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RESEARCH ARTICLE

AN EXPERIMENTAL EVALUATION OF ARTAVAJANAKA YOGA ON FEMALE REPRODUCTIVE SYSTEM W. S. R TO AMENORRHOEA.

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Abstract

Femininity is related with menstruation and reproduction. Menstruation may be defined as periodic and cyclical shedding of the progestational endometrium accompanied by loss of blood and so, sometimes described as “the weeping of a disappointed uterus”. It takes place at approximately 28 day intervals between menarche and menopause. If any of the components of the HPO axis are non-functional, pathologies arise leading to conditions like amenorrhoea where bleeding may not occur. A cyclic change in the endometrium includes regeneration and proliferation of the endometrium is done by estrogen. Withdrawal of estrogen causes shedding of the endometrium and menstruation.

Acharya Sushruta says that aggravated vata and kapha obstructs the passage of artava thus artavapravrutti does not takes place; clinical features of secondary amenorrhoea can be seen or understood in nashtartava¹.

Amenorrhea literally means absence of menstruation which is a symptom and not a disease. Evaluation and management of a patient with amenorrhea is common in gynecology and the prevalence of pathological amenorrhea ranges from 3 to 4 percent in reproductive aged population. Common causes of secondary amenorrhea are Stress, Post pills, Psychotropic and Antihypertensive drugs, Pituitary Adenoma and Sheehan's Syndrome, PCOS, Premature ovarian failure, Uterine synechiae, Malnutrition, hypothyroid state and Diabetes.² The treatment opted in modern system of medicine is hormonal therapy, which may have adverse effects on body like obesity, nausea, vomiting, endometrial cancer, breast cancer and liver diseases.

So, to prevent all these hazards and to maintain healthy life, safe Ayurvedic non-hormonal drug formulation as quoted in Bhaishajya Ratnavali Yonivyapadrogadhikar is proposed. In Ayurveda classics Jyotishmati plant is a artavapravartaka³ and the qualities of this plant are katu-tikta rasa, tiksna, snigdha, sara guna, usna virya, katu vipaka, medhya, and vatakapphasamaka⁴. Since it is the need for safe, effective and yet economical drugs which is free of side effects and easily available. So, an aim to do a preclinical study to know the effect of artavajanaka yoga on anartava is evaluated.

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Introduction:-

Ayurveda, one of the Upa-Vedas, provides not only curative but also preventing principles for healthy and long life; a science and an art of appropriate living that ensures health and longevity of human being. This medical system of world, serving the ailing humanity since the creation of life is not behind in recognizing the most pragmatic feature of woman viz. women as the root of progeny. A healthy reproductive system is essential for a healthy life; all hazards that hamper the reproductive system attract unique attention for cure.

This health can be achieved only when all of the processes in the body are in equilibrium and also with normalcy of the physical and emotional factors that has to be encountered.

There is many normal physiological phenomenon's taking place in the body which is carried out in a cyclic manner. If there is any alternation, this will give rise to the pathological conditions. Among all these physiological changes, menstrual cycle is one of them. Menstrual cycle is a beautiful hormonal change that takes place every month in women life. There is a well coordination between the hormones and the shedding of the endometrium that takes place every month indicating the normal menstruation.

Hormonal status and menstrual cycle can be affected by geographical conditions, racial factors, nutritional standards, environmental influences and indulging in strenuous physical activity. Even on completing her family, having irregular and scanty menstruation is continuous stress denoting hormonal aberrations. There is a sharp increase in the incidence of the same and this requires solution. A slight deviation in the menstrual cycle which may be excessive or less is held with fear of some serious pathology of internal genital organs.

In the present era, modern life style, food habits and unnecessary competitive attempts have increased stress, strain and restlessness resulting into increased menstrual disorders. Ratio of menstrual disorder is rising in gynecological practice which is precursor of infertility and other problems. Amenorrhoea also plays an important role among these gynecological problems; prevalence of pathological amenorrhea ranges from 3 to 4 percent in reproductive aged population² with an altered physiology in the HPOU axis thus requiring more attention, because it effects the woman psychologically also. So, it requires counseling with appropriate treatment.

