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Anatomical Review of Erectile Dysfunction (Dhwajabhangaja Klaibya) with special reference to Nervous system.

Dr Manisha Dhole[1]. Dr Manisha Thakre[2].

[1]Professor and HOD, Department of Rachana Sharir ,GovAyurved College Osmanabad Maharashtra.

[2]PG Scholar, Department Of Rachana Sharir Govt. Ayurved College Osmanabad Maharashtra.

Abstract –

Erectile dysfunction has been defined as persistent inability to attain and maintain an erection, sufficient to permit satisfactory sexual performance. In Ayurvedic classics, sexual dysfunction are described under the domain *of klaibya*. *Acharya Charak* and *Acharya Sushrut* first described the condition called *dhwajbhangaj klaibya*, which closely resembles with erectile dysfunction. Erectile dysfunction is emerging as one of the most serious life style and stress related disease. Sexual desire, arousal and orgasm are mediated complex yet still not fully understood, there is somatic and autonomic nervous system operating at the central and peripheral levels. Sexual behavior is regulated by both subcortical structure and several cortical brain areas. Providing healthcare professionals with information concerning sexual behavior may overcome useless and dangerous barriers. This narrative review aims at characterizing the involvement of the nervous system in human sexual behavior.

Keywords- *Klaibya, Dhwajbhangaj klaibya*, Erectile dysfunction, Subcortical structure Cortical brain areas

Introduction

Ayurveda is the ancient Indian medical system that relay on a natural and holistic approach to physical and mental health. The aim of Ayurveda is the prevention of disease and maintaining the health of healthy individual[1]. Ayurveda defines an ideal man as one who has got healthy body, healthy mind. To maintain the healthy mind &healthy body *Acharya Vagabhatta* has described the tripod of the life *Aahara, Nidra* & *Abramhacharya*[2]. The *Acharya* gives clear cut importance to sexual function in human life, by mentioning the *Abrahmacharya.* According to the modern science, basic needs of human life is consider as food and sex but in Ayurveda sex i.e *kaam* comes under the wide concept. *Kaam* or sex comes under one of the *purushartha* that is goal of life. *Abramhacharya* (sex or Kaam) told by Acharya is not only related to sexual desire or pleasure but for the development of S*upraja Nirmiti. Supraja Nirmiti* is the development of healthy offspring with the sound mind. For *Supraja Nirmiti Abramhcharya* is most important. In which both male and female partner should involve physically and mentally. For potent offspring both male and female Reproductive system should be healthy. In sexual processes the male partner is active partner So physically and mentally he should be Healthy and Confident. Due to modernization, life of human being become very stressful. Irregular food habits, mental stress, tension,

excess use of electronic gadgets, exposed to various radiation are responsible for disturbing sexual life and also causes of *klaibya* (Impotency).

Rutu, Keshtra, Ambu ,Beeja are four factors which are responsible for *Garbh Nirmiti*[3]. These four factor should be potent and healthy, While focusing on the *Keshtra i*t is not limited upto *Garbhashaya* but it is wide concept which include the male reproductive and female reproductive system. Active participation of male is important for sexual act if male reproductive system or psychological stress of male disturb then sexual dysfunction occurs. In Ayurvedic Classic the sexual dysfunction comes under the domain of *Kalaibya*[4]. *Acharya Charak* and *Acharya Sushruta* described the *Dhwajabhangaj Klaibya* which is closely resemblance with erectile dysfunction[5]. Erectile dysfunction is defined as the complete or persistent inability to maintain a penile erection sufficient for satisfactory sexual performance[6]. There may be anatomical or psychological reason behind that. The hypothalamus plays important role in regulating sexual behaviour. Erection are initiated and maintain by afferent inputs in the supra sacral region of the nervous system. Structural and functional anatomy of male reproductive system as well as psychological condition of male is also important so here is elaborating the anatomical review of erectile dysfunction in psychological and nervous point of you.

Aims and objective

1. To study the anatomy of erection.
2. To study the nervous control of erection with erectile dysfunction
3. To study the *dhwajabhangaj klaibya*.

Materials and methods

Structure of Penis

The penis is the male sex organ reaching its full size during puberty. In addition to its sexual function, the penis act as conduit for urine to leave the body.

The penis can be anatomically divide into three parts [7]-

1. Root – the most proximal, fixed part of the penis. It is located in the superficial perineal pouch of the pelvis floor and it is not visible externally. The root contains three erectile tissue (two crura and bulb of the penis) and two muscles (ischiocavernosus and bulbospongiosus).
2. Body - The free part of penis, located between the root and glans. It is suspended from pubic symphysis. It is composed of three cylinders of erectile tissue –two corpora cavernosa and the corpus spongiosum
3. Glans- the most distal part of the penis. It is conical in shape and is formed by the distal expansion of the corpus spongiosum. This contains the opening of the urethra, termed external urethral orifice.

