Comparative Ayurvedic Anatomy and Embryology Garbha Sharir

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Abstract- Ayurveda describes the formation of the embryo, or Garbha, as a complex process initiated by the union of shukra (sperm) and shonita (ovum) inside the mother's womb (Garbhashaya). This initial fusion creates a zygote, which is subsequently infused with the life principle (Atma). The embryonic development process involves a blend of various physical, emotional, and spiritual factors, emphasizing the significance of the mother's health, environment, and dietary habits. The interaction among the Atma, doshas, and the five elements (Panchamahabhutas) shapes the form and constitution of the developing embryo, showcasing a holistic understanding of human development. Ayurvedic embryology, the concept of doshas plays a significant role in determining the characteristics of the fetus. Each dosha—Vata, Pitta, and Kapha—influences the developmental processes and organ formation in the embryo. For instance, Vata facilitates cellular division, while Pitta supports metabolic functions and maturation. The balance of these doshas during pregnancy is critical; imbalances or vitiation can lead to fetal anomalies and complications. The text also highlights how the properties of shukra and shonita, and their respective influences of Kapha and Pitta, further influence the sex and well-being of the fetus.

Keywords: Embryology, Ayurved, Grabhasharir, Progeny, Genetic makeup

INTRODUCTION

Embryology is the study of gamete development before birth, fertilization, and embryo and fetus development. *Ayurvedic* embryology is referred to as *Garbhasharir*. Some specific chapters in the *Sushruta Samhita, Charak Samhita*, and *Kashyap Samhita* that focus on embryology basics and embryology-related elements are spread throughout the books. Compiling extracts and linked sources would provide a good overview of the embryological basics given in *Ayurveda*. *Ayurveda* is primarily concerned with human health and disease, from conception to death. Everything's existence has now been proven both practically and scientifically. *Ayurveda*, as part of this science, requires extensive study and investigation to prove all of the truths provided by *Acharyas* in ancient times. *Sharir Sthana* is an *Ayurvedic* work that describes the notion of *Garbha Sharir* in detail. The primary goal of *Garbhasharir* (embryology) as indicated in *Ayurvedic* texts is *Suprajanan* (Healthy Progeny). Modern embryology goes into great depth on embryo formation, fetal growth, and structural teratogenicity of bodily organs, whereas *Ayurveda* affirms the fetus's structural, physical, and mental state. *Ayurvedic* literature provides a methodical account of numerous facts addressed in *Ayurveda*, which are quite similar in many ways to modern science. There are several references to *Garbhasharir* in *Brihattrayee* (the three major *Ayurvedic* compendia) and their comments that must be interpreted appropriately in order to be relevant in the current age.

Historical Aspect

Vedas have the concept that mature age of woman including physical and psychological both are an essential factor for a good progeny. The proper time of insemination, the gradual and sequential stages of embryonic development have been minutely observed

