



PRANA PRATYAGAMANA WITH SPECIAL REFERENCE TO
NEONATAL RESUSCITATION

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ABSTRACT:

Aim of this article is to review *Ayurvedic* principles of *pranapratyagamana* (Resuscitation) for sick new born care in the delivery room and relate them to modern neonatology practices. Neonatology as we know today is relatively new clinical science. Interestingly however *Ayurveda*, the authentic Indian medicine had already described in detail the principles of new born care 5,500 years ago (circa 3500BC) in *Kaumarbhritya* the science of pediatrics. The term *pranapratyagamana* used in *charak samhita* is very much similar to resuscitation. The word “*Prana*” besides breath (respiration) the “*Pratyagamana*” is “coming back or arrival” over all the word “*Pranapratyagamana*” of *Ayurveda* means much beyond the establishment of respiration only. It is defined as reappearance of *prana* by respiratory effort, heartbeat, body movements in apparently dead baby. American Academy of Pediatrics (AAP)¹ developed a neonatal resuscitation program which has shown to protect and prevent harmful effects on the vital organs of the body due to perinatal asphyxia and ischemia. A weak fetal heart of less than 100 beats/minute or its irregularity during the late stage of labor is a sign of progressive asphyxia that will need resuscitative measures.

Keywords: Resuscitation, *Pranapratyagamana*, Neonatology, *Kaumarbhritya*.

INTRODUCTION: Acharya Charaka advises that many multi parous women should assist a woman during labour and to take care of the parturient lady². The delivery should not be conducted in darkness and fire should be lit there to protect the new born from evil demons. At the time of Gestation the child’s nutrition, respiration etc. are affected through placenta. Once it is born, it has to lead an independent existence and so the more vital functions like respiration should be activated immediately without losing time. The lungs of a new born are in atelectatic state, which becomes opened up with each successive cry along with the establishment of respiration, while the child is born the amniotic membranes rupture. The phlegm in the throat gets

cleared and *VAYU* enters inside so the child starts crying³. Immediately after birth it is very important for simultaneous beginning of neonate’s respiration is very essential immediately after the child’s birth. In the sequence of respiration first expansion of lungs occur for which crying of baby is necessary. If the baby has not respired and is unconscious and inactive (*Achesta*) due to some cause, proper examination and *pranapratyagamana*⁴(Resuscitation) measures should be applied. In *Ayurveda* all *Acharyas* have given a detailed description for neonatal resuscitation While for the expulsion of the placenta active management through the resuscitation related activities should positively be conducted on the new born.

Pranapratyagamana

“Ashmanosanghattanam Karnyormule”

Make noise by striking two stones at the root of the ear to give stimulation.

Sound production → Auditory stimulation → stimulation of respiratory centers in brain and secretion of epinephrine.

Pulse ← Stimulation of heart
 “Shitodaken Ushnodaken Va Mukhparishekha Tatha Sa Kleshavehatan Pranana Punarlabhate”

Warm water/cold water (cool at room temperature) should be sprinkled over face. This method is known to relieve the baby of the stress of delivery.

Sprinkling of water (hot or cold) → sudden changes in skin temperature → stimulation of superficial nerve endings
 Stimulation of Heart ← secretion of epinephrine

Rate and Respiratory rate

“Krishna Kapalika Shurpen
 Chenamabhinispuneeyuryedha- Chesta
 Sayad Yavat Pranam Pratyagamana”

After lying baby on ground if he is still inactive he should be aerated with the help of fan or leaf. Until respiration is regained and baby is active, fanning act as removal of CO₂, Adequate fresh air (O₂) supply to new born. Ambu bag is used today in place of *shoorp*. Why Black *Shoorp* – Bright light is harmful to retina of new born, due to physiological photophobia, it may cause retinal damage. So always use dull colored or dark black colored device for new born.

