

DECLINE OF SEXUAL FUNCTION IN MEN BETWEEN PHYSIOLOGICAL SENESCENCE AND PLURIETIOLOGICAL HYPOSEXUALITY - Part II-

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Abstract

The deterioration of sexual potency in the elderly male is due to complex factors and not only through the alleged decrease in testosterone levels which, after the age of 80, would represent only 20-50% of the maximum value, according to some authors (Guyton).

If we take into account these data, in which testosterone is the essential factor in determining sexual intercourse, which is undeniable, why not analyze the cause of testosterone decrease and its effects by losing testicular Leydig cells in the biological process of involution of the human body, which involves and sensitivity of cellular receptors to testosterone. Moreover, the functionality of Leydig cells is strictly controlled by the pituitary gland and brain, and in the biological process of involution, the sensitivity of brain receptor cells and of genitals, reduce their reaction to testosterone by imposing, to have the same effect, amounts much higher of testosterone in order to correct sexual dysfunction in the elderly man and to ameliorate his sexual decline. We also point out that brain neurohormones, which normally correct sexual disorders, can no longer remedy existing sexual abnormalities, the general process of cell destruction as well as apoptosis affect the neuron, too.

The cellular cycle divisions, which underlie the sexual decline associated with aging, occur according to the genetic programming for each cell, and the induced cellular morpho-functional pathology represents the associated chronic pathology (comorbidities of the elderly) that requires even surgical therapies, in order to ameliorate or to remove of sexual dysfunctions.

Keywords: *testosterone, aging, biological evolution, apoptosis, GnRH, glycoproteins, peptide, second messengers, receptors*

Introduction

With aging, serum testosterone levels begin to drop to or below the normal limit, primarily due to a decrease in the number of Leydig testicular cells (located in the interstitium between the seminiferous tubules), which synthesize testosterone after the luteinizing hormone (LH) stimulates the receptors of these cells.

Thus, the testosterone secretion is controlled by the pituitary gland, the amount secreted being proportional to the value of pituitary LH but also subjected to a negative feedback of testosterone secretion, mediated by the hypothalamus, by reducing GnRH (Gonadotropin Releasing Hormone), (Fig.1).

We emphasize that the secretion of LH exactly respects the release of GnRH, which occurs intermittently, respectively for a few minutes at an interval of 1-3 hours (1).

If the hypothalamus does not secrete GnRH (a peptide consisting of 10 amino acids, secreted by its arcuate nuclei), the secretion of FSH and LH is almost non-existent, and the action of glycoproteins by activating second messengers of cyclic adenosine monophosphate is no longer exerted on specific enzymes located on the receptors of the target Leydig cells, so testosterone synthesis stops, and the reduction of gonadal testosterone has a direct negative influence on sexuality.

The sex hormones are precisely those that increase the sensitivity of tactile receptors of erogenous zones, being essential in determining erection, respectively, sexual intercourse.

Leydig cells normally account for about 20%

of the weight of the adult testis, the organ that synthesizes the most testosterone in male, and less dihydrotestosterone and androstenedione, respectively, while the adrenal glands secrete at least 5 types of androgens, but synthesize only 2% of the total amount of testosterone.

Testosterone production is intensely stimulated at puberty (at the age of 10-13 years) by gonadotropic hormones and is maintained until the end of life, as well as spermatogenesis, both reducing, however, over time.

The serum level of testosterone decreases after the age of 50, more severe after the age of 65-70; in elderly male, after the age of 80, it remains only 20-50% of the maximum testosterone value (after Guyton), with the corresponding side effects.

The importance of testosterone in determining sexual intercourse is undoubtedly proven by:

- according to genetic programming, sex hormones are those that give rise to internal and external genitals in male and female; these hormones morphofunctionally mature the genitalia and establish the differentiation of sex, preparing them for the future sexual intercourse.

- testosterone ensures not only the morpho-physiological development of the male genitals, but also their physiology until the end of male's life.

- testosterone also ensures the differentiation of the sexual apparatus during the fetal period and, later, of the neuropsychic peculiarities, even if the hormone has no direct action on the genes (11).