and well described in ancient literature. In Vedic literature, the importance of heredity and environment has been also not left untouched as they could recognize the intimate interaction between the developing embryo and the immediate environment which its body, organ and tissues experience. In Samhitas, the matter related to concept of Garbha Sharir is systematically described. It has well recognized the paternal units taking parts in development of Garbha more precisely. The terms employed for these embryonic components and their stages of developments appear to be more appropriate and scientific, if viewed in the light of present advances. Modern Aspect The literal meaning of term "Embryo" in modern science signifies the developing ovum during the early months of gestation and the branch of science popularly known as embryology. In its widest sense means the growth from one cell stage to adult one, but the term frequently is restricted to mean the period of growth and development before birth. The development of an organism is characterized by a progressive alteration of form and proportions, both externally and internally. Definition of Garbha Acharya Charaka says that the Samyoga of Shukra, Shonita and Jeeva (Atma) inside the Kukshi is named as Garbha. [2] Garbha is generated due to intermingling of Panchamahabhutas in each other‟s.[3] Acharya Sushruta states that a combined state of „Shukra‟ and „Shonita‟ in the Garbhashaya, intermixed with the „Prakritis‟ (Mula-Prakriti along with its eight categories) and „Vikaras‟ (her sixteen modifications) and ridden in by the Atma is called „Garbha‟. [4] Vriddha Vagbhata corroborating the views of Charaka explains that due to effect of Raga (desires) etc. and impelled by deeds of previous life the Mana propells Jeeva to come to the Kukshi (uterus) and formation of Garbha occurs.[5] The term „Garbhavakranti‟ in Ayurveda, though analogically stands parallel to the embryology but is more comprehensive. In real sense it deals with the process of fertilization and development of the fetus starting from their parental units, their union (fertilization), implantation, successive growth and finally the full term delivery. It comprises of two words, i.e., the „Garbha' and „Avakranti', which literally gives an idea about descent of a dormant embodied life principle. Garbha Sambhav Samagri (factors essential for formation of Garbha) Four factors i.e., "Ritu" (menstrual period) "Kshetra" (uterus) "Ambu" (Ahara Rasa) "Bija" (Shukra and Shonita) are the essential raw ingredients for the production of Garbha, provided Bija (Shukra and Shonita) should be pure.[6] It means Ritu, Kshetra, Ambu and Bija contribute in the formation of Garbha but afterwards different organs develop in the Garbha with the help of different Bhavas. Characteristics of Shukra and Shonita for good progeny should be as described below. Shukra: The male factor which is taking part in the formation of Garbha is called as Shukra. It is composed of Vayu, Agni, Jala, Prithvi Mahabhuta. This Shukra is formed by the food substances having all the six Rasa.[7]

Shukra Guna: Shukra is Shukla (white) in Varna, Sphatika (crystal) like appearance, Madhura (sweet) in taste, Madhu in Gandha, Snighda, Picchila, Sandra, Guru in consistency and overall appearance like Taila and Kshoudra. Shukra possessing these characters, only called as Shuddha Shukra and capable to produce Garbha.[8,9]

Shukra Pramana: Quantity of the Shukra Dhatu is Ardha (½) Anjali in human body. [10]

Artava/Shonita/Raja: From Rasa (Dhatu), the Rakta named as Raja is formed. Artava is Agneya, has characteristics of Rakta, forms Garbha and is also essential for life. The Artava becomes Vyakta in a female body from the age of twelve years and persists up-to fifty. Thus it is physiologically absent before twelve years and after fifty years. [11]

Rakta reaching Yoni (uterus) and coming out for three days in every month is called Artava. The blood collected for whole month by both the Dhamanis assuming slight black colour and specific colour or odour is brought downwards to Yoni-mukha (vaginal orifice) for excretion.[12]

Shuddha Artava: Artava should be unctuous, bright red in colour like Padma (red lotus) / Gunjaphala (abrus seed) / Laksha Rasa (lac juice) / Indragopa (cochneal) / Shasha Asrik (like rabbit‟s blood), and free from pain or burning. This menstrual blood does not impart permanent stain on the cloth. The quantity is not very scanty or very excess.

Artava Pramana: It is four Anjali (approximately four ounces).

Panchbhautikta of Garbha The fusion of Shukra and Shonita (sperm and ovum) in the Kukshi (womb) mixed with Prakritis and its sixteen modifications known as Vikaras and Aatma give rise to Garbha (an embryo). Acharya Sushruta has clearly stated the role of 'Panchamahabhutas' and the self-consciousness in the Garbha.

Vayu Bhuta divides this mass into Dosha, Dhatu, Mala, Anga and Pratyanga etc.

Tejas Bhuta gives rise to the metabolism of the tissue Aap Bhuta keeps it in liquid state.

Prithvi Bhuta is embodied in the shape of its species.

