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Research Article

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Impact of Bariatric Surgery on the Sexual Health of the Morbid Obese

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Abstract: Morbid obesity is a multifactorial chronic disease associated with important physical and psychological complications that contribute to reducing life expectancy and worsening its quality. Within its great complexity, it can be a risk factor for sexual dysfunction (DS) in both genders, since it leads to states of secondary hypogonadism in men and hyperandrogenism in women, in such a way that it alters both normal and reproductive sexual activity. One of the most effective tools in the treatment of obesity is Bariatric Surgery (BC) due to the loss of weight that is obtained, therefore, it is expected to have a favorable impact on sexual dysfunction.

Keywords: sexual response, bariatric surgery, morbid obesity, post-surgical bariatric surgery.

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Introduction

Obesity is a chronic metabolic disease of multifactorial origin defined as excess weight due to the accumulation of body fat. Its prevalence has increased exponentially in recent years, becoming a major public health problem. The prevalence of Morbid Obesity (OM) represents a public health problem, it is estimated that up to 1.6 billion people in the world are overweight and 400 million are obese, with the consequent increase in cardiovascular morbidity and mortality. In adolescents (ages 10-19 years) the global prevalence ranges between 6.9% and 17.4%, showing an exponential trend in the same way. (4-5)

Therefore, obesity is one of the most challenging problems and triggers of harmful psychological, metabolic, physical and social effects, as occurs with the alterations produced in the sexual response of the individual with OM, which is composed of an important factor psychological. (5)

Sexuality constitutes a basic function of the human being that involves physiological, emotional and cognitive factors, and that is closely related to the state of health and quality of life. (6) Similarly, the potential impact that various medical problems can have on sexual health is undeniable, as well as the determining role of some psychological processes that can affect sexual functioning and the development of different sexual dysfunctions (7).)

Bariatric Surgery (BC) is considered the most effective treatment for patients with morbid obesity, since with it a weight loss that can exceed 30% is obtained and is maintained in the long term. (5) It is essential to note that the role of the BC goes beyond the aforementioned weight loss. In this sense, an improvement or remission of the different comorbidities after surgery has also been shown. (6) All these beneficial effects of BC lead to a decrease in mortality of almost 30% at 10 years, possibly due to a decrease in cardiovascular risk. (5)

Materials and methods:

Scope: Descriptive. To survey the necessary information used in this research project, an exhaustive search of historical data was carried out on the dates corresponding to the months of August, September and October of this year 2020, which frame the results according to the experiments and investigations that were developed in different investigations. For the construction of this article, the following inclusion criteria were used: Articles that are related to the topic to be developed in this review, articles published between the period 2002 to 2022, review-type articles, originals and meta-analyzes, articles found in the PUBMED, SCIELO and OVID databases, articles that had content written in Spanish or English and the implementation of logical operators "AND" and "OR" to establish a relationship for each term. Articles that were not relevant within the subject or had no relation to the subject provided, articles that were not released or that did not have free access, articles whose content was written in languages other than English and Spanish, and articles that have been published less than 2002. Of the total articles found, 42 were analyzed that collect valuable information and were used in this research article.

Results:

According to the World Health Organization, obesity is a chronic disease, characterized by increased body fat, associated with a greater risk to health; This is classified based on the Body Mass Index (BMI), which corresponds to the relationship between weight expressed in kilograms and the square of height, expressed in meters. In this way, people whose BMI calculation is equal to or greater than 30 kg / m2 are considered obese (10).

For Master and Johnson, the physiological sexual response consists of four phases: Arousal, PLATEAU, ORGASM and RESOLUTION which Kaplan and Leif modified to include the concept of DESIRE, which reflect the psychological, emotional and cognitive components of the sexual response. At a certain moment, this physiological response can be altered in some of its phases, becoming states of sexual disease that are gathered under the name of sexual dysfunction. (8, 9)

Currently, the studies that directly relate body weight and sexual functioning are minimal and the vast majority only mention the male sexual response as the central axis, necessary for study, due to the large number of male patients with morbid obesity associated with erectile dysfunction or responses ineffective, pleasurable or complete sexual activities, which degrades sexual life as a couple and alters psychological steps in the patient. However, the improvement in sexual desire in the male population stands out with respect to the other domains of sexual response, being much more effective in gastric bypass. (7, 23)

The rest of the studies focused on the female sexual response show more satisfactory results. compared to men. This is basically due to the fact that the correction of excess weight in women has a favorable impact on a complete, full sexual function and does not alter psychological steps. That is, in women a less aggressive situation is contemplated and in them the treatment shows more effective results (24).

