Critical Comparative Study of Month wise Intrauterine Foetal Development As Per Ayurvedic And Jyotish Science W.S.R.To Modern Embryogenesis

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ABSTRACT

The Jyotish science is complimentary to the Ayurvedic medical science. The principles of Jyotish science have been in applied in Ayurvedic science at various places. The month wise description of intrauterine embryonic and foetal development is mentioned in both ancient Ayurvedic and Jyotish science. Modern medical science had made enormous progress in understanding the process of embryogenesis and organogenesis in intrauterine life with modern technical advances. The 5th and 6th month description of foetal development is more precise in Jyotish science than Ayurvedic science. The 1st to 2nd month description of embryonic development is more precise in modern medical science. Hence, there is a need to study the month wise intrauterine foetal development as per Ayurvedic and Jyotish science in the light of modern medical embryogenesis. The critical comparison of Ayurvedic and Jyotish science, shows marked similarities between the description of monthly embryonic and foetal development. The extra description mentioned in Jyotish science related monthly foetal development should be incorporated in Ayurvedic science. The description of monthly embryonic and foetal development in Ayurvedic and Jyotish science, can fairly be correlated with modern description of embryogenesis and foetal organogenesis and proper blending of ancient knowledge with modern knowledge could be done.

KEYWORDS – Embryogenesis, Foetal development

INTRODUCTION

The Jyotish science is complimentary to the Ayurvedic medical science. The
principles of Jyotish science have been in applied in Ayurvedic science at various places with reference to collection and storage of drugs, administration of therapy, surgical intervention and prognostic evaluation. The month wise description of intrauterine embryonic and foetal development is mentioned in both ancient Ayurvedic and Jyotish science. Modern medical science had made enormous progress in understanding the process of embryogenesis and organogenesis in intrauterine life with modern technical advances. The basic concept of fusion of male and female gametocyte to form zygote and zygotic division leading to formation of embryo is common in all the three sciences. However, the 5th and 6th month description of foetal development is more precise in Jyotish science than Ayurvedic science. The 1st to 2nd month description of embryonic development is more precise in modern medical science. Hence, there is a need to study the month wise intrauterine foetal development as per Ayurvedic and Jyotish Science in the light of modern medical embryogenesis. Acharya Sushruta, had given the guideline in sutrasthana of his treatise to nurture and advance the science and study it from all angles. In accordance to the guidelines given by acharya, the additional description of foetal development from Jyotish science and modern medical science can be incorporated in Ayurvedic science.

MATERIAL & METHOD
Literary method of research was adopted in the present study. Critical and comparative study of Ayurvedic literature, jyotish science literature and modern medical science literature was done to come to logical conclusion.

REVIEW OF AYURVEDIC LITERATURE
Cell Division As The Cause of Embryonic Development
- प्राण: तु बीजवालु हि विभजति...नर्मस्य सर्वं अंग अवयवं। (का.सं.शा. -असमानगोङीय अध्याय)
- स्वाधीन उपभगु युक्तो वायुः स्त्रोतात्सि प्रजायते । अनुप्रविष्ट विभिन्तं पेशी: किभजते तथा ।।...जिराम आनुयात च। ....करोति आशय संवमः ।। (सू.शा. 4/28–30)
- सर्वं एव अवयवः परमाणू भेदेन अति सौङ्ख्यालु असङ्ख्यायं यान्ति ।। तेषां संयोगो विभागे परमाणूः करम्प्रप्रेतिर्मो वायुः कारणम् ।। (अ.सं.शा. 5/95–96)
- कर्म च उदिता वायु वशताः संयुक्तः परमाणूः कार्यद्रवयम् आरम्भते दि अनुक्ष आदि कर्मणः। (ईंदु–अ.सं.शा. 5/96)
- ते च परमाणूः प्रतिष्ठान सजातीय विजातीय संयोग विभागमया शारीरभावन वर्तते । यो वा बाल आसीतं स एव सूक्त्वं प्रतिपन्न इति एकस्य नानात्म योगात् ।। ईंदु–अ.सं.शा. 5/95
(प्राणः =vital force, बीजवालु हि = divides the zygot, उपभगु युक्तो वायुः = Vata accompanied with the heat, अनुप्रविष्ट विभिन्तं = enters the muscular mass पेशी: विभजते = divides the cells, स्त्रोतात्सि प्रजायते =creates the systems by tearing करोति आशय = give rise to different organs, सर्वं अंग अवयवं =cell, एकस्य नानात्म योगात् = divide into number of cells, दि अनुक्ष आदि कर्मणः =mitotic cell division)
As per Acharya Kashyapa, the vital force divides the zygot during embryogenesis. [K.S.]