5Akasha Bhuta contributes to its growth and development. A fully developed Garbha with all its parts, such as the hands, feet, tongue, nose, ear, buttocks etc. and the sense organs is called „Shariram". This is how the fetus develops. On putting lime light on monthly development and organogenesis in Ayurveda, different Acharyas have different views

Garbha Vriddhikara Bhava

1. Shatbhava Sampat: Excellence of Matrija, Pitrija, Satvaja, Satmyaja, Rasaja, Atmaja Bhava.
2. Ahara, Vihara of mother: Dietary regimen prescribed for Garbhini.
3. Upasneha and Upasweda: By diffusion and heat conduction.
4. Kala Parinama: By time factor.
5. Svabhava: By nature. The development of Garbha mainly depends upon the inflation done by Vayu and nourishment supplied by Rasa is the opinion Sushruta and Bhavamishra. Behind the umbilicus there is definitely the location of „Jyotisthana' (the place of light or fire). The Vayu by its blowing action excites or stimulates this fire, which in turn performs development of body.

Garbhadhana Vidhi Ayurveda believes that Ahara, Vihara, Mansika Stithi of mother and father during the time of coitus influence the qualities of Garbha. Hence to get a good progeny, mother and father have to follow specific Ahara and Vihara.

These are described in following points:

Appropriate age for Garbha Dharana: Male at the age of 25 and female at the age of 16 are fully mature, for conception of good progeny.

Purvakarma: Before the coitus both wife and husband have to undergo Shodhana like Sneha, Sweda, Vamana, Virechana, Asthapana and Anuvasana basti.

Diet for Stri: Diet containing primarily more of Masha and Taila is advocated. This kind of Ahara increases Pitta and helps in complete formation of Rajas. To make the woman Snigdha Phalaghrita / Mahakalyana Ghrita is advised.

Diet for Purusha: Diet containing Madhura Dravya and Madhura Dravya Siddha Ghritam, Kshiram and Shalyodana is advocated. Madhura Rasa Ahara increases the quality of Shukra.

Dress: Shweta Vastra and Pushpmala Dharana.

Time of conjugation: Couple desiring male progeny have to perform coitus on Yugma Dina i.e. 8 th , 10th and 12th days. For female child 9th and 11th days that are Ayugma Dina are indicated. Good Muhurta and Aparahna is advised for coitus.

Method of conjugation: The man should go to the bed by keeping his right leg (Dakshina Pada) first while the woman with left leg. Then male partner should take wife by Soumya Vachana, Upachara and Chesta into mood. After feeling Maithuneccha, they have to indulge into coitus. During the time of coitus both of them must be with Prasanna Chittata.

Posture of coitus: Uttana (posture lying with the face upwards of female) is advised for coitus. It aids acceptance of Bija and Doshas are kept in Samastithi.

Process of Garbhadhana: During the coitus after Shukrachyuti (ejaculation), Vata carries Shukra through Yoni and deposits it in Garbhashaya. This Shukra unite with Shuddhartava and forms Garbha. After the coitus Parisechana (sprinkling) should be done with cold water at genital organ.

Method of performing Putresti-yagya: Charaka has described the detailed methods of Putresti-yagya for the fulfillment of desires of lady.

Garbha Masanumasika Vridhi: The first month to ninth month of development of Garbha is described in classics in detail. The parturition takes place either in

the ninth, tenth, eleventh or twelfth month of conception; otherwise (pregnancy) should be regarded as abnormal. Garbha Poshana: In Ayurveda, there is an adequate literature which throws light on supply of nutrition and gaseous exchange, from the stage of fertilized egg to its full term delivery. Entire requirement necessary for the development of Garbha is made by 'Rasa-dhatu' according to Ayurveda. The role of 'Rasa-dhatu', besides meeting the nutritional requirement to a growing Garbha, has been also recognized in respect to contribute towards the mother-health and formation of milk.