It is even interesting to note that some authors have found that in women improvements are obtained in all components of the sexual response, while in men, improvements are only evidenced in the perception of sexual attractiveness (psychological component). That is, while in

women the improvement is usually complete, in men there are only improvements in psychological aspects (22).

Although it is true that there are many studies that speak of the relationship between obesity and a poor sexual response, metabolic pathways that are altered and that have an impact on the sexual gonads have not yet been confirmed, but it is confirmed that a large part of This sexual deficiency is accompanied by a psychological component that improves after bariatric surgery or some other treatment behavior (23).

According to some authors, a relatively large percentage of severely obese / morbid patients present problems of sexual satisfaction before surgery that improve significantly after 12 months of follow-up, especially women. (twenty-one)

Several studies have shown that Bariatric Surgery produces improvement in the sexual sphere. Specifically in men, they found improvement in all spheres of sexuality, as well as in weight loss. In women, most studies have shown improvements in sexuality in all domains. Only one study found no changes in desire and lubrication at 6 months after surgery and another found no difference between preoperative and postoperative measures (21)

Discussion:

Morbid Obesity is a metabolic disease of complex pathogenesis and in part not very well known, which develops from the interaction of the predisposing genotype and the environment, and which includes environmental factors conditioning intake and energy expenditure, which determine the onset, development and magnitude of obesity. (12)

Obesity can be a risk factor for sexual dysfunction in both genders and there is a strong association between obesity and erectile dysfunction (ED). However, the influence of obesity on sexual function is not clear. Men with a BMI greater than 28.7 Kg / m2 have a 30% increase in the risk of Erectile Dysfunction compared to those with a normal BMI. (13)

Sexuality is a dimension of the personality that encompasses the physiological and psychological processes inherent to sexual development and the sexual responses of the individual, both in men and in women. (1) The WHO defines sexual dysfunction as "the various ways in which the individual is unable to engage in relational sexual activity as he or she would like". This must be seen from a bio-psychosocial sphere, which directly and indirectly impacts obesity in a different way in each of its phases, finally reflected in what is known as sexual dysfunction, whether male or female. (8)

In the obese male, states of excess visceral fat become an important risk factor for the development of male hypogonadism, which, in this case, receives the specific name of MALE OBESITY SECONDARY HYPOGONADISM (MOSH). MOSH is reflected in testosterone deficiency, erectile dysfunction, and changes in sperm and semen; that is, a state of sexual dysfunction occurs. (14) Testosterone deficiency causes difficulties in achieving and maintaining an erection, the so-called erectile dysfunction, which, in addition, can be aggravated in obese patients in the presence of other important comorbidities such as cardiovascular dysfunction and type 2 diabetes mellitus. (15,16).

The definition of female sexual dysfunction (FSD) includes persistent or recurrent disorders of sexual interest / desire, subjective and genital arousal disorders, orgasmic disorders, and pain and difficulty with attempted or incomplete intercourse. (17)

In women, obesity leads to a state of hyperandrogenemia, which is frequently translated as anovulatory infertility. This association becomes more apparent with increasing BMI. Similarly, the obesity-polycystic ovary syndrome association and the cause-effect relationship of obesity with the decrease in lividity are well known. (19) In addition, for women, physical appearance translates into a subjective and intersubjective assessment of herself.

