

Obstetrics & Gynecology TEAM



Some aspects in Neonatal Management

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◆ very important ◆ mentioned by doctor ◆ team notes ◆ not important

Contents:

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1. Delivery Room Resuscitation:

Perinatal Physiology: **Apnea = inability to breath**, it has 2 types :

1. **Primary Apnea:** due to **brief hypoxia** → Recovers with **stimulation** and **oxygen** supplement.
2. **Secondary Apnea:** with **prolonged hypoxia** → Requires **assisted ventilation** and **oxygen**.

→ Quickly stimulate the baby with simple stimulation “**wiping**” if he is not responding → directly start **assisted ventilation with O₂**.

❖ **Goals of Resuscitation:**

- 1) Minimizing Immediate Heat Loss → **Dry the baby + put him under radiant warmer**
Then continue Resuscitation as usual ABC airway, breathing, circulation:
- 2) Establishing Normal Respiration and Lung Expansion
Air way : clear it by **suction** of the fluid from mouth then nose & don't introduce the suction tube deeply → this will cause vagal nerve stimulation → bradycardia.
 - Clear the airway + position the baby + assess breathing & adequate lung expansion + skin color
- 3) Increasing Arterial PO₂ → check the arterial O₂ concentration by **pulse Oximetry**
- 4) Supporting Adequate Cardiac Output → by **pulse rate** + pulse volume + color of the baby : pink → good circulation , if cyanosed : abnormal may be the baby has bradycardia



❖ **Steps for effective resuscitation:**

Preparation → **pediatric team** should be present, & informed a head of time about neonatal risks

1. identify high risk deliveries :
 - **fetal distress** “**asses through CTG**”, **fetal disease** or **serious conditions** like: meconium, prematurity, post- maturity abnormal fetal weight “**small or large**”, major anomalies “**chest cage abnormality**”, hydrops, multiple gestation, cord prolapse, abruptio placentae. Neonatal team should know about the fetal condition before to be prepared, Nitric oxide for baby expected to have pulmonary HTN. Resuscitation team → one doctor & one nurse for each baby. Many teams in multiple gestation.
 - **Labor & delivery conditions:** “**maternal condition**” APH “**Antepartum hemorrhage**”, abnormal presentation “**face, breech**” , difficult labor.

2. No pediatric team required personnel for evaluation **in low risk baby** such for diabetic mother, the team can come after the delivery.

- Neonatal conditions : unexpected congenital anomalies, respiratory distress, unanticipated neonatal depression.
- Maternal conditions: signs of maternal infection, maternal illness e.g. DM, isoimmunization, PET, renal, endocrine, pulmonary, or cardiac disease.

→ if any problem suddenly develop we call the resuscitation team, but no need for them to come from the beginning in low risk situations.

❖ Necessary Equipment:

- 1) Radiant warmer
- 2) Oxygen source
- 3) Self inflating bag with reservoir or anesthesia bag
- 4) Face mask with appropriate size
- 5) Suction tubes with different sizes 5, 6 for small baby, 8 for large, 10 for meconium “thick”
- 6) Stethoscope
- 7) Emergency box: laryngoscope, batteries, ET. endotracheal Tubes, drugs:
 - epinephrine (1:10000)
 - NaHco₃ (4.2%) half concentration cause higher can cause intraventricular hemorrhage.
 - Naloxon → antidote for opioids (pethidine or any narcotic) if the mother take it within 4h of labour, the antidote should be given to the baby to prevent respiratory depression.
 - Albumin, and NaCl 0.9% → volume expander, but if large blood → need Packed RBC.
- 8) Umbilical catheterization tray → inserting catheter through umbilical vein is faster than peripheral veins in giving volume expanders, Na bicarbonate, epinephrine & others.
- 9) Syringes, needles, t-connectors, and stopcocks
- 10) Transport incubator with batteries
- 11) Pulse Oximetry → to check oxygenation.

Begin a process of evaluation, decision, and action :

Ex: Evaluate the color “cyanosed body & limbs but with no bradycardia + with good breathing movement” → no need for ventilator or pressure only free flow O₂ will improve the color.

But if the baby is “apneic no respiratory movement + cyanosed” → he need positive pressure ventilation.

- Place on warm table
- Dry & discard the wet linens extra warming
- Positioning
- Suction the mouth, oropharynx, and nares (avoid deep pharyngeal suction) → vagal nerve stimulation → bradycardia.