Erectile tissues[8]-

The erectile tissue fill with blood during sexual arousal producing an erection. The root and body of the penis are spanned by three masses of erectile tissue.

In the root, these tissue are known as the left and right crura and the bulb of the penis. The bulb is situated in the midline of the penile root and is traversed by urethra. The left and right crura are located laterally, attached to the ipsilateral ischial ramus and covered by paired ischiocavernosal muscle.

The erectile tissue continue into the body of penis. The left and right crura continue anteriorly into the dorsal part of the penis – they form the two corpus cavernosa. They are separated by the septum of the penis although often incompletely. The bulb forms the corpus spongiosum which lies ventrally. The male urethra runs through the corpus spongiosum. Distally, the corpus spongiosum expands to form the glans penis.

Muscles-

There are four muscles located in the root of the penis[9]-

1. Bulbospongiosus (2x) – associated with the bulb of the penis. it contracts to empty the spongy urethra of any residual semen and urine. The anterior fibres also aid in maintaining erection by increasing the pressure in the bulb of penis.
2. Ischiocavernosus (2x)-surrounds the left and the right crura of the penis. It contracts to force blood from cavernous spaces in the crura into the corpora cavernosa which helps maintain the erection.

Fascia covering -

Each mass of erectile tissue has two fascia covering. The most superficial layer, immediately under the skin, is the external fascia of the colle's which is the continuity with the fascia of scarpa which cover the abdominal wall[10].

1. The deeper stratum is the deep fascia is the strong fascia called tunica albuginea. Forming an individual capsule around each cavernous body and fused in the midline. The incomplete septum between the two corpora is comprised of tunica albuginea.
2. The skin of the penis is more heavily pigmented than that of the rest of the body. It is connected to the underlying fascia by loose connective tissue. The prepuce (foreskin) is double layer of skin and fascia, located at the neck of glans it covers the glans to a variable extent.

Ligaments-The root of the penis is supported by two ligaments which attach it to the surrounding structure;

1. Suspensory ligament – a condensation of deep fascia. It connects the erectile bodies of the penis to the pubic symphysis
2. Fundiform ligament- a condensation of abdominal subcutaneous tissue. It runs down from the linea alba, surrounding the penis like a sling and attaching to the pubic symphysis.

Neuro anatomy of erection

Erectile function is a very integrated process. Numerous nerves, blood vessel hormones and other chemical messenger are responsible for getting and maintaining an erection.

Erectile function is controlled by branch of nervous system called autonomic nervous system. Within this system, the sympathetic nervous system inhibits erection and the parasympathetic nervous system facilitates erection. There are three type of erection which are Psychogenic Erection, Reflex genic Erection, Nocturnal Erection[11].

A. The hypothalamus plays important role in regulating sexual behaviour. this region of the brain links the nervous and endocrine system. A cluster of neurons in the hypothalamus called **medial preoptic area(MPOA).** Psychogenic Erection occurs in response to afferent sensory stimulation to trigger central dopaminergic erection from **pre optic area.**
B. The MPOA appears to integrate stimuli from many area of the brain helping to organize and direct the complex patterns of sexual behaviour.
C. The hypothalamus also contain paraventricular nucleus act as a processing centre that sends and receives messages from different part of brain and spinal cord, it also releases the oxytocin which is the important neurotransmitter with powerful proerectile effect, as it activates excitatory nerve pathways from spinal erection – generating centre to the penis.
D. The nerve that are important for psychogenic erection are-

1. Nerves that travel from the brain through the spinal cord (T11-L2 and S2-S4)
2. Pelvic splanchnic nerve
3. Cavernous nerves

The nerve that control psychogenic erectile function first include descending pathway from the brain. The brain sends messages down the spinal cord to activate a specific area called the sacral erection centre, located near the bottom of spinal cord.

E. Reflex genic erection occurs when physical contact with the penis or a surrounding erotic area occurs. The important nerve for reflex genic erection are
   1. The Pudendal nerve
   2. The Dorsal Penile Nerve
   3. Pelvic Splanchnic nerve
   4. Cavernous nerve

   This type of erection rely on tactile stimuli to the genitals. Therefore, these erection are controlled by the nerves by which parasympathetic pathway arises. The process originates at sensory receptors located in and around the penile skin. When these receptors are activated messages regarding sensory information like touch are sent via dorsal and pudendal nerve to the sacral centre in the spinal cord.

F. Nocturnal erection occurs during Rapid Eye Movement that occurs during the sleep from suppression of inhibitory sympathetic outflow by the pontine reticular formation and amygdala.

Klaibya – According to *Acharya charaka , klaibya* is classified into 4 types. They are *Bijopaghataj klaibya, Dhwajabhangaj klaibya, Jaraja klaibya and Shukra-kshayaja klaibya*[12].