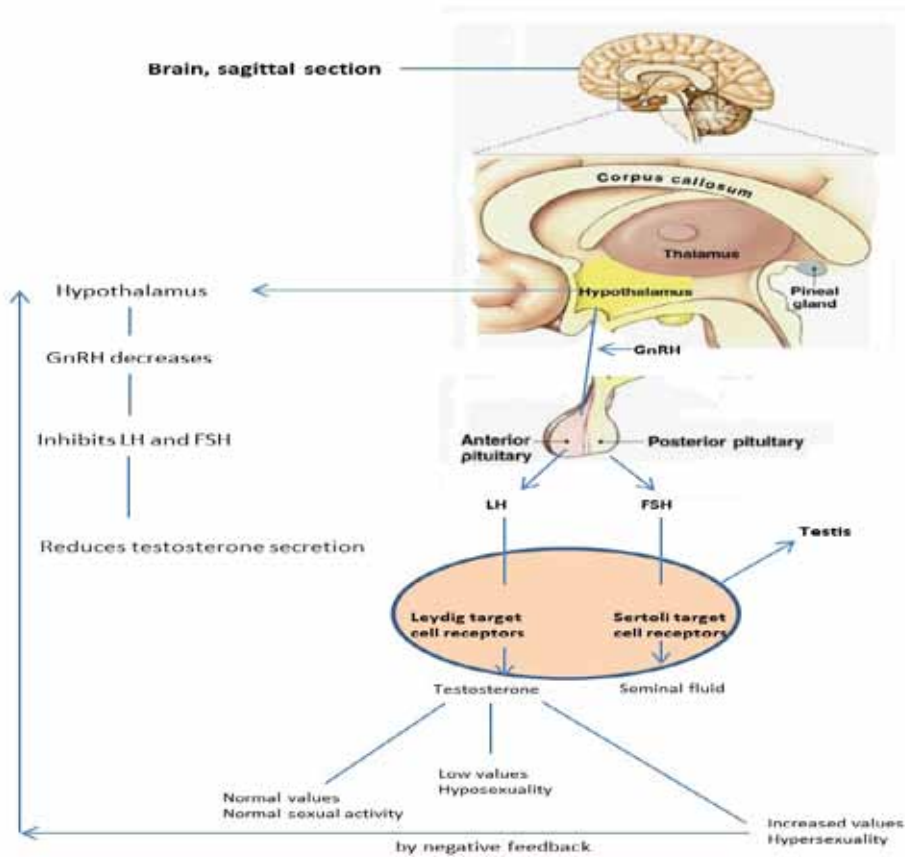


Fig. 1 Pituitary control of testosterone secretion

- androgenic hormones influence the morphology of the penis, participating in the maintenance of the penile peripheral nervous network, the structures of the corpus cavernosum, the albuginea and the endothelium of the cavernous spaces.

- testosterone has a neuroendocrine effect, through which sex hormones sensitize the peripheral tactile receptors of the tissues of the external genitalia, which determine the

state of eroticism, respectively the erection necessary for copulation.

- the molecular mechanism of sex hormones action is exerted not only on the peripheral genital tissues but also, to a lesser extent, in other sensitive areas, such as the base of the thigh or the posterior fold of the knee, and also on brain structures, increasing the individual's sexual arousal.

Method

The study presented in this paper was conducted on a sample of 80 men, aged between 50 and 82 years, diagnosed with various forms of sexual dysfunction, for which they addressed our medical sexology center.

All subjects signed an Informed consent in order to participate in this study.

In the Observation Sheet, information was recorded, among others, on the behavior of the elderly men in conjugal (8) and extramarital sexual partnerships, relationships that involved sexual contact regardless of its type, about intercourse's completion, about self- and hetero-masturbation, fellatio, cunilingus or peno-vaginal act, in order to obtain the orgasm.

The accumulated study data showed us the diversity of methods used by these men in the desire to stimulate their libido, respectively to obtain an erection.

Patients were asked about the rhythmic appearance of their libido, about the genital erotic sensation and the reasons for the absence of sexual intercourse during certain periods.

About 10-15% of patients obviously did not provide clear answers to all the questions asked.

The aim of the study:

to explore and to synthesize the causes of decreased libido and sexual potency in aging males, which, in the author's view, are represented by 3 factors:

- the value of testosterone and the decrease in sensitivity of its cerebral and peripheral receptors, due to the biological process of involution

- associated chronic pathology (comorbidities)

- cellular morpho-physiological changes caused by the process of biological involution after the age of 50, which also macroscopically alter the human body.

