

minutes, in spite of the discomfort the bath may give, must arouse antagonism in every humane physician, and especially in him who individualizes in the practice of medicine.

Hydrotherapy, in whatever way applied, is beneficial in all the fevers. In typhoid fever with a profoundly intoxicated nervous apparatus, and a vasomotor system practically paretic, the increased tone given to the nervous system by the application of cold, or hot and then cold, water with the object of producing nervous shock and secondary reaction is of great benefit. The Brand bath gives the most profound results. The cold pack, cold effusions, cold sponging give less pronounced results, but in many cases quite sufficient for the individual patient. The effects of the Brand bath and of all forms of baths to a lesser degree is to: 1. Lower the bodily temperature in the course of a half hour after the completion of the bath. 2. To increase the blood-pressure, as is evinced by the radial pulse, which becomes smaller and more tense. 3. The headache and other nervous symptoms are relieved. 4. The tongue becomes cleaner, the thirst less, the digestion is improved, and the bowels move more regularly and normally.

What is the meaning of these reactions? Nervous shock and subsequent reaction, associated with the increased tone of the cardiovascular apparatus means increased blood-pressure and consequent improved secretions and excretions. The urotoxic coefficient is increased five or six times that of the normal. (Roque and Weill, *loc. cit.*). The amount of toxins excreted is increased from the time the cold baths are begun, and remains stationary as long as the baths are given. The moment the baths are stopped, the amount of toxins excreted is diminished.

In cases of typhoid fever left to themselves the toxins are in part eliminated during the fever, the toxic coefficient being double the normal. The elimination is, however, incomplete and a hypertoxic urine is often demonstrated four or five weeks after the end of the fever.

In cases treated by the cold baths the elimination of the toxic products is enormous during the active stage of the disease. The hypertoxicity diminishes with the fall of temperature, so that when convalescence is established the elimination of the toxic products is finished and the urotoxic coefficient becomes normal. The cold bath treatment does not prevent the formation of toxins, but expels them as soon as they are formed.

It is interesting to note that of drug antipyretics, with antipyrin the elimination of the toxins is slight, while the drug is taken, the toxic coefficient sometimes falling below the normal, but during convalescence it is enormously increased for a period of about a week. Antipyrin does not act as a true antiseptic; it does not prevent the formation of the toxins, but it does prevent the elimination of them by the urine. The free excretion of the toxic products by the urine, as fast as they are formed, is then probably the explanation of the beneficial effects of the cold bath. Furthermore, the bath is beneficial just in proportion as it excites cardiovascular tone by reaction from the stimulus or shock of cold. Reaction, the necessary condition to obtain the beneficial results of the bath, may be attained more easily by skin friction both during and following the bath. Indeed, the skin friction is just as important as the application of cold. With friction a lesser cold may be applied and even the cold pack, the cold effusion, and the cold sponge, when combined with proper friction of the skin, will be followed with much more beneficial re-

sults than if the bath is given with the idea of reducing temperature. Hydrotherapy, and preferably the Brand bath, when applied to individual cases, affords better results than any other form of symptomatic treatment. It seems rational to ascribe the good results to the increased excretion of toxins by the urine, when the bath is properly given. The diminished toxemia explains the improvement in the symptoms. Other methods of treatment are partially successful or beneficial just in proportion to the effects the treatment has upon excretion. Drug antipyretics, cathartics, especially calomel, in large or in small doses, and so-called intestinal antiseptics, have run a more or less unhappy course, and are now practiced by but few thinking men. Diluent drinks and colonic flushings with normal salt solution afford a more rational treatment by improved excretion than all the antipyretic and antiseptic drugs. The preliminary treatment of typhoid fever with a cathartic of calomel, castor-oil, a saline, or any other drug is commendable as a bowel-cleansing process. The use of drugs thereafter is, for the watchful man, one of choice to meet the needs of the hour.

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TREATMENT OF TYPHOID FEVER IN PRIVATE PRACTICE.*

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I shall not attempt an exhaustive exposition of the subject, but shall limit attention to a few questions of fundamental importance and general interest.

Prevention.—This is the question of the hour. The lack of correspondence between theory and practice is nowhere more strongly exemplified than it is in this connection. Theoretically, typhoid fever is preventable, and that without reference to antitoxin inoculations; but in private practice the measures of prevention ordinarily employed are a mockery of science and an insult to the conscience of the profession.

