Sexual dysfunction in chronic kidney disease patients

Essay

Submitted for partial fulfillment of master degree of internal medicine

By

Tamer Ibrahim Diab
M.B.BCh
Alexandria University
Supervised by

Prof. Dr. Hany Ali Refaat
Professor of internal medicine and nephrology
AinShams University

Dr. Ahmed Aziz Abd Elnaby
Assistant professor of internal medicine and nephrology
Ain Shams University

Faculty of Medicine
Ain Shams University
2010

Acknowledgement

Praise to "Allah", the Most Gracious and the Most Merciful Who Guides Me to the Right Way

It is a great pleasure to express my sincere gratitude to Prof. Dr. **Hany Ali Refaat,** Professor of Internal Medicine, Nephrology Unit, Faculty of Medicine, Ain Shams University. For his parenthood attitude, continuous guidance, moral support and endless scientific advice.

Words cannot express how am I indebted to Assistant Prof. Dr. **Ahmed Aziz Abd Elnaby,** Assistant professor of Internal Medicine, Nephrology Unit, Faculty of Medicine, Ain Shams University. He did a lot to me and taught me all what I know about making essay. He was my guide, my teacher and more than a brother to me. For me he was the milestone for this essay.

Last but not the least; I would like to extend my gratitude to all staff members and my colleagues in the Nephrology Department, for the great help which they have offered me.

I would also like to express my deepest thanks to my mother, father and brothers for their continuous guidance and constant encouragement.

My great appreciation is extended to

all those who shared either practically

or morally in the accomplishment of this work.

Contents

List of Abbreviation

ADMA	Asymmetric dimethylarginine
cGMP	Cyclic guanosin monophosphate
CKD	Chronic kidney disease
EDITS	Erectile Dysfunction Inventory of Treatment Satisfaction
ESRD	End stage renal disease
ETs	Endothelins
FSD	Female Sexual Dysfunction
GABA	Gamma-amino butyric acid
GFR	Glomerular filtration rate
GnRH	Gonadotropin-releasing hormone
HCG	Human chorionic gonadotropin
IIEF	International Index of Erectile Function
MPOA	Medial pre-optic area
NA	Noradrenaline
NANC	Nonadrenergic noncholinergic
NO	Nitric oxide
NOS	Nitric oxide synthase
NPT	Nocturnal penile tumescence
NPY	Neuropeptide Y
PDE5	Phosphdiesterase5
PDE-5	Phosphodiesterase type 5
PGs	Prostaglandins
PTH	Parathyroid hormone
PVN	Paraventricular nucleus
SD	Sexual dysfunction
SHBG	Steroid hormone binding globulin
VIP	vasoactive intestinal peptide

INTRODUCTION

Satisfying sexual experiences are an essential part of a healthy and enjoyable life for most people; it is a basic instinct just like thirst and hunger. Diverse factors have promoted public awareness of sexual issues; these include the realistic portrayal of sexuality in films and other entertainment media, the prevalence of dangerous sexually transmitted diseases, and the wide spread use of medications that intentionally or unintentionally alter sexual functioning.

Sex now is a matter of open public discussion. A public that is more aware of sexual norms and more willing to discuss sexual matters has in turn led to increasing discussion of sexuality in healthcare settings.

Sexual dysfunction is a widespread problem, causing significant distress among individuals and couples .It is also a hidden source of patients who are uncomfortably talking about it and feel ashamed, as it is a reflection of their inadequacy. Many do not realize how prevalent sexual dysfunction problems are and the number of resources that are available to help. (**Hallward A et al 2001)**

For better understanding of sexual dysfunction and its major role in patients' entire life aspects, a thorough explanation of the anatomical, physiological, cultural aspects will help demonstrating the magnitude of the problem among them globally and locally.

Patients with chronic kidney disease (CKD) undergoing hemodialysis show a notable deterioration in quality of life due to the disease and the symptoms it produces, as well as the demands of the treatment, which keeps the patient hooked up to a machine for 3 – 4 h, 3 days per week.

The presence of sexual dysfunction (SD) in this group of patients contributes overwhelmingly to the decline of quality of life. The association between CKD and SD has been reported since 1975. **(Abram HS et al 1975)**

With advances in medical care; the survival of hemodialysis patients has been prolonged. The aim of medical care has evolved beyond the support of life only, but enhancing patients' physical functioning and quality of life which become more and more important. As sexual function is one aspect of physical functioning so, SD which is highly prevalent in hemodialysis patients can cause marked distress and interpersonal difficulties. **(Palmer BF et al 1999)**

SD is a major factor affecting quality of life in end stage renal disease (ESRD) as more than half of patients suffering from ESRD and receiving dialysis treatment describe SD, such as loss of interest in sexual activity, and sexuality was found to be the fifth most important life stressor (cited by 135 dialysis patients in a study of quality-of-life issues), but it receives a very limited attention in follow up of dialysis patients. **(Diemont WL et al 2000)**

