MEDICAL PRACTICE

Problems of the Newborn

The Normal Baby: Routine Care

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Though normal health usually implies that the services of a doctor are unnecessary, normal birth does not carry this implication for either mother or baby. The doctor has an important part to play in promoting the welfare of even the most normal of newborn infants.

Attention at Birth

CARE OF THE CORD

Division of the cord represents the final physical separation of infant from mother. The traditional cord ligature applied a few inches from the umbilicus may slacken, and bleeding may occur as the cord shrinks. To avoid this, self-retaining plastic clips are available and elastic bands may be used as shown in Fig. 1. Normally the cord desiccates, shrinks, and separates at 7 to 10 days and requires little further care. Tight binders which restrict abdominal, and therefore diaphragmatic, movement, and moist dressings which encourage infection, should not be used. Dusting of the umbilical stump with talcum powder at each napkin change helps to keep the cord stump dry.

ESTABLISHMENT OF RESPIRATION

In the newborn infant respiration should be established within 30 seconds of delivery. A cry is a satisfactory herald of this. To facilitate respiration the infant's mouth and pharynx should be cleared gently of mucus and other secretions which might cause obstruction, using a sterile swab wrapped round the attendant's finger or, alternatively, a sterile mucus extractor. The end of the catheter portion of the mucus extractor should be rounded to

avoid injuring the infant's mucous membrane and the tubing rigid enough not to collapse on suction. A trap should be incorporated to protect the operator. Mucus extractors are available commercially or can be assembled from simple equipment (Fig. 2).

FIG. 1—Technique for occluding umbilical cord by an elastic band.

FIG. 2—Mucus extractor.

EMPTYING THE STOMACH

Normality in the infant does not necessarily imply normality in the mother or normal delivery. If delivery has been by caesarean section or has followed hydramnios, or if there has been fetal distress, the stomach should be intubated and emptied of swallowed liquor, etc. to avoid vomiting and aspiration of stomach contents.

The Immediate Examination

At delivery we are concerned to know whether the infant is suffering from any immediate problem requiring urgent action. During the first 15 minutes of life brief episodes of apnoea, grunting, and intercostal recession are not uncommon, but a more rhythmic respiratory pattern at a rate of 30 to 50 per minute should then supervene. The heart rate at birth is normally about 180 per minute, dropping to 125 within the first one to two hours. At birth infants exhibit diffuse motor activity. This diminishes over the first three hours, when they often fall asleep. Continuing respiratory abnormality, bradycardia, cardiac irregularity, inactivity, hypotonia, or inadequate response to stimulation (for example, by flicking the skin), definite pallor, cyanosis, or jaundice would be noteworthy signs.

These observations may be quantitated at birth in the Apgar score as in the Table.

Determination of Apgar Score

Factors observed	0	1	2
Heart rate	absent	<100	>100
Respiratory effort	absent	slow/irregular	regular, crying
Muscle tone	limp	some flexion	active movements
Response to stimuli (catheter)	nil	grimace	cough, sneeze
Colour	blue	pink body, blue extremities	pink

The score (summation of scores for each individual item) should be determined at 1 and 5 minutes and should lie between 7 and 10. Scores below that indicate the need for continuing close observation and possible supportive or remedial measures.

Cot and Nursery

The ideal cot is one which is sufficiently stable to reduce the

risk of overturning, is easily cleaned, and permits ready observation of the infant. Perspex bassinets are increasingly used. Self-contained mobile cots with built-in lockers—containing spare clothing, napkins, sterile cotton wool swabs, dusting powder, zinc oxide ointment (7.5% in castor oil for the protection of skin on the napkin or other areas which are apt to become too moist), individual thermometer and individual bath—and soiled-clothing disposal bins or bags, are efficient and make nursing easier. A suitable type of cot is illustrated in Fig. 3.

The infant should be nursed in the horizontal position, or if necessary the head can be raised a little. The head-down position is not now employed; it raises intracranial pressure and the weight of the abdominal viscera is on the diaphragm.

The healthy infant should normally be nursed in a cot beside his mother's bed where she can have ready access to him and, particularly if he is her first child, learn to know him and handle him effectively. Provision has to be made for moving noisy infants from the mother's bedside to a nursery. Nursery space should be allocated on the basis of 30 sq. ft. (2.8 sq. metres) per infant.