The sexual response in women has some variations; The most important of them is that it is not a purely linear but circular process according to Basson's model, based on the fact that the sexual response of women is not always uniform and linear, but rather that it poses sequential stages (Table 1) that can be seen altered in obese patients for the reasons described above, thus giving rise to the most frequent types of sexual dysfunction in these types of patients (4, 9)

Table 1: Female Sexual Dysfunction

FEMALE SEXUAL DYSFUNCTION	
DYSFUNCTION	**DESCRIPTION**
Female organic disorder	It is defined as the persistent absence of orgasm after an adequate arousal phase.
Sexual Interest Disorder / Female Arousal	Hypoactive sexual desire or inhibited sexual desire: lack of interest in sexual activity.
	Arousal disorders: persistent or recurrent inability to obtain and maintain the lubrication and tumescence typical of the arousal phase until the end of the sexual act.
	Persistent sexual arousal disorder: it is a rare condition, and consists of intrusive, spontaneous and unwanted genital arousal in the absence of sexual interest and desire.
Genito-pelvic pain disorder on penetration	Dyspareunia: is the appearance of recurrent genital pain associated with sexual intercourse and that also produces interpersonal discomfort.
	Vaginismus: It is the involuntary, recurrent spasm of the outer third of the vagina that interferes with sexual activity and causes interpersonal discomfort.
Ramirez Durán G, Barriento García M. Sexual and reproductive health. 1st ed. Vol. 31, Cuban Journal of Nursing. UNIVERSITY OF ALMERIA; 2015. (34) Sources X. Human Sexuality and Sexual Dysfunctions Human Sexuality and Sexual Dysfunctions. Rev Chil Urol. 2016 [cited 2020 Sep 10]; 81: 39-41. (18)	

Male Sexual Dysfunction:

The frequency of sexual disorders in men in adulthood is estimated at 20-30% and shows a tendency to increase with age. (18) One of the mechanisms involved in the presentation of sexual dysfunction in obese patients is the increase in the Aromatase activity due to increased adipose tissue, leading to increased conversion of testosterone to estradiol, and increased estradiol would lead to suppression of hypothalamic gonadotropin-releasing hormone and pituitary gonadotropin secretion. This would result in a reduction of testosterone secretion by Leydig cells and of spermatogenesis in the seminiferous tubules (8,9). Additionally, there is a strong correlation between free testosterone levels and the degree of relaxation of the trabecular smooth muscle during erection (Table 2). (17)

Table 2: Male Sexual Dysfunction

MALE SEXUAL DYSFUNCTION	
DYSFUNCTION	**DESCRIPTION**
Erectile dysfunction	It is the persistent inability to obtain or maintain a proper erection

Premature ejaculation	Ejaculation that always occurs before or during the first minute of vaginal penetration causing negative personal consequences such as distress, frustration and / or avoidance of sexual intimacy.
Male orgasmic dysfunction	It includes two clinical pictures: - Anejaculation - Delayed ejaculation
Hypoactive sexual desire disorder	Permanent and persistent absence of erotic fantasies and motivation to access sexual relations.
Ramirez Durán G, Barriento García M. Sexual and reproductive health [Internet]. 1st ed. Vol. 31, Cuban Journal of Nursing. UNIVERSITY OF ALMERÍA; 2015. (34) Sources X. Human Sexuality and Sexual Dysfunctions Human Sexuality and Sexual Dysfunctions. Rev Chil Urol. 2016 [cited 2020 Sep 10]; 81: 39-41. (18)	

Sexual Dysfunction in Morbid Obesity

Taking into account that obesity is both a physical disorder (accompanied by different comorbidities and hormonal alterations), as well as a psychological one, the sexual life of patients who present it can be significantly altered (7, 21). report higher rates of sexual dysfunction among people who are in poor physical and emotional health. Several studies also suggest an inverse relationship between BMI and sexual function. In particular, obesity and / or various obesity-related comorbidities can affect sexual function and quality of sexual life. (22)

To assess ED in man, some indices are available. The most widely used worldwide is the International Index of Erectile Dysfunction (IIEF). This modelIt has been known since 1996-1997 and is an adjunct to the drug use clinical trial program. It is currently available in more than 32 languages around the world. The IIEF stands as the "gold standard" in treatment outcomes for clinical trials in ED.