Clinical features of amenorrhoea can be seen in the form of pathologies like anartava, nastartava, etc in classics. Acharya Vagbhata says that aggravated vata and kapha obstruct the passage of artava thus artavapravrutti is hampered¹. There are so many yoga's mentioned in Bruhatrayi and Lagutrayi for the chikitsa of anartava.

In modern medical science hormonal treatment which has a good therapeutic utility is used for menstrual disorders but this is not devoid of side effect. Side effects range from obesity, nausea, vomiting, endometrial cancer, breast cancer, liver diseases as well as psychological disturbance.

So, to prevent all these hazards and to maintain healthy life, it is very essential to provide a particular etiopathology and treatment for anartava. A safe Ayurvedic non-hormonal drug formulation as quoted in Bhaisajya Ratnavali Yonivyapad roga dhikar has been taken for this study³. Jyotishmati plant is aartavapravartaka and the qualities of this plant are katu-tikta rasa, tiksna, snigdha, sara guna, usna virya, katu vipaka, medhya, and vatakapasamak⁴. Since it is the need for safe, effective and yet economical drugs which is free of side effects and easily available, an aim is made to do a preclinical study to know the effect of artavajanaka yoga as artavapravartaka on anartava as well as its effect on the female reproductive system.

Objectives:-

1. To evaluate the estrogenic effect of artavajanaka yoga on rats.
2. To evaluate the progesterone effect of artavajanaka yoga on rats.

Material and Methods:-

Methodology:

- 30 Female wistar albino rats weighing 200 ± 50 gm were used. Animals were maintained under hygienic conditions and they were provided with commercial food pellets and tap water ad libitum.
- Ovariectomy was done for the two groups of albino rats.
- The Artavajanaka yoga was prepared as mentioned in Bhaisajya Ratnavali.

Inclusion criteria:

- Healthy 30 female albino rats with normal estrus cycle.
- Body weight between 200 ± 50 g.

Exclusion criteria:

- Unhealthy albino rats
- Pregnant rats
- Albino rats which are under trial of other experiment

Study design:

The selected animals were grouped into five groups with 6 animals each. Group 1, only water and normal diet was administered and served as oral control group. Whereas group 2 ovariectomized control group only water and normal diet was administered and served as positive control group. In 3rd group ovariectomized animals were treated with artavajanaka yoga at therapeutic dose. In 4th group normal rats were treated with artavajanaka yoga at therapeutic dose. The 5th group ovariectomized animals treated with DES. The group specific drug was administered for 21 consecutive days. On 21st day blood sample was taken for Hormonal assay.

Table 1. Animal grouping:

Group	No. of animals	Treatment
Normal rats	6	Normal water and rat diet
Ovariectomized control	6	Normal water and rat diet
Ovariectomy + test drug (TED)	6	artavajanaka yoga
Normal rats + test drug (TED)	6	artavajanaka yoga
Ovariectomy + Diethylstilbestrol (DES)	6	DES

Test Drug Preparation:

1. Test drug: Artavajanaka yoga taken as a test drug to be given internally. The Jyotishmati patra was roasted with ghrita and ground with durva swarasa.
2. Dose selection: dose fixation: based on the body surface area ratio by referring to the table of Paget and Barnes (1964).