The pathogenic bacilli appear in the discharges of the patient about the ninth or tenth day of the disease or later; and they persist a week or two after defervescence.

In private practice, especially among people in easy circumstances, the patient usually presents himself for treatment before the ninth day is reached; and consequently it is usually within the power of the doctor to prevent the further spread of the infection. His sense of responsibility, however, appears to be limited to the prevention of the immediate spread of the disease among other members of the same family, for he exhibits but little care for the community at large.

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His prophylactic motions usually consist of receiving the discharges of the patient into a bedpan containing a solution of carbolic acid or corrosive sublimate and then, without delay, emptying the loose mixture of disinfectant and fecal matter into the soil pipe. The urine as a possible source of infection is generally overlooked. Such measures are next to worthless.

When a 5 per cent. solution of carbolic acid is intimately mixed with an equal quantity of typhoid fecal matter, it requires about twenty-four hours to disinfect it. A 1-500 solution of corrosive sublimate, acidulated with tartaric or hydrochloric acid, and similarly employed, requires about six hours. A 10 per cent. mixture of good chlorinated lime and water, freshly prepared; or a half-and-half mixture of either hydrochloric or sulphuric acid, and water, and thoroughly diffused through the broken-down fecal matter, is effective in two or three hours.

It follows then that typhoid discharges, including urine, should stand several hours in intimate admixture with the disinfectant before being finally disposed of. A covered, glazed earthenware jar should be used for this purpose, and never an old wooden slop-bucket; and it goes without saying that the fecal matter should be treated in this manner for at least two weeks after the occurrence of defervescence.

The mattress should be thoroughly protected by a rubber sheet, and this should be destroyed when the need of it ceases. Any fecal stain on the linen should receive immediate attention. The soiled spot should be thoroughly treated for six or eight hours on both sides of the fabric, with a 1-500 solution of corrosive sublimate, and after a loose rinsing in water the entire article should be boiled half an hour in a covered boiler. Then it is fit for the laundry.

After each evacuation the person of the patient should be washed with water, and subsequently with a 1-2000 solution of corrosive sublimate. The attendants are to be admonished frequently and forcibly as to the need of scrupulous care in respect to the cleansing of their own hands after waiting on the patient. Soiled articles that are not susceptible of thorough disinfection are to be destroyed. The sick-room is to be stripped of carpet, draperies and all unnecessary furniture; and when the case is ended the room should be fumigated with formalin, and then thoroughly aired, before being turned over to family use.

General Management.—The patient is to be kept, when practicable, in a well-lighted and well-ventilated room as far from the living room and as near to the toilet as possible; and the distinction between day and night is to be maintained throughout the entire course of the disease. The sick-room is not to be a rendezvous. A single bed of woven wire, with a good hair mattress, is the best; and it is to be so placed as to be easily approachable from either side.

A good trained nurse is an invaluable coadjutor. In severe cases, when the circumstances of the patient admit of it, two nurses should be employed—one for the night and one for the day. In any case the nurse should receive a reasonable allotment of time for sleep and for outdoor exercise.

There is no better rule in respect to the discipline of the sick-room than for the physician and nurse to hold official communication exclusively in writing. On the one hand the instructions of the physician should be written out in detail, and every prescription should appear in the record, numbered and dated, to correspond with the number and date on the pharmacist's label; and,

on the other hand, the nurse's memoranda are to be equally explicit. At the bottom of each day's record-sheet, footings should show at a glance the number of ounces of milk, water and other ingesta given during the previous twenty-four hours; the number of ounces of urine passed, and the number of alvine dejections; the number of hours of sleep; and the mean temperature, pulse and respiration rate. I know of no better safeguard than this against failure to discover oncoming complications.

Diet.—Milk, which is usually the preferred food and the best, is to be given to the extent of three pints in twenty-four hours—when it is the main support of the patient—or even more freely than this when it is well digested. If curds appear in the stools, the milk may be advantageously diluted with water, or barley water, to any extent, to ensure more perfect digestion; and if, notwithstanding such dilution, curds continue to appear, the quantity of milk should be lessened or artificial aids to digestion should be used. The taste of the milk may be varied from time to time, when such variation is relished by the patient, by the admixture of a little flavoring of vanilla, whisky, rum, and the addition of a little sugar. Raw or boiled milk, hot or cold, koumyss, matzoon or buttermilk; milk mixed with 25 per cent. of Apollinaris water, lemon pop, or ginger ale; milk in the form of oyster soup, may be given up to the digestive capacity of the individual.