In addition to performing the usual general laboratory tests, the following were determined: serum androgen levels, free testosterone, PSA, Free PSA, prolactin, FSH, LH, as well as the spermogram, the balance of neurotransmitters and tumor markers.

In some cases, radioimmunoassays were used, which showed precisely the serum values of total testosterone (a hormone that is still considered as the only cause of sexual dysfunction in the elderly) but also the degradation stage of human cellular structures involved in the libido and in sexual potency.

Paraclinical analyzes have shown that cellular changes in the human body structures that occur in the biological process of involution make some cells receptors no longer to have the same sensitivity to testosterone, that being an essential factor in determining the sexual dysfunction in the elderly male, but also that testosterone remains an important behavioral activator until the end of a man's life.

The data from this paper and the results of laboratory tests also established that the serum values of testosterone in the elderly can be either slightly low, or not at all low, or even high.

The study lot included 2 groups of patients:

1. Men with serum testosterone levels considered within normal limits, without major comorbidities

2. Men with variable serum testosterone levels caused by associated chronic pathology

In both groups there were noted, as a cause of sexual dysfunction, the effects of the biological involution process of the elderly.

Group 1

Normal serum testosterone levels and sexual pathology in men over 50 years of age

Number of patients: 42; they reported erectile dysfunction as the main cause of their sexual decline, as well as the existence of:

- increase in the reception time of erotic sensations to erotic stimuli;
- reduction of the number of sexual intercours compared to the previous period, with increasing intervals between them;
- difficulty in performing the stages of the heterosexual intercourse;
- decreased sensitivity of external genitalia receptors with age and more difficult to obtain an erection;
- decreased sexual appetite and erection determination, by psychic, neurocerebral factors, which no longer activate the erotic neuroreceptor elements as in youth;
- reduction of erections and nocturnal pollution (which disappear after the age of 74-75);
- reduction of erection duration;

- decrease of the penis size (length, circumference) by decreasing the penile basal tone;

- decrease of sperm liquid elimination force, and sometimes anejaculation, that blocks orgasm;

- engaging in ejaculation of supplemental muscle groups;

- reduced efficacy in the visual, tactile and auditory reception of the sexual partner's sensual body qualities.

The 42 patients had serum testosterone values corresponding to their age (Fig. 2).

They presented to the sexology clinic because of the existence of sexual dysfunctions, which, however, could not be explained only by the values considered normal or by the slightly low serum levels of testosterone and dihydrotestosterone.

The explanation was revealed by the results of the laboratory investigations performed, which showed both the existence of physiological values of serum testosterone titer and the presence of cellular structural degradation evidence, associated to the biological process of involution, corresponding to patient's age and his constitutional type, all these being, in fact, the major causes of the forms of sexual dysfunction present.

The important contribution of sex hormones in the determinism of sexual intercourse is certain and accepted by all scientists.

In this case, the acquisition of sexual potency and of the libido are conditioned both by testosterone and by the intensity of degradation of cellular structures of the body, which decrease the sensitivity of the cellular, central and peripheral receptors, causing the decline of sexual activity of the elderly,

during biological involution. This process intensity differs from one individual to another, thus determining the very varied types of sexual dysfunction.

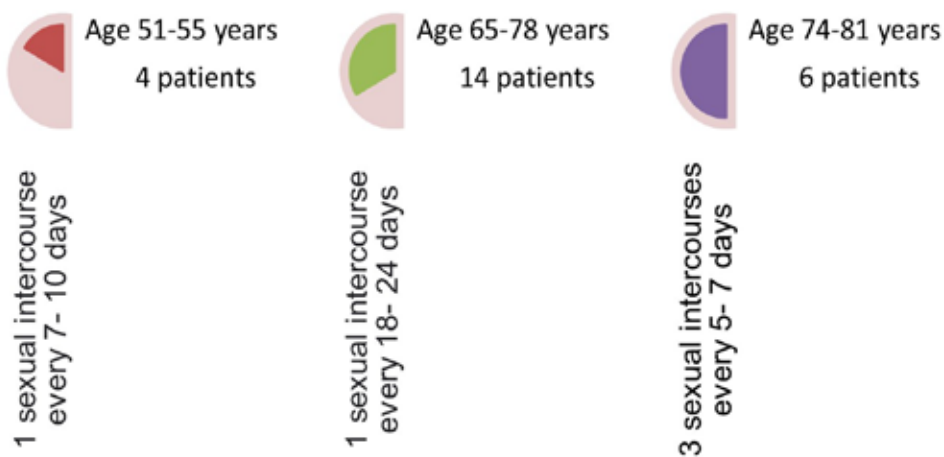
The evidence that not only testosterone levels are the cause of sexual dysfunction in male patients aged over 50 is also attested by the fact that androgen treatment, performed during this period to increase the sexual potency of the elderly, not only has a low efficiency, but is burdened with a potential high risk, such as the onset of prostate cancer, a side effect known for over 100 years.

