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Effectiveness of cognitive-behavioral therapy in morbidity obese candidates for bariatric surgery with and without binge eating disorder

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Abstract

Aims: **To analyze changes in the general and specific psychopathology of morbidly obese bariatric surgery (BS) candidates after cognitive behavioral therapy (CBT) and assess differences between patients with and without binge eating disorder (BED) and between patients with obesity grades III and IV, studying their influence on weight loss.**

Methods: **110 consecutive morbidly obese BS candidates [77 females; aged 41 ± 9 yrs; body mass index 49.1 ± 9.0 kg/m^2] entered a three-month CBT program (12 two-hour sessions) before BS.**

Participants were assessed with general and specific psychopathology tests pre- and post-CBT. Data were analyzed according to the degree of obesity and presence/absence of BED.

Results: **At baseline, BED patients were more anxious and depressive with lower self-esteem and quality of life versus non-BED patients ($p < 0.05$) and were more concerned with food, weight and figure, felt greater hunger, fear and guilt, and were more influenced by contextual cues ($p < 0.005$). Post-CBT, these differences in self-esteem, depression, and eating disorders disappeared due to significant improvements in BED patients. No difference between OIII and OIV groups was found in any psychopathology test pre- or post-CBT. Multivariate analysis demonstrated that CBT was effective to treat psychological comorbidity regardless of the presence/absence of BED or degree of obesity. At 1 yr post-CBT, weight loss versus baseline (before CTT) was > 10% in 61%, with no intergroup differences.**

Conclusions: **CBT is effective to treat psychological comorbidity in BS candidates, regardless of the presence of BED and degree of obesity.**

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EFECTIVIDAD DE LA TERAPIA COGNITIVO-CONDUCTUAL EN OBESOS MÓRBIDOS CANDIDATOS A CIRUGÍA BARIÁTRICA CON O SIN TRASTORNO POR ATRACÓN

Resumen

Objetivo: **Analizar cambios en la psicopatología general y específica de pacientes con obesidad mórbida (OM) candidatos a Cirugía Bariátrica (CB) tras aplicación de terapia cognitiva-conductual(TCC) y evaluar diferencias entre pacientes con y sin trastorno por atracón (TA y NTA respectivamente), y entre grados de obesidad III y IV; estudiando su influencia en la pérdida peso.**

Material y métodos: **Se incluyeron110 pacientes candidatos a CB [77mujeres; con 41 ± 9 años e IMC 49,1 ± 9,0 kg/m^2] que recibieron TCC preoperatoria (12-sesiones de 2 horas)**

Se evalúo comorbolidad psicológica pre-post-TCC mediante test validados para la población española.

Resultados: **Basalmente los pacientes con TA mostraron mayor ansiedad y depresión y menor autoestima y calidad de vida que aquellos NTA ($p < 0,05$). También mostraron mayor preocupación por la comida, el peso y la figura revelando sentir más hambre, temor y culpa, importándoles más el contexto ($p < 0,005$). Tras TCC, las diferencias en autoestima, depresión y desordenes alimentarios desaparecieron, asociado a una significativa mejoría en pacientes con TA.**

No hubo diferencias entre grados de obesidad III y IV en ninguno de los test pre y post-TCC aplicados.

El análisis multivariante demostró efectividad de la TCC para tratar la psicopatología independientemente de la presencia de TA o del grado de obesidad.

Tras 1 año post-TCC, la pérdida de peso con respecto a la basal fue > 10% en 67 pacientes. Sin diferencia entre los grupos de estudio.

Conclusiones: **La TCC es efectiva en el tratamiento de la comorbilidad psicológica, independientemente de la presencia de TA y del grado de obesidad.**

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Palabras clave: *Obesidad mórbida. Cirugía bariátrica. Terapia cognitiva.*

Introduction

Obesity has become a global pandemic with significant social and public health implications, and its treatment poses a major challenge to modern medicine.[1] Bariatric surgery (BS) has proven more effective than conventional therapies to treat patients with morbid obesity (OM), i.e., with body mass index (BMI) > 40 kg/m^2.[2] This surgery achieves a relatively rapid and effective long-term weight reduction[3] and can alleviate somatic comorbidities[4] and improve psychosocial functioning and the quality of life.[5]

