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## Ayurvedic Concepts of Resuscitation in an Asphyxiated New-Born – A Critical Analysis

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### ABSTRACT

*Ayurveda* the rich medical science which is formulated by keeping the nature as reference, has the credit of protecting the life of Indians since centuries. Meanwhile *Ayurveda* has given equal importance to child health as evidenced by many references. Certain emergency procedure in childhood practice like new born resuscitation is very essential procedure to save the life of the child. We find explanation of such emergency procedure in *Ayurveda* too under the heading of *Pranaprathyagamana*. This includes certain vital steps of resuscitating the baby immediately after birth, by different methods of stimulating the respirations and reviving the baby. Principles behind different steps adapted by *Ayurveda* in the process of resuscitation nowhere differ from present techniques of contemporary medical sciences and looks like guideline for present advancement in the resuscitation. Analyses of terms like *Ashmano sangattana*, *Krishna Kapalika Shoorpa* etc shows similar concepts of sensory stimulation and initiation of breathing by different methods. Certain step adopted are similar to oxygen hood box method, bag and mask ventilation. Further modification of oxygen and aseptic care in *Ayurveda* has been explained in a comprehensive way.

### KEYWORDS

Bag and Mask, *Krsihna kapalika*, *Ashmano sangattana*



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## INTRODUCTION

Resuscitation of a new born is a vital and essential procedure for the successful revival of the asphyxiated baby. As every delivery should be considered as emergency importance of the same has been well understood<sup>1</sup>. Significant advancement in resuscitation in recent decades not only reduced the neonatal mortality rate but also successfully revived and saved the life in certain critically ill babies<sup>2</sup>.

Resuscitation was also very much anticipated procedure even in ancient period, rightly Ayurvedic Samhitas also mentioned newborn resuscitation in detail. It has been told that during delivery one leg of the pregnant lady is in earth and other in the *Yamalokha* which indicates maternal and neonatal mortality rate and risk of sudden emergencies faced during the delivery<sup>3</sup>. Rightly to overcome the same, procedure by the name *Prana Prathyagamana* was mentioned. The word meaning of Resuscitation is apparently lifting the baby from a death like condition while meaning of *Prana Prathyagamana* is re-establishing the left *Prana* back in the body. *Ayurveda* explains all the essential steps of resuscitation in an order. Although certain explanation given in *Ayurvedic* methodology looks outdated in comparison

to advanced modern technology, it's clear that basic principle behind each step hold good even today and looks like guideline for present advancement in resuscitation<sup>4</sup>.

## GENERAL DESCRIPTION

Resuscitation is required to all those babies who fail to cry immediately after birth along with failure to initiate spontaneous respiration, floppy baby with absence or reduced vitals and hypotonic, i.e. Poor Apgar scoring, irrespective of causes. Such a state is also called as Asphyxia which has multi system complication with aberration in blood gas concentrations<sup>5</sup>. Causes for the same may be many like meconium aspiration syndrome, fatal hypoxia obstructive delivery, bad obstetric history and perinatal events, intra ventricular haemorrhages, birth injuries, preterm, post term, low birth deliveries etc. In all the above told situation the presentation of the baby at birth is failure initiate breathing with floppiness and with absence of symptoms of life.

The same situation of no symptoms of life at birth has been mentioned as *Achस्था* (अचेष्टता) by *Acharya Charak* and mentioned different procedures to be conducted immediately after birth in case of *Achस्था Shishu*<sup>6</sup>. He says that all procedures of resuscitation should be continued till



baby attains the symptoms of life i.e., till the baby has been lifted out of Asphyxia.

Word *Achestata* (अचेष्टता) can be very well correlated with asphyxiated state, with APGAR score less than 2 at 1 minute or at 5 minutes. There are no differences in cause of *Achestata* (अचेष्टता) or Asphyxia. Along with Charaka, other *Samhitakars* also mentioned different steps, which indicates the modification done in Ayurvedic resuscitation methods from time to time to put forth best possible practical oriented method for the benefits of asphyxiated baby. By arranging all such procedure in an order, we can explain the Ayurvedic method of resuscitation i.e. *Prana Prathyagamana* as explained below<sup>7</sup>. Focus on maintaining the TABC i.e. Temperature, Airway, Breathing and circulations are the main stay of reviving the baby and *Ayurveda* also stresses on the same. Maintenance of temperature reduces the oxygen demand of baby hence in *Suthikagara* where delivery is conducted has been ensured for temperature regulation by lighting the fire to the stems of different medicinal drugs, lighting the mustard oil lamp, construction of *Suthikagara* by heat resistant materials<sup>8</sup>. which helps to prevent the heat loss by different methods.