Dose of Artavapravartaka yoga for rats:

Recommended daily intake of churna is 1 karsha = 12 g

Rat dose per kg body weight = $12 \times 0.018 \times 5$

= 1.08g /kg body weight

Drug preparation of DES:

For rat dose Di ethyl stilbesterol = 0.1mg/kg

= $(0.01\text{mg}/100\text{mg}/0.1\text{ml}) \times 50\text{ml}$

= $(0.50\text{mg}/5\text{ml}) \times 10\text{ml}$

= 5mg/50ml

- Stock solution = 1 tab + 50ml H₂O + 10mg Carboxy methyl cellulose sodium salt
= 0.01mg/0.1ml
= 0.1mg/1ml

Drug administration-

Test drug and DES was administered for 21 days including experimental day in the morning session between 9-10am orally after taking the cervical smear.

- On 21st day, the rats were anesthetized and blood was collected from retro-orbital puncture and assigned for hormonal investigation.

Observation and results:-

Table 2. Effect of Artavajanak yoga on Serum Estrogen level

Groups	Serum Estrogen(pg/ml)	Percentage%
Normal Control (A)	310±13.41	
Ovariectomy control (B)	210±34.14*	32↓@
Ovariectomy +test drug (C)	341.83±10.33**	62.77↑#
Normal rats + test drug(D)	332±26.10**	58.09↑#
Ovariectomy+ DES(E)	358.86±16.21**	70↑#

Data expressed in Mean ± SEM, **P<0.01, *P<0.05

@-compared with normal control

#-compared with Ovariectomy control

Data related to the effect of test drug on serum Estrogen level has been shown in the Table.

Data shows there was a significant decrease in the serum Estrogen level in the Ovariectomy control group, compared to that of normal control group, the observed decrease is found to be statistically significant.

The Ovariectomy with test drug group and normal rats with test drug group and Ovariectomy with DES group has shown significant increase in the serum Estrogen level compared to Ovariectomy control group the observed increase was found to be statistically very significant.

Table 3: Effect of Artavajanak yoga on Proestrus phases

Groups	Proestrus phase	Percentage%
Normal Control (A)	2.6±0.5	
Ovariectomy control (B)	0.6±0.4&	76↓@
Ovariectomy + test drug (C)	2.6±0.4&	330↑#
Normal rats + test drug(D)	2.6±0.7	330↑#
Ovariectomy+ DES(E)	1.6±0.6	166↑#

Data expressed in Mean ± SEM & p< 0.05 by student's 't' test

@-compared with normal control

#-compared with Ovariectomy control

Data related to the effect of test drug on no. of Proestrus phase in complete Estrous cycle has been shown in the Table 3.

Data shows there was a decrease in the no. of Proestrus stage in the Ovariectomy control group compared to that of normal control group. The observed decrease was found to be statistically non-significant in compared with normal control group (the difference was found to be significant by student's 't' test for un paired data). The Ovariectomy with test drug group, normal rats treated with test drug group and Ovariectomy treated with DES group has shown increase in the no. of Proestrus stage and the observed increase was found to be statistically non-significant when compared with Ovariectomy control group.

Discussion:-

1. JYOTISHMATI^{5,6,7,8,9}:

Snigdha guna having lepana shakti, kledana and vatahara properties helps in regeneration of endometrium layer and strengthens apana vata function.

Sara guna is having the property of anulomana and pravartaka so, it helps in the vatanulomana and pravrtaka of artava. It also acts as vedanasthapana and helps in relieving pain caused by vitiated vata which causes pain during menstruation. It is also acts as lekhana so it will help in the proper shedding of the endometrium.

Teekshna guna is having the properties of pittakara, lekhana and kaphavatahara. Acharyas have mentioned pitta vardhaka and kapha vatahara chikitsa in anartava and artava kshaya so, jyotishmati drug helps in the samprapthi

ghataka of anartava as it removes margavrodha by the shodana property and kapha vatahara property, helps the proper formation of artava with the pittakara property, and helps in the proper sravan by its lekhana property and thus does the upashaya of the disease properly by kaphavatahara properties.

Katu rasa increases the pitta, which supports the principles of treatment of anartava.

Tikta rasa is having lekhana property so it may helps in the proper shedding of the endometrium.

