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A Review of'Panchabhautiktwa' of 'menstrual cycle'.

Dr. Anand Bapu Shinde[1], Dr. RanjitShamraoMohite[2], Dr.PradnyaSuhasRokade[3], Dr. Houserao Anandrao Patil[4].

1. H. O. D. &Professor, Department of Rachana Sharir, Rama Ayurved MedicalCollege, Mandhana, Kanpur, U. P.
2. H. O. D. &Professor, Department of Rachana Sharir, Loknete Rajarambapu Patil Ayurved Medical College, UrunIslampur, Tal-Walwa, Dist-Sangli
3. Associate Professor, Department of Rachana Sharir, Loknete Rajarambapu Patil Ayurved Medical College, UrunIslampur, Tal-Walwa, Dist-Sangli.
4. Associate Professor, Department of Agadtantra, Loknete Rajarambapu Patil Ayurved Medical College, UrunIslampur, Tal-Walwa, Dist-Sangli.

Corresponding Authors e mail id: - ranjeetmohite@gmail.com

Abstract

It is possible to study the anatomy and physiology of menstrual cycle in details and interpret the complete knowledge in terms of *ayurvedic* concepts. It will interpret the phenomenon of *rutuchakra.* We can judge the exact status of each and every *mahabhuta* and *tridosha* at each stage of phenomenon. This interpretation is useful for *samprapti* of *rutuchakravikruti.* With the help of this *samprapti,* we can diagnose the *doshadushti,sthanadushti* and *mahabhuta vikruti.* It will give the proper direction for *chikitsa.*

The menstrual cycle is the regular natural change that occurs in the female reproductive system that makes pregnancy possible. *Ayurveda* describes the *rutuchakra* as the period between two menses *(artavadarshan)* in female body. It concludes that the 'menstrual cycle' according to modern science and *rutuchakra* is the same phenomenon. Our aim and object is to study the changes in menstrual cycle in terms of endocrinology, anatomy, physiology and try to interpret it in terms of *ayurvedic* terminology.

Key Words: - Ayurved, Menstrual Cycle, Rutuchakra, Panchmahabhut, Tridosha

Introduction:

The terms in the title of the paper are from different fields. The term *'panchabhautikatwa'* is from *vedic*philosophy and related sciences like *ayurveda*[1]. It means 'the five constituents'. The universe (micro/macro, living/nonliving, visible / no visible) is constituted by *panchamahabhutas*.[1] Each and every 'action' in universe is done by *panchamahabhutas*. The term 'menstrual cycle' is related with living human female body in universe. It means 'the specific period of adult female in which anatomical, physiological endocrinological changes take place in body. Here we consider the menstrual cycle of human female body.

The terms are from different fields with different basic principles and concepts. *'Panchabhautiktwa'* with reference to modern philosophy and sciences means units of constituents of matter in universe. These units are microscopic and may termed as atoms, electrons, neutrons, protons etc. On the other side, the menstrual cycle described in *Ayurvedais* according to *Vedic*concepts *(panchabhautic, tridosha, saptadhatu* etc.) as *'rutuchakra'.*[2]

Objectives:

Description of *rutuchakra* in *Ayurveda Sharir* is somewhat primary. Anatomical changes (micro and macro) are not described in details in terms of *'panchabhautic sanghatana'*. The key role factors*(panchamahabhutas, tridosha*, their types and their role in *rutuchakra* phenomenon) are not described in details.

When we treat the patients of *rutuchakravikruti* (with special reference to *vandhyatwa),* we cannot interpret the *samprapti* and *dushtisthana* according to *Ayurvedic* concepts. It limits the use of proper medication and prognosis of disease.

Modern human anatomy and physiology describes each and every change step by step in detail with the help of microscopic anatomy, physiology and endocrinology etc. It is easy to interpret any menstrual disorder/pathology with the help of this description. We can diagnose the exact pathology and treat it properly with proper medication.

