The Cold-water Treatment of Puerperal Fever, according to the methods of W. Winternitz and Carl v. Braun, of Vienna.[1]

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The results obtained by any known method of treatment in cases of septic poisoning, during the puerperal state, are, as a rule, very unsatisfactory indeed; still, some lives have been saved by the following means, which, as far as I am aware, are not yet sufficiently known and appreciated by the profession. I, therefore, feel warranted in urging its trial in given cases where other resources and modes of practice seem to be useless. I refer especially to the beneficial effects obtained by the hydriatic or cold-water treatment of puerperal fever, in the manner advocated by me in 1875, in a paper read before the New York Medical Journal Association "On the Cold-water Treatment of Fever." The principal object of the administration of the cold baths is the reduction of fever heat, if of great intensity and of long duration. The baths ought to be given without the least exertion on the part of the patient, as often as the temperature taken in the axilla indicates a rise of two or more degrees Fahrenheit. The water used for this purpose should be of about seventy to fifty-three or even less degrees Fahr., or, exceptionally, in very weak patients, of about eighty degrees; the patient to remain in the bath from fifteen to twenty minutes at a time. Before administering the bath, the precaution should always be observed of first cooling the head, by covering it with a cold wet cap or cloth, in order to prevent the sudden congestion of the brain which would otherwise follow.

If the temperature does not rise above one hundred and one to one hundred and two degrees Fahr., the simple ablution or sponge bath is very valuable. This procedure, however, if repeated too often, rarely lowers the temperature more than two to three degrees, and when reaction sets in we find the fever higher than before. As a rule, therefore, simple sponging with cold water produces rather an elevation than a reduction of fever heat, if not followed by more active measures. The sponge bath has, however, a good effect on the patient as a nerve stimulant, and produces, moreover, a very comfortable feeling, and is very agreeable to the sufferer for a short period of time; it may be made use of as a preparatory method to the half bath, to be described presently, and for the purpose of strengthening the patient's confidence, and to influence the vessels of the skin, preparing them for the greater giving off of heat under further hydropathic treatment.

[1] Read before the Obstetric Section of the New York Academy of Medicine, Feb. 23d, 1882.

The friction bath, by means of a wet sheet, dipped in cold water of from sixty-two to fifty-three degrees Fahr., well wrung out and wrapped around the patient, is a more useful method of using cold water for the purpose stated. Before applying it, or any other method known as the cold-water treatment of fever, we always have to use the precaution of first cooling the head by cold applications. The friction bath is a powerful nerve stimulant, since all the peripheral nerves in the large territory of the skin are thereby stimulated the very moment of their contact with the sheet. This effect is experienced by any one who, while in a drowsy, sleepy state, or in a condition benumbed by a severe exposure to cold, rubs his face or extremities with cold water, ice, or snow. The friction bath also causes a dilatation of the bloodvessels of the periphery, which, as a matter of course, must produce its beneficial effects upon the distribution of the blood currents throughout the whole body. The relation of pressure and tension in the whole system of bloodvessels, is of great influence on the heart's action. The friction bath will not only abstract fever heat, it will lessen coma, delirium, cephalalgia, and other brain symptoms, and the hyperæmic states and inflammations of internal organs. The diminution of the frequency of the pulse and the calming of the violent action of the heart are of great importance for the neutralization of the febrile disturbance in puerperal and other fevers. By the use of the wet sheet and by gently rubbing the skin, we increase the evaporation from its surface fully fifty per cent. as proved by Weyrich. We have here, therefore, a nerve stimulant, a heart sedative, and an antipyretic, or antifebrile remedy par excellence, unequalled by any internal medicine. When the skin is dry, the urine scanty, concentrated, high-coloured, loaded with urates and phosphates, and the bowels sluggish, the secretions of bile reduced to a minimum, the pepsine glands and the pancreas backward in supplying the digestive juices, and the salivary glands also dormant as to their secreting function, we need no calomel or any other drugs, we simply administer plenty of water to drink, and apply the cold wet sheet, and by gently rubbing the skin until it gets red, we increase all the secretions and excretions of the body, and the evaporation of water (diaphoretic action) from the surface of the body, and aid the retarded elimination of used-up material; we are thus enabled, by a harmless procedure, scientifically to neutralize, to some extent, febrile disturbances, which, by themselves, often destroy life. I have often observed that after the rubbing, the burning skin became soft and moist, covered with a gentle perspiration, the pulse came down in frequency, the heart-beat gained in strength, the hurried respiration was reduced to a more normal state, and the urine became clearer and more natural in colour, etc. A little cold water, a few bed sheets, and a person to apply them, are all that is needed. By pouring cold water upon the sheet from time to time, as soon as it appears to get dry, we increase its heat-abstracting properties. By wrap-

