

**CONTRIBUTION OF AYURVEDA TO THE MODERN EMBRYOLOGY**

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ABSTRACT

Sages of ancient India are still relevant as they not only gave the vision of happy social and personal life, but also discovered many scientific facts and truth about human anatomy. Our *Acharya* have separately explained the anatomical aspects of the body and one section of the *Samhita* has been devoted exclusively for this, which is known as the *Sharira sthana*. *Acharya* have not only mentioned the anatomical

locations of various body structures but also given the detailed description right from development of various organs, intrauterine life of foetus, month wise development of foetus, nutrition of foetus etc. In this topic we will discuss specifically about the facts of modern human embryology which are already described in very scientific manner by the seers of *Ayurveda*.

KEYWORDS: Anatomy, *Ayurveda*, *Samhita*, *Sharira sthana*.

INTRODUCTION

Sages of ancient India are still relevant as they not only gave the vision of happy social and personal life, with great sense of ecological balance but they also discovered many scientific facts and truth about human anatomy. Such discoveries formed the basis of many sciences of present era.

Our *Acharya* have separately explained the anatomical aspects of the body and one section of the *Samhita* has been devoted exclusively for this, which is known as the *Sharira sthana*

(section related to the study of human body). In this section *Acharya Sushruta* planned to first deal with *Srishti utpatti krama*, Embryology and then Anatomy of the human body. Here they have given detail description about development of various organs, position of *Garbhashaya* (uterus), intrauterine life of foetus, month wise development of foetus, nutrition of foetus, maternal health etc. They have so keenly mentioned that the sperm and ovum combines together to form embryo in the *Garbhashaya* (Uterus).

AIMS AND OBJECTIVE

1. To explore and analyze the text books of *Ayurveda* to find the fundamentals of human embryology and its relevance in modern era.

MATERIALS AND METHODS

References related to proposed title are collected from classical texts of *Ayurveda* especially *Brihatrayi*. Various publications, internet, books related to the modern embryology, research papers and proceedings of seminars related to the topic are collected and their critical analysis and evaluation is done.

Review of Ayurvedic literature

Here some basic concepts are collected to show that the scientific knowledge of human embryology was very well known to ancient seers. These are following-

Description of *Garbhashaya*

The *Yoni* is like the inner portion of a conch shell and has three *Avarta* (circular folds); among this *Garbhashaya* (uterus) lies in the third *Avarta*.^[1] The shape and appearance of the uterus is similar to that of the mouth of a *Rohita* fish.^[2]

Position of *Garbhashaya*

In females, the uterus is situated beside the *Basti*.^[3] Uterus is situated between the *Pittashaya* and the *Pakvashaya* where the foetus lies.^[4]

Position of *Garbha* in *Garbhasaya* (Foetus in uterus)

According to *Sushruta* - *Garbha* lies in the uterus of women, in universal flexion and face forward; at the time of delivery the head of the foetus naturally comes towards *Yoni* (According to Prof. K. R. Srikantha Murthy).^[5] Foetus lies in woman's uterus in state of universal flexion facing towards mother's back; at the time of delivery, its head naturally comes towards *Yoni* (According to P. V. Sharma).

According to *Charaka* - The foetus lies in the uterus with its face towards the back of the mother, head superiorly and limbs folded.^[6]

***Garbha poshana* (Nutrition of foetus)**

The *Nabhinadi* is attached to the *Rasavaha nadi* of the mother and this carries *Ahararasa-viryā* (nutrition) from the mother to foetus. The foetus grows by this indirect supply of nutrition.

From the time of conception until the different parts of the body and their sub divisions will manifest, foetus gets nutrition from the obliquely running *Rasavaha dhamani* which course through all parts of body and imparts life of the foetus.^[7] The course of *Nabhi nadi* is that it is attached with *Garbha nabhi* in one end and other end attached with *Apara* (placenta) and in turn *Apara* is annexed with *Matruhrudaya*.^[8]

***Garbha Samagri* (Essential components for healthy progeny)**

Just as germination occurs by the concurrence of four things - *Ritu* (season), *Kshetra* (field), *Ambu* (water) and *Beeja* (seed), conception would definitely take place in the presence of four comparable requirements.^[9]

***Yamala garbha* (Concept of twin pregnancy)**

When the *Vata* divides the seed (zygote) into two parts and they receives two *Jeeva (Atma)* forms two foetus; these known as *Yamala* (twins) which is due to actions other than *Dharma*.^[10]

***Vikruta garbha* (Concept of teratology)**

Foetus resembling snake, scorpion, pumpkin and such abnormal shapes are due to the woman only, due to *Paap karma* (sin).^[11]

DISCUSSION

***Garbhashaya* (Uterus)**

पित्तपक्वाशययोर्मध्ये गर्भशय्या.....