Eggs are not as generally given in typhoid fever, I think, as they ought to be. Their administration in the form of egg-nog is objectionable in many instances, for this mixture is trying to the palate by reason of its mawkish sweetness and richness. It is generally more satisfactory to give the ingredients separately. A soft boiled or poached egg may be given every six or twelve hours, and a little ice-cream may be allowed now and then. Clam broth is relished by some, and it is quite unobjectionable. When milk is refused, any well-strained meat soup may be given as a substitute, fortified or not by the addition of the whites of three or four eggs. Broths are usually not well borne when there is diarrhea, and consommé is especially obnoxious under such circumstances.

Albumin water, flavored to suit, is an excellent food, and when difficulty is experienced in maintaining alimentation, farinaceous gruels may be given freely. I am a little uncertain as to the value of the proprietary foods with which we are assailed by canvassers, and for that reason rarely prescribe them. Tea, coffee and cocoa are admissible under ordinary circumstances. Nourishment should usually be given at stated intervals, night and day; but when the patient has difficulty in securing a fair amount of sleep, he is not to be aroused for unimportant reasons.

Water.—The abundant internal use of water is essential to the good management of any case of typhoid fever. It promotes elimination, quiets delirium, subsultus and jactitation and favors sleep. Enough aqueous liquids should be given when possible to cause a daily urinary outflow of at least fifty or sixty ounces. The water may be flavored with fruit juices, when desired—lemon, orange, grape—and in the summer season the patient may be allowed to partake of ripe watermelon in moderation.

Medicines.—Another example of lack of correspondence between theory and practice is seen in respect to the use of medicines in typhoid fever. No intelligent physician will maintain, in the presence of his colleagues, that in ordinary cases of the affection the in-

ternal administration of medicines is an essential feature of good management; but, in practice, when confronted by such a case, who does not begin at once a vigorous therapeutic bombardment, which he continues till the patient is dead or well? I am far from being a therapeutic nihilist, but as experience accumulates I find in myself an ever-increasing respect for good nursing.

A. Stimulants.—Nearly all systematic writers advocate the giving of whisky in severe cases of typhoid fever, to the extent of from eight to sixteen ounces in twenty-four hours. I have used it and seen it used by others in some hundreds of cases, and with various degrees of freedom—from an ounce to a quart in twenty-four hours; but I have felt an increasing positiveness of conviction, as time went on, that, as ordinarily used, it causes many deaths and few recoveries. In my view the indiscriminate use of alcohol in quantities sometimes that would actually imperil the life of a well man, is as irrational, reprehensible and disastrous as is the indiscriminate use of the coal-tar antipyretics. Men who parade their ignorance of the resources of their art by proclaiming their lack of confidence in medicines generally are often found insanely vigorous in the use of whisky. Alcohol does not promote oxygenation of the blood in health or in disease. It does not increase vascular tonus in health or in disease. It does not exalt the reflex functions of the spinal cord in health or in disease. I do not deny that it may lessen the labor of a weak heart and improve the condition of the circulation by dilating the arterioles. I do not deny that it may, at times, like antipyrin, but with less power, lower temperature, quiet delirium and promote sleep; but when vascular tonus is already nearly gone and hypostatic congestions and deepening cyanosis and relaxation of sphincters and involuntary discharges are taking place; when the heart-beat is feeble and the first sound obscure and the pulse is losing strength as it gains in frequency, and, according to authorities, that is the condition which imperatively calls for alcohol, I have never in one instance seen alcohol improve the condition of the patient; but in many cases I have seen the condition improve and sometimes advance to recovery when the administration of alcohol was stopped, and oxygen, strychnin and carbonate of ammonium given in its stead. While I condemn the routine employment of alcohol, I freely admit that when it is used rationally as an adjunct of the hydratic treatment it is a remedy of value.

B. Antipyretic Medicines.—The free and sustained use of the coal-tar derivatives undoubtedly increases the duration of typhoid fever, including the number of relapses, and it increases liability to intestinal hemorrhage. The administration of an occasional dose as a palliative may be on the side of sound conservatism, but persistent repression of bodily temperature by means of these agents is, in my view, a dangerous proceeding.

