

## PRACTICING ANCIENT AYURVEDIC METHOD OF RESUSCITATION OF NEW-BORN IN PRESENT ERA: A CRITICAL APPRAISAL

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### ABSTRACT

Being born is believed to be the most dangerous period in one's life, which may be complicated by a number of life threatening conditions which have a bearing on immediate survival as well as long term neurological outcome. Hence, every baby requires immediate care at birth. The ancient *Ayurvedic* physicians had devised a specific protocol, "*Prana pratyagamana*", for ensuring a proper management of the most dreaded condition in this crucial phase of human life- the birth asphyxia. With passage of time and modern scientific advancements, this particular procedure took the shape of a well organized modern protocol – "Resuscitation of a newborn". This paper, while comparing the ancient and modern methods of resuscitating a newborn, serves to elucidate the scope of practicing ancient *Prana pratyagamana* in present era.

**Key words:** *Ayurveda*, Birth asphyxia, Newborn, *Prana pratyagamana*, Resuscitation.

### INTRODUCTION

Being born is believed to be the most dangerous period in one's life. The process of transition from the 'dependent' fetal to 'independent' extra uterine life may be complicated by a number of life threatening conditions which have a bearing on immediate survival as well as long term neurological outcome. So every birth should be regarded as a medical emergency.

Just after birth, the baby makes an almost unaided rapid transition from reliance on the placenta (organ of respiration) to use the lungs for oxygenation and ventilation. Its success is signalled by a good cry after birth, i.e., the first functional breath; although the normal effective rhythmic respiration may take up to four to five minutes. Consequently, the muscle tone becomes good and the infant becomes pink within five to ten minutes after birth.<sup>1</sup> During this transitory period, a number of critical cardiopulmonary changes occur, e.g., lung expansion, initiation of effective breathing and clo-

sure of circulatory shunts. These changes may be affected by perinatal complications such as asphyxia, shock etc., birth asphyxia being the commonest of all. It leads to a sustained constriction of the pulmonary arterioles, thus preventing systemic arterial blood from becoming oxygenated. Such babies need assistance for their successful transition to independent neonatal life, in the absence of which damage to brain and other organs, or even death can occur because of a prolonged lack of adequate perfusion and oxygenation to the baby's organs. Hence, to ventilate the baby's lungs is the most important and most effective action in neonatal resuscitation.

Since the ancient times, birth asphyxia has been clearly identified as the most fearsome problem faced at the time of birth and hence the neonatologists of even those times had developed a specific protocol for the management of this dreadful condition- "*Prana pratyagamana*". In fact, first textual reference regarding

*Prana pratyagamana* (resuscitation) is found in *Charak Samhita* (approx 3000 years ago) and thereafter in other *Ayurvedic* classics.<sup>2,3</sup> With passage of time and modern scientific advancements, this particular procedure of *Prana pratyagamana* took the shape of a well organized and scientifically supported modern protocol – “Resuscitation of a newborn”.<sup>4,5</sup>

### The definition of *Prana pratyagamana* and Resuscitation

*‘Prana pratyagamana’* may be defined as “return of *prana* (life)”, whereas its modern equivalent term ‘Resuscitation’ is defined as “revival of an apparently dead baby”. This revival/ return is clinically observable in the form of respiratory effort, heartbeat, body tone, movements, color, etc. The method for *prana pratyagamana* / resuscitation of a newborn encompasses all those measures that are performed in a systematic manner to revive an asphyxiated baby at birth.

### Incidence of the need for resuscitation

- Of all neonatal deaths occurring worldwide each year, birth asphyxia accounts for 19 % (approx 1 million).<sup>6</sup>
- 90% of newborns make transition from intra to extra uterine life without any problem and are clearly identified as ‘vigorous babies’. Up to 10 % of all neonates require stabilization measures such as simple respiratory support within the first minutes of life. More complex resuscitation measures are needed in only about 1 % of newborn infants.<sup>7,8</sup>

### Antenatal prediction for resuscitation

Only about half of the infants requiring resuscitation can be predicted for the need by antenatal history or signs during labor.<sup>9</sup> Some important predictors of need for resuscitation being:-

- Maternal diseases as – Diabetes, Hypertension, Anemia, Isoimmunisation, Poly/Oligo-hydraminos, Cardiac disease. Premature rupture of membranes, multiple gestation, age less than 16 or more than 35, Placenta previa, drugs as narcotics, emergency cae-

sarean section, prolonged/sluggish / difficult labor, etc.