Although successful dialysis improves most symptoms of ESRD, yet many patients continue to experience many forms of SD during the dialysis treatment, but only 25% of them discuss their sexual problems with their physicians which may be due to lack of knowledge about sexuality, conservative attitudes toward sexuality and anxiety when discussing sexual concerns. **(Calaluce M 1998)**

SD addresses alterations related to drive, subjective arousal, penile erection, vaginal lubrication, ability to reach orgasm and satisfaction with orgasm and all are affected by ESRD. **(McGahuey CA et al 1999)** A questionnaire given to dialysis patients revealed that 65% were dissatisfied with sex since starting dialysis, 40% have stopped having sex, 27% have no desire for sex and 23% reported that they could not achieve orgasm. Complaints of reduction in libido, impotence and marked reduction in the frequency of sexual relations have been reported in more than 50% of male ESRD patients. **(Palmer BF et al 1999)**

There is no known single cause for these changes, but there are several physical and psychological factors that are thought to contribute to SD such as stress, depression and anxiety due to kidney disease and the management itself may affect patients' sexual desire and ability to enjoy sex which are also affected by medications, diet, anemia, lack of sleep, inadequate dialysis and uremia. **(Diemont WL et al 2000)**

Other proposed factors that may cause SD in male dialysis patients are decreased penile blood supply, hormonal disturbances, low hematocrit level, drugs such as beta blockers, fatigue, psychological problems such as depression and anxiety and difficulties with partner. **(Binik YM et al 1994)**

In comparison to males, a study comparing sexual function in females before and after renal insufficiency found that the percentage of females who completely abstained from sexual intercourse increased from 9 to 40% and among the females on dialysis who continued to have sexual activities, the orgasmic percentage increased from 9% to 31%.
(Rozemann D et al 1990)

In another study, 100% of the women on hemodialysis, 67% of those on peritoneal dialysis and 31% of those with kidney transplants reported a lack of desire for sexual activity and lack of sexual fantasy. Numerous hypotheses have been put forward as to the origin of the SD in female dialysis patients including; uremia, hyperprolactinaemia, gonadal dysfunction, depression, changes in appearance, associated hyperparathyroidism and zinc-deficiency. **(Toorians AW et al 1997)**

Diagnosis and treatment of sexual dysfunction should be included in the global health assessment of hemodialysis patients. A major obstacle in the design of such clinical studies is the need for reliable measurement techniques.
(Rosen RC et al 2002)

AIM OF THE ESSAY

The aim of this essay is to review the relation between chronic renal disease and sexual dysfunction.

This essay also aims to review the value and strategies of management of sexual dysfunction in chronic renal disease patients.

ANATOMICAL AND PHYSIOLOGICAL ASPECTS OF THE GENITAL SYSTEM

1) ANATOMICAL AND PHYSIOLOGICAL ASPECT OF MALE GENITAL SYSTEM:

Testis:

The adult testis normally measures 4.6 cm in the longest diameter (range 3.6-5.5cm) and 2.6 cm in width (2.1-3.2cm). The testis is suspended in the scrotum by scrotal tissues including the non striated dartos muscle and the spermatic cords. The only scrotal attachment of the testis is with the gubernaculum testis.

The testis is surrounded by a thick outer capsule composed of three layers: the visceral layer of the tunica vaginalis, the tunica albuginea, and the inner tunica vasculosa. The epididymis overlies the superior and postero-lateral surfaces of the testis. Both the testis and epididymis are surrounded by a series of coverings which are downward prolongations of the coverings of the spermatic cord and derived from intra-abdominal origin. **(Hendry WF et al 1994)**

Epididymis:

This is a firm structure, attached behind the testis, with the ductus deferense to its medial side. It consists of a single tube, 4-5 meters long, highly coiled and packed together by fibrous tissue. The mass so resulting has a large head (upper pole, globus major) and a small tail (lower pole, globus minor) connected by intervening body, which is applied in crescentic manner to the back of the testis.

The head receives the vasa efferentia from the rete testis and is thus firmly attached to the testis. From the tail, the vas (ductus) deferens, a direct continuation of the canal of the epididymis, provided with a thick wall of smooth muscle, passes up medially; it enters the spermatic cord, passes through the inguinal canal, across the side wall of the pelvis just under the peritoneum, and crosses the pelvic cavity. It pierces the prostate and opens by the ejaculatory duct into the prostatic urethra. **(Romanes GJ et al 1997)**

Spermatic Cord:

The spermatic cord begins at deep inguinal ring and ends at the superior pole of the testis. The left cord is slightly longer than right. The spermatic cord is wrapped in three concentric layers of fascia derived from the layers of the anterior abdominal wall which extend into the scrotal wall as external spermatic fascia, cremastric fascia which encloses some striated muscular fibers united together by areolar tissue and internal spermatic fascia. These three coverings form what is called the fasciomuscular tube. The spermatic cord is composed of the ductus deferens, blood vessels, lymph vessels and nerves. **(Shfik A et al 1997)**

Blood Supply of the Testis:

1. **Arterial Supply:**

The testis is supplied by the testicular artery, the cremastric artery, and the deferential artery. The testicular artery arises from the aorta. It passes through the inguinal ring and accompanies the other contents of the spermatic cord along the inguinal canal to the scrotum.