New born should be bathed after proper

Direct massage to skin → Tactile stimulation → Stimulation of peripheral nerve endings⁹

Stimulation of Heart & Respiratory Rate ← Stimulation of cardio pulmonary centers ← Secretion of epinephrine

In an *Acheshta*^{10, 11} child the practice of winnowing air is already described. Finally when every measure fails modern science advises artificial respiration, positive pressure ventilation by Ambubag, Endotracheal intubation, chest compression and atelectatic lung is made to open up forcibly. *Harita* describes 5 varieties of fanned air¹²; Red cloth, *bamboo fan (Rooksha* and induces sleep), *Kaamsya Patra* (absorbing sweat and suppresses *Vata*), leaves of palm tree or of

induction of respiration. *Aacharya Sushrut*^{5, 6} mentions removal of amniotic fluid first after delivery. *Ashtang Hridayakar*⁷ has mentioned cleaning of amniotic fluid with the help of *Ghrut* and *Saindhav*. Then *Bala Tail* is applied on the new born baby suffered from labour. Make noise by striking two stones at the root of the ear to give stimulation and *mantrouccharan* be done in Right ear. *VRIDDHA VAGBHATA*⁸ advises *parishechan* with *Bala Taila* of a sluggishly active child experiencing fatigue for having been crushed in pelvis while born.

Banana leaves (relieves extra fatigue, brings down *daaha and pitta*). *Bhela*¹³ describes pink face, eyes, body and limbs as a sign of good prognosis and a child showing cyanosed (*syaava*) appearance is said to perish. Today thus APGAR score of a child is calculated. A child with APGAR score less than four at one minute and less than six at 5 minutes shall have a poor prognosis. When the child starts crying a mantra ‘*Angaath ----*’ is recited by the father in its right ear where in the

father once again recollects the child, as an image of himself and prays to God for his recovery whole heartedly¹⁴.

NEONATAL RESUSCITATION

Neonatal Resuscitation^{15, 16, 17} is a real emergency requiring participation of everyone in the labor/delivery room. A weak fetal heart rate of less than 100 beats/minute or its irregularity during the late stage of labor is a sign of progressive

Initial Rapid Assessment – The following three questions need to be answered in the initial assessment.

1. Is this a term gestation? The infant is not in need of any resuscitation.

2. Is the infant crying and breathing? The infant is in need of resuscitation.

3. Does the infant have good muscle tone?

Being prepared for Resuscitation: Each delivery should be viewed as an emergency and basic readiness must be ensured to manage asphyxia. Preparation for delivery should include.

- A radiant heat source ready for use.
- All resuscitation equipment immediately available and in working order.
- At least one person skilled in neonatal resuscitation.

Resuscitation Equipment :

For Suction : Mucus aspirator, Meconium aspirator, Mechanical suction, Suction catheters 10F or 12F, Feeding tube 6F, 20ml syringe

For bag and mask ventilation : Neonatal resuscitation bag, Face masks (full term and preterm sizes), Oxygen with flow meter and tubing.

For endotracheal intubation:

Laryngoscope with straight blades number- 0 (preterm) and number -1 (term), Extra bulbs and batteries for laryngoscope, Endotracheal tubes 2.5,3.0,3.5,4.0mm ID, Stylet, Scissors.

asphyxia that will need resuscitative measures¹⁸.

High Risk Situation:

Maternal : High risk pregnancy, Maternal malnutrition, Bad obstetrical history, Hypertension, Rh isoimmunization

Fetal : Preterm birth, LBW infants, multiple pregnancies, fetal malformations, IUGR, Fetal distress eg. MAS

Medications: Epinephrine, Naloxone hydrochloride, Sodium bicarbonate, Normal saline & sterile water

Miscellaneous: Watch with seconds hand, Linen shoulder roll, Radiant warmer, Stethoscope, Adhesive tape, syringe 1, 2, 5, 10, 20, 50 ml, Gauze, Umbilical catheters 3.5F& 5 F, Three way stopcocks and gloves.

Response to Birth :

- Baby is received in pre warmed towel
- Quick assessment – clear of meconium.
crying or breathing.
good muscle tone.
term gestation
color pink.

TABC of Resuscitation: The components of the neonatal resuscitation procedure related to the TABC of Resuscitation.

T – Maintenance of temperature.

A – Establish an open airway

B – Initiate breathing

C – Maintain circulation

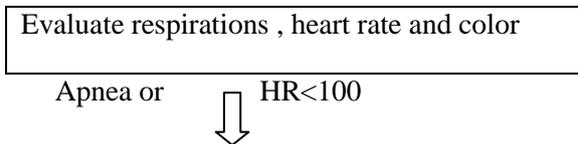
Initial Steps of Resuscitation : If answer to any of the five above question is “No” then the baby requires resuscitation. After cutting the cord, the baby should be placed

under the heat source, preferably a radiant warmer.

