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Sexual activity after bariatric surgery: a prospective monocentric study using the PISQ-IR questionnaire

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Abstract

Background

Obesity can lead to pelvic floor disorders (PFD), interfering with women's sexual life; PISQ-IR is a new instrument to measure sexual life with PFD.

Aims

This study assessed the utility of using PISQ-IR in morbidly obese women undergoing bariatric surgery and **showed** the improvement of bariatric surgery on sexuality.

Methods

Prospective monocentric study including all women who had bariatric surgery (BS) from June 2016 to May **2017**. Sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB) was performed by one surgeon, and data were collected by one researcher. Demographics, past medical history, number of deliveries, and type of bariatric surgery (Sleeve Gastrectomy or Roux-en-Y Gastric Bypass) were collected at baseline. At the 1-year follow-up consultation, postoperative complications, percentage of total body weight loss (% TWL) and percentage excess weight loss (EWL) were assessed. Questionnaires were given at baseline and at 1-year follow-up.

Main outcomes measures

Post-operative complications and total weight loss were measured at the 1-year follow-up, sexual activity, using PISQ-IR, and Pelvic Organ Prolapse (POP), Urinary Incontinence (UI),

and Anal Incontinence (AI), using USP and PDFI 20, were compared before surgery and at 1-year follow-up.

Results

72 patients were included at baseline, 54 (75%) were considered for final analysis (30 Roux-en-Y GB and 24 Sleeve Gastrectomy) and 51 patients for PISQ-IR. Mean pre-surgery BMI was $41 \pm 5.4 \text{ kg/m}^2$, and mean age was 43 ± 11.8 years. Both procedures induced an important weight loss (mean total body weight loss (%TWL) of 33%), and had similar TWL% for each procedure: 31 (15–46) for the Sleeve Gastrectomy vs 34 (9–51) for the RY Gastric Bypass.

Nine patients (17, 6%) became sexually active 1 year after surgery. For the sexually inactive population after 1 year, there was no differences in the PISQ-IR in the follow-up. When BMI loss was more than 13 kg/m^2 , a higher percentage of the sexually population improved their different scores, and there were significant results for both global quality of life and desire ($p = 0,026$ and $0,046$).

The other questionnaires showed a significant decrease in UI symptoms ($p < 0.001$) associated with the weight loss, while there was no difference in terms of POPS or AI.

Conclusion

PISQ-IR is a useful instrument to measure sexual function regarding pelvic floor disorders.

BS improves sexual activity in obese women one year after surgery.

Introduction

Obesity is defined as abnormal or excessive fat accumulation, with a body mass index (BMI) greater than 30, and presents a health issue. Obesity is a significant risk factor for multiple diseases, such as diabetes or cardiovascular diseases, but can also lead to pelvic related pathologies, such as pelvic floor disorders (PFD), and urinary or anal incontinence. Obesity is one of the risk factors for PFD, with more than 75 % of obese women reporting PFD related symptoms (1-3). This is due to an increase in the intra-abdominal pressure -- a consequence of fat distending muscles and nerves of the pelvic floor (4,5)

Sexual function in these patients is often negatively affected due to the physiological and psychological toll these symptoms take. Multiple questionnaires have been created to measure these functions, such as FSFI (Female Sexual Function Index), BSFI (Brief Sexual Function Inventory), or PISQ. PISQ (6) (Pelvic Organ Prolapse Incontinence Sexual Questionnaire) was created to assess the sexual function of women with PFD. In 2013, the IUGA (International Urinary Gynecological Association) re-evaluated PISQ to refine the measurements' properties, and provide the opportunity to evaluate outcomes in patients that were not sexually active or that suffered anal incontinence. This new questionnaire, PISQ-IR, was then translated and validated in different languages, in order to allow international use by all urogynecologists.(7)

Few studies have shown the correlation between PFD and obesity (8-11), and moreover, the correlation between sexuality and obesity in patients suffering PFD related symptoms. Bariatric surgery (BS) has significantly increased in the last twenty years due to the recent epidemic of obesity (12), and helps patients' quality of life (QoL) and life expectancy (13). BS

has also been shown to improve sexual life with most studies using either FSFI (14), BSFI (15), or subjective measures. To date, no study has been done using PISQ-IR in the setting of BS.

The objective of this study was to examine the effects of bariatric surgery (RYGB and SG) on sexual activity and function in women with PFDs using the PISQ-IR, and to validate this questionnaire for this specific population.

