

COMPARATIVE STUDY ON FUNDAMENTAL PRINCIPLES OF GARBHA SHARIRA (EMBRYOLOGY) IN INDIAN SYSTEM OF MEDICINE (ĀYURVEDA) AND TIBETAN SYSTEM OF MEDICINE (SOWA-RIGPA)

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ABSTRACT

Introduction: *Sharira* or human body and its formation is a beautiful concept explained in Ayurvedic embryology i.e. *garbha sharira*. It is mentioned in both the systems i.e. *Ayurveda* (Indian system of medicine) and *Sowa-Rigpa* (Tibetan system of medicine). Both the systems have explained the causes of formation, causes of successful conception, the features of defective semen and ovum, importance of fulfilling all conditions, characteristics of healthy semen and ovum etc. **Aims & objectives-**The main aim of comparing both the traditional systems is to combine together the knowledge of both the traditional systems and to expand the knowledge of embryology in best and easiest way. **Materials Methods-** Author have studied main text books of both the system thoroughly such as *brihatrayi* (*Charaka, Sushruta and Vagbhata samhita*) of *Ayurveda* and *Gyue-shi* (text book of four tantra) of Tibetan medicine. **Results-** Both the systems have some common and some different views regarding embryology. **Discussion-** In Tibetan Medicine the sixth factor of embryo is 'karma' while in *Ayurveda* sixth factor is 'chetana'. *Ayurveda*, have mentioned the sequence of descent of *mana* along with *Atma* and *Panchamahabhuta* while in Tibetan Medicine no such description is found. **Conclusions** - In *Ayurveda* embryology is mentioned in more detail as compared to Tibetan medicine.

Keywords: Ayurveda, *Sowa-Rigpa*, *Garbha -sharira*, *Masanumasik vridhhi*.

INTRODUCTION

We all come in to this world following a beautiful chemistry between two cells, a sperm (male cell or gamete) and ovum (female cell or gamete). The product of the union of sperm and ovum is called zygote. The zygote later gets the form of an embryo. An embryo is an unborn offspring in the process of development. The formation of zygote and embryo and subsequent development of the embryo into fetus in various stages of development and maturity

over a period of 9 months is called *garbha* in *Ayurveda*.

The whole process is called *garbha utpatti* or *garbhavakranti* (development and maturity of fetus). This constitutes the basics of the earliest embryology known as the mankind i.e. 'Ayurvedic embryology' or '*garbha sharira*'. In this article the '*masanumasika garbha vridhhi karma*' or month wise development of fetus from an *Ayurvedic* and *Sowa-Rigpa*

perspective would be explained in more detail. For expansion of our knowledge regarding embryology and before coming to the conclusion of this article it is necessary to study both the system thoroughly.

Materials and methods - Author have studied main text books of both the system thoroughly such as *brihatrayi* (*Charaka, Sushruta and Vagbhata samhita*) of *ayurveda* and *rGyud-bZi* (text book of four tantra) of Tibetan medicine.

Garbha sharira in Ayurveda and Tibetan medicine-

Ayurvedic texts have clearly explained the process of monthly development of fetus in detail in *sharira sthana* of *brihatrayi*. The explanation is unique and may not exactly correlate with the explanation given in *Sowa- Rigpa*.

Both the systems have explained the causes of formation, causes of successful conception, the features of defective semen and ovum, importance of fulfilling all conditions, characteristics of healthy semen and ovum, menstrual cycle, time for the conception that decides gender, sign of conception, precaution that pregnant women should take, condition that assist in the child development, rituals to be performed who desires a male child, monthly development of baby, conditions that delay the delivery of the child on time, sign of birth, sign indicating the birth of male child or a female child and all these are nearly same in both the system of medicine.

The beginning of the menstrual cycle-

Both the systems have mentioned that menstrual period generally begins from the age of twelve. '*Rtustu dwadasharatram bhavati drishtartawa, adrishtartawa apyastityeke. (Su.sha.3/6).*'^[1]

Six factors of embryo

Both systems have explained contribution of five elements, semen and ovum in the formation of different part of foetal body but in *Ayurveda*, it is explained in more detail.

In Tibetan Medicine the sixth factor of embryo is '*karma*'^[2] while in *Ayurveda* sixth factor is *chetana*. *Ayurveda*, have mentioned the sequence of descent of *mana* along with *Atma* and *Pancamahabhuta*^[3]

while in Tibetan Medicine no such description about *mana* is mentioned.

