



DIABETES MELLITUS INDUCED ERECTILE DYSFUNCTION - A CONCEPTUAL STUDY

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ABSTRACT

Diabetes mellitus is one of the most chronic diseases in all the countries. It has been associated with sexual dysfunctions. The aim of the study is to critically analyze the frame work of Diabetes mellitus and Erectile dysfunction and connection between two pathological entities. The cause could be vascular, neurological or psychological. In diabetes impotence the history suggestive of presence of desire bring about erectile ability at all the times. When it comes to Diabetes mellitus there are many complications and one among them is Sexual dysfunction. Impaired glucose tolerance in diabetes effects urinary tract infections and if this is not treated then it leads to sexual dysfunctions. Erectile dysfunction is a common complication of Diabetes mellitus. Diabetes mellitus causes infertility in both men and women which leads to loss of libido. That affects the nervous system and causes sexual problems. Prolonged intake of antacids, antibiotics, anti-coagulants drugs for different ailments, may affects liver functions and also nutrients in your body. The acquisition of healthy lifestyle it may reduce the insulin resistance, oxidative stress and the endothelial dysfunction which are prudent achievements in diabetic patients, and may contribute to reduce and prevent the sexual dysfunctions.

KEYWORDS : Diabtes mellitus, Sexual dysfunctions, Endothelial dysfunctions, Diabetic complications, Impaired glucose tolerance, lifestyle changes.

INTRODUCTION

The International Diabetes Federation estimates that the globally, there are about 425 million people in the world with diabetes. The estimates prevalence of erectile dysfunction (ED) in men with diabetes ranges from 20% to 85%. When defined as consistent inability to have an erection firm enough for sexual intercourse¹. The prevalence of ED is over 50.4% in Indian diabetic men after 40 years or older. The prevalence of ED increased with increasing age. A significant high prevalence of Erectile dysfunction was observed in men who smoked heavily, and all of those who were single, had diabetes and the lower urinary tract infections from benign prostatic hyperplasia. Researches confirmed that the inability to get maximum erection of the penis related with the different types of illnesses. However, living with the DM has been reported as the main cause for ED^{2,3}. Erectile dysfunction is known to be one of the major problems faced by people with diabetes mellitus. Diabetes is a risk factor for sexual dysfunction in men; a three times increased risk of ED was seen in diabetic compared with non-diabetic men⁴. Diabetes mellitus is one of the most common chronic disease in nearly all countries, increasing rapidly in every part of the world. DM associated with both macro vascular (including CVD) and micro vascular (retinopathy, nephropathy and Neuropathy) complications. People with diabetes are at a greater risk of developing CVDs, such as heart attack and stroke⁵. Metabolic syndrome, cigarette smoking, or atherogenic dyslipidemia, which are themselves risk factors for sexual dysfunction in both sexes^{6,7}. Epidemiological studies suggest that both type 1 and type 2 diabetes are associated with an increased risk of ED, which is reported to occur in $\geq 50\%$ of men with diabetes worldwide^{8,9}. In the Massachusetts male aging study (mmas), 12 diabetic men showed a threefold probability of having ED when compared to men without diabetes; moreover, the age-adjusted risk of Erectile dysfunction doubled in diabetic men when compared to those without diabetes¹⁰.

ERECTILE DYSFUNCTION (IMPOTENCE)

The Latin term Impotence is made up of two words Im and Potence. Im denotes lack of and potence denotes power.

Definition:

Lack of copulative power in male due to failure in developing or initiating an erection or sustenance of erection until proper ejaculation and satisfaction is termed as impotence (Dorland). E.D is also defined as the persistent failure to develop erection of sufficient rigidity for penetrative sexual intercourse (Kirby 1994).

Pathophysiology and factors complicating diabetic induced erectile dysfunction.