It is possible to study the anatomy and physiology of menstrual cycle in details and interpret the complete knowledge in terms of *Ayurvedic* concepts. It will interpret the phenomenon of *rutuchakra.* We can judge the exact status of each and every *mahabhuta* and *tridosha*[3]at each stage of phenomenon.

This interpretation is useful for *samprapti* of *rutuchakra vikruti.* With the help of this *samprapti*, we can diagnose the *doshadushti, sthanadushti* and

mahabhuta vikruti. It will give the proper direction for *chikitsa.*

Methodology-

Description of phenomenon of menstrual cycle in terms of *Ayurveda* is traditional. Any unknown element in universe can be described in *Ayurvedic* terminology after keen observation of its structure, volume, function etc. For example, any element having more cavity or space can be described as *'aakashiya'*.[4]

Element having more fluid content can be described as *'Jaliya/Aapya'.*[4] Element causing physical/chemical change can be described as *'pittapradhan'*[5] etc. We are trying to describe the whole phenomenon of menstrual cycle in terms of *Ayurveda* using this method.

The menstrual cycle is the regular natural changethat occurs in the female reproductive system that makes pregnancy possible. Ayurveda describes the *rutuchakra*[2] as the period between two menses*(artavadarshan)* in female body.

It concludes that the 'menstrual cycle' according to modern science and *rutuchakra* is the same phenomenon. Our aim and object is to study the changes in menstrual cycle in terms of endocrinology, anatomy, physiology and try to interpret it in terms of *Ayurvedic* terminology.

We will discuss the phenomenon of menstrual cycle as follows[6,7,8,9]

- The endocrine glands secreting the hormones. Their position in the body, structure, functions.
- The hormones which activate and conduct the phenomenon of menstrual cycle. Their period of secretion, structure, mode of action.
- The female genital tract, its structure and anatomical changes.

We discuss the *Panchabhautiktwa*[1] of all these contents participating in menstrual cycle with the help of knowledge of *Vedic* concepts.

Discussion

The mechanism of menstrual cycle is governed by endocrine system. The endocrine secretions trigger the anatomical changes in ovary and uterus. The menstrual cycle is divided in three parts- endocrine cycle, ovarian cycle and uterine cycle.

1. **Endocrine cycle**

In endocrine cycle the organs involved are hypothalamus, pituitary and ovary. GnRH triggers the production of gonadotropins, FSH and LH by anterior pituitary cells. Gonadotropins are glycoproteins and secretion of basophilic cells in anterior pituitary. The sex hormones - estrogen, progesterone, some amount of androgen and peptides like

inhibin and activin are released from ovary.

a. Hypothalamus:

The peptidergic neurons in median eminence and arcuate nucleussecretesGonadotrophic releasing hormone, which is a neurohormone and a decapeptide in structure. It is transported to anterior pituitary gland through portal vessels.

b. Pituitary gland:

With response to GnRH, the basophilic secretory cells secrete Follicle stimulating hormone (FSH) and luteinizing hormone (LH). They are glycoprotein in structure.

c. Ovary:

Ovary secretes the sex hormones estrogen, progesterone and some amount of androgen and peptides like inhibin and activin. They regulates ovarian cycle (follicular and luteal phase).

2. Ovarian cycle:

It is divided in follicular and luteal phase.

Follicular phase:

At the time of seasing of last menstruation, the level of gonadotropins is lowest. On first day follicular phase starts. FSH level slowly increases and number of graffian follicles grow and mature but only one dominant(primordial follicle)-primary follicle grows fast. Fluid filled cavity in this follicle secretes inhibin and activin.

In early follicular stage, small amount of LH stimulates theca cells in follicle to secrete androgens which get converted to estrogen, which promotes the proliferative change in endometrium.When the level of FSH rise its peak, selection of dominant follicle occurs. At that time inhibin level increases which inhibits growth of other follicles (day 5-7). It gives negative feedback and suppression of FSH occurs.There is rise in estrogen level in dominant follicle. Rise in inhibin suppressesFSH release preventing the growth of other follicles.