- Preterm delivery.
- Fetal distress due to any cause. Some time honoured clinical parameters of fetal distress are:-
  - i. Exaggerated fetal movements (followed by reduced or physical movements terminally)
  - ii. Fetal Heart Rate: initially tachycardia (>160 bpm), followed by bradycardia (< 100 bpm) and slow irregular heart rate.
  - iii. Visceral over activity: passage of meconium (meconium stained liquor amni) in a vertex presenting baby is an important and ominous sign of fetal hypoxia.

**Clinical features of a compromised baby–** the baby plausibly in need of resuscitation

A compromised baby may have following clinical features:-

- Cyanosis, due to hypoxemia.
- Bradycardia, due to reduced oxygen supply to heart muscles and brain.
- Low blood pressure due to reduced oxygen supply to heart muscles, blood loss or inadequate blood return from placenta.
- Depression of respiratory centre, due to reduced oxygen supply to brain.
- Poor muscle tone due to decreased oxygen supply to the brain and muscles.

### Basic reason behind the choice of various resuscitation methods in an asphyxiated newborn – ‘the concept of primary and secondary apnea’,<sup>10</sup>

When oxygen supply to a fetus or infant is obstructed ( $\cong$  strangulation), the baby passes through following stages in succession, if inadequate supply of oxygen persists:

- **Stage 1:** Initial period of attempted rapid breathing.
- **Stage 2:** (Primary apnea): Respiration ceases; blood pressure (BP) & heart rate (HR) begins to fall.
- **Stage 3:** Spontaneous gasping (deep, irregular): Respiration starts, the respiratory efforts widen up and depth also goes on fal-

ling; HR irregular; HR and BP and goes on falling further.

- **Stage 4:** (Secondary / Terminal apnea): After a last gasp, the respiration totally ceases (respiratory arrest).

The baby with primary apnea starts gasping breathing efforts spontaneously. Since the labour room environment has an oxygen concentration of approx 21 %, the baby becomes pink after a few gasps and establishes normal breathing. Any method of resuscitation in such a baby would succeed. This explains why a variety of physical (e.g., in *Ayurveda*) or chemical stimuli have been hailed and recommended for resuscitation of an asphyxiated baby.<sup>2,3</sup> Contrary to primary apnea, secondary apnea cannot be reversed with stimulation. So, in an infant in secondary apnea, no other method of resuscitation usually yields success except immediate ventilation after endotracheal intubation. But when faced with an apneic baby at birth, it is difficult to decide whether the baby is in primary or terminal apnea, as the infant may have passed through both the stages of apnea while still in utero, and clinically a baby in primary or secondary apnea looks almost equally lifeless and apparently dead. Some signs that favour the diagnosis of primary apnea are - absence of evidences of fetal hypoxia, stable or rising HR (if it was slow initially) and onset of apnea soon after initial cry (as in babies born by caesarean section). An improvement in baby's color, if preceded by gasping or respiratory efforts confirms the existence of primary apnea.

While attending an asphyxiated newborn requiring resuscitation, it must always be kept in mind that:

- Delay in resuscitation during terminal apnea increases the chances of brain damage.
- Longer the delay in starting the ventilation, the longer the infant will take to develop spontaneous respiration. In fact, for every one minute delay in initiation, the time for first gasp gets increased by two minutes.<sup>11</sup>