Reduced nitric oxide (NO) Advanced glycation end products - Increase in reactive oxidizing substances and reduced NO production. Failed

neural signal transmission to and from spinal cord due to - diabetic nephropathy and reduced production of neuronal nitric oxide (NO) synthase reduced levels of neuronal nitric oxide (NO) release to cavernosal smooth muscle. Endothelial dysfunction of sinusoidal endothelial cells -decrease in nitric oxide (NO) release and impaired vasodilation. Increasing age and hyperglycemia - glycation of elastic fibres failure of relaxation of the corpora cavernosa; peripheral vascular disease - reduced in arteriolar flow. So always the patient always approach with no hard feeling because it needs the nitric oxide (NO) always say no, so there is no hard feeling. Patient tells that yes I do achieve erection but unable to penetrate. The famous (Leonardo Da Vinci) tells, The penis does not obey the order of its master, who tries to erect or shrink it at will. Diabetes mellitus causes several changes in neuromuscular system, all of which can contribute to ED. In men with diabetes there is good evidence that ED is due to failure if nitric oxide (NO)-induced smooth muscle relaxation due to both autonomic neuropathy endothelial dysfunction.

ERECTILE DYSFUNCTION (KLAIBYA)SAMPRAPTI IN DIABETES MELLITUS(MADHUMEHA)

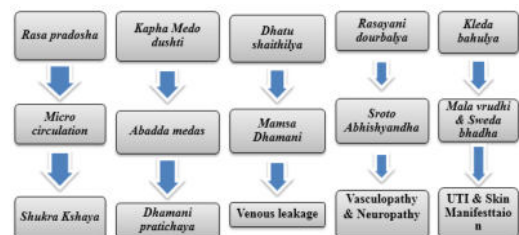


Table 01: Prevalence of erectile dysfunction in diabetes

Various studies	Prevalence of erectile dysfunction in DM (%)	Year
Schiavi et.al.11	77	1993
Kloner12	75	2004
Garg et.al.13	78	2013
Anwar et.al.14	67.4	2017

DM: Diabetes Mellitus

Table 02: Various causes of Erectile dysfunction

Psychological Disorders	Vascular Disorders	Neurological Disorders	Endocrine And Miscellaneous	Metabolic Disorder
Anxiety	Peripheral Vascular	Stroke	Diabetes Mellitus	Smoking
Psychological Trauma	Disease	Peripheral Neuropathies	Hypogonadism	Drugs And Depression

Hypertensin	Multiple sclerosis	Thyroid dysfunction	alcohol abuse	Psychosis
Venous Leak	Spinal and pelvic	trauma	Hyperlipidaemia	Surgery and Misconception
Liver disease	trauma	Hyperprolactinaemia		

Table 03: CLASSIFICATION OF KLAIBYA

Caraka	Susruta	Bhavaprakasa
Bijopaghataja	Manasa	Manasa
Dhvjabhangaja	Saumyadhatuksayaja	Pittaja
Sukraksayaja	Sukraksayaja	Sukraksayaja
Jarasambhavaja	Pumsatva-Upaghataja	Medhrarogaja
	Sahaja	ViryavahiniSiraChedaja
	Sthirasukranimitaja	Sukrastambhanimitaja
		Sahaja

Table 04: Types of Napumsaka

Caraka	Susruta	V.Vagbhata
1. Dvireta,	1. Asekya,	1. Dvireta
2. Pavanendriya,	2. Saugandhika,	2. Vatendriya
3. Samskaravahi	3. Kumbhika,	3. Samskaravahi
4. Narasanda	4. Irsyaka,	4. Asekya
5. Narisanda	5. Sanda	5. Vakradhavaj
6. Vakri	(Su. Sa. 4).	6. Saugandhika
7. Ersyabhirati		7. Irsyarati
8. Vatikasanda (Ca Sa 2).		8. Vatasandaka (As.S.Sa. 2)

The *Napumsaka* and *Klaibya* terms are used synonymously, but actually the *Napumsaka* they are not treated one, they are from *beejadoshajanyai.eMatru and Pitrubeejadoshajanya*. Except *Samskaravahi* the both individuals will be able to perform the intercourse only after taking certain *vrushyamedicines*.