Further *Ayurveda* stresses clearing the airway for proper ventilation for patency of

airway before starting the resuscitation, like thorough cleaning of the nasal cavity and oral cavity so as to clear the secretions. *Ayurveda* explained the same procedure by using a *Kavalika* mixed with *Saindava* (Sodium chloride) and *Ghrita*, which was wrapped on index finger and cleaning the throat has been done to maximum extent<sup>9</sup>. Same has been also used to induce spontaneous vomiting to clear the amniotic secretions of throat and stomach (*Garbhodaka Vamana*).

This is followed by different methods of stimulating the respiration in order to initiate the spontaneous breathing. Delay in breathing alters the blood concentration of the gases and leading to severe asphyxia and pH changes. In this scenario the stimulation of respiration will be tried by using the sensory stimulation methods<sup>10</sup>. It is in routine practice of resuscitation to give 1-2 firm flicks on the sole of the baby or rubbing the chest area or upward pressure is given in the spinal cord area at lumbar level. This helps to stimulate the respiratory centre through the spinal sensory pathways for pain and pressure<sup>11</sup>.

*Ayurveda* explains the same method of sensory stimulation in more advanced and easy way. *Ayurveda* believes in the *Bhutaupravesha* theory in the process of formation of body. From *Atma* the *Akasha* is formed first, followed by other



*Mahabutas*<sup>12</sup>. Hence the human body has got more perception for *Shabda* (शब्द) which is special quality of *Akasha Mahabhuta*. As it is formed more primitively body has increased perception for the same.

On the basis of above principle, *Ayurveda* tries to stimulate the respiration by sensory stimulatory method by using *Shabda* or sound stimulus. (अश्मनोः संघट्टन कर्णयोमूल (कर्णवादन)<sup>13</sup>. To carry on this procedure a dull sound has been made at the base of the ear (i.e. mastoid process) by striking small two stones. This produces a dull sound which helps to stimulate vestibule cochlear nerve which carries the sound stimulus to hypothalamus. In further course it also gives a relay branch to the respiratory centre. This is true for all sensory fibres from the peripheral parts of the body crossing the hypothalamus<sup>14</sup>. Therefore, extreme degree of sensory stimulation is always associated with stimulation of respiration (As evidenced by suddenly touching heat and cold followed by cessation of respiration for a while). Purpose of using the stones may be produce a dull sound as sharp metallic sounds may be injurious to labyrinth of the ear, or to prevent reflux bradycardia, like conditions. Meanwhile this method also helps to check the response of the baby as in case of

startling reflex (Moro's like response to sound stimulus) for alertness and response<sup>15</sup>. Contemporary science also believes that new born after birth will be always more responsive for sound stimulus among different kinds of sensory stimulus.

When above said first method of stimulating the respiration fails to initiate breathing the second sensory method of stimulation has been indicated in *Ayurveda*. In this method second primitively acquired special *Guna* of the body i.e. *Sparsha Guna* of *Vayu mahabhuta* is stimulated. Method adopted to achieve the same is sudden sprinkling of cold water and hot water alternatively on the facial region of sick baby. (शीतोदकेन उष्णोदकेन मुखे परिषेक)<sup>16</sup>. Sensation will be carried through sensory segment of facial nerve and trigeminal nerve to stimulate the respiratory centre. In hot season, cold water and in winter season hot water can be used. Alternate sprinkling of hot and cold water also stimulates sympathetic nervous system, which in turn stimulates the respiratory centre. Baby with apnoea can be easily awakened by this method. Sprinkling of cold water to a person during the state of unconsciousness/semiconscious is generally practiced in community practice, which also works on the same principle. Sudden cooling after birth when a human



newborn baby is delivered may lose up to 600kcal/minute at room temperature provides respiratory drive by operating through trigeminal cold receptors located on the facial skin<sup>17</sup>. sudden sprinkling of cold water over the facial region (मुखे परिषेक) may serve this purpose