The depth of the morpho-pathological lesions of the biological process of involution as well as the constitutional type of the individual explain, in addition, why, out of 42 patients, 14 of them aged 65-78 had sexual

intercourse at 18-24 days, and 8 patients, 2-3 sexual intercourses in an interval of 7 days. Also, 11 patients had 1-2 sexual intercourses within 10-14 days.

Four patients (aged 51, 54 and two aged 55 years) with testosterone values above the upper limit of normal, respectively higher than 7.4 ng/dl (reference range 2.8-8 ng/dl), reported erectile dysfunction, which again proves that there are other pathogenic conditions, besides diminished serum testosterone level, which causes sexual dysfunction. They had sexual intercourse at 7-10 days.

A number of six patients aged between 74 and 81 years, with strictly individualized medical treatment, but without major comorbidities, reported the existence of 3 sexual intercourses in an interval of 5-7 days.



Study Group 1 with Normal Testosterone serum levels

Fig. 2 Classification according to the number of sexual contacts and the patient's age

Discussions

Some of the sexual dysfunctions reported by the patients were caused by deficiencies of some analyzers (visual, tactile, auditory), in which the erotic stimuli were perceived with difficulty.

Patients also complained of decreased intensity and duration of the libido, thus reducing the number of sexual intercours. In addition, there also was present the decrease in the erotic sensitivity of the external genitalia, with a low tactile efficiency of the manual stimulation.

There were also reported: difficult ejaculation, with a supplemental muscle groups involvement, as well as a decrease in the amount of ejaculated sperm fluid, explained later in the paper.

The investigations showed, on the one hand, testosterone values considered within normal limits and, on the other hand, the existence of cellular structural degradation, such as those present in analyzers, alterations that decrease the sensitivity of cellular receptors to testosterone, definite cause of sexual dysfunction in the elderly male.

The diminished sensitivity of cellular receptors in the central and peripheral nervous system is the consequence of the biological process of human body involution.

The aging reduces the sensitivity of cerebral neuronal receptors in the hypothalamus, where androgen feedback is closed. Extrahypothalamic areas are also affected, precisely those that induce sexual motivation (2), an important factor in determining the increase in penile tone and in the genitals sensitivity, context in which hormonal values

in the elderly should be higher than in young people. The improvement of the decline of sexual activity in these circumstances is done through the neuroendocrine system of cerebral neurohormones, which tend to correct the sexual disorders (2).

The decrease in the serum titer of testosterone also determines the reduction of the number of precursor cells in the muscle fibers, thus decreasing their size.

Decreases the number of muscle fiber mio-nuclei, as well as the number of androgen receptors, thus reducing the trophic effect of testosterone on muscle fiber, respectively the muscle strength and, in the end, the phenotypic appearance of the elderly male, structural changes perceived negatively by the female sexual partner.

The total serum testosterone concentration varies from individual to individual, depending on the constitutional type, age, associated pathology, biological process of involution, so that sexual and procreative activity may exist in some men aged over 80. According to Guyton and Hall, in the studied population, sexual potency decreases, however, long after the age of 68 years (1), while in our study there were patients aged between 74 and 81 years who had even 3 sexual intercours weekly.

As shown above, the decrease in testosterone during the biological involution phase determines a different sexual behavior from individual to individual, within very wide limits, proving that, in addition to the hormonal factor, there are other factors that induce senescence.

The nuclei of the hypothalamus are involved in determining sexual motivation, contro-

ling the secretion of pituitary gonadotropes; lesions in this area of the brain cause erectile dysfunction (2,4).

This aspect reported by relatively healthy elderly men, that is without debilitating chronic pathology, cannot precisely explain the decline of their sexual life, manifested by the presence of sexual dysfunctions, especially of erection.