There are two common terminologies they are misused –

- (1) *Aharsha*- There is erection but unable to perform.
- (2) *Apraharsha*- Lack of sexual desire. (Couple will not reach orgasm)

Life style disorders like Diabetes mellitus whenever there is belly, so than like the person starts definitely Erectile dysfunction (ED) is associated. Sedentary lifestyle always is associated with complications as ED, and associated with lots of issues like, relationship issues that's what like WHO defines always like the systematic approach specific concerned with relationship concerned. As the couple that reaching the orgasm is something like dreams come true. Because one partner is healthy aroused where as another partner is not interested, so that what is the classics they have told '*Maithuneparatigaina*' or '*Vyayapratigaina*' so that kind of attitude even it leads to progeny like '*Nara and Narishanda*'. So there is lot of communication gap that's what like *tanumanaha*' *Maithune Tanumanah*: 'during the coitus the both couple should have '*Maithune Tanumanah*':.

PHYSIOLOGY OF ERECTION AND EJACULATION

The performance of sexual act depends upon physical and psychological excitement which is proportional to the strength of the body and mind.¹⁵

Male sexual act mainly comprises of two phase i.e. erection and ejaculation. Erection is the prerequisite to accomplish the sexual act, and it is attained in three ways individually or combined together – viz, *Sankalpa*(Mental preparation for sexual act),

Cesta (physical stimulation) and *Nispidana* (Localised rubbing or stimulation)¹⁶

Sankalpa indicates involvement of psyche as a prime factor and the stimulation of which is obtained through the various pleasuring objects of different sense organs such as *Darsana, Sravana, Rasana, Ghrana,* and *Sparsana*. Further *Sparsana* is the most important as it is the media in *cesta* and *Nispidana* for attaining and maintaining the erection and ejaculation. Various objects of different senses stimulating the mind for getting erection and indulging in sexual intercourse are described in the classical texts.¹⁷

The semen is discharged from its seat during sexual union of man and

woman due to *chesta*(action), *sankalpa* (determination) and *peedana*(pressure) like water being squeezed out from wet cloth. *Harsa* (exhilaration), *tarsha* (thirst for sex), flowing nature or instability, sliminess, heaviness subtleness, outward tendency and impulse of *vayu*, these 8 factors lead to the discharge of semen from the body which is known as the material substratum of the moving and omnipressant soul.

The involvement of different sense organs in their respective subjects, then the stimulation of the mind and *cesta*and *Nispidana* all depends upon the normal function of *Vata*. Particularly *Prana, Vyana*and *Apana* are responsible for erection and ejaculation of semen.¹⁸

It will be surprised to know that *AcaryaSushruta* was the first person who described the complex Psycho - Neuro - Vascular mechanism of erection. He says that the filling of *SukravahaSira*under the influence of psychological or physical stimulation results in tumescence.¹⁹ The ejaculation of *Sukra* is due to the psychological (*smarana*), visual (*Darsana*), Auditory (*Sravan*) and Tactile (*Sparsana*) stimulation.²⁰ Foregoing description indicates the involvement of complex psychoneurovascular mechanism in the process of penile erection.

NEUROPHYSIOLOGY

Neurophysiology starting from the brain with both reflexes i.e. Psychogenic pathway and Reflexogenic pathway these are two coordinates along with this automic nervous system.

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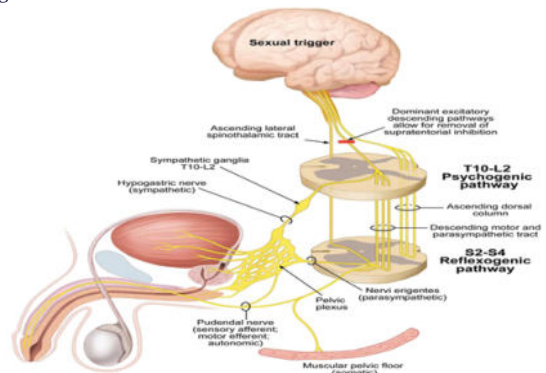


Table 05: These Are The Various Neurotransmitters Which Are Involved In Normal Neurophysiology.

