

mon, namely, to negative the action of the invading organism, to keep the eye freed from the purulent secretion, to anticipate corneal involvement, to assist the reparative process and prevent the spread of the infection.

The greatest field of opportunity, however, lies in the prevention. To accomplish the highest degree of success in this direction two important factors must be carried out: first, the utilization of prophylactic measures; second, early recognition and prompt treatment of the disease.

As to prophylactic measures, obstetricians advise—as a routine procedure—the rendering of the genitals and genital tract aseptic by suitable measures; and such procedures, it is recognized, may prove of especial importance in preventing an infection.

The value of the Credé method as a prophylactic measure is generally admitted. At birth the child's eyes are gently cleansed and one drop of 2 per cent. solution of silver nitrate instilled into each eye. Credé, at the Leipsic Lying-in Asylum, had averaged 10.8 per cent. of cases of ophthalmia; after the introduction of this prophylactic method he found that the infections were reduced to from 0.1 to 0.2 per cent.

If this method of prophylaxis were in universal use, it is certain that the proportion of ophthalmia neonatorum cases would be greatly reduced; and if, in conjunction with the method, practical measures might be devised to insure the early recognition and early treatment of the disease, it is not unreasonable to assert that such infections might be almost entirely eradicated.

A survey of the foregoing facts, which embody the observations and the views of numerous earnest workers in this humanitarian field, causes one to pause and reflect on the colossal problem of prevention which is presented. The committee of the Chicago Ophthalmological Society is determined to do what little it may in ameliorating the conditions and, if possible, inaugurate in the state of Illinois a practical campaign of prevention.

A cursory study of the situation discloses many perplexing problems which only patience, perseverance, discretion and cooperation may overcome. The plan proposed and carried out by the New York Association for the Blind appeals to our committee as one most likely to accomplish the largest measure of success, and at present we are engaged in attacking the problem along the lines suggested.

This plan is described by the New York Association for the Blind as follows:

The methods of work for the suppression of infant ophthalmia may be divided into the following groups:

1. Educational.
2. Legislative.
3. Cooperative.

Educational.—Through the preparation, publication and dissemination of printed matter, emanating from the committee or approved by it; through public lectures, addresses and exhibits; and by means of the press, on whose generous assistance the committee greatly relies.

The object sought is to spread among the general public the knowledge that infant ophthalmia is a dangerous, infectious disease, fatal to sight unless checked at the time of the birth of the child, easily preventable then if simple precautions are taken; to inform parents, more especially, of the dangers which threaten the sight of their children at birth, and the preventive measures which should be taken; and to advocate the universal adoption of such measures.

Legislation.—To promote such legislation as may be needed to accomplish the object in view—the prevention of the unnecessary blindness of infants.

Cooperation.—In furtherance of the same object, the committee seeks and invites cooperation with medical societies, health officers, ophthalmic, maternity and other hospitals in which children are born, dispensaries, city missions, settlements; with schools, institutions and associations for the blind, and with all societies engaged in work for children and for social betterment; with district visiting nurses, and with all persons who are already engaged in this work or who desire to help in it.

The foregoing "plan of campaign" appears logical and practical, and in conducting the work along these lines our committee is sanguine that a measure of success will be attained which shall serve to place our own state in a creditable position on the question of the prevention of blindness due to ophthalmia neonatorum. Even a small measure of success will be a distinct accomplishment, and will contribute a not inconsiderable part toward sparing many little ones the sad ravages which this baneful disease inflicts.

104 South Michigan Avenue.

MANAGEMENT OF DELICATE AND PREMATURE INFANTS IN THE HOME *

H. M. McCLANAHAN, M.D.

OMAHA

The premature or delicate infant has an equal right to life with the robust. Indeed, its frail condition should insure it every possible care, since because of its feebleness its life's prospect is not nearly so good. While I have no available data, such at least is my personal experience. The fact that I have seen several striking examples of the possibilities of saving the lives of some of these cases and believe that not sufficient care in their management is practiced, is my excuse for presenting this brief paper.

The two general requirements in the care of premature infants are the maintenance of body heat, and proper nourishment.