Process of nourishment to embryo

In Tibetan Medicine the main source for the development of the embryo is the navel or umbilical cord. The foetus begins receiving nutrition through two channels from the right and left of the uterus, which are connected to the *Sam-seu* (ovary), the main source of nourishment.^[4] While in *Ayurveda* according to *Acharya Charaka* the fetus obtaining its nourishment from *rasa* (supplied by mother) by the process of *upasneha* (attracting moisture) and *upasweda* (osmosis)^[5] and according to *Acharya Sushruta* only by *upasneha*.^[6] *Vagbhata-1* have mentioned that from umbilical cord the *rasa* reaches *pak-washaya* (digestive system) and with its own *Kaya-Agni* gets metabolized and provides nourishment to it.^[7]

Punsawan karma

Both the systems have explained rituals to be performed by the couple who desires male child. This ritual is termed as *punsawan karma* in *Ayurveda*^[8]. The time period for *punsawan karma* in Tibetan Medicine is 3rd week of the first month of pregnancy^[9] when the sex of the embryo is not yet determined.

In *Ayurveda* according to *Charaka*, *punsawan karma* should be done after conception but before conspicuousness (*vayaktabhava*) of the organs or up to two months, keeping in mind the living place (*desha*) and specific period (*kala*) the result is definite, otherwise it is just reverse and according to *acharya Sushruta* just after achievement of conception.

In Tibetan Medicine only one method of *punsawan karma* has been described in which two palmful of the heated milk of male metallic statue is given to pregnant woman which is followed by an intake of equal amounts of nutrients of the sun and moon (red mica and detoxified mercury)^[10] while in *Ayurveda* in addition to this method many methods have been described such as use of healthy leafy buds of banyan tree, seeds of *dhanya masa* and *gaur sarshapa* with curd during *pushyanakshata*. etc.^{[11][12]}

Both the systems have mentioned the signs and symptoms of *sadyograhita garbha* or immediately conceived women and *vyakta garbha* or after conspicuousness of body parts of embryo. [13] [14][15]

Masanumasik vriddhi (monthly development) of garbha or faetus

In *Ayurveda* the foetal development is explained month wise while in Tibetan Medicine foetal development is explained in week- wise and explained in more detail as compared to *Ayurveda* as shown below in table no 1.

Table 1: Showing the fetal development in Tibetan medicine and *Ayurveda*.

Tibetan Medicine	<i>Ayurveda</i>
<p>First Month First Week: The semen and ovum mingle like curdled milk. Second week: The mixture then becomes semi-fluid. Third Week: It solidifies and becomes curd-like. Fourth Week: It becomes round, oval and oblong in shape, which determines the gender of the child.</p>	<p><i>Acharya Charaka</i> mentioned that in the first month <i>atma</i>, getting mixed up or vitiated by all the <i>dhatus (bhutas)</i> attains the shape resembling the <i>shleshma</i> (mucoid character) in which all the body parts though present are not conspicuous.^[16] According to <i>Acharya Sushruta</i> and both <i>Acharya Vagbhata</i>s, in the first month embryo is in the shape of <i>kalala</i>.^{[17][18]}</p>
<p>Second month –Fish Phase Fifth Week: The base of the umbilical cord is first formed in the body of the foetus. Sixth Week: Depending upon the channels of the navel, the central life channel formed. Seventh Week; The eyes acquire their form. Eight Week; Depending upon the crown chakra, the shape of the cranium is formed. Ninth Week: The Shape of the body, with its upper and lower trunks is formed.</p>	<p><i>Acharya Charaka</i> - embryo becomes a solid mass. If this solid mass has <i>pinda (oval)</i> shape the born child would be male, if <i>peshi</i> (elongated) the female and with rounded (<i>arbuda</i>) mass the hermaphrodite.^[19] <i>Acharya Sushruta</i> and <i>Acharya Vagbhata</i>s corroborating the above views have elaborated that these accumulated <i>mahabhutas</i> gets processed by the combined action of <i>shleshma, pitta</i> and <i>vayu</i> and become solid.^{[20][21][22]}</p>
<p>Third Month Tenth week: The shoulders form and take shape and the two hips protrude. Eleventh Week: Form and shape of the nine orifices Twelfth Week: Form and shape of the five vital organs. Thirteenth Week: Form and shape of the six vessel organs.</p>	<p><i>Acharya Charaka and Acharya Sushruta</i> says that in third month all the <i>indriyas</i> and minor body parts become apparent, five buds one for head and four for upper and lower extremities develop. <i>Acharya Vagbhata II</i> opines that with the development of head the embryo is capable of feeling sorrow or happiness.^{[23][24][25]}</p>
<p>Fourth Month-Turtle phase Fourteenth week : Forms the structure of humerus and femur (Arms and thighs) Fifteenth week: Forms the structure of tibia and fibula Sixteenth Week: Forms the internal and external connecting channels (arteries, veins and nerves).</p>	<p><i>Acharya Charaka and Acharya Vagbhata</i> - Various body parts become more conspicuous and stability to the fetus comes in this month. Manifestation of heart and consciousness associated with heart has been added by <i>Sushruta</i>.^{[26][27][28]}</p>
<p>Fifth Month Eighteenth Week: Forms muscle and fatty tissues. Nineteenth Week: Forms the tendons and ligaments. Twentieth Week; Forms the bones and marrow. Twenty-first Week: The skin encases the body.</p>	<p>According to <i>Acharya Charaka</i>, during this month accumulation of flesh and blood is relatively more. <i>Acharya Sushruta</i> opines that the <i>mana</i> becomes more enlightened. <i>Acharya Vagbhata-I</i> has included both the versions mentioned above, <i>Acharya Vagbhata- II</i> mentioned that consciousness develops in this month.^{[29][30][31][32]}</p>