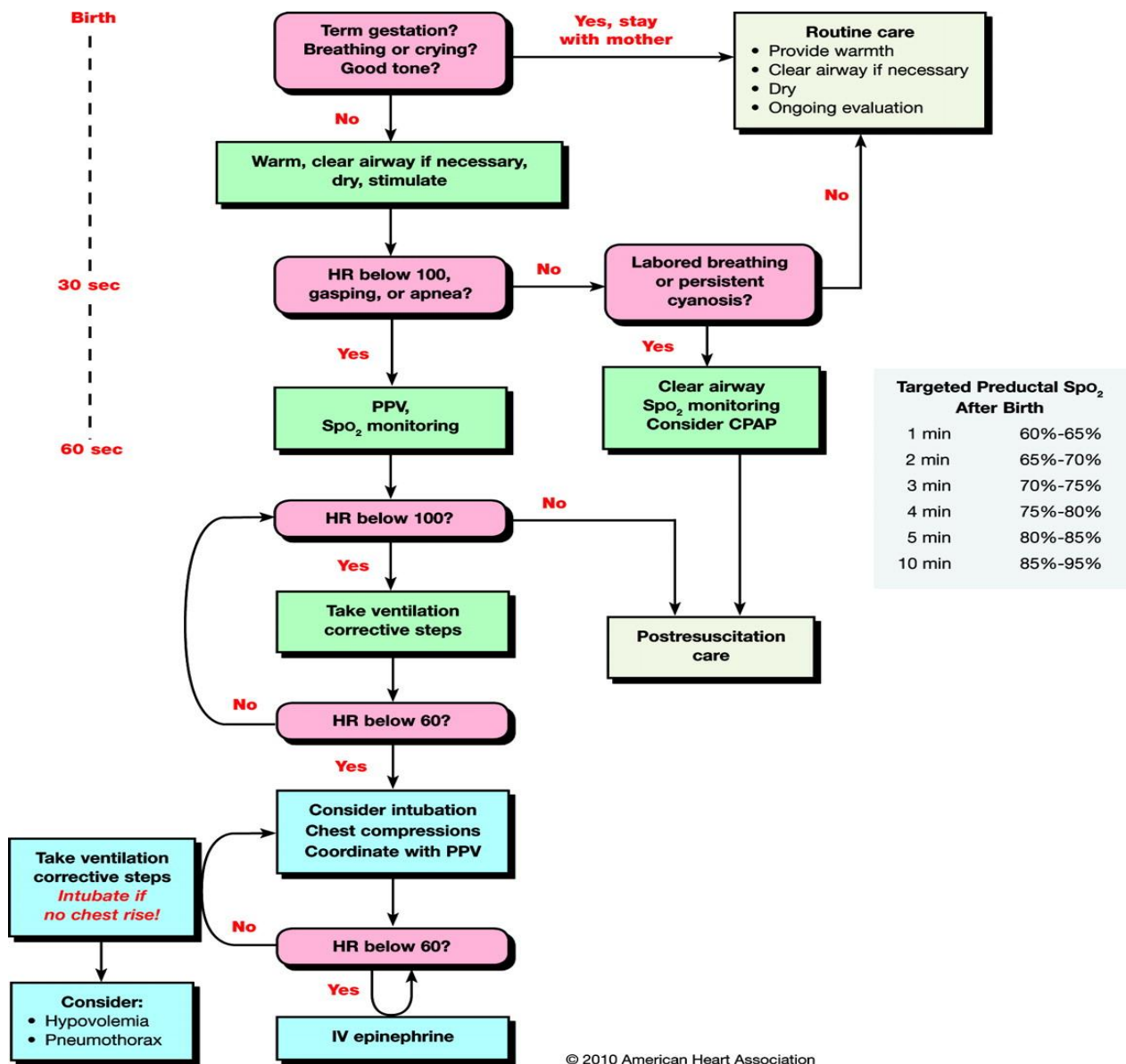


Resuscitation algorithm :-

For term is different than preterm.

Time is critical → 30 sec needed for each step in resuscitation.

1. Warm, clear, dry, stimulate + observe if healthy skin to skin contact with mother
2. Asses HR + breathing (positive pressure ventilation + O₂ + endotracheal tube)
3. Cardiac massage + positive pressure ventilation (HR :120 + ventilation : 30-60) → 3:1 ratio
cardiac compress to 1 ventilation
4. HR is not responding & below 60 : give epinephrine, correct acidosis if present.
5. Check if there is a problem preventing the success if resuscitation : Pneumothorax “chest bulge from one side” Transillumination test, Pleural effusion, Hypovolemia “the best volume expander is normal saline”
6. Preductal saturation after birth: patent ductus arteriosus between pulmonary & aorta → Preductal means the right upper limb only, the rest of the limbs & the umbilical cord is post ductal , the only part supplied by 3 ductal is the right hand → fix the saturation monitor on the right hand & connect it to the machine → normally O₂ saturation 60-65 in the first minute “physiological cyanosis” → will reach above 90 after 10 minutes of age. But if saturation is not getting better give O₂ & observe.