I. THE MAINTENANCE OF BODY HEAT

In order to sustain life, body heat must be maintained and also the rapid dissipation of heat prevented. Heat is given off from the body by the excretions and feces and urine, by the lungs in the form of vapor, and from the skin. Vierordt states that 73 per cent. of body heat is eliminated by radiation and conduction from the skin. This heat loss can be greatly limited. My experience in a number of cases with the modern incubator has not been satisfactory. The infants live a few days and then die even when they are not losing weight. For the last several years I have adopted the following method. It is not at all original and the method is described in some of our modern text-books.

I direct that an ordinary clothes-basket 24 inches long be procured. This can be purchased in any village. The bottom is padded so that the basket has a depth of 8 inches. It is then lined with white oilcloth and over this a layer of cotton batting held in place by being stitched through the sides of the basket. This in turn is covered with white flannel. The flannel

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covering for the basket is fastened over the top by means of safety-pins so that the upper portion can either be turned back or fall about the neck of the infant, leaving the body surrounded by an air-space.

Heat is maintained by means of hot-water bottles. I always direct that these be covered by flannel. The 12-ounce citrate of magnesia bottle is convenient, as it has a rubber cork and a wire fastener that insures against leaking. Five of these bottles are sufficient to maintain proper temperature. A thermometer is kept in the basket and the heat maintained at from 90 to 95 degrees. During the night when the room temperature is lower it may be necessary to cover the basket with a rubber sheet in order to maintain the temperature. It will be noted that while the body is in a warm atmosphere the face is exposed so that the infant breathes the atmosphere of the room. As the room can be well ventilated it breathes, I think, a better air than when confined in an incubator.

The body of the infant is anointed with olive-oil, wrapped in a layer of cotton batting—loosely applied—and this in turn in a soft flannel blanket. The infant can be fed in the basket without being removed. Indeed, it need be taken out only when it is necessary to oil the body. Absorbent cotton pads can be used for napkins.

As soon as the infant begins to gain in weight the temperature of the basket can be lowered and in my experience in from two to three weeks the hot-water bottles can be dispensed with.

II. NOURISHMENT

This is vitally important because of the caloric needs of the infant. Breast-milk of course is the best food, but as emphasized by Drs. Holt and Morse, breast-milk should be diluted. Many of these infants are not strong enough to draw milk from the breast and there is no doubt in my mind that physicians and attendants are frequently deceived in believing that because the infant takes the breast it is getting nourishment. Only recently I was able to demonstrate to the attendant by weighing the infant before and after a breast-feeding that there was no appreciable gain in weight. In these cases the milk should be pumped from the breast regularly, diluted with an equal quantity of water, and fed to the infant. If it does not retain this dilution then the milk should be further diluted. Whatever dilution the infant takes, the food should be rapidly increased in strength. There are cases in which the infants are not strong enough to nurse from the bottle and in these cases some other method must be adopted. In these cases I have found the Breck feeder a life-saving appliance. At the Child-Saving Institute this method of feeding is frequently employed with normal infants who refuse to take the bottle. It seems to me superior to the medicine-dropper and certainly requires less skill than gavage.

For the first two or three days at least, food should be given every hour; after this the feeding interval should be lengthened. When it is not possible to procure breast-milk, then the feeding becomes very important. In two recent successful cases I began with the following:

Whey	5 parts
Water	5 parts
Milk-sugar	1 part
Lime water.....	1 part

In one of the two cases the infant vomited this food. I directed that the whey be made from skimmed milk,

when it retained its food. As soon as it retains this formula nicely, the strength should be increased by the addition of either milk or cream.

CONCLUSIONS

1. The premature or delicate infant may develop into a strong individual. I have in mind three of these cases. One patient was normal in weight at 5 months. The other I had the privilege of examining at the age of 3 years. It was in every way a normal child. The third is now a young man in his twentieth year. He is normal physically and above normal in his intellectual attainments.

2. Among dangers to be guarded against are the regurgitation of food in the throat and the suction into the larynx. I have seen one fatal case from this cause. Temperature should be taken in order to guard against fever. In a recent case that I saw with the physician, the temperature reached to 105, due as I believe to the excessive external heat. In every case a thermometer should be kept constantly in the basket. The most frequent mistake, however, is letting the infant take the breast and assuming that it is actually getting food, or if it vomits assuming that the breast-milk does not agree with it.

3. Finally, the hopeful symptoms are a gain in weight and normal yellow stools.

Brandeis Building.

