CARE OF THE PREMATURE INFANT

Report of a Round Table

By William A. Silverman, M.D.

Department of Pediatrics, College of Physicians and Surgeons, Columbia University, and Babies Hospital, New York

The opening remarks of the moderator stressed the controversial nature of the subject and underlined the necessity for further clinical investigation.

PROBLEMS IN ROUTINE CARE

The Labor Room

It is accepted that the umbilical cord should be clamped early in known and suspected cases of erythroblastosis. When iso-immunization is not a factor, some advocate late clamping to effect a physiologic transfusion. Others say this produces excessive blood volume, which may be a causative factor in the respiratory-distress syndrome. Studies by umbilical-vein catheterization thus far have failed to show an association between high venous pressure and increased mortality.

Aspiration of the stomach is being performed routinely in many centers. No convincing controlled studies are available to show that this procedure has lowered mortality or morbidity.

Resuscitation of the newborn continues to be a problem. The trend is toward more vigorous measures more promptly applied, to produce and maintain an airway, and thus facilitate initial expansion of the lungs. Nasopharyngeal suction is adequate in most instances. Infants who do not breathe spontaneously may benefit from direct laryngoscopy, clearance of the airway and artificial respiration. Morphine antagonists may be given if narcosis is evident following use of narcotics during delivery.

Initial heat loss is greater in prematures than in full-term newborns. The rate of fall of body temperature is maximal during the first hour of life when the infant is exposed to labor-room temperatures while being resuscitated. Swaddling, effective against heat loss, has the disadvantage of interfering with direct observation of the infant. The answer to this problem may be infra-red heat lamps built into one corner of the labor room. The use of glucose has been mentioned but not enough information is available.

There is a growing trend toward the omission of silver nitrate for prophylaxis in the eyes in newborns. In some centers local instillation of antibiotics is used; others have abandoned prophylaxis completely. There is no evidence concerning the application of these methods to premature infants. Some believe that the chemical conjunctivitis produced by silver nitrate may help the premature conjunctiva to ward off other bacterial invaders as well as the gonococcus.

The Nursery

Most premature centers use vitamin K as prophylaxis against the hemorrhagic diathesis. The necessity, dosage and route of administration are all controversial. When administered in large amounts, convincing evidence has shown that vitamin K may produce kernicterus. The consensus favors a dosage of 1 to 2.5 mg given once at the time of admission to the nursery.

The concentration of vitamin E in the blood is low in premature infants. In-vitro studies have shown that erythrocyte hemolysis in hydrogen peroxide solution is increased in the presence of vitamin E deficiency. The clinical significance of this is...
unknown, since no clinical studies have been performed. It is suspected that vitamin E may have a place in the treatment of prematures.

Care of the umbilical stump assumes increasing importance because of the recent evidence that it is a common reservoir of infection. Jellard has shown that infection in this site can be controlled with the use of a triple-dye solution. Skin care must be considered for the same reason. Dry skin care has proved satisfactory in many centers for years. There is some evidence that bathing the skin with hexachlorophene soap may be of value in controlling staphylococcal infection in the nursery.

The problem of the position in which the premature should be kept has not been investigated. Most agree that the premature infant breathes more easily supine than prone. Nothing is known about the relative advantages or disadvantages of the head-up, head-down or horizontal positions.

Optimal time for institution of feedings is another issue in which there is no uniformity of opinion. Late initiation of feedings may reduce the incidence of aspiration and facilitate elimination of neonatal edema. Conversely, it may enhance metabolic acidosis. Most centers now begin feedings after clinical edema has subsided.

**Environmental Conditions**

Air and dust control are important measures in prevention of infection. Elimination of cross infection is facilitated by the use of fresh air from outside the nursery, air individually ducted into each incubator. Dust control is enhanced by frequent floor mopping with a Triton and mineral oil mix.

It has not been shown that increased environmental oxygen given only for the first day of life is associated with an increased incidence of retrolental fibroplasia among prematures. Conversely, there is no convincing evidence that the routine use of oxygen in the first day of life is associated with a lower mortality than that associated with a policy of oxygen-only-on-indication. In the present state of our knowledge it would be more prudent to advise that oxygen be given to prematures only on indication, even during the first day of life. When a high concentration of oxygen is necessary, it should be administered intermittently. Retinal vessels of animals are able to recover from the spasm induced by oxygen more readily when high oxygen concentration is intermittent rather than continuous.

