

## ESOPHAGEAL MOTILITY AFTER GASTRIC BYPASS IN ROUX-EN-Y FOR MORBID OBESITY: HIGH RESOLUTION MANOMETRY FINDINGS

Motilidade esofágica após derivação gástrica em Y-de-Roux para obesidade mórbida: achados à manometria de alta resolução

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**ABSTRACT - Background:** Bariatric operations may alter esophageal motility; however, there is a paucity of studies of the esophageal motility with high resolution manometry. **Aim:** To study patients after Roux-en-Y gastric bypass for morbid obesity with high resolution motility. **Methods:** Were included 18 asymptomatic patients (17 women, mean age 53 years) after undergoing to Roux-en-Y gastric bypass for morbid obesity. All patients underwent high resolution motility after a mean follow-up of three years after the operation. **Results:** The mean pressure of the lower esophageal sphincter was  $18 \pm 13$  (range 0-51) mmHg. Seven (39%) patients had a hypotonic sphincter and one (5%) hypertonicity. Sphincter relaxation was abnormal in one patient. Total and abdominal lower esophageal sphincter length was  $4 \pm 1$  (1-7) cm e  $2 \pm 1$  (0-3) cm, respectively. Esophageal body distal amplitude (average measurements at 3 and 7 cm above the lower esophageal sphincter) was  $77 \pm 22$  (40-120) mmHg. One (5%) patient had hypocontractility. Peristaltic waves were found in  $95 \pm 0\%$  (60-100). The upper esophageal sphincter basal pressure was  $118 \pm 82$  (33 – 334) mmHg; one (5%) patient (5%) had a hypotonic upper sphincter and eight (44%) hypertonicity. **Conclusion:** After gastric bypass in Roux-en-Y occurs significant lower esophageal sphincter hypotonia and upper esophageal sphincter hypertonia.

**HEADINGS** - Morbid obesity. Gastric bypass. Manometry.

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**RESUMO - Racional:** A cirurgia bariátrica pode provocar alterações na motilidade esofágica. Entretanto, existe paucidade de estudos com a manometria de alta resolução. **Objetivo:** Avaliar a motilidade esofágica em pacientes submetidos à derivação gástrica em Y-de-Roux para obesidade mórbida. **Métodos:** Foram estudados 18 pacientes assintomáticos submetidos à derivação gástrica em Y-de-Roux por laparotomia. Todos foram submetidos à manometria de alta resolução em média três anos após a operação. **Resultados:** O esfíncter esofágico inferior teve pressão basal média de  $18 \pm 13$  (variação 0-51) mmHg; sete pacientes (39%) apresentaram hipotonia e um (5%) hipertonia. O relaxamento foi anormal em um paciente. O comprimento total e abdominal do esfíncter foi de  $4 \pm 1$  (1-7) cm e  $2 \pm 1$  (0-3) cm, respectivamente. A amplitude distal do corpo esofágico (média de 3 e 7 cm acima do esfíncter) foi de  $77 \pm 22$  (40-120) mmHg e um paciente (5%) teve hipocontratibilidade. Ondas peristálticas foram vistas em  $95 \pm 0\%$  (60-100). O esfíncter esofágico superior tinha pressão basal média de  $118 \pm 82$  (33 – 334) mmHg; um (5%) paciente apresentou hipotonia e oito (44%) hipertonia. **Conclusão:** Após a derivação gástrica, ocorreu significativa hipotonia do esfíncter esofágico inferior e hipertonia do esfíncter esofágico superior.

**DESCRIPTORIOS** - Obesidade mórbida.  
Derivação gástrica. Manometria.

## INTRODUCTION

Obesity is in epidemic growing in the modern society<sup>7</sup>. It is associated to several different comorbidities including esophageal dysmotility<sup>15</sup>. Abnormal esophageal motor

activity may be seen as consequence of the obesity per se<sup>14,20</sup> or secondary to bariatric operations<sup>17,20</sup>.

High resolution manometry (HRM) has been recently added to clinical practice. It showed to be a valuable tool for the diagnosis of esophageal motility disorders with real advantages over conventional manometry<sup>10</sup>.

This study aims to study esophageal motility after Roux-en-Y gastric bypass (RYGB) for morbid obesity at the light of HRM.

## METHODS

### Population

Eighteen adults, being 17 females, mean age 53±5 (44-63) years patients with morbid obesity that underwent RYGB were prospectively studied. Surgical technique has been previously reported in details<sup>1</sup>. All operations were performed by the same surgical team via laparotomy. The gastric pouch had 5 cm and a volume of 30ml.

Body mass index was 46±10 (34-68) Kg/m<sup>2</sup> and 32±6 (23-46) Kg/m<sup>2</sup> before operation and at the HRM, respectively. Patients were studied after a mean follow-up of three years (3 m-7 y) after the operation.

All individuals were volunteers without foregut symptoms.

