

RADIOLOGICAL EVALUATION OF POSTOPERATIVE GASTROINTESTINAL ALTERATIONS IN PATIENTS SUBMITTED TO FOBI-CAPELLA SURGERY*

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Abstract **OBJECTIVE:** The present study was aimed at evaluating radiological findings of delayed postoperative upper gastrointestinal series in patients submitted to Fobi-Capella surgery. **MATERIALS AND METHODS:** Radiological studies of 41 patients, six to nine months following the surgery. **RESULTS:** The following pathological alterations have been found: hiatal hernia (17%), gastroesophageal reflux disease (19.5%) and sliding of the silastic ring (4.8%). Least frequent findings have been the following: enterocutaneous fistula (2.4%), stenosis of the gastric pouch outlet (2.4%), bezoar (2.4%), and non-visualization of the silastic ring caused by its removal due to patient intolerance (2.4%). Anatomical alterations resulting from the surgery have been clearly demonstrated. **CONCLUSION:** The present study could demonstrate anatomical alterations and complications resulting from Fobi-Capella surgery.

Keywords: Morbid obesity; Gastroplasty; Upper gastrointestinal series; Bariatric surgery; Fobi-Capella.

Resumo *Análise radiológica das alterações gastrintestinais após cirurgia de Fobi-Capella.*

OBJETIVO: Estudar os achados radiológicos encontrados na seriografia digestiva alta no pós-operatório tardio de cirurgia de Fobi-Capella. **MATERIAIS E MÉTODOS:** Estudo radiológico de 41 pacientes realizado seis a nove meses após a cirurgia de Fobi-Capella. **RESULTADOS:** As alterações encontradas foram hérnia hiatal (17%), refluxo gastroesofágico (19,5%) e deslizamento do anel (4,8%). Os achados menos freqüentes foram fistula enterocutânea (2,4%), estenose da anastomose gastrojejunal (2,4%), bezoar (2,4%) e não-visualização do anel em decorrência da sua retirada por intolerância (2,4%). As alterações anatômicas da cirurgia foram claramente demonstradas. **CONCLUSÃO:** O estudo foi capaz de demonstrar as alterações anatômicas e as complicações da cirurgia de Fobi-Capella.

Unitermos: Obesidade mórbida; Gastroplastia; Seriografia; Cirurgia bariátrica; Fobi-Capella.

INTRODUCTION

Obesity is a severe public health problem, and, according to a survey performed late in 2004 in a partnership between the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics) and the Brazilian Ministry of

Health, 40.6% of the Brazilian population above 20 years of age is overweight, differently from 30 years ago when only 16% of the adult population was affected by obesity. It is estimated that one million Brazilians are morbid obese⁽¹⁾.

The surgery for obesity management is indicated as an alternative for treating morbid obesity resulting in a marked reduction of comorbidities in patients who have not showed response to appropriate clinical treatments. This surgery is regulated by the Brazilian health authorities since 2001, and is performed in institutions that deliver services within the Sistema Único de Saúde (SUS) (Brazilian Public Health System). According to the Ministry of Health statistics, during 2004 in Brazil, 2,014 bariatric surgeries were performed within the SUS⁽¹⁾.

Several surgical techniques are currently available for morbid obesity management⁽²⁻⁴⁾. Currently, Roux-en-Y gastric bypass (Fobi Capella bariatric surgery) is the most frequently utilized technique for treating morbid obesity, because of its high effectiveness and low morbimortality⁽⁵⁾. This procedure involves the creation of a gastric pouch of approximately 20 cc. The remaining stomach, as well as the duodenum and the first 50 cm of the jejunum remain permanently excluded from the digestive tract. The small gastric pouch is anastomosed to an isolated jejunal loop in a Y configuration and its emptying process is limited by a silicone ring that reduces the gastric lumen to 12 mm. Secretions originated from the excluded stomach and duodenum flow into the jejunum through an anastomosis measuring 100–159 cm, this distance being related to the patient's body mass index (BMI). The silicone ring is distally placed at about 5.5 cm from the esophogogastric transition and 1.5 cm

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proximal to the gastrojejunal anastomosis⁽⁶⁾.

The method of choice for evaluating alterations resulting from bariatric surgery is the upper gastrointestinal series. Innumerable studies report that some of these complications may be structural (fistulas, intestinal obstruction, stenoses, internal hernias, marginal ulcers) or functional (nausea, emesis, diarrhea, dumping syndrome, constipation and gastroesophageal reflux disease)^(3,7,8).

The present study is aimed at reporting postoperative alterations resulting from Fobi-Capella surgery, diagnosed by upper gastrointestinal series.

MATERIALS AND METHODS

Prospective radiological study of 41 patients submitted to bariatric surgery (Fobi Capella technique) with insertion of a contention ring, between May/2000 and June/2005. Thirty-three of these patients were women, and eight men, with ages ranging between 23 and 63 years (mean age 45.3 years). Postoperative weight loss ranged between 22 kg and 71 kg (mean = 45.6 kg.).

The radiological study was initiated with an upper abdominal plain radiograph. After that, under radioscopy control, the patient was orally given small amounts of 50% barium sulfate, for evaluating the morphology and emptying of esophagus, stomach and anastomosis. Then, the amount of barium ingested was adequately increased, usually up to no more than 150 cc, according to the radiologist control. Radiographs were routinely taken in the following positions: orthostatic, for anteroposterior and oblique views; lateral orthostatic; dorsal decubitus in the right anterior oblique view; ventral decubitus (Schatzky's position).