As per Acharya Sushruta, the Vata accompanied with the heat enters the muscular mass and divides the cells, creates the systems by tearing apart the muscles, also give rise to different organs, blood vessels and hollow organs like heart by dialting property (vyas guna). [S.Sha. 4/28-30]

As per Acharya Vagbhata and Indukara, The smallest part of the body organ is 'Parmanu' (cell). Its division and union is done by the Vata aimed for that specialized work. The one parmanu (cell) divide into number of cells by mitotic cell division (Ekasya Nanatwa yogat Dwi Anuk adi kramena) from infancy to youthness. [A.S.Sha. 5/95-96 & Indu- Shashilekha]

OBSERVATIONS

1] First Month :
Ayurveda Shastra :

- तत्र प्रथमं मासिः कलं जाते ॥ सु. शा. 3/18
- अव्यक्तः प्रथमं मासिः सप्ताहां शाली बहेतु। पुस्तवनां पूर्वः यथा-प्रयोजयेत् ॥ अ.ं.शा. 1/37
- सप्ताहां आदृः गर्भगोलकः शष्कितिपितृत्वो गहेतु। सप्ताहानन्तरं व्यक्तिकृति कलाल गहेतु। अरुणदत्त

As per Ayurvedic science, in the first month of pregnancy, the intrauterine embryo is in the form of 'Kalala' i.e. like bubble. [S.Sha. 3/18]. As per acharya Vagbhata, initially it is formless. After a week's time it becomes bubble like. [A.H. Sha. 1/37]. Acharya Arundutta, is of the view that initially embryo is like thick round sputum. After a week, it becomes bubble like i.e increases in size. This appears to be very scientific as initial zygotic division is without the increase in size and after a week it increases in size to go into various stages of embryonic development.

Jyotish Shastra :

- कलालं धनं अंकुरं अस्ति चर्म अग्नि चतुरंतः ॥ सितं कुजं जीवं सूर्यं चन्द्र अर्कं बुधं ॥
- उदयचन्द्रं सूर्यनाथं कर्मशं गदिता ॥
- भविष्यं शुभायुं च मानसाधिपतं सदृशं ॥
- बृहत्जातकं 4/16

- कलालं धनं अवयवं अस्तिः तक्कं सोम स्मृद्धं भवं कर्मशं ॥ माशूपुरु शुकु कुजं जीवं सूर्यं चन्द्र अर्कं सीम्यानाम ॥
- अशानोधिग्रामस्वयं परस्तो लघानेश चन्द्रसूर्याणाम ॥ लघुजातकं 5/7

Bhottapal Tikha – आधे तु मासों कलं
Bhottapal Tikha – गर्भस्य प्रथमी मासिः कलं भविः।

As per jyotish science also, in the first month of pregnancy, the intrauterine embryo is in the form of ‘Kalala’ i.e. like
As per the modern science, in first month embryonic developments takes place as follows: 
During 1st week, Zygote undergoes cell division producing cluster of cells of same size but no significant growth. This stage is called as cleavage which converts into morula and blastocyt stage. The 4 cell divisions leads to dense ball of 16 cells which is termed as morula. The 7 cleavage / cell division leads to the formation of dense ball of 128 cells which is termed as blastula. After this, rotational arrangement of blastomeres leads to the formation of blastocyt .
During 2nd week, blastocyte undergoes trophoblaste stage with implantation in uterine wall and with outer cell layer (tropoectoderm) and inner cell mass (endoblast). Fluid collects between outer and inner mass and the morula is converted into vesicle called as the blastodermic vesicle. Thus embryo becomes bilaminar. The cells of trophoblast do not contribute in the formation of embryo proper but they contribute in formation of ectoderm of chorion and placenta.
During 3rd week, blastoderm becomes trilaminar with 3 layers. This stage characterizes with notochord, gastrulation, somitogenesis and neurogenesis. Somitogenesis begins with the formation of somitomeres (whorls of the concentric mesoderm) from which future somites (primitive segments) are produced. These tissue blocks, differentiates into skeletal muscle, vertebrae and dermis of all vertebrae. During gastrulation, cells migrate to the interior of the blastula producing 3 distinct germ layers as outer ectoderm, middle mesoderm and inner endoderm. Each of the layer give rise to certain tissues of the body. Neural fold, head fold and cardiac primordium also starts growing.
During 4th week, heart, pharyngeal arches starts developing
2] Second Month :
Ayurveda Shastra :

- द्वितौधे शीतोष्णानन्दः अभिभ्रमणानां महाभूतानां संधानो घनः संजायते । चु. शा. 3/18
- द्वितौधे मासिक कलात्तूँ घनः पेशी अथवा अबूंद पुंगाक्लीवा कमात तेसः । अ.ह. शा. 1/49
- गर्भरथ्य हदवः मात्रः तो हदयेन तत् समवदं तेन गर्भिण्या नेत्रेः श्रद्धाविस्माननम् । अ.ह.शा. 1/52