Methods

Study Design

All obese women scheduled for a bariatric surgery between 2016 and 2017 (1 year) in our institution were solicited to join our study after having a written information notification (CNIL Number 6009701). Data are issued from the same cohort as a previous paper (41). Seventy-two patients accepted to participate and were prospectively enrolled. Acceptance rate to participate in the study was 65 %. The study was designed using the STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) Checklist. All the patients satisfied conditions for surgery according to the NIH consensus congress (16): A BMI of ≥ 40 or of 35 with a minimum of 1 comorbid condition, such as high blood pressure (HT), obstructive sleep apnea syndrome, arthritis, or type 2 diabetes (T2D). The operating surgeon chose the type of bariatric surgery.

Questionnaires were answered at baseline just before bariatric surgery and during the follow-up consultation one year later. One single researcher analyzed questionnaires.

The following data, such as demographics (age, BMI), comorbidities (T2D, HT, OSAS, joint arthritis), number of children, type of surgery (Sleeve Gastrectomy or Roux-en-Y GB), were collected at baseline. At the 1-year follow-up consultation, postoperative complications, percentage of total body weight loss (% TWL) and percentage excess weight loss (EWL) were assessed.

Definition of comorbidities, and resolution have already been described in a previous study (17)

A French translation of the PISQ-IR questionnaire was used (validated by the French Urological Association, AFU), to assess the interaction between PFDs and the quality of sexual life, at baseline and at 1 year follow up after surgery. PISQ-IR (Prolapse/Incontinence Sexual Questionnaire-International Urogynecology Association (IUGA) Revised) includes 20 questions in total, and measures sexuality in women with PFDs, using 6 subscale scores for sexually active women (arousal/orgasm, partner related, condition specific, global quality, condition impact, and desire) and four for women who aren't sexually active (partner related, condition specific, global quality, condition impact). Each subscale has a score calculated on the sum of the different questions integrated in the subscale divided by the number of questions answered. Each question is on a Likert scale, based on the subjectivity of the patient answering the question. Improvement of the different subscales was based on the increase of the subscale score. Psychometric analysis, criterion validity, and responsiveness to the questionnaire have been previously described (7).

Patients were categorized in 3 groups: sexually inactive at 1 year follow-up (group A), active that stayed active (group B), and inactive that became sexually active (group C).

Two other questionnaires were also used to evaluate PFD, both validated by the AFU:

1. USP (urinary symptoms profile) (18) is a self-administered questionnaire created by the AFU. 13 items cover different symptoms of the lower urinary tract such as overactive bladder, stress UI, and dysuria.

2. PFDI20 is the pelvic floor distress inventory (19,20) which includes questions in various domains: pelvic organ prolapse distress inventory (POPDI), colorectal-anal distress inventory (CRADI, including AI, fecal incontinence and flatus incontinence), and urogenital distress inventory (UDI). A higher score signifies more severe symptoms. When a disorder was present (POPDI, UDI and CRADI), PFD was described as symptomatic.

Surgery Techniques

Two types of bariatric procedures were performed: SG was done with a endoluminal French boogie Fr 36, while laparoscopic Roux-en-Y GB included a 150-cm long alimentary limb and a 50-cm biliopancreatic limb, a vertical gastric pouch of 20 to 30 ml, and a 10 to 12 mm hand-sewn gastro-jejunostomy.

Statistical Analysis

Continuous variables are reported as medians and interquartile range and analyzed by the Mann Whitney test (when comparing two groups) and Kruskal Wallis test (when comparing more than two groups). Categorical variables are reported as frequencies and analyzed by the Chi square Test. Non-parametric tests were used for non-normally distributed continuous variables as indicated by Shapiro-Wilk test. Normally distributed continuous variables were analyzed by t-test and one-way analysis of variance (ANOVA). Statistical

Analyses were performed using STATA 14 (StataCorp LP, College Station, TX, USA). Significance was set at $\alpha = 0.05$. All patients that didn't complete the questionnaire at the 1-year follow-up consultation were excluded from the final analysis.

Results

72 women were included at the start of the study and 54 were selected for final analysis (25 % lost to follow-up) after 1 year of follow-up. Baseline characteristics are shown in Table 1, and were reported for the 54 patients that weren't lost to follow-up. Mean pre-surgery BMI was $41 \pm 5.4 \text{ kg/m}^2$, and mean age was 43 ± 11.8 years. 29 (54%) had one or more comorbidity and 11 (20%) had more than one. 44 % underwent SG and 56 % Roux-en-Y GB. There was no significant difference between the SG and the RYGB population.

Both procedures induced an important weight loss (mean total body weight loss (%TWL) of 33%) and had similar TWL% for each procedure: 31 (15–46) for the Sleeve Gastrectomy vs 34 (9–51) for the RY Gastric Bypass (Table 2).