Acharya sushruta mentioned 6 type of k*laibya* which are[13]

1. *Manasa klaibya*
2. *Saumydhatukshayja klaibya*
3. *Dwajabhangaj klaibya*
4. *Marmachedaj klaibya*
5. *Bramhacharyaja klaibya*
6. *Khara-shukraja klaibya*

Dhwajbhangaj klaibya

Etiology of *Dhwajbhangaj klaibya*- Intake of excessively sour, saline, alkaline, mutually antagonist and wholesome ingredients of food, intake of water in excess, taking meal irregularly, intake of yogurt, milk and heavy foods, Emaciation because of disease cohabitation with young virgin girl , sexual contact other than vagina sexual intercourse with women who is suffer from chronic disease, sexual contact with quadruped animal , trauma to the phallus, injury to the phallus by weapons, tech nails, beating by the stick or compression, suppression of the urge for seminal ejaculation during sexual intercourse.

Sign and symptoms of *Dhwajbhangaj Klaibya*- swelling pain and redness of the phallus, serious type of pustular eruption in and suppression of the phallus. Fleshy growth in the phallus and its quick ulceration, exudation which appears like rice water or which is brownish black or pink in colour. Circular and hard induration below the glans penis.

Erectile Dysfunction

Erectile dysfunction affects the lives of million men and their partners. Erectile dysfunction is the inability of man to achieve or maintain an erection sufficient for the sexual need or need of his partner.

Ayurveda defines erectile dysfunction as follows:

Sankalpapravano nityam priyaam vashyaamapi sthreeyam//

Na yaathi lingashaithilyaath kadaachidyaathi vaa yadi/

Shwasaarthaha swinnagaatrshcha moghasankalpacheshitaha//

Mlaanashishnashcha nirbeehaha syodetat klaibyalaxanam/[14]

charak ckikitsa 30/155-157

This means even through a man has a strong desire to perform sexual act with cooperative partner, he cannot perform sexual act because of looseness (absence of erection) of his phallus (penis). Even if he performs sexual act with his determined efforts he does not get erection and gets afflicted with tiredness, perspiration and frustration to perform the act.

There are two main manifestation – erectile dysfunction as inability to maintain an erection once one is achieved. And in some cases people cannot get a full erection either. There is both psychological and physiological things that need to be appreciated with this process of erectile dysfunction.

During significant stress, the male become too anxious to establish enough parasympathetic input to the penis to get erection. The result is stress induced erectile dysfunction. In other way male has managed to get an erection but then become anxious, his Autonomic nervous system rapidly shifts from calm, vegetative parasympathetic to adrenalin-surge sympathetic. Things have gone too fast and he suffer from either loss of erection or premature ejaculation.

Discussion

Acharya Charak explain *Purusharth Chatustaya*, they are *Dharma*(Virtuous Action), *Artha*(Wealth),*Kama*(Desire) and *Moksha*(Salvation).Each and every parts has been its own importance in Human Life. The Kama as one among the fundamental factors of *Purusharth* for Reproduction. Kama means *Sukha*, it is attained by after properly making obligation and good use of wealth. It comprises many other factors including Normal behaviour, Social, Psychological, Physiological factors. As sexual union is not an individual entity the partners have equal responsibility in the successful completion of the intercourse. Successful sexual life is the result of the balance of both physical and mental factors. Proper Anatomical condition of organs and Physiological functioning are important. Erection requires a sequence of events. Erectile dysfunction can occurs when any of the event is disturbed. Nerve impulse in the brain, spinal column, around the penis and response in muscles, fibrous tissue veins and arteries in around the Corpora cavernosa constitute this sequence of events. Working for long hours in office, Mental stress, short temperedness, and insufficient sleep can cause the erectile dysfunction. Erectile dysfunction occurs due to Grief, Fear, Anxiety and Terror are explain in Ayurveda, Which comes under influence of *Mana.* This emotion can lead to changes in brain chemistry and hormones that affect the sexual function.

Conclusion

An erection is a carefully orchestrated series of events controlled by CNS. Penis is under the complete control of the CNS, both during sexual arousal and at rest. Any disturbance in the network of nerve pathway that connects the penis and the CNS can lead to problem with erection. The sympathetic component tends to inhibit erection, whereas parasympathetic system is one of several excitatory pathways. This process depends on most importantly on sexual arousal, consistent blood flow, and functional nervous system. When our nervous system is impaired, this process may also be interrupted. Grief, Fear, Anger, Anxiety, Inferiority complex, this are said to be urges that should be supressed. And by this we can achieve the *purusharth.* The *klaibya* or ED is a disease, affects the natural life process of many human being due to unhealthy sexual life. Unhealthy sexual life is occurs due to above reasons. Which mainly controlled by *Mana*. Our Nervous system plays a significant role in the processes, So during consideration of treatment of *klaibya* like neurogenic diseases, a good knowledge of neuroanatomy makes understanding of sexual dysfunction possible and predictable.

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