Nonetheless, outcomes vary among patients as a function of non-surgical factors that may affect their capacity to adapt to postoperative conditions.[6] Thus, it has been shown that psychological disorders may influence long-term outcomes in these patients. These include binge-eating disorder (BED), highly prevalent among obese patients, which is associated with a higher psychiatric comorbidity and psychological distress[7] and is considered a risk factor for a worse postoperative outcome.[8,9]

Given the influence of psychological and behavioral factors on the success of bariatric surgery,[10,11] Cognitive Behavioral Therapy (CBT) has been recommended as a complementary approach[8,9] and is described in National Institute for Clinical Excellence (NICE) guidelines as a treatment of choice with grade A evidence.[12] Behavior modification implies a systematic approach to eating, exercise, and other behaviors that contribute to the persistence of obesity.[13]

A strong association between the degree of obesity and psychological comorbidity is widely documented, although a previous study found no difference between patients with grades III and IV obesity.[2,14] However, evidence has been published suggesting that the degree of obesity in patients with BED may influence outcomes.[14,15]

With this background, the objective of the present study was to analyze changes in the general and specific psychopathology of patients with OM after undergoing CBT and to assess differences between patients with and without BED and between patients with obesity grades III and IV and to evaluate their influence on weight loss.

Methodology

A prospective observational study was conducted in consecutive patients with OM aged between 18 and 59 yrs and enrolled in the BS program of the Obesity Surgery Unit of our hospital from June 2007 through May 2010. 110 patients signed informed consent to participate in this study, which was approved by the Clinical Research Ethics Committee of the Hospital.

For data analyses, participants were divided between patients with grade III obesity (BMI 40-49.9 kg/m^2), the OIII Group (n = 60,) and those with grade IV obesity BMI > 50 kg/m^2), the OIV Group (n = 50). They were also divided between patients with (n = 49) and without (n = 61) BED (BED and NBED groups, respectively) as diagnosed by a psychologist (AV) according to DSM-IV-TR diagnostic criteria (American Psychiatric Association; 2000).

Treatment

CBT was applied in three stages in consecutive groups of 10 patients each.

1st stage-Initial psychological assessment

Tests validated for Spanish-speaking populations were used to examine the psychological profiles of patients before their group assignment for the 2nd stage, considering four variables (table I).

2nd stage-Group therapy

Over a three-month period, CBT was applied in 12 two-hour sessions using the method of Fairburn et al.[16] (table II). The objective of the treatment was for the patient to recover self-esteem and develop appropriate eating behaviors for weight loss and long-term weight maintenance. It was necessary for patients to lose at least 10% of their initial weight to complete the CBT and be accepted for BS.

Table I
Variables examined in the psychodiagnosis

Variables	*Instruments*
A. General psychopathology	
1. Mood states	*Stress:* (CEDD44-B); Sanz-Carrillo et al. *Anxiety and Depression:* Abbreviated Scale of Anxiety and Depression (GHQ); Montón et al. *Self-esteem:* Rosenberg Self-Esteem Scale (RSE); Vázquez et al. *Quality of Life:* (QLI-Sp); Mezzich.
2. Individual and family function	*Family Relationship:* (Family APGAR); Bellón et al.
B. Specific psychopathology	*Food Craving Questionnaire-Trait* (FCQ-T) ; Cepeda-Benito et al.
1. Eating behaviour	*Eating Disorders Examination-Questionnaire* (EDE-Q Version 4) Katrine et al.