NEUROTRANSMITTER	RECEPTOR AND FUNCTION
Dopamine	D1 and D4 receptor—enhances erection D2 receptor—enhances seminal emission
Serotonin (5-HT)	5-HT—inhibits sex drive and spinal sexual reflex 5-HT1A—inhibits erection, facilitates ejaculation 5-HT2C—enhances erection
Norepinephrine	Enhances sexual function
γ-aminobutyric acid	Inhibits erectile signals
Opioids	Inhibit penile erection
Cannabinoids	Inhibit sexual function
Oxytocin	Enhances appetitive and reinforcing effects of sexual activity
Nitric oxide	Mediates erection at paraventricular nucleus
Melanocortins	MCR4—enhances erection
Prolactin	Suppresses sexual function

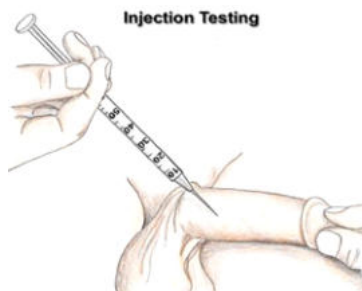
Table 06 :ASSESSMENT

01	Psychogenic
02	Neurogenic
03	Hormonal
04	Vascular

Table 07 :EVALUATION

01	Psychogenic - Sudden onset, Situational, Able to masturbate. -Counselling
02	Neurogenic - Absence of NPT & morning erections - BCR
03	Hormonal - Sukrakshayalakshanas -Serum. Free testosterone
04	Vascular - Good erections but lost during penetration - Doppler study

NPT- Nocturnal Penile Tumescence, BCR-Bulbocavernous reflex



DIGNOSTICS

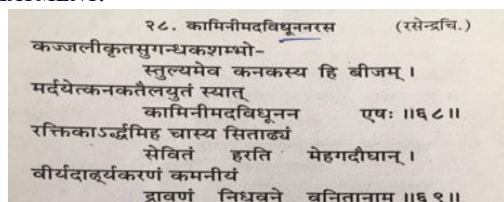
- HbA1c
- Testosterone Panel
- Penile Doppler study
- Cavernosography
- Nocturnal Penile Tumescence Monitoring (RIGI Scan)

Table 08 :DRUGS ASSOCIATED WITH ED

Antacids	β-blockers
H ₂ receptor blockers	Psychotropics
Antidepressants	Spironolactone
Narcotics	Lipid-lowering agents
Cytotoxic drugs	Diuretics
NSAIDs	Antihypertensives

Starting with antacids and Antihypertensives as well as Anti-diabetics drugs so all are having adverse events, in one or other way effects the sexual life. One published research article Metformin what we use regularly for the diabetes patients that is leading to Low testosterone levels i.e. like hypogonadism type of presentation where individual having low sex drive²¹.

TREATMENT:



KAMINI VIDRAVANA RASA is Bruhana, Rasayana, Vajikarana, Tridoshshamaka and Vatakaphahara in Madhemeha(DM) and Klaihya(ED) i.e.Dhatukshayajanya Vataprakopa.In Kaminividravana rasa, Parada (Mercury) is a major ingredient which has aphrodisiac property. The another ingredient i.e. extract of seeds of Dhaturametel and its oil is proved to be having Aphrodisiac property²². The mechanism action of the Kaminividravana rasais possibly by the combined effect of each of the ingredients of the drug. The complications of diabetes like erectile dysfunction can be helped by the formulation.

These are the some readily available formulations having the excellent results in the management of Diabetic- Erectile dysfunction.

FORMULATIONS:

1. VasantKusumakarRas
2. Manmathabhra rasa
3. Kaminividravana rasa
4. Vangeshwara rasa
5. ShrunagarabhraRas
6. RativalabhaGutika
7. Vanariguti
8. Akarakarabhadivati
9. Nidrodaya rasa
10. Pushpadhanwaras
11. Makaradhvajavati
12. NaradeeyaLaxmivilasa rasa
13. Sarivadyasava
14. Chandanasava
15. Usheerasava
16. Chyavanaprasha
17. Shreegopalataila
18. Rativalabhataila

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