

## HYPOTHETICAL EVALUATION OF ACTION OF NASYA ON INFERTILITY DUE TO ANOVULATION

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### ABSTRACT

In *ayurved classics* different routes for drug administration such as oral, rectal, nasal etc. were in practice. *Nasya* is nothing but route of drug administration. *Nasya* means administration of medicine through nose. As nose is gateway for shir, medicine administered through it occupies various parts of the head and removes morbid doshas adherent to it. It not only removes *doshas* but also gives strength to organ as well as channels in the head and restores their health. According to this *nasya* will also act on hypothalamus as well as pituitary gland. Hypothalamus plays an important role in infertility due to anovulation. Infertility is defined as the inability of a couple to achieve conception after one year of unprotected coitus. It plays very important role in marital upsets. In cases of infertility 40% aetiological factor found in female. There are various factors causing infertility in female such as ovarian factors, uterine factors, cervical factors etc. in ovarian factors anovulatory cycle contributes approximately 15% cases. Major share of control of process of ovulation begins with secretion of gonadotropin releasing hormone ( GnRH ) by hypothalamus. This hormone in turn stimulates the anterior pituitary gland to secrete two other hormones called gonadotropin hormones- luteinizing hormones for ovulation stimulation to hypothalamus and anterior pituitary gland for excreting GnRH and FSH, LH respectively is very important. Main control of hormone is situated in the head which is functional area of *nasya*. So here review is taken to evaluate the action of *nasya* in infertility due to anovulation.

**KEYWORDS** - *nasya*, infertility, anovulation, hypothalamus, GnRH, anterior pituitary gland, FSH, LH,

### INTRODUCTION

*Ayurveda* emphasizes on maintaining health rather than treating diseases. So many *upakramas* mentioned in *ayurved* are useful for maintaining health as well as treating the diseases. One of these *upakramas* is *nasya*.

*Nasya* means medication through nostrils. Drug administered through nasal route is called as *nasya*.(1) Though *ayurved* is very ancient science, at that time also various routes for drug administration other than oral were in practice. Nasal route, parental

route, topical (skin, cornea) etc. were well practiced for drug administration.

*Nasya* is specifically designed route for *shirastana*. (2) It has very significant role on diseases of *murdha*, *netra*, *shrotra*, *kantha*, etc. It has many types according to its role e.g. *shodhan nasya*, *shaman nasya* and *bruhan nasya* (3) etc. *Acharya Charak* also explained types of *nasya* according part of drug used e.g. *patra nasya*, *pushpa nasya* etc (4). Medicine administered through nose enters all channels as well as small regions in the head, destroys *doshas* and sustains their health. So though it is not clearly mentioned in *ayurved*, *nasya* will also act on endocrine glands situated in the head.

Infertility is defined as the inability of a couple to achieve conception after one year of unprotected coitus. Childless can cause of marital upset as well as personal unhappiness and ill health. In any series of infertile marriages, the main aetiological factor is found in female is about 40% cases, about 35% of the husbands concerned have some degree of infertility. In 10-20% of cases a combination of factors operates & the rest have unexplained infertility (5).

The important causes of female infertility as given by FIGO manual (1990) are - tubal factor 36-44%, ovulatory factor 26-44% and endometriosis 1-10%. Amongst them ovarian factor or dysovulatory encompass has three major causes - Anovulation or oligo-ovulation, Corpus luteum insufficiency and Luteinized unruptured follicle (6). As our subject is related to only anovulation, we will explain it further.

### **ANOVLATION OR OLIGO-OVLATION-**

The ovarian activity is total dependent on the gonadotrophins & the

normal secretion of gonadotrophins depends on pulsatile release of GnRH from hypothalamus. Thus ovarian dysfunction is likely to be linked with disturbed hypothalamo-pituitary-ovarian axis either primary or secondary from thyroid or adrenal dysfunction. Thus the disturbance may result not only in anovulation but may also produce oligomenorrhoea or even amenorrhoea. Anovulatory cycles usually represent a lesser degree of disturbance with normal pathways than does amenorrhoea. As there is no ovulation, there is no corpus luteum formation (7). Ovarian dysfunction is classified into seven main groups (WHO 1976).

Group I- Hypothalamic-pituitary failure.

Group II- Hypothalamic-pituitary dysfunction e.g. PCOS, CAH

Group III- Ovarian Failure

Group IV- Congenital or acquired genital tract disorders

Group V- Hyperprolactinaemia with a space occupying lesion (SOL) in the hypothalamic- pituitary region

Group VI- Hyperprolactinaemia without SOL in the hypothalamic-pituitary region

Group VII- Amenorrhoea with an SOL in the hypothalamic-pituitary region<sup>8</sup>

Assessment of female infertility or diagnosis of ovulation

It is clinically important to be able to determine if and when a women is ovulating and distinguish between ovular and anovular menstruation. The following methods are available.

- 1) Significance of basal hormonal evaluation by day -three FSH level values.
- 2) Estimation of Time & Frequency of ovulation by recording daily body temperature.

- 3) Ultrasonography is commonly used to track follicle development.
- 4) Hormone assays- serum progesterone level, LH surge, T3, T4, TSH serum FSH to be assessed(9).

