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Clinical aspect of *vayu* as “*karta garbhakrutinam*” w. s. r. to morphogenetic field

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ABSTRACT:

In *Ayurvedic* embryology, various interesting concepts of conception, formation of zygote and foetus and various different organs and system formation are explained. Among that concept of cell division and differentiation in conscious foetus (*Chetanayukt Garbha*) is mentioned. The role of *Panchmahabhutas* and *Tridoshas* in the formation and development of *Garbha* is mentioned. Among them most important is “*Vayu*” which is responsible for cell division. *Vayu* is vital force which divides zygote into different limb buds and organs. Thus main function of “*Vata*” is incomprehensible like formation of foetal shape. But perturbations in “*Vata*” is responsible for formation of various congenital anomalies i.e *Garbhavikruti*.

In modern concepts of developmental biology, important area is “Morphogenetic field”. It was first introduced in 1910 by Alexander G. Gurwitsch. He analyzed the embryonic

development of the sea urchin as a vector field, As it is the proliferation of cells into organs were brought about by putative external forces. It is the set of process that generates shape and form in the embryo. Morphogenetic movement is caused by large scale and dynamic movement of embryonic cell which is under control of *Vata*. Failures in any step of process can lead to birth defects.

Ancient Acharyas have mentioned various measures under *Garbhini Paricharya* for pregnant women from first day of conception till parturition. It restores the *Vayu* to its normal course and condition. Thus it helps the morphogenetic movement occur without any failure to have healthy foetus and progeny. Thus prevalence of congenital anomalies can be reduced by understanding *Vayu* as *Garbhakrutinam*, Morphogenetic field and following *Garbhini paricharya*.

Key Words: *Vata*, *Garbha*, Morphogenetic field, *Garbhini Paricharya*.

INTRODUCTION:

Healthy children builds healthy nations. India is home to the largest child population in the world. A substantial 41 percent, i.e around 450 milion ,are children.The development of the country depends upon the number of healthy children in that country .Most developed countries have large number of healthy children. Therefore it is important to prevent births with congenital anomalies. Because congenital anomalies are a major cause of still births and neonatal mortality in India. More of the birth defects can be prevented by following healthy regimen during pregnancy. Pregnancy is a challenging time of life as the mothers body goes through numerous changes in order to create and support the development of a new life. *Ayurveda* has considered various factors which may be hazardous or even fatal for the fetus, including dietetics and mode of life of pregnant woman.

This article is about the role of *Vata* in embryogenesis according to *Ayurveda*, what is morphogenetic field, and how congenital anomalies occurred and their prevention by following *Ayurvedic* measures during pregnancy (*Garbhini Paricharya*) to control *Vata*.

AIMS AND OBJECTIVES:

1. To study the concept of morphogenesis w.s.r to *Ayurvedic* embryogenesis.

2. To study the role of *Vata* and morphogenetic field in embryogenesis

MATERIALS:

Classical literature of *Ayurveda* as well as modern medical science related to the subjects from the library of the B.M.A.M, Nagpur and B.M.A.C, Butibori, Nagpur. The data from the internet also used. The data obtained were critically analysed and presented.

METHODS:

This was purely a literary study where in the explored literature was analysed and interpreted.

DISCUSSION:

Garbha (Embryo) - The combined *Shukra* (semen) and *Shonita* (ovum) in the womb, mixed with the *Prakriti* (the eight categories) and the sixteen modifications known as *Vikara* and ridden in by the *Atma* (self-consciousness) is called the *Garbha* (foetus).^[1] Charaka has described *Garbha* as combination of three factors i.e. *Artava* (ovum), *Shukra* (sperm) and *Jiva* (*Atma*).^[2]

Ayurvedic concepts of human embryology - In *Ayurvedic* embryology, various interesting concepts of conception, formation of zygote and foetus and various different organs and system formation are explained, among that concept of cell division and differentiation in conscious foetus (*Chetana Garbha*) is mentioned. The functions of *Panchmahabhutas* and *Tridosha* in the formation and development of embryo are also described in various texts.

Garbhognishad mentions that *Prithvi* is responsible for *Dharana* (maintenance), *Jala* for *Prakashana* (manifestation), *Vayu* for *Vyuhana* (division) and *Akasha* for *Avakasha* (vacuum).^[3]

Sushruta has also given description of functions of *Mahabhutas* in fetal development with few differences from *Garbhognishad*. *Dalhana* has explained the views of *Sushruta*.

1) *Vayu* is responsible for *Vibhajana* (divisions) of *Dosha*, *Dhatu*, *Mala* and body parts.

2) *Teja* by its function of *Pachan* (metabolism) provides general shape of human structure.^[4] *Sushruta* have explained important role of *vayu* element in the formation of foetus by penetrating all *srotas*(channels)^[5]

Charak gave much importance to *Vayu*. Unvitiated *Vayu* holds up the systems and organs. *Vayu* is all powerful, producer and indestructible, causes negation of the positive factors in creatures and brings about happiness and misery, taking all sort of forms, penetrates into all, executes all the systems, *Vayu* shapes the foetus and maintains lifespan.^[6]

Morphogenetic Field: In the developmental biology of the early twentieth century, a Morphogenetic Field is described as a group of cells able to respond to discrete, localized biochemical signals leading to the development of specific morphological structures or organs. As a group, the cells within a given morphogenetic field are constrained, thus cells in a limb field will become a limb tissue, cells this in a cardiac field will become heart tissue. The concept of Morphogenetic Field, in developmental biology, was first introduced in 1910 by *Alexander G.*

Gurwitsh. He analysed the embryonic development of the sea urchin as a vector field, Proliferation of cells into organs were brought about by putative external force.^[7] Morphogenetic movement is caused by large scale and dynamic movement of embryonic cells. The first Morphogenetic Movement triggered is gastrulation, which forms the future digestive tract. It rearranges the distribution of embryonic cells, thereby allowing the interaction between germ layers that previously existed separately.^[8] Morphological structure an important feature of such fields is that they have sharp spatial boundaries across which lie cells whose progeny will express different fates. Some regulatory process helps the spatial subdivision of morphogenetic region in later embryogenesis.^[9] This morphogenetic field have definite correlation with *Vata* function in foetus. Moreover it can be concluded that this *Vata* through morphogenetic field may act upon embryo to give normal shape to the foetus.