PISQ-IR

51 patients completed the questionnaire at baseline and at the 1-year follow-up.

The questionnaire helped to see that 9 patients (17,6 %) went from the sexually inactive group at baseline to the sexually active group at the 1-year follow up (group C) (Table 3). Main operative characteristics of the 3 groups were described (Table 4).

There were no significant differences in the PISQ-IR results for group A (Table 5a). Group B showed an increase in some of the PISQ-IR results after 1 year [*arousal*, 3.8 (3-4.5) vs 4.0(3.2-4.2)], *global quality of life* [3.2 (2.2-4.8) vs 4.0 (3-4.8)], although these results were not significant (Table 5b).

We then tried to see if a higher BMI loss 1 year after surgery would lead to a higher increase in any of the PISQ-IR sexually active sub-categories. A threshold of 13 in the BMI-loss was defined, as it is the median BMI-loss after 1 year in previous literature. When BMI loss was more than 13, a higher percentage of the sexually active population improved their different scores, and there were significant results for both global quality of life and desire (Table 6).

Urinary Symptoms: USP (Fig. 1)

49 patients (90%) suffered urinary symptoms before surgery: 32 (59%) had UI, 48 (89%) had overactive bladder, and 18 (33%) had dysuria. There was a decrease in the mean USP total (6.9 ± 4.5 to 2.9 ± 3.9 ($p < 0.001$)) after 1 year. There was also a decrease in the mean UI score (1.7 ± 2.09 to 0.57 ± 1.4 ($p < 0.001$)), and in the mean Overactive Bladder score (4.9 ± 3.5 to 1.9 ± 2.7 ($p < 0.001$)). No significant difference between mean low stream score were shown at baseline and at the 1-year follow-up ($p = 0.2$).

Subgroup analysis were done between Sleeve Gastrectomy and Roux-enY GB, showing similar results as the overall population.

PFDI 20 (Fig.2):

88% of the population had different PFD degrees before surgery. There was a decrease in the PFDI 20 (42.4 ± 36.6 to 29.2 ± 31.5) after 1 year ($p = 0.03$). The prevalence of PFD symptoms decreased, mostly due to a significant reduction of the urinary symptoms' prevalence: we showed a decrease in the UDI mean score (21.8 ± 19.9 before to 6.5 ± 9.2 at 1-year follow-up ($p < 0.001$)). CRADI and POPDI were not significantly different at baseline and after 1 year ($p = 0.3$ and $p = 0.3$). Subgroup analysis between Sleeve Gastrectomy and Roux-en-Y GB had similar results as in the overall population.

Anal Incontinence: (Fig. 3a, b)

56 % of the patients had AI before surgery. We showed no significant difference in the overall population in AI, FI, and flatus incontinence scores at baseline and after 1-year follow-up ($p = 0.26$, $p = 0.79$, and $p = 0.1$, respectively). In subgroup analysis, we showed an increase in the AI score for the Roux-en-Y GB population (2 ± 2.2 to 3.1 ± 2.7 ($p = 0.02$) (Fig. 3b)), mostly due to an increase in the flatus incontinence score (1.5 ± 1.57 to 2.23 ± 1.65 ($p = 0.04$)). There was no significant difference regarding FI in this population ($p = 0.3$).

Discussion

The present study demonstrates the benefits of BS on patients' quality of life, with regards to sexual activity. The PISQ-IR questionnaire helped us to see that 17,6 % of the patients that were sexually inactive before surgery became sexual active at the 1-year follow-up showing the real improvement on patient's quality of life. This is the first study using PISQ-IR questionnaire for sexual activity after BS to our acquaintance. PISQ-IR has already been used to compare sexual life in patients with anal incontinence (21).

We found no significant differences in PISQ-IR scores before and after surgery on group A. The main reason for this is probably the small size of the sample (n=9). However, we can interpret some of the results in Table 3, such as the age at surgery (53.5 (46.5, 56.5), p=0,017). Women in group A were in general 17 years older than the sexually active women (36.5 (32.0, 46.0)), and these results correlates with the results reported by Avis *et al*, showing a decrease in sexual intercourse related to aging in the American population (22). Also, this is an age of health and physiologic changes, such as menopause. However, there is a debate on the importance of the impact menopausal transition will bring on sexual functions. Research is not clear and consistent on the association between menopause and deteriorations in sexual functions. Several studies found a decrease in the sexual interest in women in peri or postmenopausal period, compared to women in premenopausal period (23-25) as well as a lower sexual desire (23). On the other part, some studies didn't find any correlation between desire (26) occurrence of sexual intercourse (27,28) or overall sexual dysfunction (29) and menopause status. This indicates that the menopausal transition could alter different domains in the sexual function.