C. Intestinal Antisepsis.—Assume that the average duration of the incubative period is two weeks, and that typhoid bacilli do not appear in the discharges till the disease is nine or ten days old. During the incubative period the ingested bacilli penetrate into the lymphatic structures of the bowels and thence into all parts of the body; so that by the end of the period a sufficient number has accumulated and a sufficient quantity of typhotoxin has been elaborated to cause the clinical picture with which we are acquainted. The ingested bacilli do not multiply in the intestinal contents to any important extent, as was formerly supposed. Multiplication occurs, for the most part, in the tissues; and the organisms do not appear in the discharges in important numbers

until they are shed by the disintegrating intestinal lymphatics. The idea that typhoid fever can be aborted by the administration of antiseptics and purgatives is, therefore, another ruined theory. But it by no means follows that intestinal disinfection and drainage are either unscientific in theory or useless in practice. Such a view would be controverted by an overwhelming majority of the physicians of the country.

It is admitted that any good effects produced by medicines of this class must be ascribed to the inhibition of putrefactive processes in the bowel, and, thereby, of secondary intoxications of the blood. It is not claimed that a thousand square inches of mucous membrane with its numerous folds and sulci can be made aseptic; but it is a fact of familiar observation that usually the administration of well-chosen and, so far as we know, harmless antiseptic medicines, especially when coupled with a moderately loose condition of the bowels, has the effect of lessening meteorism and the fetor of the discharges and of improving the condition of the patient in many other respects. I say "usually," for it must be admitted that cases are now and then met with in which this kind of treatment utterly fails to make an appreciably favorable impression. The same statement applies equally well to hydrotherapy and every other therapeutic proceeding. Calomel is perhaps the most eligible purgative, aided at times by a saline. A mixture of aromatic oils, thyme, eucalyptus, cloves, mint and the like, given in small and frequently repeated doses, is generally effective in lessening meteorism, and in producing the other beneficial effects alluded to. Guaiacol and salol, used separately or together, but without the admixture of aromatic oils, are less satisfactory.

Hydrotherapy.—It would be hard to find an enlightened physician who would not admit that the hydratic treatment of typhoid fever as expounded by Ernst Brand effects a saving of life, in hospital practice amounting to 6 or 7 per cent.; but it would be almost equally hard to find one in this country who, in private practice, habitually employs this treatment or who accepts it when he himself is the patient. I have had it refused again and again in the families of colleagues and by well-informed medical students. While there can be no question as to the practical success of the plan in hospital practice, its acceptability in private practice in this country is certain to be of slow growth.

Two persons are required to administer a bath to a very sick adult; and if the patient be uncommonly heavy and helpless and so sick as to require repetition of the baths every few hours night and day for weeks, the services of four attendants will be required. Such attention can not be commanded by poor people. No person in the world will be attracted to the treatment by seeing it administered, and without knowing the ultimate results; and the physician who presses it upon his people must, indeed, be impelled by a high sense of duty. The laboriousness of it; the upheaval of the household usually occasioned by it; the appeals, protests, commands and pitiful attempts at resistance, of the patient; his shudderings and cyanosis and pinched expression of misery while in the bath and the occasional occurrence of an involuntary discharge; together with the knowledge possessed by relatives, of cases of typhoid fever not treated in this way which eventuated in easy recovery, oppose a formidable resistance to the general adoption of hydrotherapy in private practice, which can be conquered only by the slow process of education. To be sure, there are cases in which the treatment is received kindly and in which its effects are less distress-

ing than those described. On the other hand, when the patient is a pregnant woman, or one who has just aborted or miscarried, the administration of the treatment is unendurably appalling to sympathetic friends.

By far the most convenient arrangement I have ever used is a tub of ordinary shape and full size, set on a low truck with small wheels, and placed two or three feet from the patient's bed. It is kept sufficiently full of water for the purposes of a complete immersion bath. It is not necessary to change the water oftener than once a day unless it be accidentally polluted; and, standing in the sick-room in ordinary weather it maintains about the proper temperature, 65 or 70 F., for immediate use. If it is warmer than this it can be easily cooled. I shall leave to others the description of details, premising that fidelity to every detail is indispensable as a basis of fair criticism.