During the aging process, in the elderly, at the neuronal level, dendrites are lost, causing the destruction of synapses, a context in which brain functional capacity is reduced, also due to the inability to form new synapses in the process of neurogenesis (2,5).

The neuronal loss negatively influences sexuality also by decreasing the sensitivity of brain receptors to sex hormones, in the process of biological involution that manifests itself differently in each individual, explaining the sexual vitality and fertility of some 75-80 year old men (e.g. person of 94 years, case cited by Seymour -10).

This means that, in order to ameliorate the decline in sexual activity in the elderly, brain neurohormones would also have a favorable neuroendocrine effect, meant to compensate the disorders of the elderly's sex life (2).

The libido and the sexual potency, that are involved in various forms of sexual dysfunction reported by patients aged over 50 (sometimes even younger), are not only dependent on the testosterone secretion of Leydig cells in the gonadostat.

In the libido determinism, in addition to the role of testosterone, both the integrity of the central nervous system (CNS) and the neuroendocrine factors intervene, along with the role played by the genetic support and the

vital potential of each individual, all of these factors being involved in the aging process (7).

An example can be given by the brain eroticization, which triggers the sexual response determined by the cortical command to endogenous or exogenous stimulating signals, real or imaginative.

In the absence of brain eroticization by androgens, arousal stimuli remain simple informations that cannot trigger the erotic impulse and the erection.

An essential role in the initiation of the sexual intercourse (primarily necessary for human procreation) is played by the state of erotic tension generated by the accumulation of sperm fluid. It's volume causes local congestion in the testis, epididymis, seminal vesicles, that reflexively initiates a central neurological response in which the hypothalamus, through neurohormones, stimulates the androgen secretion, increases the sensitivity of external genitalia and causes erection and ejaculation of sperm, either through sexual intercourse or by pollution or by masturbation, in the absence of a sex partner.

Group 2

Male patients with variable serum testosterone levels, sexual dysfunctions caused by associated chronic pathology and comorbidities of the biological process of involution

Number of subjects: 38

The addressability to the sexologist was made for the existence of complex sexual dysfunctions.

In general, the coexistence of associated chronic diseases decreases the serum levels of testosterone and dihydrotestosterone, that are essential in determining the sexual intercourse.

Minor hormonal variations have little influence on sexual potency in the elderly male.

Cellular morpho-functional changes and the apoptosis, caused by the biological process of aging and, in particular, by the associated chronic pathology, are the main causes of sexual dysfunctions, some severe and irreversible.

Diabetes mellitus and it's cardiovascular complications:

The study enrolled 17 diabetic male patients with sexual erectile dysfunction, usually associated with libido, intercourse, ejaculation and orgasm dysfunctions.

Diabetes mellitus is a cause of permanent male sexual dysfunction, causing the partial or total absence of libido, with anaphroditism and hyposexuality.

Erectile dysfunction is a pathognomonic sign for diabetes.

According to Harrison, about half of male diabetics develop „sexual impotence” after about 6 years from diabetes mellitus onset (3); erectile dysfunction may be the first clinical manifestation of diabetic neuropathy, followed by ejaculatory dysfunction and orgasm, damages that aggravate with aging (7).

Diabetic neuropathy is the cause of sexual impotence and retrograde ejaculations in these patients.

Erectile dysfunction is caused by a decrease in nitric oxide in the penile vascular system (3).

Erectile dysfunction in the diabetic patient may present as total or partial anerection, depending on the severity of the damage.

Two of the 17 patients in this study group presented with abandonatory erection; one of them, who had a semi-erect penis, managed to penetrate and to perform a few copulatory movements on female partner's dehiscent vulva, after which the erection became abandoning.

In the second patient, aged 70 years, also with semi-erection, at the intention to penetrate the vulva, the abandonment of the erection occurred at the very level of the vaginal introit of his 53-year-old female sex partner (who presented a high perineoraphia, performed after perineotomy with myoraphia of anal lifting muscles).

In diabetic patients, in addition to total anejaculation, there may also occur retrograde ejaculation after treatment with alpha-blockers and, respectively, premature ejaculation (in the first 2 minutes after penetration).