On sexually active women before surgery, BS improved PISQ-IR results at the 1-year follow up, on arousal and global quality of life, although these results were not statistically significant. These results also correlate with previous findings on the potential benefits of BS on sexual function in women with severe obesity (30-32). These patients achieve a significant weight loss, accompanied by general well-being, health status, and several physical variables, that help the patients to an improved self-image. Women feel more confident, because of their weight loss, and therefore sexual activity is increased. We could

see in our results that desire, and arousal, were also higher, even though the results were not significant.

Various studies have shown a median decrease of approximately 13 kg/m² at the 1-year follow-up after BS (33,34). Choosing this threshold, we were able to find significant improvement on both desire and global quality in group B. This shows that a greater loss in BMI after 1-year improves sexual life on sexually active patients before surgery. If on one side there is large evidence in the literature that a greater weight loss is followed by a greater improvement in patients' comorbidities (35), the present study allows to conclude that a greater weight loss also improves patient's QoL, regarding sexual intercourse.

The improved results on the PISQ-IR at the 1-year follow up also implies that BS improved POP symptoms interfering with the sexual life of the studied women. We did not see any change on POPs after surgery in our study, although literature is contradictory on the topic. Some studies have shown a correlation between bariatric surgery and both UI and POPs improvement (36-37), without any improvement regarding AI (37). However, Romero-Talamas *et al.* showed no resolution in the severity of POPs after bariatric surgery, using POP-Q gynecologic exam and urodynamics to clinically examine his patients (38). In our study, the main limitation regarding POPs is the absence of physical examination, even if we could argue that treatment following POPs is proposed to patients with symptoms. Questionnaires can underrate the true frequency of POPs detected with a proper physical examination, some patients having a tendency to overlook their symptoms.

We showed a decrease in the prevalence of PFD symptoms after surgery, mostly because of the significant improvement in the urinary symptoms (UI and OB), an improvement that has

already been shown in the literature (36,39,40). A decrease in the impact of urinary symptoms on the QoL was also found. We therefore think, that with a more than 50 % UI reduction rate, and similar results as in the literature, bariatric surgery could be proposed as a first line treatment for UI in morbidly obese women, that would like to start a bariatric program.

There are some limitations to this present study that should be considered as a pilot study on the subject. First of all, our findings are limited by the small sample size, and we had to exclude 24 patients that weren't compliant to answer to all the different questionnaires at the 1-year follow up, due to the sensitivity of the subject, or due to the absence of follow-up consultation (patients seeing their primary care doctor for follow-up). Many patients also refused at start of the study. Even though, we could conclude that at least 17 % of our population became sexually active after BS. These findings will help us to design a larger multicentric study, with a longer follow-up to further investigate sexuality in obese women after bariatric surgery. Another limitation is the lack of evaluation regarding confounding factors that can play a major role in sexual activity, such as relationships, or psychological parameters like depression, for example.

Conclusions

BS improves sexual life in a large proportion of women with obesity 1 year after surgery, as reflected by the improved results on the PISQ-IR questionnaire. Additionally, women had less POPs, and SG reduced anal incontinence. This is the first prospective study using a PISQ-IR score to evaluate sexual life in obese women after BS.

Compliance with Ethical Standards

Conflict of Interest The authors declare no conflicts of interest.

Informed Consent Written informed consent was obtained for each individual participant included in the study.

Ethical Approval All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments.

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Figures and tables:

Table 1: Main clinical preoperative characteristics of the population

	Total	SG	BYGBP	p value
	N=54	N=24	N=30	
<i>Age, y (IQR)</i>	42 (20-65)	40 (20-65)	44 (25-65)	0.15
<i>BMI at surgery, kg/m², (IQR)</i>	41 (35-56)	43 (35-56)	40 (35-51)	0.8
<i>HT, n (%)</i>	11 (20)	3 (12)	8 (27)	0.24
<i>T2D, n (%)</i>	4 (7)	3 (12)	1 (3)	0.3
<i>OSAS, n (%)</i>	15 (28)	6 (25)	9 (30)	0.8
<i>Arthritis, n (%)</i>	11 (20)	2 (8)	9 (30)	0.08
<i>Vaginal deliveries, n (%)</i>	24 (44)	8 (33)	16 (53)	0.3

Hypertension (HT), Type two Diabetes (T2D)

Table 2: Body weight evolution at 1-year follow-up and Postoperative complications (POC)