Table II
Cognitive behavioral treatment

Components	*Techniques*
Self-monitoring	Refers to keeping a daily log of food consumed and exercise taken. The aim is to increase the patient's awareness of what they eat and of possible situations of risk that may influence eating habits. By means of this daily log, at what time they usually, that they eat when stressed, depressed, bored, or in the company of certain people, etc.
Stimulus control	This refers to how our inmediate environment can be altered to promote behaviour appropriate eating routines. For example, restricting the number of places, where eating is permitted, not missing meals, keeping palatable food in opaque containers, etc.
Controlling the speed of eating	The patients learn to eating slowly, food purchasing strategies, mastication exercises, etc.
Positive reinforcement	To reward behaviors that assist weight attainment. With incentives not related with food, such as new clothes when a given objective is attained, or small gifts, prizes or diplomas when the aimed weight is reached.
Cognitive restructuring	The patients learn to recognise and modify weight-related thoughts or beliefs. This is an attempt to revise thoughts of self defeat and attitudes such as "all or nothing". This technique helps patients with low self-esteem, by substituting negative and self-destructive thoughts by positive and stimulating ones.
Preventing relapses	By teaching how to identify "slips" and which techniques can be applied to avoid them.
Stress confrontation	Discovering compulsive eating behaviors from emotional alterations and anxiety. Analysis of body signs. Training in muscle relaxation and meditation on positive thoughts.
Problem resolving	Differentiating obstacles and temptations. Overcoming them through specific strategies. Instead of knowing "What" to change, discover "How" to change it.
Nutritional training	Healthy and balanced diet through nutrient groups. Calorie tables. Information about food. Preparation of personalized menus according to individual needs.
Physical activity	Idenfication of sedentarism. Suggestion of exercises appropriate to the disease. Progressive increase in duration and intensity of walks.

3rd stage-Individual monitoring and treatment

After the group therapy stage, patients again underwent psychopathology assessment to detect behaviors needing reinforcement or symptoms requiring individual treatment. Next, patients were followed up in weekly 60-min sessions for 12-months, and their suitability for BS was then evaluated in a final report.

Throughout this 12-month period, the calorie intake of the patients was restricted by following a balanced diet of 1,500 kcal in accordance with guidelines provided by a nutritionist (AJ). At the start of the study (baseline), the height of participants (barefoot) was measured to the nearest 0.1 cm using a wall-mounted stadiometer (SECA, Vogel & Halke, Hamburg, Germany).

At baseline and at all treatment and follow-up sessions, the weight of participants was measured to the nearest 0.1 kg using a TANITA Ultimate Scale 2000 (Tanita Corporation, Tokyo, Japan). The BMI was calculated as weight (kg) divided by the square of the height (m).

Statistical analysis

SPSS for Windows version 16.0 was used for data analyses. Continuous variables were expressed as means ± standard deviation (SD). To assess the effectiveness of the program, the Student s paired t test and chi-square test were used to analyze differences in the characteristics of the groups during the treatment. Univariate analysis of variance (ANOVA) was used for intragroup comparisons, applying the Tukey test for *a posteriori* analyses.

Multivariate linear regression analyses were used to quantify the relationship between general and specific psychopathology test outcomes and study groups. All analyses were two-tailed, and $p < 0.05$ was considered significant.

Results

Demographic and descriptive data

Table III exhibits the baseline characteristics of the 110 volunteers (77 females, 33 males) and study groups, showing a significantly higher body weight and BMI in the OIV *versus* OIII group and in the non-BED *versus* BED group. All except for two patients correctly followed the course of treatment, i.e., completed ≥ 10 of the 12 CBT-sessions.

Changes in eating behavior

During the month before initiating CBT, at least one episode of objective binge-eating (OBE) was reported

Table III
Baseline characteristics of the study population

Variables	*Total (n = 110)*	*OIII group (n = 60)*	*OIV group (n = 50)*	*p*	*BED (n = 49)*	*NBED (n = 61)*	*p*
Age	41 ± 9	42 ± 9.8	39 ± 8. 9	NS	42.6 ± 9.1	39.2 ± 9.1	NS
Gender (Males/Females)	33/77	18/42	15/35	NS	17/52	20/39	NS
Body weight (kg)	134 ± 25	120 ± 17	150 ± 22	0.00	127 ± 24.0	142 ± 24.1	0.002
BMI (kg/m^2)	49 ± 9.0	44 ± 4.2	57 ± 5.7	0.00	41 ± 7.5	52 ± 8.3	0.002

OIII Group: patients with grade III obesity (BMI 40-49.9 kg/m^2); OIV group: patients with grade IV obesity (BMI > 50 kg/m^2).
BED = Binge Eating Disorder; NBED = Non-Binge Eating Disorder.

