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TUTOR

ICON

CARE OF LOW BIRTH WEIGHT BABY

Low birth weight :A neonate weighing less than 2500 gm at birth, irrespective of the gestational period. They can be term, preterm or post term.

Very low birth weight: A neonate weighing less than 1500 g at birth.

Extremely low birth weight :A neonate weighing < 1000 g at birth.

Appropriate for gestational age : An infant whose birth weight falls between the 10^{th} and 9-th percentile on intra-uterine growth curves.

Small for gestational age / small for date: A neonate weighing <10th centile or < 2 standard deviation for corresponding gestational age.

Intrauterine growth retardation: It is defined as the intrauterine growth that has deviated from the normal expected growth

Preterm neonate: A neonate born before completion of 37 weeks of gestation, irrespective of birth weight

Low birth weight infants are classified into two clinical types

1. Preterm (babies born before 37 weeks)
2. Small for date / small for gestational age (babies having intra-uterine growth retardation)

PRETERM (BABIES BORN BEFORE 37 WEEKS)

MEASUREMENTS

- Their size is small with relatively large head.
- Crown-heel length isless than 47 cm
- Head circumference isless than 33cm butexceeds the chestcircumference by morethan 3cm.

ACTIVITY AND POSTURE

The general activity is poor. Their automatic reflex responses such as moro response, sucking and.Swallowing are sluggish or incomplete. The baby assumes an extended posture due to poor tone.

FACE AND HEAD

- Disproportionately large head size
- Sutures are widely separated and the fontanels are large
- Small chin, protruding eyes due to shallow orbits and absent buccal pad of fat.
- Optic nerve is often umyelinatec but oresence of papillary membrane makes its visulaization difficult
- Ear cartilage id deficient or absent with poor recoil
- Hair appear woolly and fuzzy and individual hair fibres can be seen separately

SKIN AND SUBCUTANEOUS TISSUE

- Skin is thin gelatinous, shiny and excessively pink with abundant lanugo and very little vernixcaseosa
- Edema may be present
- Subcutaneous fat is deficient and breast nodule is small or absent
- Deep sole creases are often not present

GENITALS

- ✓ In male testes are undescended and scrotum is poorly developed
- ✓ In female infants, labia majora are widely separated exposing labia minora and hypertrophied clitoris

ETILOGICAL FACTORS:

Etiology is multifactorial and involves a complex interaction between fetal, placental, uterine and maternal factors

1. **Fetal factors**
   - ✓ Fetal distress
   - ✓ Multiple gestation
   - ✓ Erythroblastosisfetalis
   - ✓ Non-immune hydrops
2. **Placental factors**

- ✓ Placental dysfunction
- ✓ Placenta previa
- ✓ Abruption placenta

3. **Uterine factors**
   - ✓ Bicornuate uterus
   - ✓ Incompetent cervix
4. **Maternal factors**
   - ✓ Pre-eclampsia
   - ✓ Chronic medical illness (renal or heart disease)
   - ✓ Infections such as (listeria monocytogenes, group B streptococcus, UTI, bacterial vaginosisetc
   - ✓ Drug abuse (cocaine)
5. **Other factors**
   - ✓ Premature rupture of membranes
   - ✓ Polyhydramnios
   - ✓ Iatrogenic
   - ✓ trauma

PHYSIOLOGICAL HANDICAPPS

Central nervous system

- ✓ Immaturity of central nervous system is expressed as inactivity and lethargy, poor cough reflex and in-coordinated sucking and swallowing
- ✓ Intraventricularhemmorhage
- ✓ Seizures
- ✓ Retinopathy of prematurity
- ✓ Deafness
- ✓ Hypotonia

Respiratory system

- ✓ Cuboidal alveolar lining poor alveolar diffusion of gases
- ✓ Hyaline membrane diseases
- ✓ Breathing is mostle diaphragmatic, periodic and associated with intercostal recessions
- ✓ pulmonary aspiration and atelectasis

- ✓ They are vulnerable to develop chronic pulmonary insufficiency

Cardio vascular system

- ➢ The closure of ductusarteriosus is delayed
- ➢ In grossly immature infants(less than 32 weeks) EKG shows left ventricular
- ➢ Risk to develop thromboembolic complications and hypertension

Gastro intestinal system

- ✓ Due to poor and in-coordinated sucking and swallowing
- ✓ Animal fat is not tolerated as well as the vegetable fat
- ✓ Regurgitation and aspiration are common
- ✓ Hypoglycaemia
- ✓ Abdominal distension and functional intestinal obstruction
- ✓ Entero-colitis
- ✓ Immaturity of the glucoronyltransferase system in the liver leads to hyper-bilirubinemia
- ✓ Development of kernicterus at lower serum bilirubin levels

Thermoregulation

- ➢ Hypothermia is invariable
- ➢ Excessive heat loss due to relatively large surface area due to paucity of brown fat in the baby who is equipped with an inefficient thermostat
- ➢ Infections are the important cause of neonatal mortality.
- ➢ The low levels of IgG antibodies and inefficient and Cellular immunity
- ➢ Excessive handling, humid and warm atmosphere contaminated incubators and resuscitators expose them to infecting organisms.