ABSTRACT OF DISCUSSION

DR. HENRY DWIGHT CHAPIN, New York: I wish to emphasize what Dr. McClanahan has said concerning incubators. I treated about 150 babies in different incubators and almost all of them died. While we gain in one factor, that is, heat, we lose in a vital factor, and that is fresh air. Most of them do not deliver sufficient fresh air to the infant, and these premature infants are unusually susceptible to lack of air. I think incubators should be abandoned entirely. I have used such appliances as Dr. McClanahan suggests. In the hospital I have two modern incubators but I do not use them. These premature infants have great difficulty in swallowing. Some of them are so difficult to feed I have been obliged to resort to gavage. I have saved one or two that I am sure would have otherwise been lost, by feeding in this way. One or two have died suddenly. Necropsy showed food had gone into the larynx. The nurse must be warned about slow feeding with any kind of a feeder.

DR. JOHN ZAHORSKY, St. Louis: Most of us who have had experience with expensive apparatus for warming babies have discontinued its use. One method is valuable in the ordinary home; that is, to use an ordinary soap-box, and an ordinary steam or hot-water radiator, and put the box with one side to the radiator so that the heat from it will pass into the box. The heat can be regulated by putting the box nearer or farther away from the radiator. This method can be used with the ordinary stove, with which, of course, someone will have to see that the fire is uniform. The distance will regulate the amount of heat the baby gets. Especially are mistakes made in the amount of heat to which the baby is subjected. Some nurses seem to think the warmer the baby is kept the better. The most common injury to the baby is from too much heat, which will produce injury that it may take a few days to overcome. It often produces cyanosis and death. A good rule is not to keep the temperature over 90. From 86 to 88 is usually sufficient. Watch the baby's rectal temperature, and if it goes lower than 96 degrees do not heat the incubator but warm the baby with a hot bath. Heating by hot air is a slow process. Most premature babies that are not sickly in any way die of exhaustion because they are not sufficiently fed. After the third or fourth day they get attacks of cyanosis, which means exhaustion of the respiratory center. In some way the baby must get enough

food or it will die. The premature baby should have one-fifth of the body-weight in mother's milk daily. Commence on one-twentieth of the body-weight the first day—do not wait three days as we do with the normal baby, but commence to feed at once. It has no reserve store to sustain life. Every day the amount should be increased until it reaches one-fifth of the body-weight. It is best given with a dropper, a spoon, or, as Dr. Chapin has emphasized, with a catheter. One may get it down in six feedings, or it may take ten, twelve or even twenty-four, but the baby must receive one-twentieth of its body-weight during its first twenty-four hours.

L. R. DEBUYS, New Orleans: The principal problem we have is to maintain the body temperature, and in doing this we have to be careful not to get it too high. A plan I have used is to make a gown of two layers of Canton flannel with one layer of cotton batting between. The baby is put in this and the warmth put externally—either hot bottles or hot-water bags. Covering all is a blanket. Another point that has not been mentioned is the placing of a thermometer inside the top covering and external to the baby's gown, to which it is pinned. You can tell then whether you are giving the baby enough or too much heat.

DR. S. M. HAMILL, Philadelphia: I, also, protest against the use of the older type of incubator, and emphasize one point in Dr. McClanahan's paper that seems to me important in the case of the premature infant, namely, supplying a sufficient amount of fresh air. I have not used an incubator for some years. I have been following much the same course that Dr. McClanahan has outlined. I had an experience a year and a half ago, which demonstrated that at least one premature infant was able to breathe an air of low temperature without detriment. I had the infant forced on me in the children's ward of the Polyclinic Hospital. None of the small rooms in the hospital were then available. Being an advocate of fresh air, I kept the windows open constantly, winter and summer. Having had this child brought into that ward it became necessary either to rob the children in the ward of their usual amount of fresh air, or to keep the windows open and endeavor to maintain the body-heat of the premature infant while at the same time letting it breathe the cold, fresh air of the ward. On the principle of doing the greatest good to the greatest number, I chose the latter course, and put the baby in a specially prepared clothes-basket close to a radiator. I succeeded in maintaining the heat about the body of the baby at from 90 to 95 F., whereas the temperature of the ward often fell as low as 50 or 55 F. at night. That baby did better than any premature baby I have ever seen. I have had experience in keeping these babies in room temperature of from 65 to 70 degrees for a short time, but never before at such a temperature as that above indicated. I am not advocating this as a proper procedure, but it illustrates the fact that these babies can breathe an air at low temperature without harm.