Further, Facial area (मुख) is the *Adhithana* of maximum *Indriyas* like *Shabda*, *Rasa*, *Ghaana* etc. Hence, it easy to stimulate all *Indriyas* by *Mukha - Parisheka*. Blood circulation is maximum on the facial area and face is supplied by external carotid arteries which are connected with internal carotid artery containing baro receptors. Role of baro receptors in stimulation of respiration is well known<sup>18</sup>.

Thus, *AshmanoSanghatana* (अश्मनो संघटन) looks to be the stimulation of respiration by sensation carrying in through the vestibulo- cochlear pathway guided by sound stimulus; while in sprinkling of water (शीतोदकेन उष्णोदकेन मुखे परिषेक) causes the stimulation of the trigeminal nerve pathway<sup>19</sup>.

Once the baby is not responding to this two-above methods *Ayurveda* explain to shift for other methods like positive pressure ventilation. As per contemporary methods sensory stimulation when fails to initiate breathing and heart rate fall below hundred (100) usually the positive pressure

ventilation by using Bag and mask ventilation has been conducted<sup>20</sup>. This is an artificial method of pushing the oxygen inside lungs helps to overcome the existing the positive pressure of the chest.

Although *Ayurveda* didn't explain the procedure of bag and mask ventilation where air is pushed inside the lung forcefully, the effort has been done to provide high concentration of oxygen to the baby. The same as been explained under the heading of Krishna Kaplika Shoorpa (कृष्णकपालिक शुर्पेन अभिनिष्पूणीयात)<sup>21</sup>. The 21% of oxygen present in atmosphere air as it is usually done in community practice more than sufficient to carry on positive pressure ventilation. *Ayurveda* explains fanning of atmospheric air to the site where baby is placed, and thus providing the high concentration of oxygen<sup>22</sup>. Fanning helps clear impure air and create a negative pressure at the site followed by high concentrated oxygen air to the site. The materials used for fanning are rushing of blackish broken earthen pot (कृष्णकपालिक)<sup>23</sup>. Further to provide high concentration of oxygen to baby by *Ayurveda* explain the *Shoorpa* method. *Shoorpa* is basket shaped structure which was covered from all the four sides. This method is almost similar to oxygen hood box method used to provide high



concentration of oxygen to the baby<sup>24</sup>. Probably exact method of positive pressure ventilation was not explained in *Ayurveda* although its basic principle of providing high concentration of oxygen was explained. Further their efforts were limited to the use of atmospheric oxygen only, due to either lack of knowledge of collecting oxygen in a cylinder or due to awareness of toxic effects of high oxygen (Lenticular Nuclear degeneration as Oxygen is always a double-edged sword. It is true that advanced modern methods of resuscitation have saved many lives, but, in prolonged cases quality of future life of the child is always questionable. Such babies carry higher risk of brain- damage resulting in cerebral palsy, mental retardation, neuro – muscular pathologies, oxygen toxicity etc<sup>25</sup>.

Although method of collection of oxygen was perhaps unknown to them. Method of modification of oxygen was well explained. *Harihta* (हारीत) gives the concept of modification of air for the benefit of sick baby. He explains five varieties of fanning materials for fanning and idea is to modify the air when it passes through particular fanning material. Atmospheric air while passing through a particular fanning material gets modified, like fanning with *Kadali patra* (banana leaf) or palm tree leaf,

air gets moistened and humidified due to *SheetaGuna* of *Kadli Patra* (कदली पत्र). It relieves the fatigue and air becomes humid (wet) which brings down *Daha* (दाह), Pitta (पित्त) and induces sleep<sup>26</sup>. This is similar to conventional practice of converting dry oxygen in to humidified oxygen passing dry oxygen through water medium, which is comfortable for the body and is devoid of the bad effects.