Ushna veerya pacifies kapha and vata, aggravates pitta, which is the need for the chikitsa of anartava.

2. DURVA^{10,11}:

For the healthy menstrual cycle and for the treatment of artava kshaya or anartava, first there should be proper formation of the endometrium, after that only anartava or artava kshaya like conditions can be treated. On the observation of the rasa, guna, veerya and vipaka it seems that durva helps in the proper formation of the artava (endometrium),

Acharya Charaka has mentioned durva under the prajasthapana. Prjasthapahna are the dravya's which act as a fertility promoter or helps in progeny. So, here durva helps in the proper formation of the endometrium which helps in the amenorrhoea.

Madhura rasa is formed by the combination of prathvi mahabhata. Madhura rasa being satmya or attribute to the tissues of the body, increases the rasadi dhatu which is essential for the proper formation of the artava. According to Acharya Vagbhata, Madura rasa is beneficial in kshaya like conditions, so it will help in the kshaya of artava.

Kasaya rasa is having property of vaisadya, samgrahi sandharaka and stambhaka so; it may increase the thickness of the endometrium and promote retention for a proper time.

According to acharya Sushruta kasaya rasa is having the property of visada i.e. cleansing. It is having lekhana property also.

Lagu guna is having properties of srotoshodhaka so it helps to remove the obstruction of the artavavaha srotas. Laghu guna is having the property of deepana so it will help in the conditions of amenorrhoea due to anorexia nervosa or weight loss.

Sheeta virya pacifies pitta and having the properties of prahladana, jivana and sthambhana which helps in the stabilization of the artava.

3. GHRITA¹²:

Ghrta is having the properties of deepana, snehana, anulomana, vrusya, garbhasthapana, balya, vranghana and rasayana. These all properties are helpful in the formation of artava which is essential for a healthy female reproductive system.

Ghrta is having the property of yoga vahi, so ghrta improves the quality of other drugs also.

Consolidated statement of investigation:

Parameter	Ovariectomized control group Compared with normal control group	Comparison with Ovariectomized control group		
		Ovarectomy +test drug	Normal rats + test drug	Ovarectomy+ DES
Serum Oestrogen	SD	SI	SI	SI
Serum progesteron	SD	SI	SI	SI

The hormonal investigation revealed there is an increased level of estrogen in the blood in Ovariectomy + test drug group, Normal rats + test drug and Ovariectomy + DES group compared with the Ovariectomized control group.

Oestrogen brings about the following changes in the female reproductive system such as growth of uterus, fallopian tube and vagina. Vaginal epithelium gets thickened, stratified and cornified. They are responsible for the proliferation of the endometrium in the preovulatory phase.

In the present study the increase level of progesterone was observed in the Ovariectomy + test drug group, Normal rats + test drug and Ovariectomy + DES group compared with the Ovariectomized control group. This indicates the test drug has progesterone potentiating activity. The underline mechanism is not much clear with the present data; it might be due to stimulation of anterior pituitary so there is increased secretion of FSH and LH. These hormones are very much necessary for the growth and development of the ovary and ovulation. The study reveals significant elevation in both serum oestrogen and progesterone levels like reference standard- it is interesting and important to get an insight into the mechanism of this elevation.

Conclusion:-

- ✓ On the observation of ayurvedic literature and test drug action indicates that For the healthy menstrual cycle, first there should be proper formation of the endometrium, after the observation of the rasa, guna, veerya and vipaka it seems that jyotishmati is having artavajanaka properties and durva helps in the proper formation of the artava (endometrium), and ghrita is having lipophilic action, which facilitates drug delivery to target organ and It facilitates drug entry into cell, mitochondria, microsome, and nuclear membrane and gives a good medium for absorption, transport and delivery of the drug.
- ✓ This artavajanaka yoga is having the properties of proper formation of artava and artavapravartan also which is needed for a healthy reproductive system.
- ✓ It elevated oestrogen and progesterone level comparable to DES.

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