Another frequently used tool is the Brief Sexual Function Inventory (BSFI, for its acronym in English; O'Leary et al., 1995), that It is a brief self-report that allows evaluating the sexual functioning of the man in the last 30 days. It has been validated in various countries, including Spain (26).

Results of Bariatic Surgery in the Sexuality of the Morbid Obese According to Their Gender:

Regarding gender differences, as in sexual functioning, it has been found that couple relationships are more affected in the case of obese women than in that of men. Obese women have more problems having a sexual partner than

normal-weight women. Within the general health of the individual, sexuality is a key element for physical and mental well-being. The treatment of obesity can have very positive effects on a woman's sexual health, since it can improve certain sexual dysfunctions and certain aspects related to contraception, pregnancy, fertility and menopause. (24)

This weight loss is achieved through nutritional measures and physical activity planned in the first instance, however, the group of patients with morbid obesity will usually require some type of surgical intervention (Bariatric Surgery) to achieve the goal of losing weight. desired weight (28)

It is of interest for public and clinical health to try to understand how sexual satisfaction evolves in obese patients after BC. However, to date, it is unknown how BC influences the degree of sexual satisfaction of patients with severe / morbid obesity. (twenty-one)

It is established, yes, that BC for weight loss improves hypogonadism secondary to obesity in men, and hyperandrogenemia in women, with the consequent improvement of the individual's sexual activity. What remains in conflict is the evidence that these surgeries may have some positive effect on fertility. (31) SEE ANNEX 5

In fact, BC, whatever it may be, causes an immediate and sustained reduction in BMI, much more than medical therapy, which leads to an improvement in pathophysiological alterations (hormonal and metabolic profile) that cause or contribute to male hypogonadism and hyperandrogenemia. female, with which favorable effects are achieved on the erectile function of men and sexual satisfaction of women (31)

Table 3: Results in Women

IMPACTO DE LA CIRUGIA BARIATRICA EN LA SALUD SEXUAL DE LA MUJER OBESA MORBIDA											
AUTOR	MUESTRA	INDICE DE FUNCION SEXUAL FEMENINA (FSFI)						TIPO DE CIRUGIA	DISFUNCION SEXUAL		EVOLUCION POSOPERATORIA
		DESEO	*EXCITACIÓN*	*LUBRICACION*	*ORGASMO*	*SATISFACCION*	*DOLOR*		*PREOPERATORIA*	*POSOPERATORIA*	
Oliveira CFA, Dos Santos PO, de Oliveira RA, *et al (Mar-2019)*	38	3,6/4,2	3,6/4,5	4,1/4,8	3,4/4,4	3,6/4,8	4,8/5,2	ByPass gástrico en Y de Roux	62%	19%	6 meses
Silvia JM, Puerto Niño A, Duarte A. Vargas I, Sanchez Basto C *(Dic-2018)*	13	2,67/4,15	2,42/3,30	2,65/3,71	2,70/3,87	3,07/3,87	2,55/1,38	ByPass gástrico en Y de Roux/Manga Gástrica	*Incremento del 12,4% en el puntaje global de FSFI*		19 meses
Pichlerova D, Bob P, Zmolikova J, *et al (Abril-2019)*	60	3,1/3,7	3,1/3,6	3,7/4,2	3,4/3,8	3,1/4,0	3,7/4,4	Banda gástrica ajustable/Plicatura Gástrica/Derivación Biliopancreática	51,60%	39,50%	6-12 meses
Assimakopoulos K, Karaivazoglou K, Panayiotopoulos S, *et al (Mar-2011)*	59	3,25/3,74	3,13/3,92	3,62/4,48	3,50/4,04	3,55/4,26	3,76/4,61	ByPass gástrico en Y de Roux/Manga Gástrica/Derivación Biliopancreática	*Mejoría no especificada en número y/o porcentaje*		12 meses
Janik MR, Bielecka I, Pasnik K *et al (Mayo-2015)*	23	4,2/4,8	3,9/5-7	5,1/4,6	4,8/4,4	4,8/4,8	6,0/4,0	ByPass gástrico en Y de Roux/Manga Gástrica/Derivación Biliopancreática	50%	50%	12-18 meses
Steffen JK. Kig CW. White EG, et al (2019)	1152	1,25/1,82	28,7/14,3*	28,7/14,3*	28,7/14,3*	1,72/2,14	15,3/11,4*	Bypass gástrica en Y de Roux	50,30%	80,20%	12-60 meses