The positive feedback on LH causes rise in LH level.Gradual rise in level of LH (along with local oestrogen production in the follicle) influences granulosacells to produce progesterone. Peak estrogen level occurs 72 hours before ovulationand peak LH level occurs24-36 hours before ovulation. Peak LH level causes rise in progesterone level, which gives negative feedback on LH.

Fall of FSH causes reduction in inhibin level and rise in peptide activin in follicle. It causes mid cycle rise in FSH and serves to release the oocyte from follicular attachment.

Luteal phase:

This phase lasts for 15 days from ovulation. After release of oocyte, corpus luteum is formed. In this phase, oestrogen and progesterone levels rise, which is

secreted by corpus luteum. This rise brings about the secretory phase of endometrium.

Some amount of androgen is produced by unsuccessful follicles. Luteum degenerates on day 26-28 if no pregnancy occurs. This results in fall of progesterone and oestrogen and menstruation takes place. This fall results in appositive feedback mechanism and triggers the hypothalamus to release GnRH for next cycle.

3. Uterine cycle:

It starts along with ovarian cycle. The stimulating hormones are estrogen and progesterone. It has two phases- proliferative and secretary. In proliferative phase, the decidua basalis of endometrium starts proliferating to form decidua functionalis. After that the secretary phase starts. In this phase, the secretary cells in decidua functionalis starts secreting glycogen.

The secretary action is maximum on day 20-22 of cycle. If fertilization not occurs, the estrogen and progesterone level falls, glandular secretion stops, irregular breakdown of decidua functionalis starts, the corpus luteum atropies and menses starts. If fertilization occurs, progesterone level is maintained by corpus luteum up to 12thweek and by placenta afterwards throughout pregnancy.

Menstrual cycle is a 'game' played by hormones released by endocrine glands (hypothalamus, pituitary and ovary) and the playground is female genital tract. While understanding the *'Panchabhautiktwa'* of menstrual cycle, these three factors (glands, hormones and genital tract) are most important. Each factor should be discussed for *Panchabhautiktwa.*

A. Endocrine glands:

The three glands hypothalamus, pituitary and ovary secretes the endocrine secretions responsible for menstrual cycle. The panchabhautic nature of these glands must be confirmed. The endocrine glands should be discussed for Panchabhautiktwa on following points-

1. Position of the gland in body.
2. Structure of the gland.
3. Function of the gland.

a. Hypothalamus:

The hypothalamus is the part of central nervous system, is consists of ***majja dhatu***[10]. It is ***adhisthana***[11] of ***vata dosha***[12] and Initiates the phenomena of menstrual cycle. At the stage of initiation of each phenomenon in nature, there is dominance of ***Vayu*** and ***teja***. The GnRH hormone, secreted by the gland, stimulates the whole phenomenon of menstrual cycle. We can conclude here that hypothalamus is ***Teja-vayupradhan*** *organ*.

b. Pituitary gland:

The pituitary gland is also part of nervous system and made up of ***majja***

dhatu. The FSH and LH hormones secreted by pituitary also stimulate the initial stage of growth of follicle formation. We can conclude it as ***teja-Vayu pradhan*** **organ**.

c. Ovary:

The ovary is dual working structure. It changes its structure due to action of FSH and LH as well as it secretes estrogen and progesterone.It is part of ***aartavavaha srotas***[13] which is ***aagenya***[14] in nature. The ***aartava*** which is produced by ovary is ***aagneya***[14]. Though the ***aagneyatwa*** is dominant in ovary, the ***vayu, jala*** and ***prithvimahabhutas*** are second dominant to ***agni.***

B. Endocrine hormones:

The *panchabhautikatwa* of hormones should be evaluated on the following points-

1. Sight of secretion of hormone.
2. Chemical structure of hormone.
3. The time of release of hormone.
4. The sight of effect of the hormone.
5. The change (functional/structural) in sight by the hormone.
6. Other effects on body.