Diabetes produces morphological testicular changes such as atrophy of the seminiferous tubules, slowing sperm maturation and decreased activity of Leydig cells, a context in which testosterone secretion is reduced, followed by damage of the testicular germinal epithelium, besides decreased serum titer of androstenedione, of pituitary gonadotrophins, respectively of 17-ketosteroids.

In the diabetes-associated sexual dysfunction, apart from vascular lesions, which cause morphological and structural changes in the arterioles of the cavernous bulbs with

decreased penile blood flow, coexists the sensory and motor nerve fibers damage, that of the cavernous bulb nerves, which directly affect penile vasodilation.

Denervation of sinusoidal smooth muscles causes the loss of vascular contractile elements, limiting both local vasodilation and the functionality of the medullary reflex arch.

Erectile dysfunction, in turn, can be an early marker of cardiovascular disease in diabetes, appearing even 2-3 years before the onset of myocardial infarction or stroke or severe heart failure, according to some authors.

The association of cardiovascular disease classical risk factors with diabetes mellitus doubles the incidence of erectile, copulation, ejaculation and orgasm dysfunctions.

In the case of streptozotocin diabetes, VIP-ergic neurons (vasoactive intestinal peptide) of the penis decrease by relaxing the smooth muscles of the penis, reducing blood flow in the erection.

In addition to the causes already listed, the pathogenesis of sexual dysfunctions also involves the damages determined by lesions associated to the biological process of aging, which require the existence of stronger hormonal stimuli of sexual arousal, including at the brain level.

Reduced reactivity to stimuli, decreased transmission of nerve influx from analyzer receptors, involuntary brain damage, reduced gonadal secretion of androgen hormones determine a decreased erectile tone; the mentioned factors explain why in young men erection may occur in 3-5 seconds, while in the elderly the time of erection appearance increases by 3-4 or even more times.

Patients operated for recto-sigmoid pathology:

Number of male patients: 15, aged between 68 and 81 years, with an iliac anus (colostomy) after surgery for recto-sigmoid diseases.

Patients presented with libido and erectile dysfunctions with either organic and psychogenic etiology (7).

A number of 9 men had, postoperatively, semi-erection, which allowed them, however, to perform vaginal penetration, but only in female sexual partners with vulvar dehiscence.

In 3 of these male patients, in the context of penile tone decrease, the copulatory act sometimes could not be completed due to the abandoning semi-erection, a situation in which sexual intercourse was without ejaculation and orgasm.

The remaining 6 patients, on the background of a phase of immediate postoperative stress, did not have any sexual intercourse, but subsequently they became almost sexologically normal, by having semierection, which allowed them to perform hetero-masturbation or even peno-vaginal intercourse, but of low quality.

These men were also able to ejaculate, by training additional muscular groups, and had low-intensity orgasm.

There were also 2 patients, operated for rectal tumors and later with colostomy, who had a complex recovery system and who obtained semi-erection and sexual intercourse three times a week, but with reduced ejaculation and orgasm.

The interval between sexual intercourses was 10-14 days, and the age of these men was 72 and 74 years. The serum testosterone level of the respective patients was 12.9, respectively 18 nmol/L (reference range for men aged over 50 years = 6.68- 25.7 nmol/L).

The cause of the semi-erection, respectively of the types of sexual dysfunctions, was the surgical sectioning of the pelvic vascular and nervous structures (both motor and vegetative fibres).

The lesions produced by the surgical act are related to the severity of the rectal pathology, to the septic "time" and the urgency of the intervention, to the professionalism of the operator, to the anatomical variant of the topography of the pelvic formations and to the

type of surgical intervention (20).

Anatomically speaking, between the rectum and the presacral aponeurosis there is a retrorectal space cleavable to manual, bleeding maneuvers, space that laterally has the ureters and middle hemorrhoidal arteries, in the foreground has the bladder, the seminal vesicles, the vas deferens and the base of the prostate; thus, the surgical maneuvers can easily damage adjacent anatomical formations, as well as the local vascular-nervous elements, with severe repercussions on the functionality of the male genital tract. Moreover, each lower hypogastric plexus, right and left, also contains parasympathetic fibers, which, by sectioning, negatively influence the male erection (Fig. 3).