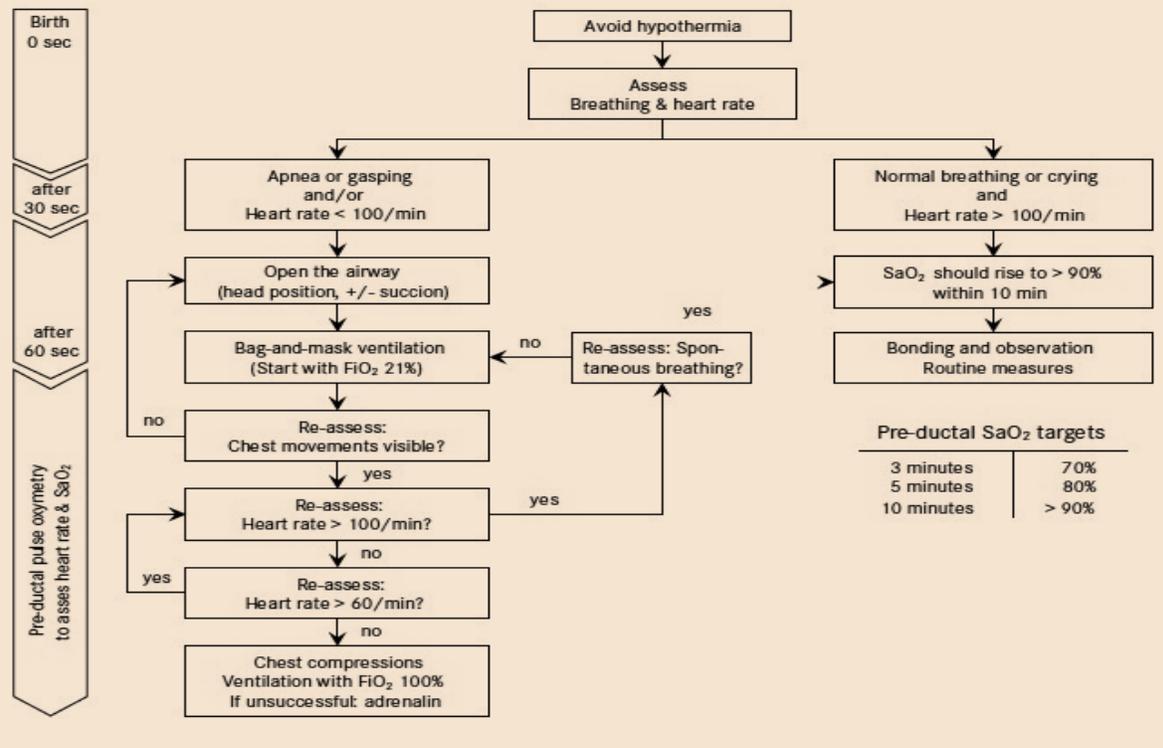
Therefore, all babies delivered in apnea at birth must be assumed to be in secondary apnea and hence active resuscitation (intubation +PPV) must be started without any delay. Initiation of effective PPV (Positive Pressure Ventilation) during secondary apnea usually results in a rapid improvement in heart rate. The babies turn pink before they start breathing spontaneously.

#### **Resuscitating a newborn baby**

Aim of resuscitation: Immediate care is required to the baby at birth. All newborns require initial assessment to determine whether resuscitation is required or not. The prime aim of a resuscitation skilled neonatologist at birth is to achieve a normal core temperature, adequate ventilation, oxygenation, cardiac output and tissue perfusion in an asphyxiated baby.

#### **The "Modern Method" of Resuscitating a Newborn<sup>12</sup>**

It is executed in a rapid sequence of steps, remembered in short as the 'TABC of resuscitation', i.e., - Temperature maintenance, Airway patency, Breathing initiation and Circulation maintenance. Out of all these, ventilation of the lungs is the single most important and most effective step in cardiopulmonary resuscitation of the compromised infant. So, opening the airways and ventilating the lungs are the most important measures in neonatal resuscitation, and in most cases, these measures are sufficient to stabilise a neonate. In fact, further more complex interventions are ineffective if those two initial measures are not correctly established.<sup>13</sup>



**Table 1: Algorithm: Stabilization and Re-resuscitation of the Newborn**<sup>14</sup>

The modern resuscitation protocol is basically a logical composition of following steps:

**Airway management**

- Open the airway by positioning the newborn in a “sniffing” position.
- If meconium is present and the newborn is not vigorous, suction the baby’s trachea before proceeding with any other steps. If the newborn is vigorous, suction the mouth and nose only, and proceed with resuscitation as required.

**Initiation of breathing**

- Appropriate forms of “tactile stimulation” are - slapping or flicking the soles of the feet or gently rubbing the back. But continued use of tactile stimulation in an apneic newborn is a waste of valuable time.
- For persistent apnea, begin “PPV” promptly.
- “Free-flow oxygen” is indicated for central cyanosis.
- Improvement during PPV with a mask is indicated by a rapid increase in heart rate

and subsequent improvement in color and oxygen saturation; muscle tone; spontaneous breathing.

- If supplemental oxygen is unavailable, use room air to deliver PPV. If resuscitation is started with room air, supplemental oxygen, upto 100%, should be administered if there is no appreciable improvement within 90 seconds following birth.

**Augmentation of circulation**

- “Chest compressions” are indicated when the heart rate remains less than 60 beats per minute despite 30 seconds of effective positive-pressure ventilation.
- During chest compressions, the breathing rate is 30 breaths per minute and the compression rate is 90 compressions per minute. This equals 120 “events” per minute. So, one cycle of 3 compressions and 1 breath should take 2 seconds.
- After 30 seconds of chest compressions and ventilation, check the heart rate. If the heart rate is
  - Greater than 60 beats per minute discontinue compressions and continue ventila-

tion at 40 to 60 breaths per minute.