2. APGAR score

Virginia Apgar devised the Apgar score in 1952 as a simple and replicable method to quickly and summarily **assess the health of newborn children immediately after birth.**

The five criteria of the Apgar score: **out of 10**

	Score of 0	Score of 1	Score of 2	Component of Acronym
★ <u>Appearance/Complexion</u>	blue or pale all over	blue at extremities body pink (acrocyanosis)	no cyanosis body and extremities pink	A ppearance
★ <u>Pulse rate</u>	absent	<100	>100	P ulse
★ <u>Reflex irritability</u> Reaction to suction	no response to stimulation	grimace/feeble cry when stimulated	cry or pull away when stimulated	G rimace
★ <u>Activity</u> Tone & movement	flat + full term → asphyxia none Preterm + no tone → normal	some flexion	flexed arms and legs that resist extension Flexion & spasticity	A ctivity
★ <u>Respiratory Effort</u>	absent	weak, irregular, gasping	strong, lusty cry	R espiration

- Gasping → Prolonged hypoxia → Metabolic acidosis (شهيق قوي كأنه مخنوق)
Hypoxia cause accumulation of Lactic acidosis → depression of brain & respiratory centre.
- Grunting → Breathing against closed glottis (the sound of weak cough مثل الكحة بصوت ضعيف)
- Don't depend only on the first minute APGAR assessment give him a chance → every 5 minute assess the score & resuscitate (until reach 20 minutes here stop).

3. Management of Premature Infant

Prematurity:

1- Definition: **baby born more than 20 weeks and less than 37 weeks. Wight more than 500 - 2449 gm.**

* we are not resuscitating babies 20 weeks or less. (we usually resuscitate 23 w & above)

2 - Features: **Shiny Thin Red skin, extended arms and legs**, little subcutaneous fat, sparse hair few palmar and sole creases, poorly developed ear cartilage, genitalia boys few rugae undescended testicles girls gaping labia prominent clitoris, small labia.

Premature infants:

the premature infant is quickly transferred from the warm fluid medium of the liquor amnii with its practically constant temperature to the variable circumstances of an extra uterine life; he loses the preparatory transition-time of the third trimester of intrauterine existence.

- * Need special environment resembling the mother uterus.
- * Hypotensive baby due to poor vascular tone "immaturity".

Problems of prematurity: (Temperature → ABC)

- Thermoregulation (hypothermia → incubator + humidity + Vaseline)
- Respiratory distress (surfactant)
- Apnea (control breathing centre is absent)
- Sepsis (thin skin, immature immunity)
- poor sucking & swallowing reflex

Delivery room Management of premature infants:

- Resuscitation
- Temperature management
- Ventilation support and maintain normal saturation (89-95%).
- Surfactant administration for infants 1kg or less.
- Counseling the mother
- Transportation to NICU

Premature infants management in NICU:

- Ventilation
- Monitoring blood pressure
- Prevention of insensible water loss
- Treating sepsis
- Monitoring acid-base status
- Prevention of intra ventricular hemorrhage
- Nutrition, enteral and parenteral → the best : mother breast milk only!
- Fluid, electrolytes, glucose

4. Management of Infant Diabetic Mother

Fetal-neonatal complications are directly related to inadequate glycemic control during key periods of pregnancy.

- 1) Poor peri-conceptional and **early first trimester glycemic** control are related to spontaneous abortions, early growth delay, and major congenital malformations.
- 2) **During the second trimester**, it is predictive of Pregnancy Induced Hypertension (PIH), preterm labor and delivery and minor congenital anomalies.
- 3) **During the third trimester** of pregnancy it is predictive of macrosomia, birth trauma, fetal dystocia, maternal trauma and high **cesarean delivery** rate. It is also associated with complications linked to fetal **hyperinsulinism** such as neonatal hypoglycemia, respiratory distress, cardiac Asymmetric Septal Hypertrophy (ASH), and to decreased fetal oxygenation and its acute or chronic complications such as neonatal polycythemia, or thrombocytopenia.
- 4) Finally, hyperglycemia **in labor** aggravates the risk of neonatal hypoglycemia

Major congenital malformations:

High sugar concentration is toxic to cultured cell growth, which may explain the early growth delay highly predictive of congenital malformations of complicated diabetic pregnancies. **Maternal magnesium (Mg) depletion (lost in urine with polyuria)** may contribute to malformation.