In the best hospitals in the world in which this treatment is systematically used, the mortality rate of typhoid fever is 7 or 7.5 per cent.; and, in hospitals of like grade in which the treatment is not employed, the mortality rate of the disease is 14 per cent. To be sure, certain hospitals quote a rate of 1 or 2 per cent., based on a small number of cases or on a large number of mild ones; but a private practitioner who has never employed hydrotherapy at all may be able to do the same thing. It is not to be forgotten that the fatality of typhoid fever is extremely variable in different years and in different localities during the same year. During the past seven or eight years the disease has been uncommonly mild; and I doubt very much if the general mortality rate of private practice during this period has reached even the smallest figure named.

If immersion bathing is refused, or impracticable, sponging with very cold water, ice-water, is a fair substitute. Indeed, in my view, efficient sponging is to be preferred in many cases, when the patient is very weak, or pregnant, or has a complicating pneumonia, and the effects of the immersion bath are overwhelming. In severe cases the sponging with ice-water may have to be continued twenty or thirty minutes and be repeated every three or four hours. A rectal temperature of 103 F., or above, is, in this country, usually regarded as the critical point requiring the immersion or the sponge bath. Vigorous rubbing is an important feature of both methods of treatment, in which respect they are much superior to the cold pack.

Perfunctory sponging with tepid water, without reference to effects, is of little consequence apart from maintaining an empty show of activity. An important result of the cold bath is the increased activity of elimination as shown by the increased toxicity of the urine following the bath.

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TREATMENT OF MEDICAL COMPLICATIONS OF TYPHOID FEVER.*

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In the consideration of any phase of the typhoid fever question, we are confronted by, and must take cognizance of, the following facts: 1, that the disease is a general infection by a germ which circulates freely in the blood and may find lodgment, and cause inflammatory reaction in almost all organs and tissues of the body, and that it possesses pyogenetic properties; 2,

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that typhoid infection predisposes to the occurrence of secondary infection, especially by the pyogenic organisms, as the streptococcus, staphylococcus, and also by the pneumococcus, the bacterium coli and the bacillus of tuberculosis. Furthermore, there seems to be no uniformity in the use of the term, "complication." Is it to be employed in designating all the unusual manifestations of the affection when due to the typhoid bacillus alone, or only to those complications which follow secondary infection?

I shall, as far as possible, limit my remarks to the medical complications which are now commonly attributed to secondary infection in connection with the circulatory and the respiratory systems. The most important ones in connection with the circulatory organs are endocarditis, pericarditis, myocarditis, arterial and venous thrombosis, embolism, and hemorrhage. While endocarditis and pericarditis are rare, and although they are sometimes caused by the typhoid bacillus, they are more frequently due to secondary infection by the pyogenic organisms. When the result of the blood examination demonstrates this to be the case, or even when it is suspected, the beneficial results of the treatment by means of antistreptococcic serum, together with the fact that it is harmless, would seem to justify a more extended use. It is difficult to formulate general rules for treatment, but we may be safely guided by general principles. In the treatment of acute endocarditis, the most important factor is rest, absolute rest in all that this term implies, physical, mental, sufficient sleep, and reasonable freedom from pain. Such patients should not be permitted to make the slightest exertion, nor should even the head be lifted from the pillow, and no movement or turning or unnecessary disturbance of the patient should be permitted. Food should be given through a glass tube. Even the bedpan may have to be dispensed with and a cloth substituted.

Chilling of the surface must be carefully guarded against, when artificial warmth may be necessary. Occasional hot applications and counter-irritation in the precordial region are of advantage, and Abram's theory of the heart reflex offers a reasonable explanation of its mode of action. Such patients should be kept in bed for at least thirty days after the complete disappearance of the acute disease of which the endocarditis is a complication or sequel. The neglect of this rule very frequently leads to disaster in cases which might otherwise have recovered with only slight leakage.

In the drug treatment, it is as important to know what not to do as to know what drugs to administer. When the heart's action is becoming enfeebled, there is restlessness, some breathlessness, pain and anxiety. There is often a temptation to give digitalis; it should not be given; it is not only useless, but absolutely pernicious and dangerous. This is true not alone of acute endocarditis, but also of myocarditis, the latter being suspected when there is diffuse, feeble impulse and the first sound is greatly weakened or absent. Even in the ordinary weak heart of typhoid fever, where the heart does not respond to its use within twenty-four hours, it should be discontinued. In such cases, where it is being administered, if the arterial pressure becomes high or the heart irregular, or if the beats become interspersed with small ones, its use should be abandoned.

Opium in some form, either morphin or heroin, is the most valuable drug in the treatment of acute endocarditis. The size of the dose will be determined by the degree of restlessness and pain and the amount of