Temperature Control

Nakedness, a large surface area per unit weight and moistness of the skin with resultant evaporative heat loss are conducive to hypothermia in the newborn infant. The environmental temperature into which the infant is received should be 21-24°C (70-75°F) and should remain at this level for several weeks. It is particularly in the home that low environmental temperatures are likely to be encountered. The environmental temperature which counts is that near the infant—i.e., within the blankets around him and not at a distant point in the nursery. The newborn infant's temperature is taken most accurately in the rectum and should be within the range 36.6 to 37.2°C (98-99°F). If a newborn infant's temperature shows signs of falling a somewhat higher environmental temperature will be required temporarily.

Clothing plays an important part in the maintenance of body temperature. In colder climates a vest, gown, jacket, and blankets are the traditional articles. Clothing should not impair respiration in any way or hinder limb movement.

Bathing

In the newborn infant the virtues of washing have been questioned in hospitals where staphylococcal infection is prevalent. Communal baths may be a source of cross infection and if used should be carefully cleansed with an antiseptic such as

Perspex bassinette

FIG. 3—Modern neonatal cot with built-in locker, removeable disposal bin, and Perspex bassinette.

cetrimide after each use. Individual baths are to be preferred. The first bath is a matter of no urgency and may be given any time up to 24 hours, or later if necessary. The practice of daily bathing has the wide support of mothers and midwives. In hospital it allows an inexperienced mother to practise handling her infant and to gain experience and confidence in his management. Local cleaning of the buttock area after soiling will be required more frequently. The skin of the newborn infant is soft and easily excoriated, and rough towelling should not be used on it. The infant's towel should be individual to him.

Prevention of Infection

Owing to the immaturity of his immune response, the exposure during delivery to any infection present in the maternal birth passages, the ease with which the integrity of his skin can be broken, the infected nature of the environment into which he is so often delivered, and the close contact with attendants on whom he depends, the newborn infant is particularly prone to infection.

THE MOTHER

Though he may appear healthy at birth the infant may have been infected from an apparently healthy mother. Prolonged rupture of membranes—that is, for more than 48 hours—increases the risk of infection of the infant owing to aspiration of infected liquor. Gram-negative organisms are usually involved, and in these circumstances the practice of giving prophylactic antibiotic—that is, ampicillin 50 mg per kg per day over a period of, say, three days—is advocated by many but not all paediatricians.

During his passage through the maternal birth canal the infant may be infected also with monilia from the mother. Prophylactic treatment is not indicated but the mouths of all infants should be routinely inspected for thrush during the first ten days of life.

THE ENVIRONMENT

The newborn infant is at risk of infection from his physical environment including attendant staff. The essence of prevention is to try and deny the access of infecting organisms to him. General preventive measures include the reduction of dust (which may carry pathogenic bacteria) by wet mopping with an antiseptic solution and suction cleaning rather than dry mopping and brushing, scrupulous cleanliness of cots and incubators, and the immediate disposal of soiled linen into bags which are sealed and removed from the maternity unit for washing and laundering of the contents.

Staphylococcal Infection

The train of events is usually contamination of the infant from staphylococci derived from the hands of attendant nurses or doctors; secondary colonization of the infant's nose, umbilicus, and perineum; and then infection. Attendant staff should wash the hands between handling each infant. If staphylococcal infection is occurring the use of hexachlorophane in the form of a 3% hand emulsion such as PhisoHex, or in the form of pre-prepared hand lamellae reduces hand contamination. Individual paper towels not communal cotton towels should be used for hand drying. Those engaged in close handling of the infant—that is, on the lap—should wear a plastic or rubber apron which can be wiped with an antiseptic solution between infants or a sterile gown individual to the infant being handled. Ordinary clothing of attendant staff should be changed for

hospital clothing, or should be covered with a sterile gown or recently laundered laboratory coat. Face masks do not prevent the dissemination of staphylococcal infection.

The clothing and blankets of the newborn infant should be of cotton material which can be dealt with by the normal laundering processes. These processes will kill staphylococci but the lower temperatures used in washing woollen clothes and blankets will not do so.

When staphylococcal infection is occurring in a nursery the infant should be covered daily with a hexachlorophane emulsion (3%), or a hexachlorophane dusting powder (0.33%) should be used particularly on the umbilicus. Hexachlorophane should not be used along with soap.

Gastroenteritis

Though much less common than it was, gastroenteritis continues as a risk to the newborn infant, particularly from cross infection among newborn infants grouped together in a nursery. It is often associated with Gram-negative organisms and is largely conveyed during feeding. The hands of the attendant should be washed before feeding. Adequate sterilization of feeding bottles, teats, and receptacles should be carried out by boiling or by using the hypochlorite method. In the latter the articles must be submerged in the hypochlorite solution and left in it for the recommended length of time. The prevention of the spread of thrush from feeding bottles and teats will also depend on adequate sterilization. With Gram-negative infections hexachlorophane is of no value and may even encourage such infections.