Garbha Poshana can be studied in two parts:

1. Till the Organogenesis of Garbha: At the initial stage, when specific parts of Garbha are not explicited, the Garbha obtains its subsistence by Upasneha and Upasweda processes. Upasneha is unctuousness and Upasweda is moistness. The substances which are having more fluidity and thin in nature are absorbed by Upasweda process. In the initial stages, Kapha is more predominant in Garbha. So, for the nourishment of Kapha, Kapha Vardhaka Ahara is essential. Guru, Snigdha, etc. Ahara which improve Kapha in the body cannot pass through the small pores. So, for that another separate process "Upasneha" has been mentioned by Acharyas.

2. After the Organogenesis of Garbha: When body parts become conspicuous, a part of nourishment is obtained by Upasnehana permeating through Loma Kupas and another part through Nabhi Nadi. Garbha Nabhi-Nadi is attached one side with Garbhanabhi and the other side with Apara (placenta). Apara is connected with the Matrihridaya through Syndamana Siras (pulsating vessels). From Matrihridaya, through these Siras by the process of Samplavana (inundation), Rasa enters into Apara, consequently to Nabhi Nadi and Garbha. 'Rasa' of the pregnant woman serves three purposes, viz.: ⎫ Matru-Pushti ⎫ Garbha- Pushti ⎫ Stana/Stanya Pushti Coming to the fetal nourishment, the Tiryak Rasavahinis which start from mother attach to the Apara and the nourishment passes to Garbha through the Nabhi Nadi. Garbha Angotpatti / Anga-Pratyangotpatti The great „Punarvasu Atreya' describes the manner in which the Garbha is formed in the uterus of mother and the mode of manifestation of its various body organs. Summing up the opinion God Dhanvantri explained that all the body parts develop simultaneously, the logic that being basic supporting structure or abode of various features (Oja, Mana, Atma, Buddhi etc.) the heart comes first is not correct Garbha Lingotpatti According to Ayurveda Garbha Lingam or sex is the contribution of Shukra Dhatu and Artava. It is the predominance of „Shukra' and „Artava' particularly at the time of „Shukra Artava Samyoga' (time of fertilization), which determines the sexuality according to Indian thoughts. Acharya Charaka and Sushruta both have recognized the 3 different types of sexes, viz., „Puman' (male), „Stri" (female) and 'Napumsak'. Predominance of Shukra: Lead to the formation of a male child

Predominance of Artava: Leads to the formation of female child Equality in strength of Shukra and Artava: Leads to the formation of a Napumsak.

Pumsavana Karma: Pumsavana Karma (measures which help procreating a male progeny)/ Vedic hymns recited on this occasion mention Puman or Putra and favour the birth of a son. However, Chakrapani, the commentator of Charaka Samhita, says that this procedure is adopted for achieving progeny of desired sex.

Garbha Varnotpatti

Ayurveda gives more stress to 'Panchamahabhutas' for the production of diversity, colour and complexion of the body as well as the cornea of eye. Mentioning the role of individual 'Mahabhuta' Acharya Sushruta has stated that the 'Tejo-Dhatu' is the source of all colours. Different complexions arise on the basis of association of other Mahabhutas with 'Teja'.

Garbhashaya-Antar Garbha-Stithi

The Garbha stays in Garbhashaya with all its body parts fully flexed, and facing towards the back of the mother. Charaka has mentioned the position of head as upwards. Sushruta mentioned position of head in downwards direction in Garbhashaya. Vriddha Vagbhata has added the Garbha lies inside the Garbhashaya facing the mother"s back, keeping both its hands on the forehead, with its body contracted, and if it is male it"s situation is more on right lateral side of the Kukshi; if female then on left lateral side and if a Napumsak then it remains centrally situated. Garbha Paratantrata Garbha is totally dependent on mother for

nutrition so it is said that Garbha is in Paratantra stage. Pachana kriya in Garbha (Digestive functions): After the Pachana Kriya, formed Rasa from the mother enters into Garbha through Garbha Nabhinadi. This Rasa gets metabolised by Garbha Kayagni present in Pakvashaya and utilized for Garbha Dhatu Pushti. Major Pachana Kriya is not necessary in Garbha as Rasa is available in Prasada Rupa. Mala Kriya in Garbha (Excretory functions): Sthulamala formation or excretory function does not take place in Garbha due to two reasons. Absence of Pakvashyagata Vayu. Receiving of Prasada-Rupa Rasa.