ping the patient in two wet sheets at the same time, we are enabled to abstract a double quantity of heat. An ordinary cot or bed, or a sofa with a rubber sheet spread over it for the patient to rest upon, is, of course, to be prepared before applying the sheet. The abdomen, or other painful parts, ought to be covered with cold wet cloths; colder portions, the hands and feet, for instance, are to be rubbed until they get warm. By continuing this method until the temperature is reduced to the normal standard, we obtain surely the most beneficial effects, at least, in some cases of puerperal fever, which would terminate fatally if otherwise treated. The abstraction of fever heat also retards and often prevents the chills, which indicate the severity and the gravity of the attack.

A still more potent method of treating puerperal-fever patients is the administration of the so-called half bath. A common bath-tub is placed near the bed, filled to the depth of six or eight inches with water of from fifty-three to seventy degrees Fahrenheit, exceptionally of eighty degrees in very feeble patients; the sufferer, prepared by a previous cold sponge bath and gentle rubbing, with a wet, cold cloth or cap on her head, is gently and cautiously put into the bath, and, by means of an ordinary pitcher, the water is poured upon her neck and shoulders, her skin all over being briskly rubbed at the same time, by herself if able to do it, otherwise by the attendant, more or less force being used, according to the state of her bloodvessels, as indicated by the colour of the skin. Unconsciousness, delirium, symptoms of great irritation of the brain, or pressure upon it, may be relieved by douching, the distance of the fall to be proportionate in height to the disturbance of the functions of the sensorium. If the patient be able to wash her face during these showerings, the procedure will be less disagreeable to her. If the patient is afraid of the cold shower-bath, several layers of cloths may be laid over the head, and the water poured upon it. It will be rare, indeed, to find a patient leaving the bath without having become conscious, or, at least, partially so, if she be rubbed briskly at the same time. The disagreeable feeling of chilliness will soon be overcome after entering the tub, even in the colder bath. It has been found good practice to use water of a higher temperature, at first, in order to overcome the sensibility of nervous patients, the water used to be about sixty-five to sixty degrees; by and by we can use and add cooler water, down to fifty degrees Fahr. By adding cooler water gradually, we do not cause so much nerve excitation as would follow if the lowest temperature were used at the beginning. Only where we find an indication to exert a potent nerve stimulant, as in sopor and in conditions of coma, do we use water of very low temperature from the first. Too cold baths are objectionable for the following reasons:—

1. Too cold water is too powerful a nerve stimulant and would soon exhaust the patient; but, if the nervous system is very much depressed, if

sopor or coma have supervened, I repeat, this powerful stimulant of a very cold shower bath finds its rational and beneficial application. We accomplish our purpose best under the circumstances by placing the patient in a tepid bath or in an empty tub, pouring the cold water upon her from a height in proportion to the severity of the brain symptoms. The abstraction of heat must take place gradually and slowly in order to prevent a too severe reaction. The patient is to remain in the half bath until her temperature in the axilla shows that the fever has been reduced to the normal standard. The skin must become red, never bluish or pale; the circulation of the whole body must be equally distributed. This result we obtain by rubbing. It may be laid down as a rule, in no matter what way the hydropathic method is applied, the patient should never feel chilly while in the bath, and as soon as her skin becomes bluish, she is to be taken out and put to bed and some warm drink with a little stimulant administered. The antipyretic bath need seldom exceed fifteen or twenty minutes, but exceptionally, in otherwise strong women with a rapid production of heat, the bath may be continued for half an hour and over at a time. The bath is to be repeated as soon as the fever returns, day or night. I have given as many as a dozen half baths within twenty-four hours, and have never regretted the frequent application of the same.