Table IV
Mean Eating Disorder Examination-Questionnaire (EDE-Q) score of morbid obesity groups and BED-NBED groups before and after CBT

	Pre-CBT			*Post-CBT*			*Pre- and post-CBT*
	OIII group (n = 60)	*OIV group (n = 50)*	*p*	*OIII group (n = 60)*	*OIV group (n = 50)*	*p*	*p total*
Subscales			NS			NS	
Restraint	9. 5 ± 6.5	11.6 ± 7.5		17.6 ± 3.8	14.5 ± 4.3		0. 000
Eating Concern	8.3 ± 6.7	8.9 ± 6.4		2.5 ± 2. 2	2.2 ± 1.9		0. 001
Shape Concern	16.3 ± 6.9	17.4 ± 6.5		13.3 ± 3.2	14.4 ± 2.8		0. 000
Weight Concern	31.3 ± 12.9	33.9 ± 11.5		24.2 ± 9.4	27.9 ± 7.5		0. 0000
	BED (n = 49)	*NBED (n = 61)*	*p*	*BED (n = 35)*	*NBED (n = 75)*	*p*	
Subscales						NS	
Restraint	9. 6 ± 7.2	11.3 ± 7.6	NS	16.4 ± 3.5	16.1 ± 5.6		0. 002
Eating Concern	11.9 ± 5.5	3.8 ± 4.1	0.001	2.7 ± 3.7	1.9 ± 2.0		0. 000
Shape Concern	35.6 ± 10.4	25.7 ± 13.6	0.004	27.8 ± 8	22.1 ± 9.2		0. 045
Weight Concern	18.8 ± 5.7	13.2 ± 7.3	0.031	14.5 ± 3.1	12.4 ± 2.6		0. 003

OIII Group: patients with grade III obesity (BMI 40-49.9 kg/m^2); OIV group: patients with grade IV obesity (BMI > 50 kg/m^2).
BED = Binge Eating Disorder; NBED = Non-Binge Eating Disorder.

by 93% of patients. BED was present in 37 (61%) patients in the OIII group and in 24 (48%) patients in the OIV group. The frequency of binge-eating did not differ between OIII and OIV groups.

After CBT, a reduction in OBE episodes was reported by 35.5% of patients, while a cessation of episodes was reported by 8% of patients.

Eating Disorders Examination-Questionnaire (EDE-Q) (table IV)

No difference between obesity groups was found in any subscale score either before or after CBT. Pre-CBT, concerns about weight, shape, and food were greater in the BED versus NBED group ($p < 0.05$); the frequency of OBE was also positively correlated with the frequency of concern for weight ($r = 0.44$, $P = 0.015$). Post-CBT, no differences were found between BED and NBED patients in any EDE-Q subscale.

Food Craving Questionnaire-Trait (FCQ-T)

Results showed that the food craving of participants was driven by hunger, fear, and guilt, with no difference between obesity groups either pre- or post-CBT. Post-CBT, both obesity groups evidenced a significant reduction in food craving *versus* pre-CBT values, and a marked decrease in preoccupation with food was observed in the global sample (table V). Pre-CBT, BED patients made more plans about food, were more concerned about food, felt more hunger, fear, and guilt, and were more influenced by contextual cues in comparison to NBED patients ($p < 0.005$). Post-CBT, the significant intergroup differences in food craving items persisted, but an improvement in all test subscales was observed in the whole sample *versus* pre-CBT values ($p < 0.005$) (table V).

Table V
Mean Food Craving Questionnaire-Trait (FCQ-T) score of morbid obesity groups and BED-NBED groups before and after CBT