Mg is necessary for parathyroid gland & Ca → fetal hypomagnesaemia & hypocalcaemia in the baby → convulsion, spasticity, jitteriness.

All malformations are more frequent in IDM's, but some, such as **caudal regression syndrome** are highly specific to maternal diabetes.

- **Small left colon syndrome:** transient
- **Macrosomia:** After 20 weeks gestation maternal hyperglycemia leads to fetal hyperglycemia and hyperinsulinemia, which in turn lead to enhanced growth and macrosomia .
- **Intrauterine growth restriction:** A small subgroup of IDMs delivered to mothers with advanced diabetic class, with significant vascular disease, may be affected by growth restriction.
- **Fetal and neonatal hypoxia:** Poorly controlled diabetes may lead to both decreased oxygen supply to the fetus, and increased oxygen consumption by the fetoplacental Unit.

Increased affinity of glycosylated hemoglobin (**HbA1c**) to O₂ may be contributory to decreased O₂ maternal-fetal transfer. In the presence of excess fuels or of **hyperinsulinemia**, the placental metabolic and oxygen consumption rates increase, depriving the fetus of sufficient oxygen.

Chronic fetal hypoxemia may lead to:

wide range of clinical consequences, from "sudden" intrauterine death, to mild neonatal depression at birth. It also leads to increased production of fetal erythropoietin and increased rates of polycythemia.

Management of IDM

- **Neonatal Hypoglycemia (NH):**
- **Disorders of mineral metabolism in IDM's:**
- **Decreased bone density in IDM's:** Decreased bone density has been reported in IDM's and appears to be due to increased bone resorption, rather than to decreased bone formation.
- **Neonatal hypocalcemia and hypomagnesemia:** In a recent past, Risk factors of NHC in IDM's are birth asphyxia and prematurity. Mg deficiency plays also an important role in the pathogenesis, maternal glycosuria, accompanied by urinary Mg loss. In turn, maternal Mg deficiency leads to fetal Mg deficiency. Mg is necessary for the appropriate secretion of PTH, as well as in its action upon its target cells .
- **Prematurity and Respiratory Distress Syndrome (RDS):**

Neonatal Management of the IDM :

- **Delivery room management** (difficult labor, birth trauma, glucose level)
- **Nursery management.:**
 - a. Vital signs examination and monitoring, at least hourly for the next following 4-6 hours, time during which signs and symptoms of complications such as hypoglycemia or RDS may develop
 - b. Complete physical examination
 - c. Screening for and management of NH *neonatal hypoglycemia. The definition of NH is highly controversial. Many reports have arbitrarily defined NH as being a serum, plasma, or whole Blood Glucose value below 30-50 mg/dl Lucas et al., who found a threshold value of 47 mg/dl (2.5 mmol/l) to be more predictive of lower Bayley scores. → less than this dangerous to brain + delay development.

Management of hypoglycemia:

Oral mother “if not responding” → IV bolus of dextrose “if not responding” → increase to high concentration dextrose & use UVC umbilical vein cord for high conc.

2 ml/kg dextrose 10% in water (D10W), intravenously) and/or starting a continuous infusion of glucose (D10W at 80–100 ml/kg per day). The goal is to maintain plasma glucose concentrations in symptomatic infants between 40 and 50 mg/dl.

Asymptomatic infants: A pragmatic approach was developed there is little or no evidence to indicate that asymptomatic NH in the first days

5) Premature vs. Dysmature:

Premature:

- Less than 37 weeks
- Incomplete organ system development

Dysmature:

post maturity syndrome a syndrome due to placental insufficiency that causes chronic stress and hypoxia, seen in fetuses and neonates in post term pregnancies, characterized by decreased subcutaneous fat, skin desquamation, and long fingernails, often with yellow meconium staining of the nails, skin, and vernix.

→ poor intrauterine nutrition

Definitions:

1. Of, relating to, or characteristic of faulty embryologic development, often leading to structural and/or functional abnormalities.
2. Relating to or characteristic of an infant whose birth weight is inappropriately low for its gestational age

A complex of symptoms occurring in an infant, such as a relative absence of subcutaneous fat, skin wrinkling, prominent fingernails and toenails, and a meconium staining of the skin and the placental membranes, that is associated with post maturity or placental insufficiency.

* There are lots of things from “Major congenital malformations” and below, the doctor didn’t comment on it because of shortage of time.