	Total	SG	RYGB	p value
	N=54	N=24	N=30	
<i>TWL, % (IQR)</i>	33 (9-51)	31 (15-46)	34 (9-51)	0.3
<i>EWL, % (IQR)</i>	87 (31-140)	79 (37-127)	94 (31-140)	0.2
<i>POC, n (%)</i>	2 (5.9%)	2 (8.3)	0 (0)	0.2

Total weight loss (TWL); Excess weight loss (EWL); postoperative complications (POC)

Table 3: Postoperative population sexually active and inactive 1 year after bariatric surgery

	Before surgery	1-year follow-up	p value
PISQQ1			
Not sexually active at all	15 (29.4%)	8 (15.6%)	0.09
Sexually active with or without a partner	36 (70.6%)	43 (84.3%)	

Table 4: Main operative characteristics of the 3 PISQ-IR populations

	GROUP A	GROUP B	GROUP C	p value
	N=8	N=34	N=9	
<i>Age at surgery, y (IQR)</i>	53.5 (46.5, 56.5)	36.5 (32.0, 46.0)	42.0 (38.0, 54.0)	0.017
<i>weight at surgery, kg (IQR)</i>	108.5 (95.5, 124.5)	106.0 (98.0, 117.0)	102.0 (98.0, 111.0)	0.7
<i>BMI at surgery, kg/m² (IQR)</i>	40.3 (37.6, 43.1)	39.8 (36.3, 45.0)	42.3 (38.4, 43.4)	0.7
<i>BMI post-surgery, kg/m² (IQR)</i>	29.7 (23.3, 33.0)	26.6 (23.0, 31.6)	28.7 (22.6, 30.7)	0.7
<i>BMI reduction kg/m² (IQR)</i>	12.2 (9.2, 16.5)	13.6 (11.8, 16.3)	13.0 (12.5, 16.2)	0.7
Type of surgery				
GBP, n (%)	5 (62.5%)	18 (52.9%)	6 (66.7%)	0.7
Sleeve, n (%)	3 (37.5%)	16 (47.1%)	3 (33.3%)	

Table 5a: PISQ-IR results on group A before surgery and at the 1-year follow-up (median, IQR)

	Before	bariatric	1 year after surgery	p
	surgery			value
<i>Partner-related</i>	3.5 (3.2, 3.8)		2.5 (1.0, 4.0)	0.5
<i>Condition-specific</i>	1.5 (1.0, 2.0)		1.0 (1.0, 1.8)	0.8
<i>Global quality</i>	3.5 (3.2, 3.8)		2.2 (1.0, 3.8)	0.4
<i>Condition impact</i>	1.0 (1.0, 1.0)		1.0 (1.0, 1.2)	0.6

Table 5b: PISQ-IR results on group B before surgery and at the 1-year follow-up (median, IQR)

	Before	bariatric	1 year after surgery	p
	surgery			value
<i>Arousal/orgasm</i>	3.8 (3.0, 4.5)		4.0 (3.2, 4.2)	0.8
<i>Partner-related</i>	3.7 (3.3, 4.0)		3.7 (3.3, 4.0)	0.8
<i>Condition-specific</i>	5.0 (4.0, 5.0)		5.0 (4.3, 5.0)	0.8
<i>Global quality</i>	3.2 (2.2, 4.8)		4.0 (3.0, 4.8)	0.4
<i>Condition impact</i>	4.0 (3.2, 4.0)		4.0 (3.5, 4.0)	0.4
<i>desire</i>	3.0 (2.7, 3.7)		3.0 (2.7, 3.7)	0.8

	BMI loss < 13 kg/m²	BMI loss > 13 kg/m²	p value
	N=22	N=29	
Arousal/Orgasm			
<i>No improvement</i>	15 (68.2%)	18 (62.1%)	0.7
<i>Improved score</i>	7 (31.8%)	11 (37.9%)	
Partner related			
<i>No improvement</i>	20 (90.9%)	23 (79.3%)	0.3
<i>Improved score</i>	2 (9.1%)	6 (20.7%)	
Condition specific			
<i>No improvement</i>	16 (72.7%)	20 (69.0%)	0.8
<i>Improved score</i>	6 (27.3%)	9 (31.0%)	
Global quality			
<i>No improvement</i>	18 (81.8%)	15 (51.7%)	0.026
<i>Improved score</i>	4 (18.2%)	14 (48.3%)	
Condition impact			
<i>No improvement</i>	18 (81.8%)	19 (65.5%)	0.2
<i>Improved score</i>	4 (18.2%)	10 (34.5%)	
Desire			
<i>No improvement</i>	18 (81.8%)	16 (55.2%)	0.046
<i>Improved score</i>	4 (18.2%)	13 (44.8%)	

Table 6: Percentage of sexually active patients with PISQ-IR improved scores 1 year after surgery, based on BMI loss (threshold of BMI loss=13 kg/m²)