<p>Sixth Month Twenty-second Week: The nine orifices of the body are clearly opened. Twenty-Third Week: Growth of hair, body hair and nails. Twenty-fourth Week: The vital and vessel organs become fully developed. Foetus begins to recognize feelings of pleasure and pain. Twenty-fifth Week; the movement of <i>rLung</i> energy through the Orifices begins, resulting in the proper function of respiration and blood circulation. Twenty-Sixth Week: memory becomes so clear that the foetus may even remember his/her previous lives.</p>	<p><i>Acharya Charaka</i> opines that relatively more accumulation of energy and complexion.^[33] <i>Acharya Sushruta</i> More enlightenment of <i>buddhi</i>.^[34] <i>Acharya Vagbhata-I</i> Development of hairs, body hairs, nails, bones, tendons and accumulation of energy and complexion.^[35] <i>Vagbhata- II</i> – Development of Tendons, vessels, body hair, nails, skin, energy and complexion.^[36]</p>
<p>Seventh Month Twenty-seventh to Thirtieth Week: During this period the whole body systems such as organs, vessels, and constituents, reach the state of completion.</p>	<p><i>Acharya Charaka and Acharya Vagbhata</i> -In the seventh month, all the features (muscle, blood, bone) etc. get proper nourishment. <i>Acharya Sushruta</i> all the major and minor body parts are more conspicuous or are fully developed and whole body gets completely associated with <i>vata, pitta and kapha</i>.^{[37][38]}</p>
<p>Eighth Month -pig Phase Thirty-first to Thirty-fifth Weeks: During this period the whole body systems rapidly grow in size and strength. The shifting of complexion and vitality takes place between mother and child during this particular time due to alternate domination of nutrients by the mother and the child.</p>	<p><i>Acharya Charaka, Acharya Vagbhata - I and II</i> opines that due to this transfer of <i>ojas</i> mother and fetus become happy or dull alternately (happiness when <i>ojas</i> is present and dullness when <i>ojas</i> has gone to the other side). If delivery takes place the life becomes doubtful. <i>Acharya Sushruta</i> - child born in this month dies due to absence of <i>ojas</i> and influence of <i>nairita</i> portion.^{[39][40]} <i>Vagbhata- I-</i> mentioned same as <i>Charaka</i> and <i>sushruta</i> but further in more detail.^[41] and he also mentioned the measures to prevent labour in eighth month as that of Tibetan medicine.^[42]</p>
<p>Ninth Month Thirty-sixth Weeks: The fetus experiences five feeling of distress and disgust in the mother's womb (unclean environment, imprisonment, darkness, foul smell and a strong desire to leave the womb).^[46]</p>	<p>According to <i>Ayurveda</i> 9th, 10th and 11th month are considered as the period of <i>prasava</i> (delivery).^{[43][44][45]}</p>

First appeared body part of fetus in womb-

In Tibetan Medicine during second month-fish phase, the base of umbilical cord is the first organ formed in the body of fetus^[47], while in *Ayurveda* different views has been mentioned by different *acharyas* regarding the first-born body parts of fetus but finally *Punarvasu Atreya* and *Dhanvantari* concluded that the all body parts forms together in the foetal body.^{[48] [49]}

Both the systems mentioned the measures to prevent the labour in eighth month.^[50]