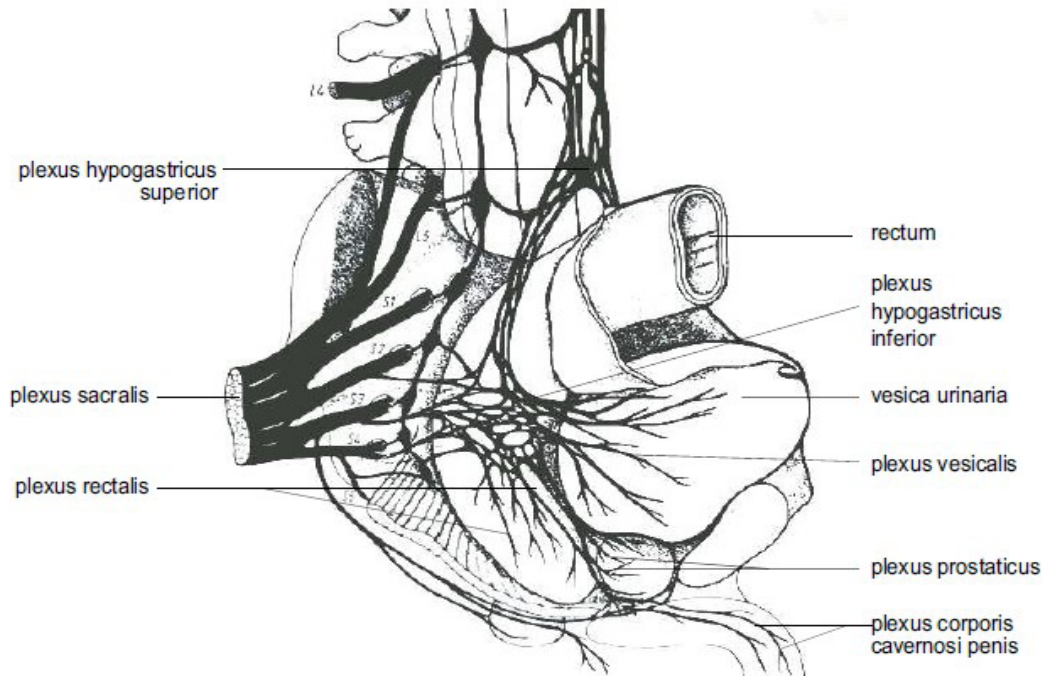


Fig. 3a The vegetative/autonomous pelvic innervation in male- schematic drawing

(Adapted from Benninghoff-Goertler 1979, JCS, Vol.2, No.2/2019)

From this category, 7 people presented permanent lesions (Fig. 4) at the level of the glans. Asymptomatic penile lesions negatively affected the partner, who refused peno-vaginal sexual intercourse and fellatio on the grounds that it may be “a venereal disease”

It is also worth mentioning that all patients operated in this group had night dreams with low erotic intensity, without erection and pollution.

The vascular-nervous surgical sections, by modifying the morpho-physiology of the external genitalia, reduce the intensity/smell of pheromones, especially the penile ones, situation that may decrease the sex partner's arousal.

A mucous secretion is present, in small quantities and having a particular odour, at the level of the postoperative remaining rectal segment (which can no longer be controlled voluntarily); more than that, the colostomy itself may disturb the sex partner's attention and inhibit her. Also, simultaneously, through the same process, inhibition of man's erection appears.

Obviously, the sexual partner of this type of operated male patient must show understanding of his particular physiological and anatomical situation due to the presence of iliac anus and must try to minimize, as much as possible, the special condition generated by the colostomy and by the rectal abutment smelly secretion, being necessary to encourage a normal sexual relationship.

The sperm fluid eliminated by the patients in this group was in a small amount (on average about 2.5 ml) and ejaculation occurred with difficulty, by using additional muscular groups compared to the muscles normally in-

involved in this process.

The orgasm was of low intensity and short duration, which proves once again the importance and severity of the local consequences of the section of neuro-vascular elements produced intraoperatively, during surgical dissection, on the pelvic anatomical elements and also remote effects the on the brain, as a psychic inhibitory factor.

Patients that had prostate surgery: in a number of 5 patients who underwent prostatectomy by transurethral endoscopic prostate resection, retrograde ejaculation occurred postoperatively, a context in which the sexual partner no longer received the smell and taste of sperm after fellatio.

The state of continuous mental stress increases the level of cortisolemia, followed by decreased androgen production, increased daily rate of neuronal destruction, affecting brain function and which, of course, causes morpho-pathophysiological changes reaching the level of cellular DNA.