***Garbhini Paricharya* :(Antenatal Care)**

The nine monthly regimen is broadly discussed in *Ayurveda*. *Ayurvedic* texts have considered various factors which may be hazardous or even fatal for the fetus, including dietetics and mode of life of pregnant woman from the first day of conception till parturition. Pregnant women should always cherish a clear, joyful spirit in a clean body. The fetus is wholly dependent on mother, therefore, her diet and other activities may affect the growing fetus during pregnancy. If the woman during her menstrual period doesn't follow the rules, the vitiating

Doshas reaching the fetus may produce various abnormalities.^[10]

Charak have mentioned the factors which damage the fetus such as all food articles which are very heavy, hot and irritant as well as severe activities. The elders also advise like this, she should not wear red cloths in order to prevent the attacks of demons and their followers. She should abstain completely from the things which are unfavorable to all the sense organs. otherwise *Vayu* gets vitiated and moving inside the body causes destruction or deformity in the ensuing foetus.^[11] By keeping this fact in mind, the woman desirous of having an ideal offspring should discard harmful diets and activities.

Sushruta have mentioned the concept of *Asthapana* (enema) composed of a decoction of various drugs for the purpose of restoring the *Vayu* of her body to the normal course and condition and for the cleansing of the bowels. After that *Garbhini* (pregnant lady) should have an *Anuvasana* (enema) made up of oil prepared with milk and decoction of the drugs known as the 'Madhuradi Gana'. This restores the *Vayu* to its normal course and condition which brings on an easy and natural parturition unaffected with any puerperal disorders.^[12]

CONGENITAL ANOMALIES:

When *Vayu* is vitiated in the body, it afflicts foetus with various disorders and deforms or detains the embryo for long.^[13] When pregnant woman uses aggravating factors the *Vayu* gets vitiated and moving inside the body causes destruction or deformity in the ensuing foetus. When vitiated *Doshas*, in course of spreading reach the ovum and uterus but do not affect them entirely, she

conceives but the foetus gets damaged in one or more maternally derived organs, that part is affected with morbidity in the gene wholly or partially of which the *Doshas* are vitiated.^[14]

According to modern biology, errors in various aspects of the establishment and interpretation of morphogenetics fields result in failures to maintain systems level properties of anatomical shape, manifesting as birth defects, cancer, aging and failure to regenerate after injury.^[15]

The neural tube, the embryonic precursor of the vertebrae, brain and spinal cord is generated by a complex and highly dynamic morphological process. Failures in any step of this process can lead to neural tube defects a common class of birth defects that occur in approximately 1 in 1000 live births.^[16]

CONCLUSION:

Ayurvedic embryology is an interesting branch from ancient time, Ancient *Acharyas* have explained the concepts of conception, formation of zygote and foetus, the inheritance of various qualities formation of different organs and systems and monthly development of foetus. In all these process *Vayu* plays vital role, most essential part of the system. Main function of *Vayu* is incomprehensible like formation of proper foetal shape by cell division and cell differentiation and manifestation of body parts and organs. Hence *Vayu* can be called as 'vital force'. Vitiating '*Vayu*' moving inside the body causes destruction or deformity in the ensuing foetus.

In modern developmental biology, concept of morphogenetic field is very important. Morphogenetic field can be

defined as the sum, Integration of chemical, pressure, tension signals of all non-local patterning signals. This allows the initial development of complex form from a single fertilized egg cell.^[17] Errors in this signals causes foetal deformity.

Vayu can be compared to morphogenetic field as both have some property of powerful signals. The nature of things depends on morphic fields. This theory of the biologists Rupert Sheldrake suggests that each type of living system has its own type of field. These fields inform and shape different types of atoms, molecules, crystals, living organisms, modes of thought etc.^[18]

Ayurveda believes that a man is made up of *Sharir* which in turn is made up of *Mahabhutas* and basic building blocks of a living being. Human beings are sub atomic particles, atoms and molecules which have been labeled by *Charaka* as *Dashparamanu* or materials which constitute the smallest units of the human body i. e. cell.^[19]

A morphogenetic field is a region of an embryo that forms a discrete structure, such as a limb or heart. This field offers important lessons about the nature of development and genetic determination. A morphogenetic field has the property of self-organization, forming the best possible whole from available cells.^[20]

The growth and development of an individual has been told by *Ancient Acharyas* by knowing the rule of *Tridoshas*.

The entire biological development, cannot explain how do embryos generate a perfect tissue and body pattern time after time. *Ayurveda* principles made this concept of development and congenital anomalies simple to understand and

suggested (*Garbhini Paricharya*) antenatal care. It is necessary to study the clinical aspects of this principles in correlation with modern developmental biology. In these article, sincere attempt is made to study this topic, as *Ayurvedic* principles are eternal.

Because more than 7000 kinds of birth defects are known to occur. The cause of birth defects remains largely a mystery. In many regions birth defects are the largest single causes of infant deaths. The majority of birth defects are considered the result of multiple environmental and /or genetic causes occurring together.^[21]

So in this article sincere attempt was made to study the said topic for the benefit of society to build healthy children thus healthy nation.

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