Both the systems have mentioned that semen from father, ovum from mother, consciousness and five elements take parts in the formation of different structural and functional parts of body^[51]. While in *Ayurveda*, in addition to these *Acharya* have mentioned the description of constituents of formation of different body parts such as foetal liver and spleen get their origin from *rakta*, lung from the foam and caecum from the waste product of *rakta* etc.^{[52][53]}
 In *Ayurveda*, *Acharya Charaka* have given the description of some specific features depending upon

the sex of fetus such as the features of female are – *klaivya* (cowardice), *bhirutwa* (timorousness), *avaisharadya* (lack of skill or fallibility), *moha* (mental confusion), *anawasthana* (flicking nature), *adhogurutwa* (heaviness of lower part), *ahana* (intolerance), *shaithilya* (laxity of joints or body parts), *mardava* (softness of body parts) and presence of uterus and *bija* (ovum) etc. and Opposite to these are masculine characters and mixture of both belonging to hermaphrodite.^[54] *Vagbhata- I* have also expressed almost similar view in abbreviated form and has replaced intolerance with looseness, while in Tibetan Medicine no such description have been mentioned.

In *Ayurveda* there is description of factors (*panchbhotic sanghatan*) for the formation of body complexion while in Tibetan medicine there is description of shifting of the complexion and vitality during 31st to 35th week of pregnancy^{[55][56][57]} but the constituents of the complexion are not described.

In *Ayurveda* it is mentioned that the causes of the congenital blindness or *jātyandha* is due to deficiency of *tej dhatu* (*Acharya Sushruta* and *Vagbhata -I*). If the *teja* is followed by *rakta* then the colour of eyes would be red, if by *pitta* then yellowish, if by *Shleshma* then white and if by *vayu* then the eyes would be dry, pink and abnormal in shape and size (*vikrita*)^[58], while in Tibetan Medicine, such description are not found.

In *Ayurveda* the main factors responsible for multiple pregnancy, cause of specific sex in a twin pregnancy, why one child in a twin is healthier than the other is due to *vayu*^[59]. While in Tibetan Medicine, no description of twine and multiple pregnancies have mentioned.

In *Ayurveda* effect of intake of different *dosha* vitiating - diet by mother upon the fetus, cause of birth of boneless fetus, reason of absence of foetal cry and foetal excretes, effect of mother disease upon fetus, auspicious or *shubha* and inauspicious or *ashubha* features of fetus, factors responsible for normal delivery of normally developed full term fetus, intrauterine situation of the fetus are explained in detail

^[60], while in Tibetan Medicine, these are not mentioned.

DISCUSSION

Factors which are mentioned in both the systems

Both the systems have explained the causes of formation, causes of successful conception, the features of defective semen and ovum, importance of fulfilling all conditions, characteristics of healthy semen and ovum, menstrual cycle, time for the conception that decides gender, sign of conception, precaution that pregnant women should take, condition that assist in the child development, rituals to be performed who desires a male child, monthly development of baby, conditions that delay the delivery of the child on time, sign of birth, sign indicating the birth of male child or a female child and all these are nearly same in both the system of medicine.

Factors which are not similar in both the systems

Responsible factor for garbha in *Ayurveda* is *panchmahabhuta* and *atma* while in Tibetan medicine 6th factor is *karma* instead of *atma*.

Punswana karma mentioned in *Ayurveda* is mentioned in more detail than Tibetan medicine.

In *Ayurveda* month wise foetal development is mentioned while in Tibetan medicine it is week wise. In *Ayurveda* child delivery is restricted during 8th month of pregnancy and in Tibetan medicine special child care is mentioned during 8th month of pregnancy.

Formation of organs of embryo is also explained in *Ayurveda* in more detail.

Factors which are only mentioned in Ayurveda

In *Ayurveda* Involvement of five elements during formation of color complexion of embryo, Cause of twine or multiple pregnancy, *jatyandha*, effect of intake of different *dosha* vitiating - diet by mother upon the fetus, cause of birth of boneless fetus, reason of absence of foetal cry and foetal excretes, effect of mother disease upon fetus, auspicious or *shubha* and inauspicious or *ashubha* features of fetus, factors responsible for normal delivery of normally developed full term fetus, intrauterine situa-

tion of the fetus are explained in detail while in Tibetan Medicine, these are not mentioned

CONCLUSION

Thus, on studying embryology in both the systems, both the systems have mentioned embryology with deep insight, observation and valuable knowledge. Embryology is very vast subject and author has focused mainly on *masanumasik vridhhi*. Study and knowledge of embryology is very important for physicians since the ancient era and both the systems have mentioned embryology with depth material in all the aspects. This review will be helpful to provide information about the embryology of ayurvedic as well as Tibetan system for further future research.

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