- Greater than 100 beats per minute, discontinue compressions, and gradually discontinue ventilation if the newborn is breathing spontaneously.
- Less than 60 beats per minute, intubate the newborn (as intubation provides a more reliable method of continuing ventilation), if not already done, and give epinephrine.

**Drugs**

- Epinephrine should preferably be given by umbilical vein.
- Indications for volume expansion (Normal saline/ Ringer’s lactate/ O Rh-negative blood used @10 mL/kg via Umbilical vein, over 5 to 10 minutes) during resuscitation include
  - Baby is not responding to resuscitation
  - &
  - Baby appears in shock (pale color, weak

pulses, persistently low HR, no improvement in circulatory status despite resuscitation efforts)

&

- There is a history of a condition associated with fetal blood loss (e.g., extensive vaginal bleeding, Abruptio placentae, Placenta previa, Twin-to-twin transfusion, etc).

**Prana Pratyagamana- “The Ayurvedic (Ancient) Method” of Resuscitating a Newborn**

Studying *Prana pratyagamana* vis-à-vis with aforementioned modern methods of resuscitation of newborn demonstrates that it was the astuteness of our ancient scholars which helped them manage such critical cases even in the absence of modern age’s precise equipments. Similarities in *Ayurveda* and modern methods of resuscitation of newborn can be summarised as: -

Specially in ↓	ANCIENT MEASURES <sup>3,15</sup>	MODERN MEASURES	
<b>Temperature and humidity maintenance</b>			
Primary apnea	Measures for temperature maintenance in <i>sutikagar</i> at the time of delivery	Maintenance of temperature in thermoneutral range, with the help of equipments as radiant warmer )	
	<i>Bala</i> oil application on skin of newborn (to prevent heat loss. For better results, use in a luke warm state)		
	<i>Udaka kumbha sthapna</i>	Air conditioned nursery	
	<b>Airway maintenance</b>		
	Cleaning of airway with the help of a cotton swab wrapped around little finger	Cleaning of oropharynx ,followed by nasopharynx , with the help of infant mucus sucker	
	Firstly clean the oral cavity before cleaning the rest of body	Same concept	
	<b>Stomach wash</b>		
For cleaning the stomach of newborn, emesis was induced by administering rock salt with but-	NG tube is inserted and then stomach wash is done with normal saline		

	ter(a.s.u.1/2)	
	<b>Initiation of breathing</b>	
	Tactile stimulation (pressure) : Rubbing the body (with <i>bala</i> oil)	Tactile stimulation by flicking of sole and rubbing of back is used
	Tactile stimulation (temperature): Sprinkling of cold/lukewarm water on the cheek of new born	Temperature maintenance (TABC) is considered vital to revive a baby
	Auditory stimulation : i. By striking of pebbles near the ear of newborn ii. by enchanting a specific hymn near the ear of newborn ( $\cong$ <i>daivavyapashraya chikitsa</i> )	Sound stimulation not done.
	Visual(photic) stimulation : Fanning with a blackened winnowing basket ( <i>Krishnakapalika soorpena</i> ). In the process, tactile stimulation of face with pressure of air also occurs and also a fresh batch (better oxygen concentration) air is repeatedly made available for gaseous exchange.	Photic stimulation is not given.
	<b>Last (terminal) measures</b>	
Terminal apnea	<i>daivavyapashraya chikitsa</i> given by enchanting specific hymn near the right ear of newborn.	Adrenaline. In fact, all equipment based resuscitation steps (bag and mask,ETT intubation, parenteral medications ) are now practised before “ <i>praying the almighty to do a wonder to save the life of the baby(daivavyapashraya chikitsa)</i> ” !

(adopted & modified from: Textbook of Bal Roga Kaumarbhritya by Dr. B.M.Singh)<sup>16</sup>

## DISCUSSION

On examining the method of *Prana pratyagamana*, it becomes quite clear that the ancient methods of resuscitating a newborn were centered mainly upon prompt management of the commoner form of apnea – the primary apnea. On closely looking at the methods employed in *Ayurvedic* method of resuscitation of newborn-*Prana pratyagamana*, it becomes evident that

the concept is actually based upon the stimulation of the three most sensitive sense organs. In this context its worth mentioning here that all the sensory nerve fibers before terminating in cerebral cortex, give a branch to medulla; so stimulation of sensory nerves can activate the vital centers lying in medulla.<sup>17</sup> It is interesting however, to note here that, how clear the understanding of our ancient clinicians was regarding the cause of an apparently dead looking baby, that the deficiency of sophisticated equipments did not come in their way and they

were able to accomplish the herculean task of resuscitation with readily available crude materials as pebbles.