Pichu Dharana or application of a gauze piece dipped with *Bala Taila* over the scalp and the anterior fontanel area or *Brahm randra pradesha* is another step mentioned in *Prana prathyagaman*<sup>27</sup>. *Bala* is known for its *Vatahara* property and known for its beneficiary effects over the central nervous system. As scalp and head area also accounts for maximum heat loss, *Bala Taila* also works as insulator to prevent the same, along with its protective action over anterior fontanel which is weak point of the cranium. Further anterior fontanel is un ossified area, and Ephedrine present in the *Bala*<sup>28</sup> when given with lipid medium like *Taila* can be gets absorbed, however this needs to be confirmed by researches. Contemporary medical sciences believe in ice water central cooling to prevent the extensive brain damage in severely asphyxiated babies. A similar attempt has



been also practiced in *Ayurveda* in the form of *Bala Taila Parisheka*<sup>29</sup>.

However, *Ayurveda* explains the multi system involvement of Asphyxia due to various causes in the context of *Ulbhka Roga* and while explaining indication of *Bala Taila Parisheka*<sup>30</sup>. *Ayurveda* also proposes *mantra chikitsa* as a last option which is chanted at the right ear of the baby, when there is no hope of saving the baby. Chanting of the Mantras in rhythmic fashion not only acts as auditory form of stimulation but also helps to stimulate the electromagnetic waves of the brain as evidenced in music therapy<sup>31</sup>.

**DISCUSSION.** - *Ayurveda* considered every delivery as an emergency and chance of high neonatal mortality rate if not handled properly. Considering this fact, they have adopted all the steps for successful, safe delivery by a procedure called *Prana prathyagama*<sup>32</sup>. It is obvious that, after coming through certain practical difficulties in resuscitation, certain changes have been done to formulate a comprehensive method of Resuscitation which was evidenced by difference of opinion and change in the order of steps of *Prana Parathyagamana* adopted by different *samhitakaras*. Such modification is quite common in medical field like TABC of resuscitation instead of ABC of resuscitation, utility of soda bicarbonates,

blue light instead of white light in phototherapy, Open care system of sick baby instead of incubators etc<sup>33</sup>. Further the different steps adopted by different authors suggest different clinical situation they would have been faced.

Although certain methods like striking the stones, sprinkling the water to the face looks quite outdated at the present scenario owing to rapid advancement in neonatal care special principle behind each step is quite similar to contemporary medical sciences. Rather it gives an impression that Ayurvedic principles has been reference frame for possible present advancement in neonatal care. Importance of temperature regulation during resuscitation is quite obvious and maintained in *Suthika gara*. Different measures adopted inside the *Suthikaragara* help to maintain the higher degree temperature at higher degree than that of atmosphere.

Method of sensory stimulation has been dealt in more convincing manner according to principles of *Ayurveda* which is almost similar to contemporary practice. It is quite obvious that new born is always highly responsive for sound than any other stimulus. Knowledge of sensory stimulation to stimulate the respiratory centre which also highlights their mastery over anatomy<sup>34</sup>.



Similarly, the need of high concentration of oxygen to an asphyxiated baby and effective way of its delivery to the baby was well known to them. By analysing the principles behind fanning the baby to provide the fresh air and by *Krishna Kapalika* and modification of the air to provide humidified air by different fanning materials looks like basic principle of today's positive pressure ventilation<sup>35</sup>. Further the *Shoorpa* or basket like structure to provide higher concentration of oxygen which nowhere differs from oxygen hood box method. *Bala Taila parisheka* as a method of central cooling in asphyxiated baby was also well explained, and role of Ephedrine (chemical in *Bala*) to have stimulation of sympathetic nervous system<sup>36</sup> and circulation need to further evaluate by researches.

## CONCLUSION

It is quite obvious that *Ayurveda* has considered every delivery as an emergency and were prepared to attend the same which is evidenced by the explanation given under *Prana prathyagaman*. Principles of resuscitation like TABC have been also employed in *Prana prathyagamana* and will no way differ from the present scenario of neonatal care although methodology adopted is quite different. Ayurvedic

methodology of resuscitation has also undergone time to time modification as evidenced by explanation of different *Samhita*. Ayurvedic principles of *Prana prathyagamana* which was explained centuries back looks like base for recent advancement in principles of critical care of newborn.



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