	Pre-CBT			*Post-CBT*			*Pre- and post-CBT*
	OIII group (n = 60)	*OIV group (n = 50)*	*p*	*OIII group (n = 60)*	*OIV group (n = 50)*	*p*	*p total*
Subscales			NS			NS	
Plans	8.98 ± 5.7	8.10 ± 3.8		6.8 ± 2.9	6.6 ± 2.8		0. 001
Positive reinforcement	14.85 ± 5.8	13.8 ± 5.7		11.57 ± 3.9	11.24 ± 4.2		0. 001
Negative reinforcement	8.45 ± 4.3	7.98 ± 3.60		6.95 ± 2.9	6.98 ± 3.3		0. 000
Preocupation with food	18.9 ± 7.7	18.2 ± 7.4		13.4 ± 5.6	12.2 ± 5.5		0. 000
Hunger	13.5 ± 5.4	14.2 ± 4.8		10.61 ± 4.3	9.8 ± 3.4		0.001
Fear	12.8 ± 5,9	10.9 ± 5.15		9.78 ± 4.9	7.98 ± 3.6		0.003
Context	12.8 ± 5	11.6 ± 4.6		10.15 ± 4.2	9.06 ± 4.15		0.001
Guilt	10.6 ± 4.2	11.4 ± 4.4		8.45 ± 3.9	8.04 ± 3.86		0.000
	BED (n = 49)	*NBED (n = 61)*	*p*	*BED (n = 35)*	*NBED (n = 75)*	*p*	
Subscales							
Plans	9.42 ± 3.7	8.86 ± 2.9	0.001	7.52 ± 2.7	6.23 ± 2.0	0.001	0. 002
Positive reinforcement	14.91 ± 4.1	13.7 ± 4.8	0.001	12.36 ± 3.5	11.09 ± 2.9	0.001	0. 000
Negative reinforcement	8.78 ± 2.9	8.01 ± 3.0	NS	6.37 ± 2.1	6.98 ± 2.7	NS	0. 045
Preocupation with food	18.81 ± 7.5	17.52 ± 8.1	0.000	13.58 ± 6.7	12.75 ± 7.2	0.000	0. 003
Hunger	16.22 ± 6.2	14.36 ± 5.3	0.001	12.37 ± 5.8	10.01 ± 4.6	0.001	0.000
Fear	14.78 ± 6.5	12.81 ± 4.7	0.000	12.31 ± 5.3	10.22 ± 2.8	0.001	0.001
Context	13.81 ± 3.2	11.85 ± 2.6	0.001	12.10 ± 2.7	10.83 ± 3.1	0.002	0.002
Guilt	11.71 ± 3.8	11.58 ± 4.3	NS	9.52 ± 3.5	9.02 ± 2.7	NS	0.001

General psychopathology

Table VI reports the results obtained for each obesity group pre- and post- CBT, showing the beneficial effect of the treatment on the general psychopathology and quality of life of participants, with significant improvements in anxiety, depression, stress, and self-esteem ($p < 0.05$); no significant differences were observed between OIII and OIV groups.

At baseline (table VI), BED patients were significantly more anxious and depressive and had a lower self-esteem and quality of life *versus* NBED patients ($p < 0.05$). Post-CBT, the intragroup differences in anxiety and quality of life persisted but the differences in self-esteem and depression disappeared due significant improvements among BED patients.

Weight loss

The mean weight loss immediately after CBT was 11.6 ± 5.14 kg and at the 12-month follow-up was 15, 3 ± 3,05 kg.

Post- CBT, the obesity groups did not significantly differ in mean weight loss. At the one-year follow-up period, a weight loss of > 5% of their initial weight was achieved by all participants (both obesity groups), and a loss of > 10% was achieved by 67 patients. There were no significant differences in weight loss between patients with and without BED.

Association between weight loss and psychological comorbidity

Weight loss was significantly associated with a reduction in anxiety ($r^2 = 0.3$; $P = 0.036$) and improvement in self-esteem ($r^2 = 0.5$; $P = 0.028$) in the OIV group but not in the OIII group.

Association between psychopathology results and study groups pre- and post-CBT

After controlling for age and sex in the multivariate analysis, no significant relationship was found between