Renal immaturity

- The blood.urea nitrogen is high due to low glomerular filtrate rate.
- The renal tubular ammonia mechanism is poorly developed thus acidosis occurs early.
- They vulnerable to develop late metabolic acidosis especially when fed with a high protein milk formula.
- Concentration of urine is poor

- Preterm has to pass 4 to 5 ml of urine excrete one miliosmole of solute. Baby gets dehydrated.
- The solute retention and low serum proteins explain occurence of edema in preterm infants.

SMALL FOR DATE / SMALL FOR GESTATIONAL AGE (BABIES HAVING INTRA-UTERINE GROWTH RETARDATION)

Classification of small for date:

Classification of Small-for-date

SFD or SGA babies are of 3 types:

1 Malnourished small-for-date infants:- Growth arrest in later part of pregnancy leads to reduction in cell size but not cell number, resulting in small and malnourished baby. Such baby looks marasmic and has less subcutaneous fat and poor muscle mass.

2. Hypoplastic small-for-date babies:- Growth retardation in early part of pregnancy leads to reduction in number of body cells resulting in hypoplastic small for date babies. These babies are proportionately smaller in all parameters including head size.

3. Mixed:- When adverse factors operate during early and mid pregnancy, reduction in both cell number and size occurs leading to mixed small for date baby.

Etiology of Small-for-Date baby/lUGR

IUGR may be fetal response to following factors:

1**. Fetal Factors**

- Chromosomal anomalies
- Infections (congenital rubella, syphilis)
- Infarction
- Multiple gestation
- Pancreatic hypoplasia
- Insulin deficiency

2.Placental Factors

- Placental weight or cellularity (size)

- Infraction
- Abruptio Placenta
- Infection of placenta

3.Maternal Factors

- Toxemia of pregnancy
- Hypertension or renal disease
- Hypoxemia (cyanotic cardiac or pulmonary disease)
- Malnutrition
- Short stature of mother
- Primi or grand multipara
- Young mother (below 20 years)
- Smoking, alcohol or drug abuse

CARE OF PRETERM BABIES

Optimal management at birth

- Delayed clamping of cord.
- Elective intubation of extremely LBW babies (<1000g)
- Should be promptly dried, kept effectively covered and Warm
- Vitamin K Img (0.5mg in babies < 1500g) should be given intra-muscularly
- Transferred by the doctor or nurse to the NICU as soon as breathing is established

Monitoring

- Vital signs.
- Activity and behaviour.
- Colour.
- Tissue perfusion.
- Fluids, electrolytes and ABG's.
- Tolerance of feeds
- Watched for development of RDS, apneicottacks, sepsis, PDA, NEC, IVH, etc.
- Weight gain velocity

Criteria for a healthy preterm baby

- The vital signs should be stable.

- The healthy baby is alert and active, looks pink and healthy, trunk is warm to touch and extremities are reasonably warm and pink.
- The baby is able to tolerate enteral feeds and there is no respiratory distress or apnic attacks and baby is having a steady weight gain of 1-1.5 % of his body weight every day.

Provide in-uetro milieu

- ✓ Create a soft, comfortable, 'nestled' and cushioned bed
- ✓ Avoid excessive stimuli
- ✓ Effective analgesia and sedation
- ✓ Provide warmth
- ✓ Ensure asepsis
- ✓ Prevent evaporative skin losses
- ✓ Provide effective and safe oxygenation
- ✓ Partial parenteral nutrition and give trophic feeds with expressed breast milk (EBM)
- ✓ Provide rhythmic gentle tactile and kinaesthetic stimulation

Position of the baby

- ✓ Thermo-neutral environment
- ✓ Application of oil or liquid paraffin on the skin
- ✓ Should be covered with a cellophane or thin transparent plastic sheet
- ✓ Provide partial KMC care

Oxygen therapy

- Oxygen should be administered with a head box when spo2 falls below 85% and it should be gradually withdrawn when spo2 goes above 90%
- The lowest ambient concentration and flow rates should be used to maintain spo2 between 85-95% and pao2 between 60-80mm hg

Phototherapy

- Early phototherapy is adviced to keep the serum bilirubin level witin safe limits in order to obviate the need for exchange blood transfusion

Prevention of nosocomial infections

- The handling should be bare minimum
- Vigilance should be maintained on all procedures
- Early diagnosis and prompt treatment of Infections