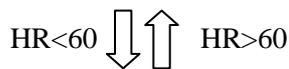
Positioning:

- The neonate should be placed on his back/side with the neck slightly extended in sniffing position.

Algorithmic approach to neonatal resuscitation¹⁹



Provide positive pressure ventilation



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If HR 60-100/minute and increasing/not increasing – continue ventilation

If HR is between 60-100/minute and increasing/not increasing – continue ventilation.

Suction: First mouth and then nose.

- If there is meconium stained amniotic fluid- Intrapartum suctioning.
- Limit suctioning to 5 seconds at a time.

Initiating Breathing:

- Immediately dry the baby and reposition.
- If drying and suctioning do not induce effective breathing, additional safe methods include.
- Flicking the soles of the feet.
- Rubbing the back gently.
- Do not waste time continuing tactile stimulation if there is no response after 10-15 seconds.

Evaluation²⁰: The baby should be evaluated for three signs.

- Respiration (R.R.) – by the chest movement
- Heart rate (H.R.) – Auscultation of the heart (in 6 sec.)
- Color – by looking at tongue and mucous membrane.
- If the baby has good breathing, HR>100 and pink color then supportive care is needed.

- A folded towel can be placed under the infant’s shoulders to maintain this position.

- This will bring posterior pharynx, larynx and trachea in line.

- If the baby is not breathing well or HR<100 then bag and mask ventilation is needed. (Positive pressure ventilation)

Bag and Mask Ventilation

Indications:

- Not breathing/gasping
- HR<100 bpm

Procedure:

- The baby’s neck should be slightly extended.
- The mask is placed in position so that it covers the mouth and the nose but not the eyes.
- Squeeze the bag to generate required pressure.

Rate : 40-60 breathes per minute.

Pressure: Initial lung inflation may require a pressure as high as 30-40 cmH₂O but subsequent breathes should be in the 15-20 cm H₂O range.

Method : speak SQUEEZE - Two – Three (Inspiration) (Expiration which is longer)

Evaluation:

- If heart rate is more than 100/minute and infant having spontaneous breathing – stop ventilation.

- If HR > 100/minute but infant yet not having spontaneous breathing or is gasping – continue ventilation.
- If HR 60-100/minute and increasing/not increasing – continue ventilation.
- If HR < 80/minute – start chest compressions
- If HR < 60/minute – continue to ventilate, start chest compressions, consider intubation

Sign of Improvement: Rising heart rate, Spontaneous breathing, Improving color

ENDOTRACHEAL INTUBATION

Indications:

- Prolonged/Ineffective bag and mask ventilation
- Meconium stained liquor
- Diaphragmatic hernia
- Extreme prematurity

Equipment :

- Neonatal laryngoscope with straight blades
- For preterm – 0 size and for term babies – 1 size
- Endotracheal tube of appropriate size (2.5, 3, 3.5 and 4mm)

Procedure:

Method: ONE AND TWO AND THREE AND BREATH AND



- A 3:1 ratio of chest compressions to ventilation is recommended.
- At any stage endotracheal intubation can be performed.

Evaluation:

- If HR > 80/minute, stop chest compression but continue ventilation until heart rate crosses 100 beats/minute and the baby is breathing spontaneously.
- If the HR < 80/minute after thirty seconds of chest compression – the procedure should continue along with bag and mask ventilation with 100% oxygen, plus medication.

Medications²¹

Indications – HR < 60 bpm after 30 sec of chest compressions

Epinephrine:

- The new born is placed in a supine position with fully extended neck.
- Introduces the lighted laryngoscope into the nasopharynx up to the epiglottis.
- The glottis is cleared by gentle suction and a curved endotracheal tube is gently inserted through the larynx.
- The laryngoscope is now withdrawn.
- As soon as respiration gets established the tube should be withdrawn.

Precautions during intubation: In order to prevent hypoxia during intubation, provide free flow oxygen, limit intubation attempt to 20 seconds and avoid excessive flexion of neck.

Chest Compressions:

Indication; HR < 60/minute or < 60-80/minute after 30 sec of bag and mask ventilation with 100% oxygen.

Site: Lower third of the sternum below the imaginary line drawn between two nipples.