1. **Gonadotropic releasing hormone:**

This hormone is released by hypothalamus (peptidergic neurons in the median eminence and arcuate nucleus).The **GnRH** is again ***teja-vayupradhan*** secretion due to its sight of production, very small in quantity, the arterial transportation and nature of action (again triggering the production of FSH and LH.).

GnRH is neurohormone and decapeptide in nature. It suggests the ***vayu-aagneyatwa***. It is released after adolescence period active throughout adult age. It suggests that it works in ***Pittakala*** of life hence ***aagneya***. Secondly, it stimulates pituitary which is part of ***majjavahasrotas*** to release FSH and LH and the whole menstrual cycle starts.

It suggests the ***vayavatwa*** and***aagneyatwa***of GnRH. It influences on the behavior and makes the person socially dominant. This again suggests the ***vayavyatwa*** of GnRH.

2. **Follicle stimulating hormone:**

The name itself suggests the nature of this hormone. It is stimulating, which is the main function of ***vayu mahabhuta***. It is released by the pituitary gland, which is again *vayutatwatmaka*.It is heterodimer glycoprotein with alpha and beta polypeptide unites.

The structure suggests the *aagneyatwa* of FSH.It is released in brooding female which is the *Pittapradhana* period of life. It also suggests the *aagneyatwa*of FSH. It is released after the action of GnRH. In nature, the air stimulates the fire. Like that *Vayavatwa*of GnRH stimulates the

aagneyatwa of FSH. It is the time when the 'drama' of menstrual cycle starts.

The *gati* and *urja*is created by *vayavatwa* and *aagneyatwa* of FSH.It works on ovarian tissue and stimulates primordial follicles to grow. The ovary again is sight of production of *aartava*, which is *aagneya.* It means that *vayavatwa* and *aagneyatwa* of FSH stimulates and increases ovarian tissue. In ovary, due to the increased level of FSH, the primordial follicles start to grow and one of them become matured and releases secondary oocyte.

The *aagneya*ovary, due to the presence of *vayavagneya* FSH, stimulates and forms the matured follicle. This proves the *vayavagneyatwa* of FSH.After release of secondary oocyte the FSH level decreases and the follicle size deceases to form corpus luteum. This change is due to fall of level of gati and urja i.e. FSH.

3. **Luteinizing hormone:**

This hormone luteinizes (aggregates, atropies and come to normal structure) the ovary. It is secreted by pituitary gland which is *vayutatwatmaka*.It is heterodimer glycoprotein with alpha and beta polypeptides. Its structure is same like FSH (some variation in beta part), it works exactly opposite. The variation lowers the *aagneyatwa* in LH.

This hormone is released in second half of menstrual cycle. The changed structure of ovary comes to normal in this period. That means the *aagneyatwa* of ovary reduces. This is due to LH. This suggests that it is more *vayaviya*.It works on ovarian tissue.

At first its peak level initiates the ovulation, the rupture of follicle. The rupturing is the action of *vidarana* of *vayu.* Secondly it luteinizes the ruptured follicle, which secretes progesterone and maintains the endometrial bed for implantation.

This repair the ovary and prepare for next cycle. This is due to the *vayavatwa* of LH. LH acts as a controller of production of testosterone in males. Normally, LH level is low in childhood and in female, It is high after menopause. It indicates the *vayaviya* nature of LH

4. **Progesterone:**

This hormone is secreted by ovary. The release of progesterone starts when level of LH increases. That means progesterone is product of LH, which is *vayupradhan.* The increase in level of estrogen and progesterone develops the endometrium and secretary phase starts. On day26-28, the corpus luteum degenerates and the level of estrogen and progesterone falls and menstruation take place.