As per Ayurvedic science, in the second month, as the Vata brings the absorption of Kapha and Pitta, the embryo becomes ‘Ghana’ i.e. solid. Acharyas are further of the view that if this solid structure is oval then offspring will be male and if this solid structure is elongated like muscle then offspring will be female and if this solid structure is like tumour then offspring will be eunuch. [S.Sha. 3/18]. Acharya Vagbhata is of the view that in this month mother’s heart gets connected with foetal heart through placenta and mother develops desire for eating various things. This state is called as ‘Dwi Hrut’ awastha in ayurveda.

Jyotish Shastra :

- कलाल घनं अंकूरं अस्थि चर्म अगज चेतनता । शित कुज जीव सूर्य चंद्र अर्किण कुवा । परतः ।
- उदयचंद्र सूर्यानाथं कमशः गदिता । भवनि शुभाशुधुं च मासाधिपते सद्भुतां ।
- बृहत्तात्तक 4/16
As per the modern science, in second month embryonic developments take place as follows:

During 5th week, rudiments of liver, gut starts developing, leg buds, nasal plate and hand plate start growing.

During 6th week early face starts developing. Auricular and foot plate start growing. Finger start raying.

During 7th week, head and limb starts developing. Ossification commences, Straightening of trunk occur.

8th week marks the last stage of embryonic development. Upper limbs become longer and bent at elbow. Hands and feet turn inward. Eyelids and external ear starts appearing. Head becomes round. After this stage embryo is called as foetus.

3] Third Month :
Ayurveda Shastra :
- As per Ayurvedic science, in the third month embryonic development takes place as follows:
  - During 5th week, organs start sprouting. This phase is ruled by the planet Jupiter (Guru). [B.Ja. 4/16].
  - As per modern science, from 3rd month onwards, embryo is called as foetus with all body parts which start growing simultaneously.

4] Fourth Month :
Ayurveda Shastra :
- As per Ayurvedic science, in the third month, hands, legs and head becomes prominent and all rudimentary minute organ becomes expressed. [S.Sha. 3/18]
  - As per modern science, also up to 2 months there is embryonic stage. After which foetal stage starts from the 3rd month. At the completion of embryogenesis, all body parts are fully expressed.
As per Ayurvedic science, in the fourth month, body parts become more prominent. Foetal heart sounds become evident as the Chetana dhatu (vital living force) becomes active and the seat of Chetana is heart. At this stage mother develops desire for various things which should be fulfilled. If these desires are not fulfilled then congenital anomalies results in the form of lame, dwarf, blind, hunched and mentally retarded child. [S.Sha. 3/18].

As per acharya Vagbhata, foetal parts are felt at this stage as they are expressed.

**Jyotish Shastra :**

- कलां घन अन्तर्ग मृत्यू चर्म अग्र चेतनाः | सित कुज जीव सूर्य चंद्र अर्क बुधः परतः ||
  उदयचंद्र सूर्यान्तर कमः गदिताः |
  भविष्य शुधाशुम च मासाधिपते: सदृश्याः ||
  
  बृहतज्ञातं 4/16
- कलां घन अवयव अभिय तवं दोम स्मृत भवः कमः | मासेषु शुकु कुज जीव सूर्य चंद्र अर्क सूम्यान्तः |
  अशोभेण्डग्रासवः परतः लग्नेश चन्द्रसूर्यान्तः | लघुज्ञातं 5/7

**भविष्य टिका — मर्जान्तविखणां अधि पंचमसे तु |**

**भविष्य टिका — पंचमे चर्मसंमय: चंद्र अधिपति: |**

As per jyotish science, in the fifth month of pregnancy the skin starts becoming prominent. This phase is ruled by the planet Moon (Chandra). [B.Ja. 4/16] As per acharya Bhatotpala, in the fifth month, the bone marrow, nervous mass (majja), intestine (antra), skin (charma) grows.

6] Sixth Month :

**Ayurveda Shastra :**

- पंचमे मन: प्रतिभूततरं भवति | शु. शा. 3/30
- चेतनाः च पंचमे | अ.ह.शा. 1/57

As per Ayurvedic science, in the fifth month, mind and heart becomes active. [S.Sha. 3/30 and A.H. Sha. 1/57]

**Jyotish Shastra :**

- कलां घन अन्तर्ग अभिय चर्म अग्र चेतनाः | सित कुज जीव सूर्य चंद्र अर्क बुधः परतः ||
  उदयचंद्र सूर्यान्तर कमः गदिताः |
  भविष्य शुधाशुम च मासाधिपते: सदृश्याः ||
  
  बृहतज्ञातं 4/16
As per jyotish science, in the sixth month of pregnancy, various body parts start becoming prominent. This phase is ruled by the planet Saturn (Shani). [B.Ja. 4/16]

As per acharya Bhatotpala, in this month, hairs, nails and liver grows.