Rodanam in Garbha (Cry): Garbha does not cry inside the Garbhashaya, the reasons being. Covering of Mukha with the Jarayu (fetal membranes) Obstruction of Vayu Marga Garbha Prakriti: The Prakriti is defined as the aspect which is stable from birth to death and which is formed at the time of conception due to self-aggressiveness of Shukra and Shonita. This Prakriti consist of Vikararahita Doshas at the preliminary stage. This Prakriti is influenced by 4 factors when the Garbha is in the womb of mother. These factors are (1) Shukra Shonita Prakriti, (2) Kala Garbhashaya Prakriti (3) Maturahara Vihara Prakriti (4) Mahabhuta Vikara Prakriti

According to Modern Science

The science dealing with development of fetus is called Embryology. Embryology in its widest sense means the science of growth from one cell stage to the adult one. Embryology mainly concerned with the pre-natal life which can be generally further subdivided into period of ovum, embryonic period and foetal period. Total period of development is of nine months i.e., 38 weeks or 266 days. The first two month is important as the unborn baby. During embryonic period all the primitive organs and systems are formed and just begin to be recognizable as human. This developmental process is called as ‘general embryology’. It is the development of accessory structures like chorion, amnion, umbilical cord and placenta. Further development and functional maturation of various organs and systems which take place in foetal period is called as ‘systemic embryology’.

DISCUSSION

Science is the result of curiosity of human being through which human being has studied, analyzed and come to the results of various natural processes occurring in body. Today practically and scientifically the existence of everything has been proved. Ayurveda, being a part of this science also needs a deep study and research for proving all the facts established by Acharyas in ancient time. In Ayurvedic treatise, the matter related to the concept of Garbha Sharir is scientifically described. Specific Sthana of the Samhitas where the whole growth, embryology and genetics is recognized as “Sharir Sthana”. It has well recognised that the parental units taking parts in development of Garbha more precisely. The terms employed for these embryonic components and their stages of developments appear to be more appropriate and scientific, if viewed in the light of present advances. The references related to Garbha Sharir are scattered throughout the various Samhitha. Which are to be compiled together for complete knowledge of Garbha Sharir and for further use in various studies. Garbha Sharir helps us to understand why some children are born with organs that are abnormal. Appreciation of the factors responsible for mal-development assists us in preventing, or treating such abnormalities. Ayurvedic texts have very systemic description of various facts responsible for better progeny likeprescribed dietetic regimen for both partners, mode of life and unvitiated qualities of Shukra, healthy Yoni, healthy Garbhashaya and unvitiated Shonita for conception thus ultimately a better offspring. Marriage with disease free and Atulyagotriya women will avoid various hereditary disorders which may affect the child as in these conditions recessive gene become dominant thus increases the probability of congenital deformities.

Embryology is the study of development from the fertilized egg through eighth week. From fertilization through eighth week of development, a stage called the embryonic period, the developing human is called an embryo. Further development i. e. beyond eighth week is considered as foetal development. In Ayurveda related to Grabha “fertilization – foetal development – nutrition“ all these aspects explained in sharir-sthan of Sushrut Samhita. Garbha related chapter explained by Acharyasushruta, Charaka, and Vagbhata in various treatises. The following Aadhyayaare described: shukrashonitshudhhishariradhyaya, Grabhavkranthi,