Where gastroenteritis occurs in the newborn nursery prompt removal of cases and 24 hour barrier nursing of contacts is necessary to prevent spread of infection.

Gonococcal Infection

Gonococcal infection may be on the increase but the prophylactic use of silver nitrate solution (1%) or antibiotic drops into the eye is not generally considered necessary. Any purulent discharge from the eye of a newborn infant, however, should be examined bacteriologically both by culture of a swab and by examination of a smear.

Other Infections

Staff with sore throats, upper respiratory tract infections, skin infections, diarrhoea, or any unexplained pyrexia should not be engaged in nursing the newborn infant. Masking may have a prophylactic value in mouth and throat infections other than staphylococcal.

Routine Examination of the Infant

All infants should be examined routinely during the neonatal period probably soon after birth and again at the time of discharge from the maternity nursery.

HISTORY

Routine examination should be carried out in conjunction with a knowledge of the antenatal and natal history. Thus the doctor should be aware of any hereditary disorder in parents, siblings, or other relatives which might have a bearing on the health of the child (for example, cystic fibrosis in a sibling, Marfan's syndrome in the father, or haemophilia in an uncle of a male child would have significant implications) and of the history of the mother's pregnancy and delivery.

EXAMINATION

Any symptoms reported by the nursing staff such as vomiting, reluctance to feed, diarrhoea, choking, convulsions, abnormal cry, or unusual quietness should be evaluated. The umbilical cord should be examined on cutting to ascertain whether there is a single umbilical artery, a condition associated with a higher incidence of congenital abnormalities. Gross defects will indicate abnormality but the apparently normal infant may have covert defects such as cleft palate, congenital heart disease, renal abnormalities, metabolic errors, etc. whose detection requires special examination.

The infant's general appearance should be noted. Do the facial or nuchal characteristics indicate any specific disorder such as mongolism or Turner's syndrome? Does the skin show any abnormality of colour or texture? Is there any evidence of dehydration or oedema? Is there any poverty of movement or inability to sustain the limbs against gravity—in a general way as in widespread hypotonia or a local way as in Erb's palsy? Is there any suggestion of respiratory difficulty with an abnormal respiratory rate, intercostal indrawing or costal margin recession, abnormal precordial pulsation, abdominal swelling, or abnormal abdominal wall movement? Inspection of the mouth will reveal any abnormality such as a cleft palate. The auditory meatuses, anus, and urethral opening should be inspected for abnormality of position or structure.

Palpation will indicate the size and tension of the fontanelle and state of the skull sutures, muscle tone, presence of abnormal swellings in the abdomen (for example, enlargement of

FIG. 4—Testing for congenital dislocation of the hip.

FIG. 5—Testing the Moro reflex

the operator places each forefinger crooked to a right angle in the baby's palm. The infant grasps each of the forefingers and the grasp is sufficient to permit the weight of the infant's head and trunk to be pulled off the bed

FIG. 6—Eliciting the grasp reflex.

FIG. 7—The rooting reflex.

the liver), neck (for example, sternomastoid tumour), or other site. The presence or absence of testes in the scrotum or inguinal canal should be noted and the palpability of the pulses including the femoral pulse.

Routine examination of the hip joint for dislocation should be carried out. With hips flexed and knees at right angles the thighs are abducted (Fig. 4). During this manoeuvre the dislocated femoral head re-enters the acetabulum with a palpable "clonk" helped if need be by pressure from the fingers placed behind the trochanter. Dislocatability may be detected by pushing outward and backward on the medial aspect of the baby's thigh when the joint is semi-abducted. With further abduction the head can be felt returning into the acetabulum.

Auscultation of the heart should be carried out to ascertain whether any murmurs are present.

The presence or absence and (where relevant) symmetrical or asymmetrical distribution of the primitive reflexes normally present such as the Moro reflex (Fig. 5), the grasp reflex (Fig. 6), and the rooting reflex (Fig. 7) should be noted.

The stools should be examined and, if possible, micturition observed to see whether there is a normal stream of urine.

At birth the infant's weight, total length or crown-rump length, and maximum head circumference should be measured. Continuing routine measurements of weight at daily or less frequent intervals may be desirable.

Screening Techniques

Determination of the Apgar score, examination for congenital dislocation of the hip, weighing, and measurement of length and head circumference are all screening procedures. Many would consider routine examination of the urine for reducing substances—for example, to exclude galactosaemia—another desirable screening procedure. The test used should not be a specific one for glucose.