DR. F. B. TALBOT, Boston: Concerning the conservation of energy in the new-born, the new-born baby maintains his own body-heat after birth by using up the glycogen which has been deposited in the liver. In a certain number of instances when all the glycogen is used up, the body-fat is converted into sugar, and is used in this form. If the mother's milk comes in on the third day, and often later, they may not use their own body-fat at all. Under those circumstances they do not lose weight. If it does not come until five or six days they lose a good deal of body-fat and weight. The obvious conclusion to draw from this is that if the baby has not much fat, is not well developed, is a weak baby, it must be fed early to give it energy to keep its life, and to maintain its body-heat. This discussion goes with accurate scientific measurements of heat and determination of the respiratory quotient.

DR. F. N. ROGERS, Manchester, N. H.: One point I would bring out that Dr. McClanahan mentioned in his clothes-basket arrangement is that the weight a child would lift by respiration is simply the displacement of air. When cotton batting and pads are put about the child, there is apt to be more or less weight to be displaced, which takes energy.

DR. HENRY F. HELMHOLZ, Chicago: In those cases with syncopial attacks during the first or second day, I have used in two cases 6 per cent. dextrose solution with excellent results. The child in one instance was practically moribund, but responded quickly to an ounce of 6 per cent. dextrose solution. That was kept up at five-hour intervals. There was no breast-milk available and the child from that time on did very well. The following day we were able to obtain some breast-milk, and the child recovered. The dextrose was administered hypodermatically.

DR. H. M. McCLANAHAN, Omaha: Some years ago I bought what I thought was a model incubator, and all our premature babies died about the fifth or sixth day, until I became discouraged. In all the cases I cited in my paper I was called to the home. Gavage is not as convenient there as in the hospital. The infant should not go too long without food. I believe a thermometer should be constantly present in the basket, and the temperature of the basket should not go above 90 or 95. Secondly, I emphasize, also, the danger of letting a baby's temperature go to 104, 105 or 106. In the last child I lost, one I saw an hour before it died, the temperature was 106, I believe due to the carelessness of the nurse in letting the temperature of the basket get too high. The temperature should be taken as a routine measure every twenty-four hours at least.

INTRACRANIAL HEMORRHAGE IN THE INFANT

WITH HISTORY AND NECROPSY REPORT OF A CASE

J. W. SHUMAN, M.D., SIOUX CITY, IOWA

Recently I was called to conduct a necropsy in the case of an infant succumbing to some obscure lesion, and through the kindness of the attending physicians, Drs. J. W. Flageolle and G. S. Browning, the following clinical history was obtained:

History.—Dr. Flageolle was called Aug. 18, 1914, to see baby G. W., aged 6 weeks. The child had not been well since the sixteenth, but not ill enough to need medical attention. The history was negative as to traumatism or syphilis. He found the baby irritable when disturbed. There was considerable tenderness over the lower abdomen but no distention; the mother stated that the baby cried in his sleep and also when she attempted to pick him up. There had been no spasms, the Cheyne-Stokes respiration was present, the temperature was 98.6, pulse 90, and as no bowel movement had been secured since August 16, attempts were made per enemata to empty the bowel, but without satisfactory result. The following day at 9 a. m., Drs. Browning and Flageolle examined the child noting the following: pupils unequal (left dilated, right, "pin-point"); Cheyne-Stokes respiration, clonic spasms, some cervical rigidity and Kernig's sign positive. The clinical diagnosis of cerebrospinal meningitis was tentatively entertained. Death occurred without any change in symptoms at 1 p. m., of the same day.

Necropsy.—Necropsy was held at 4:30 p. m., the same day, showed a well-nourished child, with slight bulging of the fontanelles and rigor mortis pronounced; an elongated prepuce with pin-point opening was noted. There were bluish-red discolorations on the back and left leg (post-agonal).

The thoracic and abdominal findings were negative except as to the colon, the mucous membrane of which was dotted with numerous small ecchymotic areas, extending from the ileocolic valve to the anus, with a slight membrane present, which was easily washed away.

No ecchymosis or other evidence of traumatism on the scalp or exterior surface of the skull. On incising the dura mater the brain substance exuded, denoting increased intracranial pressure. The consistency of the brain tissue was extremely soft and pulpy rendering it impossible of manipulation; the cranial bones were normal. On removing the cerebrum subdurally and left posteriorly a well organized, dark blood-clot (1½ ounces) was found compressing, but no.