Stress causes erectile dysfunction by inhibiting testosterone secretion, by altering the pulsating secretion of LHRH (Luteinizing Hormone Releasing) and by inducing hyperprolactinemia (2)

In the involution process, the accumulation of mutant mitochondria (due mutations in the mitochondrial DNA produced by oxidative stress) contributes to cell degradation.



Fig. 4 Penile mucosa lesions, in patients operated for recto-sigmoid pathology

Sexual dysfunction secondary to anabolic steroids usage:

This type of sexual dysfunction was present in a number of 6 patients, aged between 51-65 years, who used anabolic steroids in order to increase muscle mass.

Anabolic steroids act at the hypothalamic-pituitary level, decreasing the secretion of FSH and LH, so those hormones reduced level no longer stimulate testicular activity. In these patients, who invoked the presence of erectile dysfunction, there was also a shrink in testicular volume and tone.

The diminished testicular volume decreases not only the production of testosterone but also that of sperm, causing infertility.

Conclusions

The sexual function decline of the elderly male, respectively the plurietiological hyposexuality of the man aged over 50, is accentuated by the biological process of involution, which gradually causes the entire human body deterioration.

Cellular changes occur, according to genetic programming, for each cell type, from skin receptors to brain tissue, constituting comorbidities.

Morpho-functional alterations of cellular structures involved in determining the state of male's arousal consist in reducing the sensitivity of testosterone cellular receptors, both centrally and peripherally, and especially of the ones located on the glans penis, which, through its structure, is the most important

source of sensory nerve impulses necessary to trigger and to maintain an erection, respectively for the initiation of sexual intercourse.

In the elderly, a decrease in the sensitivity of cellular receptors to testosterone requires the existence of an increased amount of circulating testosterone in order to obtain the same erotic effect, necessary for copulation. It must be reminded that, in humans, the adrenal gland is responsible for the synthesis of only 2% of total testosterone, the rest being provided by the testicles.

In older men, testicular atrophy is due to the loss of Leydig cells and to the damage to the remaining cells, so that, over time, hormone synthesis and secretion are reduced, with negative repercussions on the erection, which will be more difficult to achieve and to maintain.

In the biological involution process characteristic of "physiological" aging, the synthesis of dopamine decreases at the level of presynaptic nerve endings, the degradation of this neurotransmitter is accelerated by monoamine oxidase B, the reuptake being also low.

The reduced amount of dopamine negatively influences both brain and perceptual functions of some analyzers (visual, auditory, tactile etc.) at the level of their receptors and also the cerebral cortex integration process.

The decrease, in the elderly man, of the serum titer of testosterone, by Leydig cells loss, as well as the reduction of the sensitivity of the peripheral and cerebral receptors located in the hypothalamus also negatively affects the extra-hypothalamic areas, responsible for the sexual motivation.

Measurement of steroid hormone levels

by lab tests, which did not take into account the serum level of testosterone in men with pathological hypogonadism, revealed other titers of the androgens (2,12).

In this context, the analyzes performed revealed „normal” values of testosterone in the elderly, as evidenced by this paper’s study, as proven by group 1 patients.

The effect of chronic debilitating diseases was added to all these mentioned above; so, the comorbidities, among other things, depress the gonadostat, especially through pituitary glycoproteins that act on Leydig cells, by activating the second messenger system of cyclic adenosine monophosphate, thus impacting the enzyme systems in target cells.

Numerous deficiencies in patients who do not normally exist before the age of 50 (such as impaired visual acuity and erection speed at erotic stimuli received visually or tactilely, reduced tactile sensitivity of the external genitalia, especially of the penis) led us to conclude that the decrease in the sensitivity of cellular receptors to achieve the same effect (erection) imposes, in the elderly, the presence of a significantly higher amount of circulating testosterone, which needs to increase with aging and which augmented amount is indispensable for the normal functioning of brain receptors; the statement refers to both androgens in the hypothalamus and extrahypothalamic areas, as well as peripheral ones, especially those of the genitals.

The male’s constitutional type, his general state of health, respectively the presence of comorbidities, explains the existence of testosterone values above the upper limit in the elderly, which could bring him a much higher sexual performance, as well as fertility.

Conflict of interest

The authors have no conflict of interest to make the declaration, had full access to all the data in the study and takes responsibility for the accuracy of the data analysis.

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