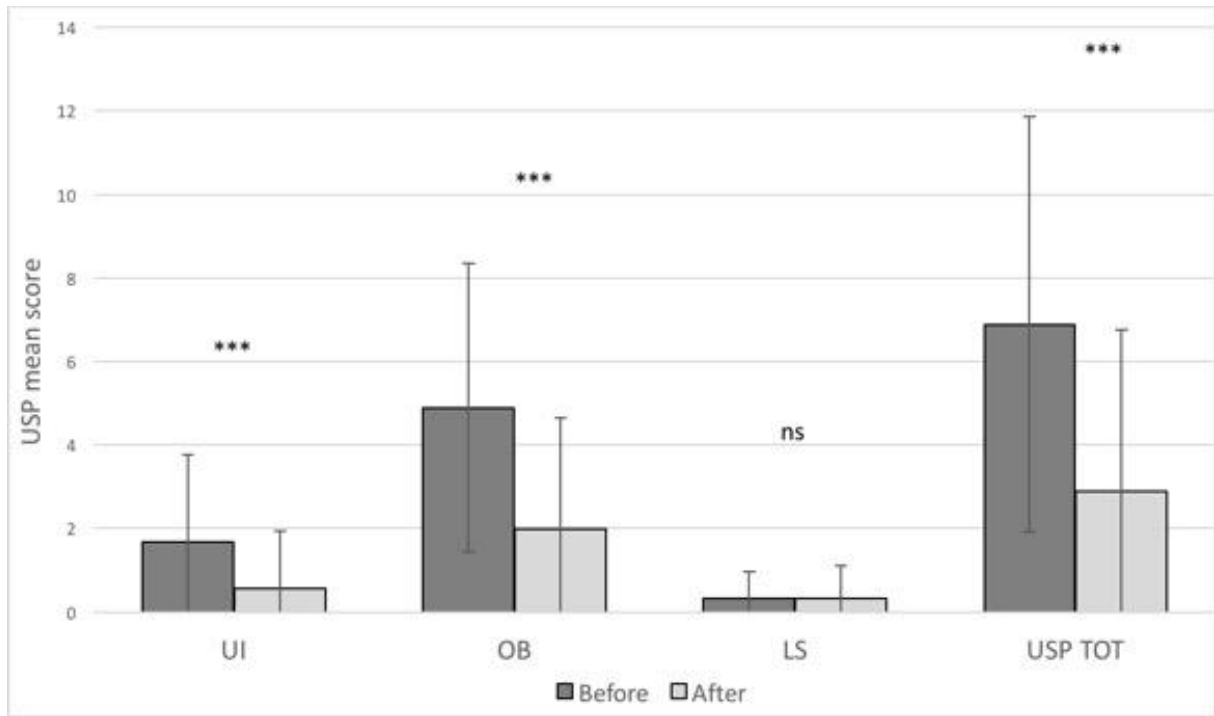


Figure 1: USP before and after surgery. UI urinary incontinence, OB overactive bladder, LS low stream, USP TOT urinary symptom profile total score, *** indicates p value < 0.001 , ns not significant