It denotes the position of gravid uterus in pregnancy.

Sushruta has explained that the shape of *Yoni* looks like '*Shankha nabhi*' (hollow segment of conch shell). It contains three '*Avarta*' (loops or compartments). The location of

'*Garbhashaya*' is in third '*Avarta*'. According to this description, *Yoni* suggests the birth canal path. '*Avarta*' of *Yoni* remind of various parts of it. Modern science explains analogous descriptions with *Ayurveda* but with more details.

The uterus is a hollow pyriform muscular organ situated in the pelvis between the bladder in front and the rectum behind.^[12] The cervix is spindle shaped, bounded above by the internal os and below by external os. The external os is circular in a nulliparous woman, but gets split during delivery, resulting in the formation of anterior and posterior lips.^[13] This appearance of external os is somewhat similar to *Rohita matsya mukha* which is described in classics.



Figure No 1: (A) Cervix of multiparous woman (B) Mouth of *Rohita* fish.

Garbha samagri

In *Ayurveda* it is said that there are four essential components i.e. *Beeja*, *Kshetra*, *Ritu* and *Ambu* for the conception. *Beeja* is that substance which is responsible for reproduction. It indicates both *Shukra* and *Artava* in male and female respectively. Here *Ambu* is the *Ahara Rasa* which nourishes the *Garbha*. *Kshetra* refers to *Garbhasaya* and *Ritu* denotes *Kala* which indicates the fertile period of women (menarche to menopause), which denotes the phase of ovulation.

Modern science also denotes that if there is fusion of healthy sperm and healthy ovum in healthy uterus at appropriate time with proper nutrition, there will be healthy progeny.

***Grabha poshana* (Nutrition of foetus)**

In context of *Garbha poshana*, *acharya* has mentioned that *Nabhi nadi* is attached to *Rasavaha nadi* of mother and this carries nutrition from mother to foetus. *Nabhi nadi* is that which is attached with *Garbha nabhi* on one end and other end attached with *Apara* (placenta).

The same thing is described in modern science. The umbilical cord is a conduit between the developing foetus and placenta. The placenta provides all the oxygen, water and nutrient, the foetus needs to grow in the uterus, and transmits foetal waste and carbon dioxide from the baby to the mother's system for excretion. The placenta is attached to the foetus through the umbilical cord.^[14]

All these information shows that *Acharya* were well acquainted about the process of nutrition of foetus. They knew that there is any connecting structure between mother and foetus which carries nutrition from mother to foetus.

Garbha in Garbhashaya (Foetus in uterus)

The relation of the different body parts of the foetus to one another is called attitude of the foetus. The universal attitude is that of flexion.^[15] *Acharya* has mentioned universal flexion in classics very earlier.

In obstetrics, position is the orientation of the foetus in the womb, identified by the location of the presenting part of the foetus relative to the pelvis of the mother. The foetus assumes various positions and postures during the whole time period of pregnancy but before parturition the head of foetus is engaged usually into the pelvic brim. The same position is mentioned by *Sushruta* in classics. He also said that at the time of delivery the head of the foetus naturally comes towards vagina but *Charaka* mentioned the position of head directed superiorly. It shows that *Charaka* noticed this position when the foetus head was not engaged and the foetus was still floating in womb. It means *Sushruta* described the position of late pregnancy and *Charaka* described it of early phase of pregnancy.

All this shows that *Acharyas* were known about the different position of foetus in uterus during different period of pregnancy.

Whatever the reason is described in the classics for *Yamala garbha*, but it shows that our *Acharya* knew the concept of twin or multiple pregnancy. They also described about *Vikrut garbha* which shows that the concept of teratology was described in ancient time also.

CONCLUSION

With advancement of time, science is expanding its wings in every field but the basic principles remain always unchanged. All these shows that our *Acharya* were well known about the concept of developmental embryology which is mentioned in *Ayurveda* as *Garbha*

Sharira. So we can say that the knowledge generally found in modern medical literature is nothing but the amendment of *Ayurvedic* literature.

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