The deferential artery arises from the internal iliac artery, sometimes from the umbilical artery, superior vesical or inferior rectal branches. Its main branch follows the ductus deferens to the tail of the epididymis. The cremasteric artery arises from the inferior epigastric artery. **(Romanes GJ et al 1997)**

2. Venous Drainage:

The venous drainage of the testis takes place chiefly via a deep and superficial network of veins anastomosing with each other.

(I) Superficial system:

The superficial system consists of the superficial and deep inferior epigastric veins, the superficial internal circumflex and scrotal tributaries of the superficial and deep external and internal pudendal veins.

(II) Deep system:

The chief drainage of the testis is by way of internal spermatic vein, which is typically a single vessel as it enters the abdomen, Before that**,** it begins in the lower part of the spermatic cord as the dense pampiniform plexus which, on the basis of relationship to the vas deferense, is divided into three groups of vessels comprising the deep system. **(Ludwige G et al 1982)**

Penis:

The penis is a pendulous organ suspended from the front and sides of the pubic arch and containing the greater part of the urethra. In the flaccid condition, it is cylindrical in shape. But when erection occurs, it assumes the form of a triangular prism with rounded edges, one side of the prism forming the dorsum.

It is composed of three cylindrical masses of cavernous tissue bound together by fibrous tissue and covered with skin. Two of the masses are lateral, and are known as the corpora cavernosa penis; the third one is median and is termed the corpus cavernosum urethrae (corpus spongiosum).

The corpora cavernosa penis forms the greater part of the substance of the penis. For their anterior three fourth they lie in intimate apposition with one another, but behind they diverge in the form of two tapering processes, known as the crura, which are firmly connected to rami of the pubic arch. They surrounded by strong fibrous envelope called tunica albugina consisting of the superficial and deep fibers.

The corpus spongiosum is cylindrical structure sits in a groove created by other two corpora cavernosa penis and contain urethra. The tunica albuginea surrounds three cylindrical and consist mainly of thick collagenous bundles that contain few elastic fibers. Its thickness is two mm in flaccid condition but it would be decreased during erection to 0.25-0.5 mm. **(Gray H et al 2000)**

The body of the penis is supported by two ligaments. The fundiform ligament which springs from the front of the sheath of rectus abdominis and linea alba; it splits into two fasciculi which encircle the root of the penis. The suspensory ligament which pass downward from symphysis pubis; together they form the strong fibrous band, which extends to the upper surface of the root of the penis, where it blends with the fascial sheath of the organ. **(Cold CJ et al 1999)**

Blood supply of the penis:

1. **Arterial supply:**

The blood supply of the penis comes from the aorta branches. The paired internal pudendal arteries are the major branches that supply the penis. They arise from the ischiopudendal trunks of the internal iliac arteries, which are terminal branches of the aorta. The internal pudendal artery originates at the greater sciatic foramen, crosses the back of the tip of the ischial spine and enter the perineum through the lesser sciatic foramen. It then passes through Alcak's canal in the ischiorectal fossa to become the penile artery. **(Juskiewiski S et al 1982)**

The penile artery passes through the urogenital dighram and along the medial margin of the inferior ramus of the pubis. It divides into four terminal branches in the pernium, the bulbar, urethral, dorsal, and cavernous arteries. The bulbar artery supplies the bulb of the urethra. The urethral artery runs in a longitudinal direction within the corpus spongiosum to supply it, urethra and the glans penis.

The dorsal artery of the penis runs deep to Buck's fascia and in short helical branches in glans penis. Along its rout, it divides into a number of circumflex branches that pass around the corpus cavernosum and the corpus spongiosum. **(Krane RJ et al 1986)**

2-Venous draining:

The venous drainage of the penis is more complex and divided into three separate systems:

(I)The superficial system:

They are consisting of the superficial veins from the penile skin and prepuce and run superficial to Buck's fascia. This is usually a single vessel but may be multiple. It usually empty into saphenous vein or may empty into femoral vein.

(II) The intermediate system:

They are consisting of the emissary, circumflex, and deep dorsal veins. They lie deep to Buck's fascia, and they drain the distal part of the corpus spongiosum, and the corpora cavernosa penis. Small emissary veins from the dorsal and lateral of the corpora cavernosa penis pierce the tunica, combine as the circumflex veins, and empty into the periprostatic plexus of Santorini.

(III) The deep system:

They are consisting of the hilar and cavernosal veins. They drain the proximal portion of the corpus spongiosum and large portion of the corpora cavernosa penis. Both veins empty into the deep dorsal vein**. (Christ GJ et al 1994)**

Penile Innervations:

The nervous system of the penis is involved with both the creation and maintenance of an erection as well as an ejaculation.

Three groups of peripheral nerves have a role in erectile function: which are sympathetic, parasympathetic and somatosensory pathways. These pathways describe efferent and afferent projections.