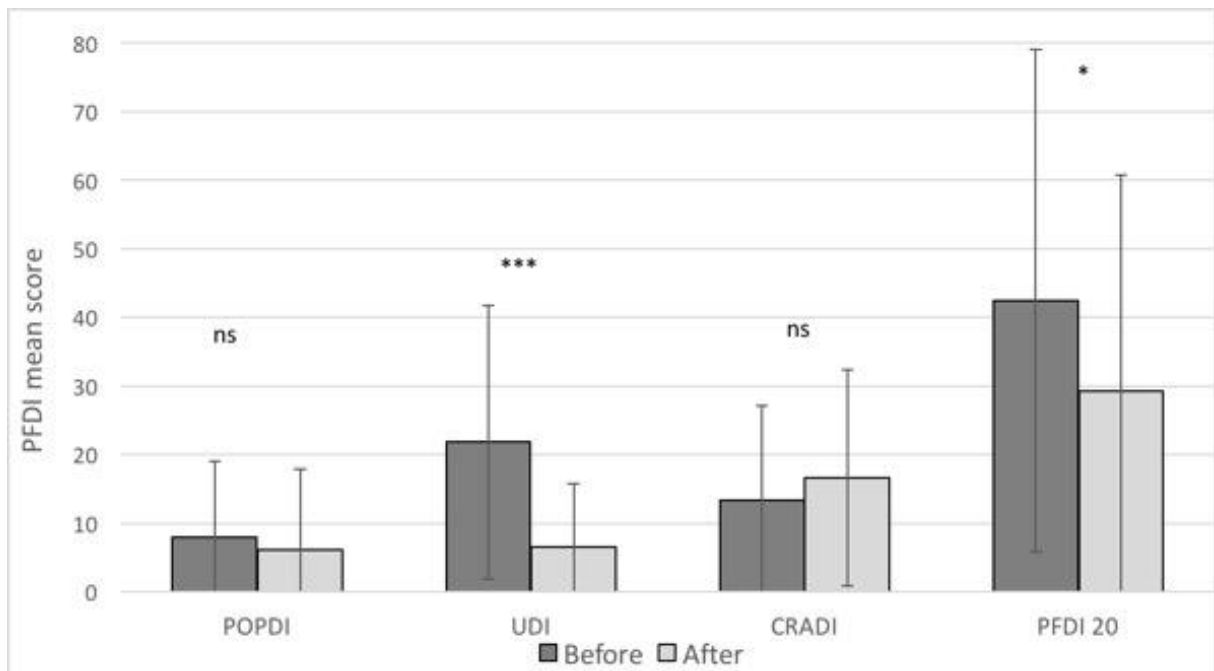


Figure 2: Evaluation of PFDI 20 (Pelvic Floor Disability Index) before and after surgery. POPDI

*(Pelvic Organ Distress Inventor), UDI (Urinary Distress Inventory), CRADI (ColoRectal Anal Distress Inventory), *** indicates p value < 0.001, * indicates p value < 0.05, ns not significant*

