

Obese Patients with Type 2 Diabetes Submitted to Banded Gastric Bypass: Greater Incidence of Dumping Syndrome

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Abstract

Background Dumping syndrome is one of ten most common complications in morbidly obese patients operated. Recent studies in relation to type 2 diabetes mellitus (DM2) in patients submitted to gastric bypass led us to examine the different outcomes in this group of patients. Our objective was to determine the difference in the prevalence of dumping syndrome in patients with DM2 submitted to gastric bypass.

Methods In this retrospective study, 49 diabetic and 54 non-diabetic morbidly obese patients were submitted to gastric bypass and followed up at 3, 6, and 12 months after surgery. The occurrence of dumping was determined by the patient's medical chart, where it was considered positive if recorded in at least one of three evaluations.

Results The 103 patients evaluated had a mean BMI of 49.5 ± 9.3 kg/m² and mean age of 38 ± 9.7 years, with 75.7% being women. The prevalence of dumping syndrome in this population was 24.3%. The prevalence of dumping was greater in patients with DM2 (44.9%) when compared to the control group (5.6%; $p < 0.001$). Multivariate logistic regression analysis indicated the diagnosis of DM2 as the only variable associated with dumping syndrome.

Conclusions Dumping syndrome is a common postoperative complication in gastric bypass. Patients with DM2 show a greater postoperative prevalence of dumping.

Keyword Morbid obesity · Bariatric surgery · Diabetes · Dumping

Introduction

Recent studies in relation to type 2 diabetes mellitus (DM2) in patients submitted to gastric bypass led us to examine the different outcomes in this group of patients. New hypotheses on the mechanism of action in the control of DM2 and the discovery of various hormones prompted us to relate possible influences not involved only with the control of glycemia [1–8]. Dumping syndrome is one of the ten most common complications in morbidly obese patients operated. The objective of our study was to determine if there is a difference in the prevalence of dumping syndrome in patients with and without DM2 submitted to gastric bypass.

Materials and Methods

A retrospective study was conducted based on patients' medical charts. A selection was made of 49 morbidly obese patients with DM2 and 54 morbidly obese non-diabetics (control) submitted to gastric bypass, who made office visits for medical and nutritional consultation at three scheduled times of 3, 6, and 12 months after surgery.

Not included in the study were patients with a history of prior bariatric surgery or who utilized an intragastric balloon.

Diagnosis of dumping was based only on clinical information (palpitation, sweating, headache, full feeling, diarrhea, nausea, and abdominal pain) from routine examination during patient visits. All patients are routinely screened for this syndrome in consults after surgery, but we

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do not record separately the prevalence of each of the symptoms. Dumping was considered in all patients who presented with three or more of these symptoms in a period of up to 30 min after meals, where at least one should be palpitation, sweating, or abdominal pain.

The presence or not of dumping was defined by records in the medical chart, where it was considered present when recorded during at least one of the three evaluations.

The patients operated by the team underwent a multi-disciplinary follow-up. All patients studied were evaluated by one of the two surgeons and by one of the two nutritionists of the same team who follow the same patient care protocol and utilize the same medical chart.

The measurements of intestinal diversion were taken intraoperatively. The biliary limb was considered between Treitz's angle and the section site, and the alimentary limb between the gastroenteroanastomosis and the enteroenteroanastomosis. We utilized a Silastic band of 7 cm in the gastric pouch in all patients operated in this period. The biliary limb varied from 50 to 80 cm depending on vascularization, such that the limb could be moved to the gastroenteroanastomosis without tension. The alimentary limb was 100–250 cm. When these patients were operated, we chose to make the limbs longer (200–250 cm) in cases of superobesity.

Patients were considered having DM2 with the occurrence of two glycemias above 126 mg/dL or based on a glucose tolerance test >200 mg/dL.

Quantitative variables were compared by Student's *t* test and categorical variables by the chi-square test. A logistic regression analysis was applied in order to control confounding factors. The level of significance was set at $p \leq 0.05$, and population estimates showed a 95% confidence interval. Statistical analysis was performed with the Statistical Package for the Social Sciences version 13.0 program.

Table 1 Profile of patients with regard to DM2

	DM2, <i>N</i> =49	No DM2, <i>N</i> =54	<i>p</i> value
Female gender	33 (67.3%)	45 (83.3%)	0.097
Age	42.7±7.5	33.9±9.6	<0.001
BMI	49.9±9.2	49.1±9.7	0.686
Waist (cm)	137±14	125±20	0.002
Biliary limb (cm)	57±6	58±9	0.475
Alimentary limb (cm)	157±38	111±24	<0.001
Glycemia	207±70	96±13	<0.001
Glycosylated Hb	8.4±2.1	4.8±1.0	<0.001
%EWL, 3 months	41.3±13	39.3±11	0.411
%EWL, 6 months	58.6±17	57±14	0.634
%EWL, 12 months	73.5±19	76.5±14	0.423

Table 2 Profile of patients with regard to dumping

	Dumping, <i>N</i> =25	No dumping, <i>N</i> =78	<i>p</i> value
Female gender	21 (84.0%)	57 (73.1%)	0.401
Age	42.3±7.0	36.7±10.1	0.003
BMI	48.2±7.1	49.9±9.9	0.440
Waist (cm)	130±14	130±20	0.919
Biliary limb (cm)	58±5	58±9	0.858
Alimentary limb (cm)	156±49	126±32	0.007
%EWL 3rd month	43.1±14	39.4±11	0.191
%EWL 6th month	62.2±18	56±15	0.109
%EWL 12th month	79.0±17	73.8±19	0.293

Results

A total of 103 patients were evaluated, of which 78 (75.7%) were female, and the mean BMI was 49.5 ± 9.3 kg/m² and mean age 38.1 ± 9.7 years. The prevalence of dumping syndrome in this population was 24.3%, where 44.9% were diabetic and 5.6% non-diabetic ($p < 0.001$).