Feeding and nutrition

- ❖ Intravenous dextrose solution (10% dextrose in babbies>1000g and 5% dextrose in babies <1000g)
- ❖ Trophic feeds with EBM through NG tube
- ❖ Condition is stabilized – enteral feeds

Total parenteral nutrition

Indications

- ✓ Infants with BW<- 1000g
- ✓ Infants with BW<- 1500g, done in conjunction with slowly advancing enteral nutrition
- ✓ Infants with BW<- 1501-1800f for whom enteral intake is not expected for > 3 days

Total parenteral nutrition:

- ✓ Glucose: 6-8 ml/kg/min
- ✓ Lipid: 0.5-1g/kg/d
- ✓ Sodium: 2-4mEq/kg/d
- ✓ Potassium: 2-3mEq/kg/d
- ✓ Chloride: 2-4mEq/kg/d

Early enteral nutrition

Trophic feeding/ gut priming

- ✓ Practice of feeding very small amount of enteral nourishment to stimulate development of the immature GIT

Advantage:

- ❖ Improves GI motility
- ❖ Enhances enzyme maturation
- ❖ Improves mineral absorption
- ❖ Lowers incidence of cholestasis
- ❖ Shortens time to regain birth weight

Feeding guidelines

- ❖ <1200g/32wks: IV fluids for first 2-3 Days, once stable start gavage feeding
- ❖ <1200g/-1800g32- 34wkswks: start gavage feeding, once vigorous start spoon/ breast feeding
- ❖ >1800g/>34wks:start breast feeding directly: if trail feed takes >20mins or intake is less than required, switch to gavage feeding

Preterm human milk

Advantages:

- ❖ Higher concentration of amino acids
- ❖ Higher concentration of exssential fatty acids
- ❖ Lower renal solute load
- ❖ Specific bio-active factors provide immunity
- ❖ Promotes intestinal maturation

Disadvantages

- ❖ Low concentrations of vitamin D, Ca, P
- ❖ Inadequate iron

Enteral nutrition

- ✓ Energy: 130-175 kcal/kg/d
- ✓ Protein: 3.4- 4.2/kg/d
- ✓ Fat : 6-8g/kg/d
- ✓ Na: 3-7 mEq/kg/d
- ✓ Cl: 3-7 mEq/kg/d
- ✓ K: 2-3 mEq/kg/d
- ✓ Ca:100-220mg/kg/d

Nutritional supplements

- ➢ Multivitamin drops
- ➢ Iron supplementation
- ➢ Vitamin E supplementation
- ➢ Supplements of calcium 20mg/day and phosphorous (100g/day)

Gentle rhythmic stimulation

- ✓ Gentle touch massage, cudding, stroking and flexing
- ✓ Rocking bed or placing a preterm baby on inflated gloves
- ✓ Soothing auditory stimuli
- ✓ Visual inputs

Kangaroo care

- ✓ Kangaroo care is placing a premature baby I an upright position on a mother's bare chest allowing tummy to tummy contact and placing the premature baby in between the mothers's breasts

- ✓ The baby's head is turned so that the ear is above the parent's heart

Body temperature:

- ✓ Mothers have thermal synchrony with their bbay
- ✓ The study also concluded that when the baby was cold, the mother's baby temperature would increase to warm the baby up and vice versa

Breast feeding

- ✓ Kangaroo care allows easy access to the breast and skin-to-skin contact increases milk let-down

Increase weight gain

- Kangaroo care allows the baby to fall into a deep sleep which allows the baby to conserve energy for more important things.
- Increased weight gain means shorter hospital stay
- Increased intimacy and attachment

Prevention, early diagnosis and prompt management of common problems

- ✓ Nosocominal infections
- ✓ Hypothermia
- ✓ Respiratory distress syndrome
- ✓ Aspiration
- ✓ Patent ductusarteriosus
- ✓ Chronic lung disease
- ✓ NEC and IVH
- ✓ ROP and late metabolic acidosis
- ✓ Nutritional disorders
- ✓ Drug toxicity

Weight record

- ✓ Loss is upto a maximum of 10 to 15 percent
- ✓ Regain their birth weight by the end of second week of life
- ✓ Excessive weight loss, delay in regaining the birth weight or slow weight-gain – suggest baby is not being fed adequately or unwell and needs immediate attention

Avoid care of preterm babies

- ➢ Routine oxygenation without monitoring
- ➢ Intravenous immune-globulins
- ➢ Prophylactic antibiotics
- ➢ Prophylactic administration of indomethacin or high dose of vitamin E
- ➢ Unnecessary blood transfusions
- ➢ Formula feeds
- ➢ Rough handling, excessive light and loud sound