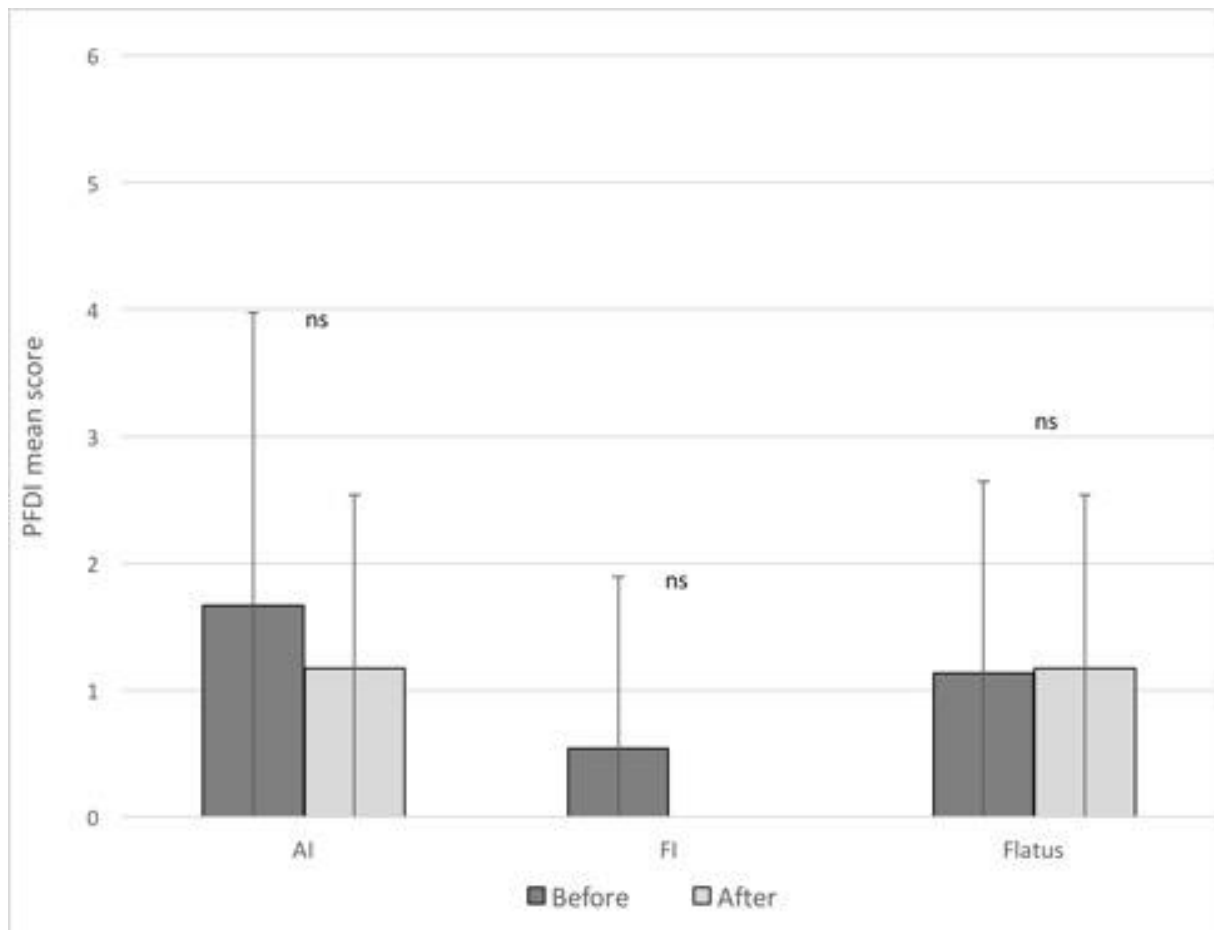


Figure 3a: Evaluation of anal incontinence before and after SG. (AI: Anal Incontinence, FI: Fecal Incontinence, Flatus: Flatus incontinence). * indicates p value < 0.05 , ns not significant

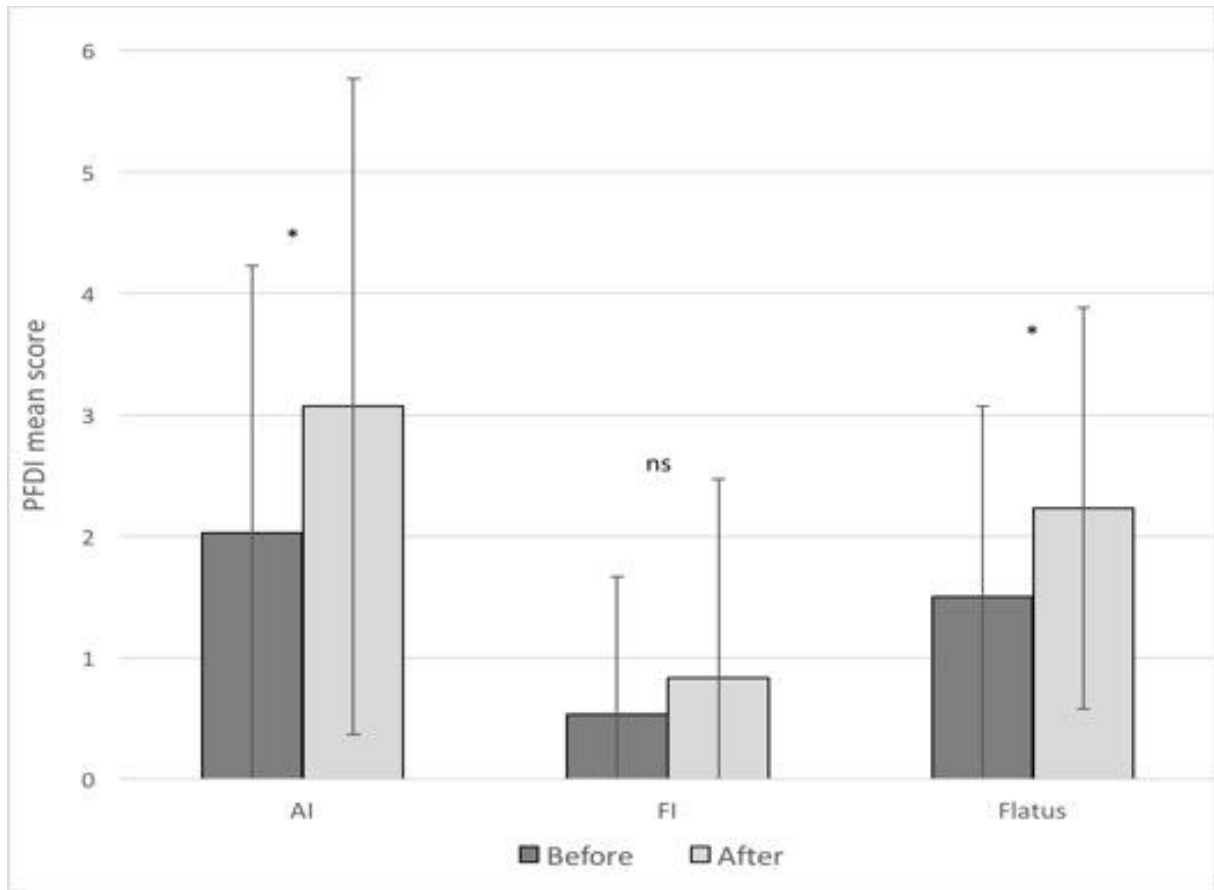


Figure 3b: Evaluation of anal incontinence before and after RYGBP. (AI: Anal Incontinence, FI: Fecal Incontinence, Flatus: Flatus incontinence). * indicates p value < 0.05 , ns not significant