Table 4: Results in Men

IMPACTO DE LA CIRUGIA BARIATRICA EN LA SALUD SEXUAL DEL VARON OBESO MORBIDO										
AUTOR	MUESTRA	PUNTUACIONES IIEF/IBFS/EVAS-H					TIPO DE CIRUGIA	DISFUNCION SEXUAL		EVOLUCION POSOPERATORIA
		ERECCION	*SATISFACCION*	*ORGASMO*	*DESEO*	*SATISFACCION TOTAL*		*PREOPERATORIA*	*POSOPERATORIA*	
Pomares M, Ferrer M, Solvas M (2018)	44 EVAS-H	15,0-19,5	6,8-7,9	4,3-4,5	6,3-8,0	-	Bypass gastrico o gastrectomia vertical laparoscopica	42,1	50,8	12 meses
Steffen K, King W, White G, et al (Feb-2019)	279	-	1,61-3,40	49, 5- 23,5 *	1,06-3,40	-	Bypass gástrico en Y de Roux	53,40%	80,10%	12-60 meses
Janik MR, Bielecka I, Pasnik K *et al (Sep-2016)*	44	24.5-28,5	11,5-10,5	10,0-10,0	8,0-8,5	8,0-10,0	ByPass gástrico en Y de Roux/Manga Gástrica	56%	20%	12-18 meses
Xu J, Wu Q, Zhang Y, Pei C. *(Sep-2019)*	12 ESTUDIOS 420 PACIENTES	2,34-5-19	0,43-3,03	0,15-0,68	0,55-1,32	0,56-2,00	*Bypass Gástrico en Y de Roux*	5,52	10,88	1-36 meses
Liu S, Cao D, Ren Z, Li J, Peng L, *et al (Oct-2020)*	11 ESTUDIOS 370 PACIENTES	4,12-6,54/ 2,39-2,67	1,19-3,94/0,6 0-0,76	0,60-0,94	0,61-1,93/1 ,32-1,49	0,78-2,56/ 40,2-43,9	*TODAS*	4,33	10,1	3-24 meses

IIEF: Indice Internacional de Función Eréctil

IBFS: Inventario Breve de Función Sexual

EVAS-H: escala de valoracion de la actividad sexual en el hombre

* Se evaluo el tipo de disfuncion pero pero en en la evacluacion posoperatoria se disminuye

Studies: Brazil 3, European countries 6, USA 2, China 1

Conclusions

Currently obesity has had a progressive increase throughout the world, being considered a public health problem; therefore, adequate management must be had to improve people's quality of life. Bariatric surgery is considered the most effective long-term treatment for people with morbid obesity, since a weight loss of 30% or more is obtained, consequently obtaining improvement in the different comorbidities, and also a sample of large significant changes in the sexual function of women more than men due to the influence of weight on their self-esteem.

Sexual dysfunction occurs with a higher prevalence in women than in men because in them there is a greater influence of weight on their self-esteem. Bariatric Surgery improves sexual function in obese patients, but its scope remains unknown. Patients undergoing Bariatric Surgery show significant changes in their sexual function,

being more evident in women than in men. The most noticeable changes in women are expressed in an improvement in total sexual satisfaction, and are very few or almost null in relation to obtaining orgasm, while in men the recovery of the erection in all its components stands out more.

Annex 5 Effects of Bariatric Surgery

Efectos de la cirugía bariátrica sobre el perfil hormonal y metabólico, disfunción eréctil, semen y parámetros espermáticos.