7] Seventh Month :
Ayurveda Shastra :
- As per Ayurvedic science, in the seventh month, the differentiation of all the body parts takes place and are fully formed in its entirety. [S.Sh. 3/30 & A.H.Sh. 1/58]

Jyotish Shastra :
- As per jyotish science, in the seventh month of pregnancy, foetus starts moving (chetanta). This phase is ruled by the planet Mercury (Budha). [B.Ja. 4/16]

8] Eighth Month :
Ayurveda Shastra :
- As per Ayurvedic science, in the eighth month, the Oja is unstable, hence if the baby is delivered in this month, does not survive. After the eighth month the baby may get delivered in 9th, 10th, 11th or 12th month. [S.Sh. 3/30]

Jyotish Shastra :
- As per jyotish science, in the eighth month of pregnancy, foetus senses the taste from the maternal nutrition. This phase is ruled by the planet of Aadhan Lagna. [B.Ja. 4/16]

9] Ninth Month :
Ayurveda Shastra :
As per Ayurvedic science, foetus gets delivered in the ninth month of pregnancy, foetus gets delivered. This phase is ruled by the planet Sun (Suryra). [B.Ja. 4/16]

**DISCUSSION:**

Both science holds the same view as far as intrauterine foetal development is concerned in first and second month. About the development in third month both science are of the same opinion that rudiments of hands and feet (shakha or hastapada) starts appearing in this month. About the development in fourth, fifth and sixth month, opinions differ. As per Ayurveda, in fourth month, heart activity becomes evident whereas as per jyotish science, in this month bones becomes prominent. In fifth month, as per Ayurveda, mind becomes active whereas as per jyotish science, during 5th month, the bone marrow, nervous mass (majja), intestine (antra), skin (charma) grows. In the sixth month of foetal development, as per Ayurveda, brain becomes active whereas as per jyotish science, various body parts starts becoming prominent along with hairs, nails and liver. In the seventh month as per Ayurveda, differentiation of all the body parts takes place. Jyotish science also holds the same view and also mentions about the foetal movements. As per ayurveda, in eighth month, the Oja is unstable and it constantly moves from mother to foetus and vice versa. Hence, if baby is delivered in this month have less chances of survival. Whereas as per jyotish science, sensory development occurs in this month. Both science agree that in ninth month complete foetal development take place and foetus may get delivered 9th or 10th month. Ayurveda, considers delivery of the baby upto 12 months as normal and
after that it is abnormal. But jyotish science, limits the delivery period upto 10 months only. Both these ancient descriptions when studied in the light of modern medical knowledge, it is found that there upto embryonic stage, the modern science studies the embryonic development on weekly basis whereas Ayurvedic and Jyotish science studies it on monthly basis. The modern concept of cell division in zygote leading to formation of embryo is also seen in Ayurvedic science. The modern science studies the embryogenesis in terms of zygotic division, cleavage, morulla, blastocyte, trophoblast, gastrulation and formation of three germinal layers, smoitogenesis and formation of primitive segments of the body.

RESULT:

1. Modern science studies the embryonic development on weekly basis whereas Ayurvedic and Jyotish science studies it on monthly basis.
2. The 5th and 6th month description of foetal development is more precise in Jyotish science than Ayurvedic science.
3. The 1st to 2nd month description of embryonic development is more precise in modern medical science.
4. The modern concept of cell division in zygote leading to formation of embryo is also seen in Ayurvedic science.
5. The ancient description of month wise foetal development can also be blended with modern scientific and more accurate description.

CONCLUSION:

1. The monthly embryonic and foetal development is well described in the Ayurvedic as well as Jyotish science.
2. The critical comparison of Ayurvedic and Jyotish science, shows marked similarities between the description of monthly embryonic and foetal development.
3. The description of monthly embryonic and foetal development in Ayurvedic and Jyotish science, can fairly be correlated with modern description of embryogenesis and foetal organogenesis and proper blending of ancient knowledge with modern knowledge could be done.
4. Jyotish Science is complimentary to the Ayurvedic medical science and the extra description mentioned in Jyotish science related monthly foetal development should be incorporated in Ayurvedic science.

Abbreviations :

S.Sha. – Sushrut Sharirsthana, B.Ja. – Brihat Jatakam, L.Ja. – Laghu Jatakam

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