In great depression or collapse, we must have recourse to the most powerful irritating procedures, such as the half bath with water from sixty to fifty degrees Fahr., and the cold douche. If the urgent symptoms are removed, we again use warmer water. If in spite of these measures the skin remains hot and dry, I use the wet-pack. In very weak patients with exceedingly high temperatures, where a sudden collapse might be feared from moving about or sitting in a half bath, we spread a blanket on a second bed or sofa, over it we lay smoothly one or more sheets well wrung out in very cold water, and wrap the patient in them so that the coverings, the sheet and the blankets, adhere closely to her body. If the fever increases during this treatment, we loosen the coverings at once and place her in a second sheet and again tighten the blanket around her. After each packing the production of heat becomes less, until at last the skin becomes moist and warm and the temperature normal or even less.

After the packing the patient is to be sponged off, in order to eliminate the accumulated heat from the surface of the body, to give tone to the relaxed skin, and to moderate the rush of blood to that organ. It is of the utmost importance to see that the extremities become warm during the packing, the contrary being a sign of an unequal distribution of blood by the contraction of parts and the relaxation of the bloodvessels of other portions of the periphery. The principal rule in applying the cold-water treatment is its methodical repetition, as based upon rational and scientific principles. The continued lowering of the fever heat must be our aim. We use as few applications as possible during the twenty-four hours; still

we must not permit a single exacerbation to be left unabated, either during the day or during the night. The tender and painful parts, especially the abdomen, are to be covered with wet cloths, as already stated. A bed sheet folded four, five, or six times, well wrung out of cold water, should be placed over the abdomen and the back from the lumbar region down to the sacrum, and a large dry sheet applied over the wet one to prevent the wetting of the bed. The application is changed every hour. Tympanites and abdominal pain are usually greatly relieved by these so-called Brand's or Priessnitz's applications.

After administering the cold bath it is a good plan to wrap the patient in blankets without being dried, and after she is put to bed to give her a glass of wine or a little brandy and water to guard against chilliness. Very weak patients require warmer baths in the beginning, say of about eighty degrees Fahr.; the cold pack is well borne, even by weak patients, especially if the hands and feet are left uncovered. Four packings of from ten to twenty minutes each have the same effect as a cold bath of ten minutes' duration. Cold applications and ice-bags are efficient as heat-reducing measures if used over large portions of the body. Dr. Thomas Addis Emmet kindly showed me a few months ago, at the New York Woman's Hospital, a patient upon whom he had performed ovariotomy a few days before, where a coil of soft rubber tubes was placed over the abdomen, through which, siphon like, a constant stream of cold water was flowing. A similar contrivance, made of tin, placed over the patient's head, was used as a heat-reducing agent with great benefit and to the doctor's entire satisfaction. These tubes were devised by the house-surgeon, Dr. Townshend, after the recommendation of Dr. Chamberlain of this city, and are similar to the tubes sold by instrument-makers under the name of Leiter's tubes. Another good plan of using cold water is to put the fever patient upon water-beds or cold water rubber pillows, provided always these come in contact with large surfaces of the body. By wrapping the patient's trunk in cold, wet sheets, each application being continued for several hours, and placing ice-bags over the inguinal region, we reduce the fever heat, and, in some instances at least, will, as experience teaches, save fever patients who could take neither quinia nor salicylate of soda; this water treatment alone being continued for one or two weeks.

There is still a great prejudice among the laity as well as among medical practitioners against the cold-water treatment; no doubt, from the fact of their want of experience in applying the methods here recommended in accordance with scientific principles. It may be well to remind those who are fearful of evil consequences arising from the application of the cold-water treatment, that *a fever patient does not show any tendency whatsoever to take cold*, according to my experience and that of many reliable authorities, if the method is applied scientifically.