Table VI
Comparison of general symptoms between obesity and after CBT.Ç

General symptoms	Pre-CBT			Post-CBT			Pre- and Post-CBT
	OIII Group (n = 60)	OIV Group (n =50)	p	OIII Group (n = 60)	OIV Group (n = 50)	p	P total
Anxiety	5.6 ± 3.2	4.9 ± 2.9		4.6 ± 2.35	4.2 ± 2.5		0.003
Depression	4.2 ± 2.8	3.9 ± 2.8		1.9 ± 2.3	2.2 ± 2.2		0.003
Quality of life	63.5 ± 16.3	63.4 ± 15.9	NS	68.4 ± 14.9	72.2 ± 12.8	NS	0.000
Self-esteem	24.9 ± 2.6	24.9 ± 2.1		26.7 ± 2.5	26.9 ± 2.3		0.000
Stress	78.8 ± 26.7	87.4 ± 29.8		67.6 ± 26.1	71 ± 26.1		0.000
Apgar	8.1 ± 2.1	7.9 ± 2		8.0 ± 2	8 ± 1.9		NS
	BED	NBED		BED	NBED		
Anxiety	5.9 ± 2.9	4.4 ± 2.9	0.007	4.8 ± 2.8	3.8 ± 2.3	0.037	0.005
Depression	4.5 ± 2.9	3.3 ± 2.8	0.013	2.9 ± 2.5	1.8 ± 1.8	NS	0.000
Quality of life	6.3 ± 1.5	7.1 ± 1.7	0.009	6.7 ± 1.4	7.4 ± 1.3	0.005	0.000
Self-esteem	24.6 ± 2.3	25.7 ± 2.5	0.014	26.7 ± 2.5	26.9 ± 2.2	NS	0.001
Stress	102.3 ± 24.0	97 ± 27	NS	85.3 ± 26.7	84.5 ± 21.9	NS	0.000
Apgar	7.9 ± 2.2	8.3 ± 1.8	NS	8.0 ± 2.0	8.4 ± 1.8	NS	0.000

OIII Group: Patients with grade III obesity (BMI 40-49.9 kg/m^2); OIV group: Patients with grade IV obesity (BMI > 50 kg/m^2).
BED = Binge Eating Disorder; NBED = Non-Binge Eating Disorder.

general (depression, anxiety, self-esteem, stress, quality of life and family function) or specific (food behavior and food craving disorders) psychopathologic variables and the study groups (BED and NBED or OIII and OIV groups).

Discussion

In this study of candidates for BS, the prevalence of BED, estimated to be 2-5% in the general population,[17,18] was 55%, comparable to previous reports of up to 68%.[19] Obese individuals with BED have been found to have significantly greater concerns about shape and higher psychiatric comorbidity in comparison to those without this disorder.[11,20] In our study population, the presence of BED was associated with greater concerns about shape, food intake and weight, which are also characteristic of patients with bulimia and anorexia. These findings confirm previous reports that preoccupation with image is not limited to these two diseases.[21] Dietary restrictions driven by these concerns may play an important role in the etiology and persistence of compulsive binging episodes. However, all participants in our study, including those without BED, followed a diet of 1,500 kcal, suggesting that binge-eating is not an inevitable consequence of dietary restriction. The onset of a binge-eating habit is considered to follow dietary restriction in patients with bulimia but appears to precede attempts at dietary restriction in obese individuals with BED.[22]

In the present study, greater depression and anxiety was observed in the participants with BED than in those without, confirming previous reports of higher psychological comorbidity in obese individuals with this disorder.[11,23] It has been reported that the prevalence of BED is lower (20-30%) among patients with lower degrees of obesity (grades I and II),[17,18] and its presence has been associated with increased adiposity.[24] In the present study, however, patients with grade III and IV obesity did not significantly differ in the presence of BED, suggesting that severe degrees of obesity may produce similar levels of psychological comorbidity.

The presence of psychological disorders has sometimes been considered a contraindication for BS because it is believed to increase the risk of postsurgical complications.[8,9,24] Some researchers have reported that patients with these disorders experienced difficulties in following dietary instructions given after the surgery, with a negative effect on their weight reduction.[25] In fact, Hsu et al. recommended the prior screening of candidates for BS in order to identify and exclude patients with psychological disorders.[26] However, other authors have found no correlation between the presence of psychopathology and worse BS outcomes and have argued against the exclusion of these patients.[27] It has been proposed that these patients can undergo surgery on condition that they receive appropriate psychotherapeutic treatment both before and after the intervention.[28]

CBT has been selected as the treatment approach over the past 20 years, with good results.[29] The application of CBT in our patients produced a significant improvement in their specific and general psychopathology and a satisfactory weight reduction, and the response to CBT was no less favorable in patients with BED than in those without, BED was reduced or eliminated as a

result of the CBT, in agreement with previous reports that this therapy produces a short-term reduction in BED among obese patients.[30]

One study limitation is that we included all BS candidates during the study period, precluding the formation of a control group and hindering comparisons with randomized controlled studies.

According to our findings, CBT is effective in patients with OM, regardless of the degree of obesity and the presence of BED. It appears advisable to identify and treat psychological disorders in candidates for BS in order to improve post-operative outcomes, although further research is required on the long-term impact of this approach.

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