**Process of ovulation-** Ovulation, the rupture of mature follicle and the release of the secondary oocyte into the pelvic cavity, usually occurs on day 14 in a 28 day cycle. Gonadotropin releasing hormone (GnRH) secreted by the hypothalamus controls the ovarian and uterine cycles. GnRH stimulates the release of follicle stimulating hormone and luteinizing hormone (LH) from the anterior pituitary. FSH in turn, initiates follicular growth and the secretion of estrogens by the growing follicles. LH stimulates the further development of ovarian follicles and their full secretion of estrogens. At midcycle, LH triggers ovulation and then promotes formation of the corpus luteum produces and secretes estrogens, progesterone, relaxin and inhibin. Estrogens promote the development and maintenance of female reproductive structures.(10) The high levels of estrogens during the last part of the e-ovulatory phase exert a positive effect on the cells that secrete LH & gonadotropin-releasing hormone (GnRH) and cause ovulation as follows-

1. A high concentration of estrogen stimulates more frequent release of GnRH from the hypothalamus. It also directly stimulates gonadotrophins in the anterior pituitary to secrete LH.
2. GnRH promotes the release of FSH & additional LH by the anterior-pituitary.
3. LH causes rupture of the dominant follicle & expulsion of a secondary oocyte about 9 hours after the peak of LH surge. The ovulated oocyte LH and

its corona radiate cells are usually swept into the uterine tube .(11)

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## DISCUSSION

### A) Action of nasya on infertility due to anovulation-

As we already reviewed that in case of infertility due to anovulation hypothalamus and anterior pituitary gland plays major role. Both have their anatomical position in head which is functional area of nasya. According to Charak Samhita, nasya is the best treatment for shirorogas. Drug introduced through nasa enters uttamanga and removes morbid doshas responsible for the diseases. In Ashtang Sangraha, nose is mentioned as gateway for head. Medicine introduced through it occupies shrungatak marma as well as all channels of eyes, ears, throat, head and removes adherent doshas.(12)

### B) Action of nasya according to Modern science -

**Action of nasya on hypothalamus-** Hypothalamus is the major integrating link between the nervous and endocrine system. It receives input from the limbic system, cerebral cortex, thalamus, reticular activating system and also sensory signals from internal organs (13). Hypothalamus is also a crucial endocrine gland. Cells in the hypothalamus synthesize nine different hormones (14). Modern science accepts concept of close relationship between nose and brain. Drug introduced through nasal route enters the CNS by three ways.

1. **Through nasal mucosa:** The nasal cavity is covered with a well vascularized and stratum corneum epidermis is absent. So drug molecule can be transferred across the single epithelial cell layer directly into systemic blood circulation without first

pass hepatic and intestinal metabolism. (15)

2. **Vascular pathway:** Rich vascular plexus permits topically administered drugs to rapidly achieve effective blood levels. (16) Vascular path transportation is possible through the pooling at nasal venous blood into the facial vein. The facial vein has no valves so it communicates freely with intracranial circulation. (17)
3. **Neurological pathway:** When medication molecule comes in contact with specialized olfactory mucosa, through olfactory cells, they are directly transported into brain and achieving very rapid CSF levels. (18) Olfactory nerves differ from other cranial nerves in its close relation with the brain. Olfactory nerves are connected with the higher centers of brain i.e. limbic system consisting hypothalamus. (19) Olfactory stimuli denoting pleasant or unpleasant smells transmit strong signal components directly and through amygdaloidal nuclei into hypothalamus (20). Thus drugs administered as nasya may enter the hypothalamus. Hypothalamus plays an important role in ovulation. Almost all secretion by the pituitary is controlled by either hormonal or nervous signals from the hypothalamus. (21) When hypothalamus is stimulated by drug molecules, it will secrete gonadotropin releasing hormones. These hormones in turn stimulate anterior pituitary to secrete FSH and LH which are responsible for ovulation. (22)

**Action of nasya on pituitary gland -** Pituitary gland lies in hypophyseal fossa of sella terca of sphenoid bone and attaches

to the hypophyseal hypothalamic portal system. (23) In hypophyseal portal system blood flows from capillaries in the hypothalamus into portal veins that carry blood to capillaries of anterior pituitary. Hypothalamic hormones flow with blood through portal veins and into secondary plexus. Due to this direct route, hypothalamic hormones act immediately on anterior pituitary cells before dilatation or destruction in general circulation. Hormones secreted by anterior pituitary cells pass into anterior hypophyseal veins. Now in general circulation anterior pituitary hormones travel to target tissues throughout the body (24). From above anatomical and physiological relation between hypothalamus and anterior pituitary gland, drug which enters the hypothalamus will affect the pituitary by following ways-

-After stimulation of hypothalamus, GnRH will be secreted which will stimulate anterior pituitary gland to secrete FSH and LH.

- After reaching to hypothalamus, drug will enter the pituitary gland through hypophyseal hypothalamic portal system. Thus nasya medicine will act on both three major structures involving in process of ovulation.

1. It will stimulate neurosecretory cells near median eminence and above optic chiasma which secrete hypothalamic releasing and inhibiting hormones .
2. It will stimulate hypothalamus through nasal mucosa, vascular pathway and neural pathway for secretion of GnRH
3. It will stimulate hypothalamus anterior pituitary gland by direct entry from hypothalamus through hypophyseal portal system or by stimulation through increased GnRH signal.

Thus anterior pituitary will secrete FSH and LH in appropriate quantity which will be responsible for ovulation.(25)

## CONCLUSION

Hypothalamus and pituitary gland both have their anatomical positions in the head which is functional area of *nasya*. *Nasya* acts on all *shiro-rogas* and also gives strength to the constituents in the head for their normal functioning. For normal ovulatory cycle, proper functioning of hypothalamo-pituitary-ovarian axis is necessary. Thus to treat infertility due to anovulation, main factors are FSH & LH deficiency. For FSH & LH secretion stimulation to neurosecretary cells, hypothalamus and anterior pituitary gland are essential. This is possible through *nasya*. So *nasya* will have great therapeutic effect on infertility due to Anovulation

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