By drinking cold water, taking ice, and cold rectal injections, the fever is, as a rule, but slightly reduced; but rectal irrigations from a fountain syringe, applied through a large soft tube, introduced high up into the rectum, and continued for hours, have a decidedly antipyretic effect. Bartels and Jurgensen have obtained excellent results in the treatment of high fever by cold baths, applied day and night, repeated as often as the thermometer, placed in the axilla, indicated a rise in the temperature. From four to eight, in severe cases even twelve baths were given during twenty-four hours. One hundred and sixty typhus patients thus treated by Liebermeister, from 1863 to 1866, showed a mortality of only three and one-tenth per cent. Wiltshire and Playfair, the latter the author of a valuable work on the puerperal state published last year, also highly recommend the energetic use of cold baths, if quinine, laxatives, and intra-uterine injections prove fruitless, in the treatment of puerperal fever. As is well known, quinia has a decidedly antipyretic effect; therefore no remedy is so extensively used in the treatment of fevers as the preparations of cinchona. But the question in medicine is not only what to use but how to use a given remedy to produce the desired effect, and perhaps it may not be so well known that reliable and trustworthy experiments have shown that quinine is to be given in decidedly large doses, say from twenty to forty grains in one or two doses, one to two hours before or after any food or drink has been taken, otherwise it causes nausea and often vomiting; the dose mentioned to be repeated but once in forty-eight hours.

According to Liebermeister, the effect of quinine should be to reduce the temperature to about 98½° F. (38° Celsius). If this is not accomplished by the first dose, the second dose is to be increased. If the temperature is found to be below the normal after the administration of quinia, the dose is to be decreased. If, however, forty grains at a dose do not reduce the fever heat, digitalis in pill or powder might be tried with the quinia, ten to twenty grains of the former (of pulv. fol. digitalis purp.) taken during twenty-four hours in one- or two-grain doses, to be immediately followed by one dose of from thirty to forty grains of the muriate of quinia; or, if typhoid symptoms are present, the same quantity of the hydrobromide of quinia taken in capsules or wafers. Before taking the quinia the patient is given a piece of chocolate to correct the bitter taste of quinia. As a corrigent the comp. elixir of taraxacum and the syrup of coffee have proved in my hands very pleasant additions to quinia if given in solution or mixture. Salicylate of soda is ten times cheaper than quinia, and is used in its stead in Vienna, forty-five to ninety grains pro die, to be repeated daily until the fever has subsided. Salicylate of soda as well as the muriate of quinia, fifteen to thirty grains of the latter, may be taken with advantage per rectum with tinct. opii, either by injection or in a suppository of ol. theobroma. Their effect is the same as if given by the mouth. The freshly prepared tincture of eucalyptus globulus,

from one to four drachms daily, as recommended by Herz (1874), Osterlot, Winckel, and others, is sometimes also found useful.

The heat-reducing agents should be used principally in the evening or during the night. The antipyretic remedies, quinia, salicylate of soda, often produce a soothing and quieting effect, especially if used about midnight. Alcoholic stimulants also greatly aid in reducing fever heat. Alcohol is an important analeptic, dietetic, and fever-reducing agent, the more so if the pulse is weak, and syncope or heart paralysis threatens. According to Binz, Bouvier, Riegel, Strassburg, and Daub, brandy or Jamaica rum should be freely given if salicylic acid is used, the latter antipyretic agent having a very depressing effect upon the heart's action. Pure Jamaica rum contains seventy-seven per cent., brandy fifty per cent., and wine seldom over ten per cent. of alcohol. Rum may be administered with advantage in teaspoonful doses with an equal quantity of sugar and water, day and night, every hour, so that about three ounces be taken during twenty-four hours. After the fever is reduced, teaspoonful doses every two hours suffice.

The observations of Breisky, Konrad, Schröder, Spiegelberg, and Braun, 1875, are positive proof of the fact that in severe cases of puerperal fever alcohol has a decidedly antipyretic effect, producing considerable reduction of fever heat, if taken every half hour. The secretion of milk is thereby not decreased but increased.

The best treatment of puerperal fever, stated in so many words, seems to be a combination of cold baths or the wet pack, quinine or salicylate of soda; sometimes with, oftener without digitalis and alcohol. In conclusion I will say a few words more regarding the value of intra-uterine, disinfecting injections for the treatment of puerperal fever. In the beginning, and if the temperature is not very high, vaginal injections of a two or three per cent. watery solution of carbolized, lukewarm water is all that is required. In tympanites and endometritis the injections of salicylic or carbolic acid are made during the puerperal state, as I have already stated, when I condemned the indiscriminate use of this measure after normal labour, without febrile symptoms.[1] I generally irrigate the uterine cavity with about a quart of lukewarm water containing in solution twelve to sixteen grains of pure salicylic acid, and continue its use until the irrigated fluid returns free from clots, shreds, mucus, etc., without perceptible odour, and appears to be clear and colourless; as soon as the lochia become offensive I repeat the procedure, and I may state I have saved several lives by this medication. Yet we have abundant testimony from good authorities to show that intra-uterine injections are not without danger; for instance, Fritch and Herdegen in 1878 saw them followed by convulsions, acute mania, and chills, even when only a one-half per