The patients with DM2 were compared to the control group with respect to gender, age, BMI, waist, biliary limb, alimentary limb, glycemia, and glycosylated hemoglobin preoperative and percent excess weight loss (%EWL) at 3, 6, and 12 months (Table 1). There was greater age, greater waist measurement, longer alimentary limb, and higher levels of glycemia and glycosylated hemoglobin among diabetics compared to the control group ($p < 0.05$). No statistically significant difference was seen between the two groups with respect to gender, BMI, length of biliary limb, and %EWL at 3, 6, and 12 months postoperative.

The patients with and without dumping were compared with regard to gender, age, BMI, waist, biliary, and alimentary limb, and %EWL at 3, 6, and 12 months (Table 2). No statistically significant difference was observed between the two groups with respect to the above variables at 3, 6, and 12 months. Age ($p = 0.003$) and alimentary limb ($p = 0.007$) were significantly greater in patients with dumping when compared to patients who did not show dumping.

In view of the differences identified with respect to DM2, age, and alimentary limb, we performed a multivar-

Table 3 Logistic regression

Variable	OR	95% CI	<i>p</i> value
DM2	9.27	2.06–41.8	0.004
Age	1.02	0.95–1.09	0.598
Alimentary limb	1.01	0.99–1.02	0.408

iate study with these three variables. Multivariate logistic regression analysis showed that there was only one variable associated with dumping syndrome, namely, the presence of DM2 (OR=9.27; 95% CI, 2.06–41.8), as seen in Table 3.

Discussion

Dumping syndrome has been extensively studied in the last years, certainly due to the increase in its prevalence, which is directly related to the large number of bariatric surgeries performed annually.

Besides the clinical presentation of this syndrome, investigators have carried out laboratory tests in these patients for the purpose of confirming the diagnosis. In this retrospective study, we did not perform any laboratory tests, and the diagnosis of dumping syndrome was based only on clinical information collected during visits. We believe that the criteria utilized for defining dumping syndrome, described previously, are adequate for responding to the objective of this study, which acknowledges the arguable clinical diagnosis of dumping and the lack of laboratory confirmation of the syndrome. In the literature, we did not find reports that evaluated the association of dumping with DM2. Therefore, this work identified important information that should be confirmed in future prospective studies that evaluate, in the best possible way, the variables and outcomes. The differential diagnosis with reactive hypoglycemia, which occurs later (1 to 2 h after meals), is a precaution that is taken with these patients.

Despite the lack of these laboratory tests, our results showed a much higher prevalence of dumping in the group of patients with DM2, and we believe that this finding can contribute to future studies. The data suggest that, in evaluating dumping syndrome in this group of patients, the variable DM2 should be determined to avoid a possible bias.

The professionals who evaluated the patients are of the same team, follow a patient care routine based on a pre-established protocol, and use the same patient chart, but interobserver/interviewer variability can be questioned. We believe that the rigorous adherence to these routine guidelines should have reduced this bias. Moreover, the differences observed were substantial. Another important factor to be pointed out is that, as this was a retrospective study, the records were taken without concern for the patient having or not DM2, which could occur in a prospective study in which this variable is tested without evident blinding of the information.

The correlation of the length of the alimentary limb with dumping syndrome was a finding described in Table 2 and which was not confirmed in multivariate analysis, shown in

Table 3. The patients with DM2 had an alimentary limb on average longer than did the control group, and dumping syndrome was a more frequent finding among the diabetics than the control patients. However, multivariate analysis showed that there was no association of dumping with alimentary limb length and that the isolated finding was due to the greater prevalence of DM2 in patients in which the alimentary limb was longer. We did not find in the literature any work that reported this association.

We do not know the true reason for the greater prevalence of dumping among patients with DM2, but possible alterations related to innervation damage caused by DM2 can be involved in the pathophysiology. Diabetic gastroparesis is a complication in the diabetic patient and is related to symptoms of occlusion and stasis, unlike that of dumping. There was no assessment of gastroparesis in the patients evaluated in this study. The results obtained in this study call attention to a finding different than that expected with respect to this variable because it would be expected that a diabetic patient would have more gastroparesis than would patients of the control group, and consequently less dumping. However, the findings show a greater prevalence of dumping among the patients with DM2 when compared to the control group.

Conclusions

Dumping syndrome is a common complication in the postoperative period of gastric bypass. Patients with DM2 showed a higher prevalence of dumping postoperative. We believe that future studies that evaluate these patients in a prospective manner, with the help of laboratory tests, should take into consideration the diagnosis of DM2 in the evaluation of dumping syndrome.

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