

Neonatal Resuscitation -Golden first minute

Guidelines

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FOGSI Statement for Neonatal Resuscitation:

Neonatal resuscitation at the time of birth is important and vital for the long term well being of the neonate.

- FOGSI appreciates the fact that the members are well equipped with the knowledge of neonatal resuscitation and update themselves regularly in this regard.
- FOGSI approves of the Golden first minute project which highlights that neonatal resuscitation provides maximum benefit when implemented in the first minute of birth.
- FOGSI endorses that the delivery facility is adequately equipped with neonatal resuscitation facilities
- FOGSI encourages its members to display the neonatal resuscitation flow chart in the delivery room

Neonatal Resuscitation -Golden first minute

Introduction:

The first minute after the birth of a newborn is a period of anxiety for parents and health providers, as the newborn undergoes rapid and significant physiological changes to adjust to the environment outside the mother's womb. While a majority of babies go through this transition with minimal assistance from those attending the labor, about 10% of newborn require assistance. Failure to provide the required assistance at this time could cause birth asphyxia, with long term complications and even death.

Birth asphyxia contributes to about 23% of the one million neonatal deaths in India. Neonatal Resuscitation should be carried out in all settings where babies are born. Individuals at all levels require training, and seldom used skills need to be maintained, so that, when required, resuscitation can be carried out efficiently and effectively.

Neonatal resuscitation is simple, inexpensive, and cost-effective but often not initiated, or the methods used are inadequate or wrong. Though Neonatal Resuscitation training has been widely used in the developed world it had limited dissemination in the developing countries, where it has a great potential as an intervention to reduce **NMR** .

First Golden Minute Project:

Neonatal Resuscitation Program (NRP) is a skill-based-program that provides maximum benefit when implemented in the first minute.

Physiology, pathophysiology of Neonatal asphyxia:

Most newly born babies are vigorous. Only about 10% require some kind of assistance and only 1% needs major resuscitative measures (intubation, chest compression, and/or medications) to survive.

The most important and effective action in neonatal resuscitation is to **ventilate baby's lungs**. Lack of ventilation of newborn's lungs results in sustained constriction of the pulmonary arterioles. This prevents systemic arterial blood from becoming oxygenated. Prolonged lack of adequate perfusion and oxygenation to the baby's organ can lead to brain damage, damage to other organ or death.

When a newborn first becomes deprived of oxygen, an initial period of attempted rapid breathing is followed by **primary apnea** and dropping heart rate that will improve with tactile stimulation. If oxygen deprivation continues, secondary apnea ensues, accompanied by a continued fall in heart rate and blood pressure. **Secondary apnea** cannot be reversed with stimulation; assisted ventilation must be provided. Initiation of effective positive-pressure ventilation during secondary apnea usually results in a rapid improvement in heart rate. The majority but not all, neonatal resuscitation can be anticipated by identifying the presence of antepartum and intrapartum risk factors associated with the need for neonatal resuscitation. All newborns require initial assessment to determine whether resuscitation is required.

Resuscitation should proceed rapidly. The attendant providing resuscitation has approximately 30 seconds to achieve a response from one step before deciding whether one needs to go on to the next. Evaluation and decision making are based primarily on respiration, heart rate, and colour.

Problems with newborn transition:

Problems that may disrupt normal transition is that insufficient breathing fails to force

fluid from the alveoli. Foreign material (such as meconium) may block the airway. Excessive blood loss or poor **contractility** of heart or bradycardia from hypoxia and ischemia causes systemic hypotension. Lack of ventilation of the lungs results in sustained constriction of the pulmonary arterioles, preventing systemic arterial blood from becoming oxygenated. Prolonged lack of adequate perfusion and oxygenation to the baby's organs can lead to brain damage, damage to other organs and death. Sustained constriction of the pulmonary arterioles may occur, even after lungs are filled with air/oxygen. This condition prevents oxygen from reaching body tissues and is called persistent pulmonary hypertension of the newborn (PPHN). When oxygen supply is decreased by an interruption in the transition sequence, blood flow to the bowels, kidneys, muscles and skin decreases, while blood flow to the heart and brain remains stable or increases. If oxygen deprivation continues, myocardial function and cardiac output deteriorate, blood pressure falls, and blood flow to all organs decreases. Continued lack of adequate perfusion and oxygenation can cause brain damage, damage to other organs and death.