[1] See my article in Philadelphia Medical News, August 19, 1882.

cent. watery solution of carbolic acid was used. The bad symptoms were caused by the admission of air into the veins. One fatal result from intra-uterine injections of a one per cent. solution of carbolic acid was reported by Bruntzel in 1879, it having occurred in the late Professor Spiegelberg's clinic, where, on the fourth day, on account of fever and fetid lochial discharge, the uterus was irrigated with a one per cent. solution of carbolic acid. The patient lost consciousness, and died in spite of all the efforts made to resuscitate her. The post-mortem examination, however, did not reveal the cause of the sudden collapse and death. The patient died from shock in the same manner that some persons have lost their lives from a blow upon the stomach or the testicle. Veit, like myself, never had any accident in 450 intra-uterine injections through a rubber tube, while in 400 cases made through a catheter he had ten. Hard rubber or glass tubes are objectionable for, in the most skilful hands, they are apt to wound the endometrium, and thus become sources of danger to the patient.

The cases in which Veit irrigated the uterine cavity were, 1st, eight cases that came under his care twenty-four hours after the first chill; all of these recovered; 2d, where there was diphtheria of the vulva and vagina; no deaths; 3d, cases where he was called to moribund patients; of five of these *one* recovered, two died on the tenth and the twentieth day respectively. The autopsy showed the uteri of both in a healthy condition.

In 1879 Thiele, upon Schroeder's recommendation, applied as a local antiphlogistic measure in puerperal fever, drainage and irrigation of the uterus with ice-water. This cold drainage he found useful in tympania uteri. He commenced twenty-four hours after delivery; there was fever, and he continued to irrigate the uterine cavity day and night from two to five days, until the temperature was reduced or peritonitis followed; in the latter case, of course, the irrigation was at once discontinued. In exudations of the parametrium, so called pelvic cellulitis, warm moist applications are preferable to cold applications. In Vienna, in such cases, moist heat is applied by means of so-called Priessnitz application, viz., a large towel folded into four or six layers, dipped in cold water, applied over the painful part, covered by a dry sheet so as to avoid wetting the bed or clothing, and left in situ an hour or more until it gets hot, and is found steaming when taken off; it is to be reapplied in the same manner until the pain and the exudation have subsided. It is hardly necessary to add that absolute rest in bed is to be insisted upon as long as there is fever, to prevent the formation of pelvic abscess. After the fever subsides local applications of one part of iodoform to ten of collodion, with the addition of some peppermint oil or balsam of Peru to mask the unpleasant odour, made over the seat of the exudation if any remain, and later on warm baths, are found to be quite beneficial. If the pain is

severe, and cannot be relieved by anodynes and the local application of icebags, three or four leeches applied to the intra-vaginal portion of the uterus may be tried.

Pelvic abscesses with a dull percussion sound ought to be punctured through the vagina or the abdominal wall, and the pus aspirated with Dieulafoy's aspirator, or an air-tight syringe. The cavity should be syringed with an antiseptic fluid, and a drainage tube, with several openings at the sides, placed deep into it, well secured by a Listerian bandage. The antiseptic irrigations are applied once or twice daily, or even oftener, until the discharge ceases, then the drainage tube may be removed. In migrating erysipelas, in addition, general applications of salicylated powder one to ten of starch, or salicylated water 1 : 1000, usually cause its disappearance, and the skin becomes pale and natural-looking. Deep and necrotic portions of the vulva require the application of charcoal, camphor wine, or coal tar. In cases of extreme meteorismus and dyspnœa, the aspiration of the intestinal gas, and the high irrigation of the colon by means of a large, soft, rectal tube, after Simon's method, improve the respiration, and have proved highly beneficial in my hands in a number of cases.