### **“The inadequacies” in ancient method of resuscitation**

The method of *Prana pratyagamana* may be sufficient to revive a baby born in primary apnea. But regarding management of a baby born in secondary apnea, it looks as if the measures employed were limited only to recitation of some hymn in the right ear of the baby. So, management of the more morbid stage of apnea, the secondary apnea seems to be an unclear segment of *Prana pratyagamana*, probably because of the following reasons:

- They wanted that only highly specialized doctors with hands-on training in neonatal care should attend babies expected to be born in secondary apnea, and as such, the management of such a condition was not disclosed in routine texts.
- The hymn may be a powerful ancient tool to revive baby in secondary apnea, but only if it is uttered in a special way so as to create sound waves of such a frequency and waveform, that it led to stimulation of medullar centers (of respiration and circulation) and other centers of consciousness. The hymn may also have other modes of action.
- It is also quite possible that because of unavailability of specialized equipments as AMBU bag, laryngoscope etc, they must not have been able to manage a baby in secondary apnea at all. But because of a relatively low natural tendency of secondary as compared to primary apnea, coupled with their habit of ensuring prompt management in the very stage of primary apnea, they might have been successful in significantly reducing their confrontation with the babies landing into secondary apnea and dying of it.

### **“The goodness” of ancient (historical) method of resuscitation**

It has been clearly recognized that the success of resuscitation largely depends upon an early

institution of the resuscitative measures and hence the concept of the ‘golden minute’ has evolved.<sup>18</sup> The standard resuscitation protocol gives best result and hence it should be followed strictly. But at times the need for resuscitation may arise suddenly at unexpected places where there is a complete unavailability of resuscitation facilities. It is in such circumstances that the ancient method of resuscitation may score over the standard resuscitation protocol.

It is thus quite interesting to see the roots of modern resuscitation lying in the methods of *Prana pratyagamana* of *Ayurveda*. In fact in the light of the knowledge of primary and secondary apnea, it appears that the ancient and modern methods of resuscitation are by and large similar conceptually. The need for prompt institution of resuscitative measures was also clearly recognized in ancient era. But the ancient methods of resuscitating a newborn were mainly centered on prompt management of the commoner form of apnea – the primary apnea and the instruments used were nothing but the crude objects readily available in the vicinity.

### **Scope of practicing *Prana Pratyagamana* in modern era: Resuscitation outside the hospital setup, at unexpected places**

The message by now is loud and clear- if appropriate and prompt medical attention is not given, then many more newly born babies may die in primary apnea rather than in difficult to manage secondary apnea. A good understanding of the basic concepts of resuscitation of a newborn may help one save life of a lifeless looking newborn delivered at a place where no immediate hospital facility and medical equipments are instantly available (hoping the baby to be in the more commoner stage of apnea – the primary apnea). In such circumstances, without any undue delay in that golden minute, the resuscitation can be promptly instituted even with the crudest objects as pebbles which are readily available in the vicinity,

along with maximum possible application of the measures for TABC, as per CPR guidelines. But it should always be remembered that a hospital set up is meant for following the standard protocols; aforesaid heroic non-routine measures may be attempted only in desperate unforeseen situations when no medical facilities can be procured timely e.g., birth in a running train or in natural disasters as the natural calamities as the recent floods in Jammu and Kashmir, the terrible Kedarnath tragedy last year, etc. But whatsoever may be the place of resuscitation, restoration of adequate ventilation should always remain the priority while resuscitating babies at birth. The temperature may be maintained by placing the baby skin-to-skin with the mother (or even father) and if possible, raising the environmental temperature.

So we can say that the resuscitative approach in an asphyxiated newborn baby should ideally be no less than the standard modern protocol, nevertheless, in view of the importance of the “golden minute”, the ancient *Ayurvedic* resuscitation protocol (with some modifications) may be attempted at places devoid of medical facilities.

## CONCLUSIONS

- The roots of modern protocol for resuscitating a newborn lie in the methods of *Prana pratyagamana* given in *Ayurveda*.
- While the methods described in *Prana pratyagamana* may be attempted for resuscitation of a newborn delivered in a complete absence of medical facilities; in a hospital set up, nothing less than the latest recommended modern protocol for resuscitation of newborn should be followed.
- Role of hymn in resuscitation of a newborn in terminal apnea needs a proper study on scientific lines.
- There is an urgent need to strengthen the *Ayurvedic* knowledge by accepting newer

approaches, couched upon our own concepts.

- There is an urgent need to review and reconstruct the section of emergency medicine in *Ayurveda* to enable its rational use in present era.
- This paper can be viewed as an example of the need for selective assimilation under medical pluralism, rather than merely integrative medicine.

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