Mortality has been reduced by elevation of relative humidity in the incubator to 80 to 90%. The use of nebulization or mist is no more effective than a relative humidity level of 80 to 90%. High humidity probably has no effect on the respiratory problems of the premature, but does reduce heat loss of these subjects. When better methods are available to help the premature infant maintain the body temperature, the humidity factor will have to be reconsidered.

The optimal body temperature for premature newborns is not known. Limitations in present day methods of warming prematures have not permitted a safe approach to 98.6°F. Environmental temperatures above 94°F have been associated with episodes of dangerous hyperpyrexia in these infants.

**SOME CLINICAL PROBLEMS**

**Infection**

Good isolation technique was stressed. Air isolation of prematures was advocated. Masks are recommended in England and by some centers here. Hand washing is emphasized universally; hexachlorophene soaps are advocated by some. Cold water seems to be easier on the hands than warm. Adequate cleansing of incubators between occupants is often neglected. This should be accomplished by thorough washing with an antiseptic solution (e.g., Wescodyne®) and exposure to ultraviolet light.

There is no general agreement in the choice between the policies of prophylactic versus therapeutic administration of anti-
Proponents of the former argue that the diagnosis of infection or sepsis is uncertain during the first 5 days of life, and therefore use prophylaxis during this period. Others believe that prophylaxis has not significantly lowered mortality rates, and prefer to wait for specific indications before commencing therapy. Most pediatricians now accept the fact that Gantnisin® and sulfadiazine may facilitate development of kernicterus in a premature newborn with hyperbilirubinemia, and therefore believe that these antibiotics are contraindicated.

Examinations of the gastric contents from newborns may show bacteria or increased numbers of polymorphonuclear leukocytes and thus give a lead to the diagnosis of prenatally acquired infection as the result of amnionitis.

Other agents have been suggested to combat infection. Human milk and gammaglobulin have failed to show any beneficial effects in recent studies. Some new work indicates that fresh serum from adults enhances the ability of polymorphonuclear leukocytes of the premature newborn to ingest carbon particles in-vitro; there are no clinical studies to date.

Respiratory Distress

Identification of respiratory is more readily possible than was previously thought. Roentgenologic diagnosis may be specific, as shown by a recent study of consecutive films made on 100 newborns during the first 3 days of life. In addition, respiratory rate and degree of retraction are significantly elevated; these clinical signs may become apparent during the first twenty-four hours of life. Diaphragmatic hernia may also produce respiratory distress in the newborn period. Early chest films in patients with respiratory distress are indicated. The need for routine chest films in all newborns is highly questionable.

Treatment is more controversial than diagnosis. Some advocate therapy with oxygen; others say that oxygen may be a factor in production of hyaline membrane disease. In England digitalization and phlebotomy are being performed, with questionable indication and equivocal results. Dr. Helen S. Reardon of Temple University has indicated favorable results from administering 30 ml/lb/day of 5% glucose in 0.45% saline solution intravenously to newborns of diabetic mothers. The Scandinavians are trying hypothermia, but no results are available.

Can one prognosticate in the respiratory-distress syndrome? Some say that the presence of cyanosis with crying is a poor sign. One series predicts a fatal outcome for half of all infants showing the “typical” roentgenologic picture in the lungs. Degree of retractions and pattern of respiratory rate are the most important clinical prognostic signs.

Brain Damage

The relationship between hyperbilirubinemia and brain damage (kernicterus) has not been precisely defined. Many premature newborns develop hyperbilirubinemia (bilirubin of over 17 mg/100 ml); few are found to have kernicterus at necropsy. Certain factors, such as iso-immunization (erythroblastosis), sulfadiazine, Gantnisin® and excessive administration of vitamin K are associated with the development of kernicterus in the presence of varying degrees of hyperbilirubinemia. The value of exchange transfusion for hyperbilirubinemia in pre-matures, not associated with these co-factors, is unknown.

Intraventricular hemorrhage is the most common cause of brain damage and death. Recent studies have shown that the diagnosis may be made during life by serial determinations of the capillary hematocrit in premature newborns; a precipitous decline in the first 10 days of life may indicate that intraventricular hemorrhage has occurred. Even if the diagnosis is made, treatment is uncertain. Pediatricians tend to be conservative; neurosurgeons maintain that these collections of blood must be drained. No data is available. This is an important area for study.
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