The steps of neonatal resuscitation are as follows:

Derived from AAP/AHA Guidelines for Neonatal Resuscitation 2005

A) Initial steps

- Provide **warmth** by placing the baby under a radiant heat source.
- Position head in “sniffing” position to open and **clear airway** if necessary. *
- **Dry** and stimulate the baby to breathe.
- Evaluate respiration, heart rate and colour. All newborns require initial assessment to determine whether resuscitation is required.

Evidence
Class I

B) Provide **positive pressure ventilation** with a resuscitation bag and supplemental oxygen*

C) Provide **chest compressions** as you continue assisted ventilation. *

D) Administer **medications** like epinephrine or volume expanders as you continue assisted ventilation and chest compressions. *

(* Consider intubation of the trachea at these points.)

The ABC's of neonatal resuscitation are the same as those applied to adults.

Airway (position and clear)

Breathing (stimulate to breathe)

Circulation (assess heart rate and colour)

In addition, maintenance of body temperature is important during neonatal resuscitation.

Resuscitation should proceed rapidly. One has approximately 30 seconds to achieve a response from one step before deciding whether to go to the next.

Initial Steps in Resuscitation:-

If meconium is present and the newborn is not vigorous, suction the baby's trachea before proceeding with any other steps. If newborn is vigorous, suction the mouth and nose only, and proceed with resuscitation as required. (Wiswell et al 2000) .

- "Vigorous" is defined as a newborn who has strong respiratory efforts, good muscle tone ,and a heart rate greater than 100 beats per minute.
- Open the airway by positioning the newborn in a "sniffing" (extension of neck, with the help of shoulder roll)position. Appropriate form of tactile stimulation are slapping or flicking the soles of the feet and gently rubbing the back. Continued use of tactile stimulation in an apneic newborn wastes valuable time. For persistent apnea, begin positive-pressure ventilation promptly. Free flow oxygen is indicated for central cyanosis. Acceptable methods for administering free-flow oxygen are Oxygen mask held firmly over the baby's face, Mask from the flow-inflating bag or T-piece resuscitator held closely over the baby's mouth and nose or Oxygen tubing cupped closely over the baby's mouth and nose.
- Free-flow oxygen cannot be given reliably by a mask attached to a self-inflating bag.

Evidence
Class II

- Determine a newborn's heart rate by counting how many beats are in 6 seconds, then multiply by 10. For example, if you count 8 beats in 6 seconds, announce the baby's heart rate as 80 beats per minute.

Post-resuscitation care encompasses three levels:-

- **Routine care** - when baby is vigorous and may stay with mother. Provide warmth, clear airway, dry and assess baby's color.
- **Observational care** – when baby requires initial steps under the radiant warmer due to depressed breathing or activity, meconium-stained amniotic fluid or cyanosis. Manage with frequent evaluation and perhaps admission to a transitional nursery.
- **Post-resuscitation care** – when baby receives positive pressure ventilation or more extensive resuscitation and is at high risk for recurrent deterioration or subsequent complications. Manage where ongoing evaluation and monitoring are available. Neonatal intensive care may be necessary.

Meconium:

- No longer recommended that all meconium-stained babies routinely receive intrapartum suctioning (i.e. before delivery of shoulders).
(Wiswell et al 2000). Traditional teaching recommended that meconium stained infants have endotracheal intubation immediately following birth and that suction be applied to the endotracheal tube as it is withdrawn.
Randomized controlled trials have shown that this practice offers no benefit if the infant is vigorous. Other recommendations about post delivery neonatal suctioning remain unchanged.

Evidence
Class I

Ø Effectiveness of assisted ventilation:

Increasing heart rate is the primary sign of effective ventilation during resuscitation. Other signs are:

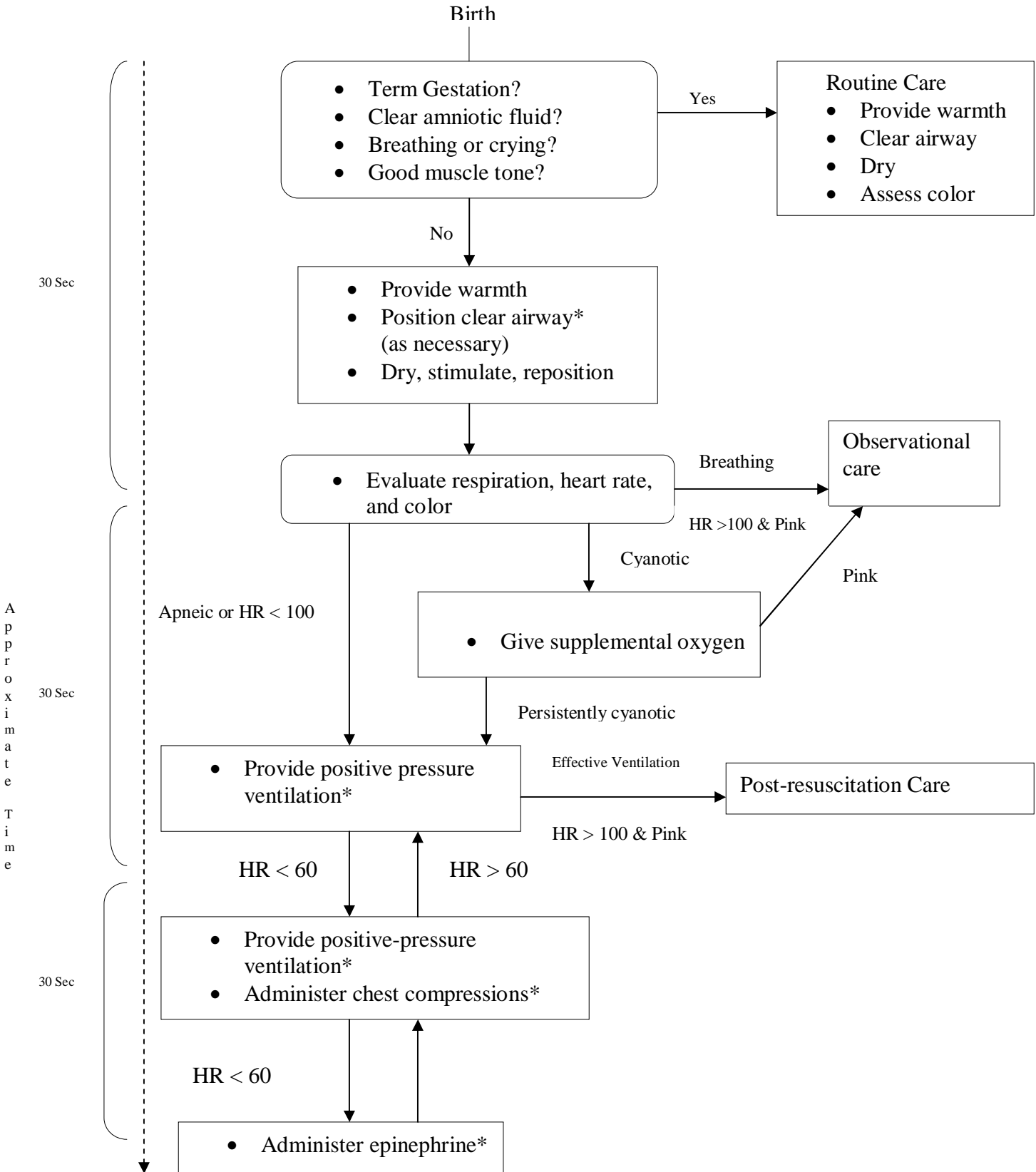
- Improving colour
- Spontaneous breathing
- Improving muscle tone.

Temperature Control:

Very low birth weight babies are likely to become hypothermic despite the use of traditional techniques for decreasing heat loss like drying, warming pads, increasing environmental temperature and covering with blankets.

Hence it is recommended that additional warming be used like covering the baby in plastic food grade heat resistant wrapping and placing under a radiant warmer. Temperature must be monitored due to the slight but known risk of hyperthermia. Infants born to febrile mothers have an increased incidence of perinatal respiratory depression, neonatal seizures, and cerebral palsy. Hence hyperthermia should be avoided.

Evidence
Class II



- Endotracheal intubation may be considered at several steps.

Neonatal Resuscitation algorithm.

Reference:

1. American Academy of Paediatrics/American Heart association Guidelines for Neonatal Resuscitation 2005. www.americanheart.org/eccguidelines.or www.C2005.org
2. Wishwell TE, Gannon CM, Jacob J, Goldsmith L, . Delivery room management of the apparently vigorous meconium stained neonate: results of the multicentre international collaborative trial. Padiatrics.2000;105:1-7.

Classification of evidence levels:

- I Evidence obtained from studies with a blind comparison of test to reference standard among an appropriate broadly defined sample of consecutive patients.
- II When any one of the following is present in the study: narrow population spectrum; differential use of reference standard; reference standard not blind; case-control study design.
- III When any two of the following are present in the study : narrow population spectrum; differential use of reference standard; reference standard not blind : case-control study design.
- IV When any three or more of the following are present in the study : narrow population spectrum; differential use of reference standard; reference standard not blind; case-control study design.
- V Expert opinion with no explicit critical appraisal, based on physiology, bench research or first principles.