Nivel de evidencia	Referencias	Tamaño de la muestra	Intervención	Salir
Nivel Ib	Samavat y col. (58)	103	Bypass gástrico	Revisión del punto de tiempo postoperatorio: 9 meses Pérdida de peso lograda: media -36,2 ± 20,24 kg Resultado: aumento significativo de testosterona libre y total, OCN y SHBG; disminución de estradiol
Nivel Ib	Arolfo y col. (59)	44	Bypass gástrico en y de Roux; Banda gástrica	Revisión del punto de tiempo postoperatorio: 9 meses Pérdida de peso lograda: media-39,75 ± 24 kg Resultado: aumento significativo en la testosterona total, la puntuación de SHBG y IIEF; disminución de HbA1c, insulina, triglicéridos, colesterol HDL y PCR
Nivel Ib	Legro y col. (60)	6	Bypass gástrico en y de Roux	Revisión del punto de tiempo posoperatorio: 1, 3, 6 meses Pérdida de peso lograda: Media -55 ± 30 kg Resultado: mejora en el nivel de testosterona
Nivel Ib	Reis y col. (61)	20	Modificaciones del estilo de vida, bypass gástrico	Revisión del momento posoperatorio: 4 y 24 meses Pérdida de peso lograda: inaccesible Resultado: mejora en la testosterona total y libre y FSH y niveles reducidos de prolactina
Nivel Ia	Glina y col. (64)	7 artículos	Cirugía bariátrica: artículo de revisión	Resultado: mejora en la puntuación IIEF
Nivel IIb	Dallal y col. (65)	97	Bypass gástrico	Revisión postoperatoria del momento: 19 meses Pérdida de peso lograda: media 53 ± 29 kg Resultado: mejora en el deseo sexual, la función eréctil, l función eyaculatoria y la satisfacción sexual
Nivel IIb	Kun y col. (66)	39	Bypass gástrico en y de Roux	Revisión del momento posoperatorio: 12 meses Pérdida de peso lograda: No especificado IMC medio preoperatorio: 41,2 ± 8,5 kg / m ^{2} y posoperatorio 32,1 ± 7,3 kg / m ^{2} Resultado: mejora en el grosor cavernoso y vasculopatía, puntuaciones de función endotelial y IIEF
Nivel Ia	Wei y col. (67)	6 artículos	Bypass gástrico: artículo de revisión	Resultado: aumento del volumen de semen; sin cambios en la concentración o motilidad del semen

Nivel IIa	Carette y col. (68)	46	Bypass gástrico; Banda gástrica	Revisión del momento posoperatorio: 6 y 12 meses Pérdida de peso lograda: inaccesible Resultado: aumento del recuento de espermatozoides probablemente debido a la resolución del hipogonadismo y la fragmentación del ADN
Nivel IIb	Samavat y col. (69)	31	Bypass gástrico en y de Roux; Administración medica	Revisión del momento posoperatorio: 0 y 6 meses Pérdida de peso lograda: media -34,7 ± 16,7 kg Resultado: mejora en la motilidad y el número total de espermatozoides; Aumento estadísticamente significativo del volumen de semen. Niveles reducidos de Il-8 y fragmentación del ADN espermático
Nivel IV	Sermondade et al. (70)	3	Bypass gástrico en y de Roux; Banda gástrica	Revisión del momento posoperatorio: no especificado Pérdida de peso lograda: no especificado Caso 1: −32,3 kg / m ^{2} Caso 2: −23,1 kg / m ^{2} Caso 3: −11,1 kg / m ^{2} Resultado: empeoramiento severo de los parámetros en 2 pacientes; reversibilidad observada en 1 paciente 2 años después de la operación

Levels of evidence based on the Oxford Center for Evidence Based Medicine criteria

OCN, osteocalcin; SHBG, serum hormone binding globulin; IIEF, International Index of Erectile Function; HDL, high-density lipoprotein; CRP, C-reactive protein; FSH, follicle stimulating hormone. Taken from: Di Vincenzo A, Busetto L, Vettor R, Rossato M. Obesity, malereproductive function and bariatric surgery. Front Endocrinol. (2018).

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