### High resolution manometry

All patients underwent a HRM (Given Imaging, Los Angeles, EUA) after 8 h fasting. Medications that could interfere with esophageal motility were discontinued. After topic anesthesia, the catheter was introduced transnasally to the point when the reading of both sphincters was obtained. Upper esophageal sphincter (UES) and lower esophageal sphincter (LES) basal pressures were recorded for 30 seconds (landmark) followed by 10 wet swallows (5 ml).

Data acquisition and analysis were performed by the dedicated software (ManoScan and Manoview, Given Imaging, Los Angeles, EUA).

UES pressure was considered normal between 34-104 mmHg. Esophageal body amplitude was measured at 3 and 7 cm above the LES. Normal values were 41-168 mmHg and 37-166 mmHg, for 3 and 7 cm, respectively.

LES pressure was considered normal between 13-43 mmHg. LES total length was considered normal between 2.7-4.8. There is no universal acceptance in relationship to value for abdominal length. Residual pressure was measured for four seconds after the beginning of the swallow, with reference value of <15mmHg.

### Ethics

The study was approved by the local Institutional Review Board. All individuals signed an informed consent.

There were no conflicts of interest. The authors are responsible for the manuscript, no ghost or professional writer was hired.

## RESULTS

UES mean basal pressure was 118±82 (33-334) mmHg; 1(5%) patient had hypotonia and 8 (44%) hypertonia.

Esophageal body amplitude was 77±22 (40-120) mmHg; 1(5%) patient had hypocontractility. Peristaltic wave were noticed in 95±0% (62-100) of the swallows.

LES mean basal pressure was 18±13 (0-51) mmHg; 7 (39%) patients had hypotonia and 1 (5%) hypertonia. LES relaxation was partial in 1 (5%) patient. LES total and abdominal length was 4±1 (1-7) cm and 2±1 (0-3) cm, respectively.

## DISCUSSION

### High resolution manometry

Esophageal manometry is the gold-standard test to evaluate esophageal motility<sup>6</sup>. It is able to study both esophageal sphincters and the esophageal body at rest and during wet swallows. HRM is a variant of the conventional manometry displacing multiple circumferential sensors in the dedicated catheter, instead of only six or eight characteristics of the conventional manometry. The number and disposition of the sensors may vary according to the manufacturer; however, the most common special disposition has 36 sensors spaced 1 cm. HRM has been proved superior to conventional manometry; however, few studies have been published in our country due to the high cost of the equipment. Clinical experience showed clear advantage on the evaluation of segmental defects of peristalsis, LES relaxation and gastric pressures<sup>8-10</sup>.

The authors do not see advantage on the analysis of segmental defects of peristalsis in the population of morbid obese, since there are no reasons to expect this finding in these patients. For that matter, segmental defects were not noticed in this study. The detailed evaluation of the LES may be useful in the preoperative work-up of bariatric operations due to the possibility of the rare complication of pseudoachalasia<sup>3,12</sup>. Surprisingly, a case of partial relaxation of the LES was noticed in an asymptomatic individual in this study. The study of intragastric pressures, impossible to be obtained at the light of conventional manometry, may

help the evaluation of postoperative symptoms consequent to the restricted gastric emptying. HRN also allows to identify the pressure caused by a ring banding the gastric pouch or an adjustable gastric band<sup>2,4</sup>; however, the real values that may identify a successful or unsuccessful operation in regards to obstructive symptoms is still elusive<sup>5</sup>.

### Esophageal motility after bariatric procedures

Esophageal dysmotility is a frequent complication after bariatric operations with variable incidence according to the surgical technique. Naef et al.<sup>18</sup> showed abnormal motility in up to 70% of the patients that underwent a gastric banding and 25% of those developed esophageal. The incidence of dysmotility may reach 60% after RYGB<sup>11</sup>.

Conventional manometry studies after RYGB depicted a LES as hypotonic<sup>20</sup>, hypertonic<sup>20</sup> or even normal<sup>13,19</sup>. In the current study, a significant number of hypotonic LES was noticed. This finding may be associated to multiple factors, such as change in local anatomy and physiology due to the surgical procedure or decrease in the abdominal pressure with weight loss. Interestingly, previous studies also showed abnormal relaxation of the LES in a proportion similar to this study<sup>17</sup>.

Similarly to the LES, manometric findings regarding the esophageal body are controversial. Some authors showed hypercontractility in more than half of the cases<sup>20</sup> while others showed hypocontractility<sup>16,17</sup> or normal peristalsis and amplitude<sup>13,19</sup>.

UES has always been neglected in the population of operated morbid obese. Was found a significant number of cases of UES hypertonia, even though wasn't possible to explain the fact.

The current study has some limitations. First, a small number of patients were studied, since they were asymptomatic volunteers. Second, patients were not studied before the operation. Despite the limitations, it was shown that abnormalities in the esophageal motility are common after RYGB for morbid obesity, especially LES hypotonia and UES hypertonia.

## CONCLUSION

LES hypotonia and UES hypertonia are common findings after RYGB.

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