Immunizations

- ✓ It is desirable to administer 0- day vaccines (BCG, OPV, HBV) on the day of discharge from the hospital
- ✓ If mother is HBV carrier and is e- antigen positive- hepatitis B vaccine and hepatitis B specific immunoglobulins within 72 hours of age
- ✓ Live vaccines should be avoided in symptomatic HIV- positive mothers
- ✓ WHO recommends that BCG and oral polio vaccines can be given to asymptomatic HIV- positive infants

Family support

- ✓ The family dynamics are greatly disturbed
- ✓ The problems and issues should be handled with equanimity, compassion, concern and caring attitude of the health team
- ✓ Encouraged to touch and talk with her baby

- ✓ Provide kangaroo mother care
- ✓ Emotional support and guidance

Transfer from incubator to cot

- ✓ A baby who is feeding from the bottle or cup and is reasonable active with a stable body temperature, irrespective of his weight, qualifies for transfer to the open cot

Discharge policy

- ➢ The other should be mentally prepared and provided with essential training and skills
- ➢ The mother baby should be kept in down nursery
- ➢ The baby should be stable, maintaining his body temperature and should not have any evidences of cold stress

Follow up protocol

- ✓ Common infective illness reactive airway disease, hypertension, renal dysfunctii, gastro-esophageal reflux disease
- ✓ Feeding and nutrition
- ✓ Immunizations
- ✓ Physical growth, nutritional status, anemia, osteopenia/ rickets
- ✓ Neuro-motor development, cognition and seizures
- ✓ Eyes: retinopathy of prematurity, vision, strabismus
- ✓ Hearing
- ✓ Behavioural problems, language disorders and learning disabilities

Home care of preterm babies

- ✓ She must be explained about the importance of asepsis
- ✓ Keeping the baby warm and ensuring satisfactory feeding routine

- ✓ The service of postpartum program public health nurse and social worker can be utilized

Environmental control

- ✓ The infant should be effectively covered taking care to avoid smothering
- ✓ Woollen cap, socks and mittens should be warm
- ✓ The infant should preferably lie next to the mother
- ✓ In winter, the room can be warmed with a radiant heater or angeethi
- ✓ A table lamp having 100 watt bulb can be used provide direct radiant heat
- ✓ Hot water bottle should never come in contact with the baby

Nursing management

- ➢ Obtain detailed antenatal, intra-natal history
- ➢ Assess the gestational age and birth weight of the baby
- ➢ Assess the features of clinical immaturity
- ➢ Assess the behaviour of preterm neonate
- ➢ Assessment of common problems

Nursing diagnosis and interventions

1. Impaired gas exchange related to immaturity of lungs and deficiency of surfactant

- ➢ Assess the respiratory pattem and colour of thebaby
- ➢ Observe for any apneicepisode(Oxygen hood is often used for able to breathe alone but need extra oxygen.
- ➢ Oxygen also may be given by nasal cannula to the infant who breathes alone.
- ➢ Humidify the oxygen
- ➢ CPAP may be necessary to keep the alveoli open and improve expansion of lungs

2.Impaired breathing pattern distress related to immaturity and surfactant deficiency

- Assess the respiratory rate, heart rate and chest retractions

- Position the child for maximal ventilatory efficiency and airway patency
- Provide humidified oxygen
- Spo2 monitoring
- Provide suctioning
- Provide chest physiotherapy
- Administer bronchodilators
- Administer anti inflammatory medications
- Administer antibiotics

3. Activity intolerance related to increased work of breathing secondary to distress

- Arrange to provide routine care
- Schedule periods of un-interuppted rest
- Determine infant's stress level
- Reduce nonessential lighting
- Use positioning devices

4. Ineffective airway clearance related to excessive trachea-bronchial secretions

- Assess the child's breathing pattern
- check the vital signs
- Provide suctioning
- provide humidified oxygen
- Assess the ABG analysis
- Provide C-PAP using mask /hood/nasal prongs
- Observe for risks of C-PAP
- Assist in CMV with PEEP if needed

5. Hypothermia related to immature thermoregulationsystem

Monitor vital signs frequently

Wrap the baby well and keep warm

Provide small and frequent breast feeding as tolerated

Look for hypoglycemia

Administer IV fluids if not tolerating the feed

Monitor the vital signs and blood pressure

Assess the skin tone, pallor and signs of dehydration

Administer IV fluids

6. Imbalanced nutrition less than body requirements related to feeding difficulty, respiratory distress, or NPO status

- ✓ Assess the sucking and swallowing ability of the newbom
- ✓ Assess the tolerance of the child
- ✓ Monitor the blood glucose level frequently
- ✓ Administer IV fluids if not tolerating oral fluids
- ✓ Administer human milk fortifier if the child is preterm

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