Grabhavyakransharir, Mhatigrabhavkrantisharir the foetus), apara, function of apara, grabhanabhinadi etc. these concepts of grabha are elaborated by Sushruta. Chapter of conception, care of product of conception and pregnant women, Month wise treatment of pregnant women, care of child just after delivery, instruction to pregnant women, cutting of umbilical cord are described by Acharya Charaka thoroughly. Ayurveda gives importance to the quality of seed (beeja i.e. sperm and ovum) and concept of conception is compared with planting of tree as for proper growth of tree which needs healthy nourishment. "Garbha is union of shukra, shonit & aatma" after the union of these garbha started the vrudhi that is the masanumasikvrudhi which is from prathma mas to navam mas. In this duration of nine months, garbha require the essential nutrition that is as called the poshan. In sharir sthana, Acharya Sushruta described the poshan of garbha. According to Ayurveda Maternal food with nutrients enters in maternal rasvahininadya through the nabhi nadi of garbha. It circulates blood in garbhasharir and sarvashariravayav. This nutrient part provides through Tiryak gat and Rasvaha dhamnya to all over body of garbhait causes Angpratyang poshan. Acharya Charaka has mentioned Matrupatantrata that is maternal food (nutritional part) absorbed by foetus and foetus get nourished by Upsnehannyaya. Kedarkulyanyaya also explained in Ayurveda for the garbhaposhan. According to modern science nutrients, oxygen and antibodies are provided to the foetus from the maternal circulation. As per modern science, foetus is union of human egg and sperm that is called as the fertilization. This fertilized ovum gets implanted in the endometrium with formation of germ layer of foetal development. In modern science two stages are described in foetal nourishment before placenta formation and after placenta formation. Embryo gets nourished with uterine secretion and yolk sac. After placenta formation get nourished through the circulation from placenta to foetus–foetal circulation. Circulatory system of mother is not directly connected to that foetus, so the placenta function as the respiratory centre for the foetus as well as site of filtration for the plasma nutrients and waste through the umbilical cord which containTwo umbilical arteries and one umbilical vein. Arteries are return deoxygenated blood, foetal waste, CO2 to placenta. Oxygenated blood and nutrients provide foetus by umbilical vein. Circulation after birth changes occurs in 1) Pulmonary circulation –lungs functional and. 2) Systemic circulation –placenta removed. Three shunts present in foetal life 1) Ductus-venosus-connect the umbilical vein to the inferior vena cava. 2) Ductus-arteriosus-connect the main pulmonary artery to the aorta. 3) Foramen ovale -anatomical opening between the right and left atrium. Development of healthy foetus and to prevent the nutritive anomalies of the foetus, Acharya mentioned Garbhini Aharparichrya and also importance of Garbhini Aharrasa in Ayurveda in terms of masanumasik ahar. If we compare the concept of grabhaposhan and foetal nourishment explained in Ayurveda and modern science, similarity related to dependency found. Foetus get nourished with maternal blood through placenta same as that of grabha acquires "Poshan' through Matru- ahar – ras. Maternal heart is connected to foetus via channels. Here in Ayurveda channels are mentioned as Rasvahinidhamnya.

CONCLUSION

The idea of embryology given in *Ayurvedic Garbhasharir* is founded on *Ayurveda's* philosophical and fundamental principles. Righteous and unjust deeds are given the most priority for the appearance of qualities in an individual. The majority of the genesis principles discussed in *Ayurveda* should be understood in light of modern genetic theory. Righteous and unrighteous behaviors can be considered the precursors of genetic code in the individual, whereas food and lifestyle changes recommended to parents can be compared to epigenetics. The notions of embryology in Ayurveda for individual genesis are founded only on its fundamentals, namely *Tridosha*, *Triguna*, and *Pancha-Mahabhoota*. The analytical assessment of *Garbhasharir's* literature reveals two sorts of processes associated to offspring genesis: independent and dependent. *Ayurveda* believes in a unique idea of the soul, which is responsible for the existence of life. As a result, understanding the embryology principles articulated by *Ayurveda* centuries ago necessitates a thorough comprehension of the concepts that remain relevant in today's modern world.

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