If fertilization occurs, the corpus luteum continue to produce progesterone, level of which is important to maintain pregnancy. The progesterone is important

hormone throughout the pregnancy period. After 10 to 12 weeks of pregnancy, the placenta takes over the production of progesterone and continue it till birth. The progesterone initiates the development of endometrium, the secretary phase and helps to implant the embryo. This function of progesterone indicates that its action is to produce and maintain the conditions for healthy development of fetus.

According to *sushrutsamhita* the essential material for fertilization is *rutu, kshetra, ambu* and *beeja*[15]. The *ambu* means the essential humidity or moisture for implantation of seed. Likewise here the essential humidity or moisture in female genital tract is important for fertilization. This condition is maintained by progesterone. The *ambu* in *ayuveda* is *agni-pavan-nabhapradhan* entity.

5. **Estrogen:**

The ovary releases estrogen, the sex hormone which acts on edometroeum of uterus. There is proliferation of endometrium due to estrogen. Estrogen is a product of FSH, which is *Vayu-agnipradhan*. It acts like FSH but at different sight (uterus). It is clear that estrogen is *vayavagnipradhan.*

C.Female genital tract:

The whole genital tract should be studied for *panchabhautiktwa* during menstrual cycle. Basically, the *aartava* and the tract which transports it is *aartavavahasrotas* is *aagneya* according to *ayurved.*

The vaginal canal is *vayu-aakashbhutapradhan* part as it has cavity. It is situated in *vatasthana* and acting place of *apanavayu* (discharge urine, *aartava, garbha* and transport *Shukra*). The uterus is *prithvi-aakashbhutapradhan*. It has more weight than any organ in the tract. The *samhanana* of *garbha* takes place in uterus.

The potential uterine cavity gives more *aakash* to *garbha.* The uterine tubes are *vayvakashbhutapradhan* due to their tubular structure and function of transportation of ovum, sperms and emryo. As already discussed, the ovary is *aagni-vayu-jalabhuta* pradhan.

Conclusion:

The *rutuchakra* is a happening of *pittapradhan kala* (fertile adult life period) in human female body. *Adhishthana* of *rutuchakra* is *aartawavahasrotas,* in which the *agni* and *vayu*are *pradhanmahabhutas.*

The *vata* and *pitta* are *pradhanadoshas. Vata* is dominant with its *gatitwa,daranatwa* and stimulating nature. The *pitta dosha* is dominant by its *ushnatwa*and *pachakatwa* (changing the old into new form). The*kapha dosha* is recessive but works with *sanghatanatwa.*

Rutuchakra is for *garbhadhana* (impregnation). The essential material for

garbha sambhava is *rutu, kshetra, ambu* and *beeja.* The *rutu* is important in these four because the *rutu* prepares the *kshetra* means *aartawavahasrotas,* it produces the *ambu*and *aartawa.*

The *rutuchakra* is meant for fulfilling the basic instinct of reproduction. The *murdhasthitaprana* initiates the process of reproduction to fulfill the basic instinct. The *vayu* in the *murdha* is stimulated for initiation. The *vayu*stimulates the *agni* as he can't do anything individually.

The *vayu*and *agni* reach at the *kshetra,* the *aartawavahasrotas*. The presence of *vayu*and *agni* in*aartawavahasrotas,* which is *aagney,* increases the *aagneyatwa.* The *paka*- production of new *dhatu*- the *ambu* and the *aartawa* starts.

The *kshetra*is prepared for *garbha.* If the *Shukra* is available during this period, *Shukra-shonitasanyoga* occurs,the *prana* enters in it and the *garbha* is formed. If the *Shukra* is not available, the *agni* reduces, the *aartawa*is discharged out by the *vayu*. the urge of reproduction is not completed. the murdhasthitaprana again initiates the vayu for next rutuchakra.

1. Panchbhautiktwa -
2. Rutut / Rutuchakra

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