposes. I believe that for the average wound requiring packing a very weak gauze will prove satisfactory and safe.

In the large number of cases upon which I have very freely employed acetanilid, but twice have toxic effects been noticed. One was in an infant aged fourteen months, where I had excised the hip for tuberculosis and packed with iodoform gauze. Upon re-dressing a few days later the iodoform was replaced by 10 per cent. acetanilid gauze. The temperature four hours later dropped five degrees, and there were great pallor and feeble pulse. The temperature rose upon withdrawal of the acetanilid. The second case was a superficial suppurative scald of arms, chest, legs, and head in a man aged fifty-seven years, who had for six days been dressed with boric acid ointment. About two drachms of finely-powdered acetanilid were dusted over the surfaces at 12 o'clock noon. At 5 P.M. the patient became very blue, respirations somewhat accelerated, pulse slow and very compressible; face and extremities covered with cold perspiration; temperature normal; mind clear. All acetanilid was at once removed. At 8 P.M. he became maniacally delirious and intensely blue. Yawned to such an extent as to dislocate the lower jaw several times. Beginning with the first symptoms of poisoning, he was freely stimulated with digitalis and whiskey, and at midnight of the same day was again in normal condition. The delirium, of course, may in part or wholly have resulted from the whiskey. Practically no suppuration took place afterward, and he was soon sent home well.

I have found that all ordinary suppuration ceases in the presence of acetanilid, even when much diluted, in a manner equally astonishing and gratifying. Abscess cavities, boils, and carbuncles, when opened, and dirty, greasy wounds, produced by machinery or upon the street, have healed, as a rule, without further suppuration, and in an unprecedentedly short time after acetanilid has been applied in the form either of pure powder, gauze, ointment, or dissolved in alcohol, water, or oil, as an injection. Sloughing septic lesions have been trimmed up, dusted with acetanilid, and sutured without drainage, yet have frequently healed by primary union. Clean wounds have been likewise freely dusted and sutured, and have healed similarly, thus proving that the drug does not interfere with healing in the absence of sepsis. So slight is the secretion of wounds so treated that many extensive ones have been healed under the collodion scab.

Tuberculous lesions appear to be affected in a much better manner by acetanilid than by iodoform—probably in large part, as in other wounds and conditions, by the intense dryness of the surroundings depriving the bacilli of their required pabulum. Tuberculous bone cavities have healed rapidly under acetanilid gauze (10 per cent.).

A number of fistulæ have instantly taken on a healthy appearance after injection of alcoholic, watery, or oleaginous solutions of acetanilid, and have very quickly closed.

Suppurating joints freely dusted with the drug after opening have ceased to form pus, and under subsequent packing of the wounds with acetanilid gauze have healed with excellent functional results. In acetanilid I believe that we have the safest dressing to ward off the infection of joints subsequent to operation through wounds, persistent fistulæ, etc. It would appear that pus microbes cannot exist in the presence of the drug, and that skin bacteria do not multiply in its proximity.

In compound fractures the use of the agent is obvious, and the results, so far as the prevention of sepsis goes, excellent.

I have not injected suppurating or tuberculous joints, or acute or cold abscesses with the substance as yet, but am about to commence some experiments in this promising direction.

Upon chancroids the effect of acetanilid is perhaps most surprising of all. These troublesome sores heal almost instantly under a crust of the agent. At the Out-patient Department of the Pennsylvania Hospital during the past two months I have been able to study the effects of acetanilid upon a large number of such cases, as well as upon other venereal irritations about the genitals. All of these soft sores and inflammations have uniformly healed in from one to seven days with a single exception. This one was of a phagedenic nature, and required cauterization by nitric acid before it would heal under the acetanilid. My habit at present is to prescribe a drachm of powdered acetanilid, and direct the patient to wash several times daily, and subsequently to rub in the dry powder. If the sore is beneath the prepuce, he is instructed to leave a quantity of the drug inside. Presence of the powder prevents excoriations by urethral discharges. The entire absence of odor from the drug is especially gratifying to venereal patients.

Syphilitic chancres and condylomata are usually much improved by the dry powder, and some are promptly cured. Secondary and tertiary ulcerations are stimulated by the drug, and, when thus relieved of the septic element, are prone to more rapid cicatrization.

External and internal rectal affections are instantly benefited by applications in the form of powder or by ordinary cocoa-butter suppository containing two or three grains of the drug. One case, a child with an ulcer of the rectum, complained of pain after full-strength powder was used. Irritable or inflamed hemorrhoids are at once relieved by this suppository, as a rule. Fistulæ about the anus heal very well when split open and packed with the gauze.

In-growing toe-nails rapidly lose their irritative element when painted with the alcoholic solution and packed with cotton containing the powder.

In injuries of the head, involving bleeding from the ear, I have packed the external auditory canal with pure acetanilid in order to prevent the invasion of the inner ear or brain by sepsis from without.

Before experimenting with this drug it had long been my custom to paint suture lines, after closing a wound, with a saturated solution of iodoform in ether in an attempt to sterilize the surrounding skin of its normal bacilli. This has given way to the saturated alcoholic solution of acetanilid, with the effect of almost always preventing stitch abscesses.

I have seen much to lead to the belief that in acetanilid we have at last found a substance which will either destroy or render inactive the normal bacteria of the skin by its absorption into and through the epidermis; also a few facts which point toward the possibility of controlling certain inflammations of the lymphatics and superficial tissues by contact with the drug during absorption from the surface into the economy.

Possibly we may be able to render operative fields sterile, even of the skin bacteria, by the previous local application of the drug in question. Should this prove practicable, then we can operate with what has never before been secured—an absolutely sterile skin.

Finally, it should be pointed out what great possibilities of usefulness this drug may have in first aid to the injured in factories and mines, upon railroads, in ambulance service, and upon the battlefield.