Procedure: two techniques – 1. Thumb technique 2. Two finger technique

- The rate of chest compression should be 120 beats/minute and depth 1-2 cm.
- During the procedure thumb and fingers should remain in contact with chest all the time.

- Recommended concentration – 1:10,000
- Recommended route – Intravenous (IV)/Intratracheal (IT)
- Recommended dose – 0.1 – 0.3ml/kg of 1:10,000 solution
- Recommended rate – as quickly as possible

Volume expanders: Normal saline, whole blood, 5% albumin or Ringer lactate.

- Indicated in the event of an acute bleeding with signs of hypovolemia.

Soda bicarbonate: In documented metabolic acidosis

Dose – 2meq/kg

Route – Umbilical vein

Preparation – 0.5meq/ml (4.2%)

Rate – 1-2 meq/kg/min

Dopamine: 5-20 mcg/kg/minute IV

Indication: poor peripheral perfusion, weak pulses, hypotension & tachycardia.

Pulse oximetry: The new guidelines have emphasized the use of pulse oximetry rather than the color of the baby.

Postresuscitation Care: Resuscitated new born will require close monitoring in a neonatal intensive care unit.

- Arterial PH and blood gas determinations.
- Correction of documented metabolic acidosis
- Appropriate fluid therapy.
- Treatment of seizures.
- Screening for hypoglycemia and hypocalcemia.
- Chest x-rays for diagnostic purposes.

Complications And Management Of Resuscitation

1. Insert the catheter very deep:

Stimulation of the posterior pharynx during the first few minutes after birth can produce a vagal response, causing severe bradycardia or apnea.

- The size of suction catheter should be proper & the suction pressure should be kept around 80mm Hg.

2. Abdominal distention because of gastric distention from entry of air into stomach during ventilation exceeding 2 minutes.

- An orogastric tube (feeding tube size 6-8 fr) should be inserted and left open to decompress the abdomen.

3. Chest Compression - Trauma to the infant, broken ribs, Laceration of liver, Pneumothorax

- Chest compression is used to proper site & procedure.

DISCUSSION:The order of development and maturity of sense organs follow the same pattern as that of the creation of the *PANCHA BHUTAS* and hence the sense of hearing is the first to be developed followed by the sense of touch, just as the *VAYU* forms after *AAKASH*. Though the new born is said to have developed the

ability of perceiving all senses at birth, the sense of hearing and touch have acquired a greater degree of maturity for the fetal resuscitation and revival of consciousness. Aacharya's have mentioned the stimulation of sense organs e.g. ear, skin & nose. After delivery for induction of crying and respiration these external stimulation should be given, produce sound near the ear root, use of lukewarm water for bathing. In modern context tactile stimulation is flicking the soles of the feet, rubbing the back gently, by these stimulation new born suddenly regains consciousness. The superficial nerve endings give stimulation to respiratory centers in brain which stimulates secretion of epinephrine. This epinephrine stimulates heart and respiratory rate. Even in today's context if baby doesn't cries different stimulation are given. Even after applying these stimulation if normal respiration and consciousness is not regained then fetal resuscitation method should be applied. *Pichu* should be applied in infant for protection from hypothermia & injury. Infant should be aerated with *KRISHNA KAPALIKA SHOORPAN* till regaining of proper respiration (oxygen supply to new born). Artificial respiration, Ambubag, endotracheal intubation and chest compression should be applied for proper respiration.

CONCLUSION:The measures of care of new born described in our ancient texts indicate their wisdom regarding resuscitation, Prevention of hypothermia, aspiration and infections and promotion of rooming in and early initiation of breast feeding. It is interesting to note that the steps described above are very close to modern day principles of neonatal resuscitation. It is interesting to note the majority of the recommendations of *pranapratyagaman* steps are relevant to neonatal resuscitation. Some of the resuscitation steps described in detail for more clear understanding. Now a day's resuscitation has become advanced by available sophisticated equipment and

continuous research in field of neonatology.

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Source of support: Nil

Conflict of interest: None Declared

Cite this Article as : [Ram Kumar Bhamu :Prana Pratyagamana with Special Reference to Neonatal Resuscitation]www.ijaar.in : IJAAR VOLUME III ISSUE II MAY-JUNE 2017 PAGE No:265-271