Other radiographic views were taken under radioscopy control. A proximal jejunal radiograph completed the study. Patients weighting more than 130 kg were evaluated only in the orthostatic position, because the radiological table could not support such a weight.

RESULTS

Postoperative alterations have been found in 51.2% of studies, the most fre-

quent being gastroesophageal reflux disease, followed by seven cases of hiatal hernia, with three patients presenting with both alterations (Table 1).

DISCUSSION

Obesity is a chronic and universal disease whose prevalence continues to increase at concerning rates, especially in Western countries. In the last 30 years, the obese population increased more than 90%⁽⁹⁾.

Bariatric surgery was firstly reported in 1954 by Kremer et al., in a study describing a jejunoileal bypass. The term "bariatric" is originally derived from the Greek *baros*, meaning "weight", and *iatrike*, meaning "treatment"⁽¹⁰⁾. In 1986, Mathias Fobi described the gastric bypass technique reported by the present study⁽¹¹⁾.

In the last years, bariatric surgery has gained acceptance both from the medical community and the public in general. It is considered as a relatively safe surgery⁽¹²⁾ (Figure 1).

With the remarkable increase in the incidence of morbid obesity, gastroplasty surgeries, particularly Fobi-Capella surgeries, have become increasingly frequent, so the knowledge of the technique and possible alterations and complications become more and more significant, considering that the clinical examination of these patients is impaired by the obesity itself. Many times, the radiologist is the first to detect complications as a result from this surgery. By this reason, it is extremely important that the specialist knows the possible complications as well as their appearance in imaging studies.

An extensive literature review has shown that 72.6% of the patients submitted to bariatric surgery were women, a data that also has shown to be more prevalent in the present casuistic, corresponding to 80.5% of the patients submitted to this procedure. Mean age was 38.97 years, a little below the mean age of the population included in the present study (45.3 years). The mortality rate described in the literature is 0.5%. An analysis of 936 gastroplasty surgeries has demonstrated a mean weight loss of 39.45 kg, a little below the 45.6 kg found in the present study⁽¹³⁾.

Table 1 Postoperative complications.

Complications	N (%)
Gastroesophageal reflux	8 (19.5)
Hiatal hernia	7 (17.0)
Sliding of the silastic ring	2 (4.8)
Enterocutaneous fistula	1 (2.4)
Stenosis of the gastric pouch outlet	1 (2.4)
Bezoar	1 (2.4)
Nonvisualization of the silastic ring caused by its removal	1 (2.4)
Total	21 (51.2)

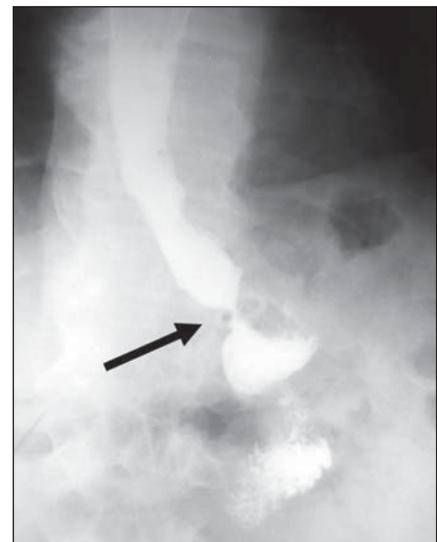


Figure 1. Posteroanterior contrast-enhanced radiograph clearly demonstrating the presence of the ring (arrow). The radiological technique was satisfactory.

Upper gastrointestinal series have shown alterations in 51.2% of patients, however, not all gastroesophageal reflux diseases and hiatal hernias should be considered as postoperative surgical complications, considering that a preoperative examination has not been performed. With the exclusion of these complications, the total of remaining complications would correspond to 14.3%, a little below the percentage reported in the literature (20–25%)⁽¹⁴⁾. In another study performed by Arasaki et al., who have also performed the surgeries in the present study, 23% of patients have presented postoperative gastroesophageal reflux disease when a standard-sized silicone ring was utilized, and only 8% with a little larger ring, therefore it may be concluded that the resulting lower esophageal



Figure 2. Radiograph showing the presence of gastric fundus hernia through the diaphragmatic esophageal hiatus (arrow). Constriction caused by the silicone ring (arrowheads).

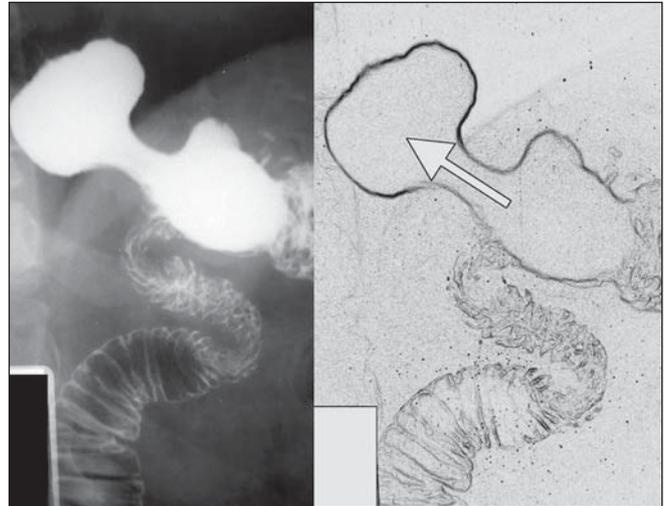


Figure 3. Lateral, contrast-enhanced radiograph demonstrating gastric fundus hernia sliding through the esophageal hiatus (arrow).

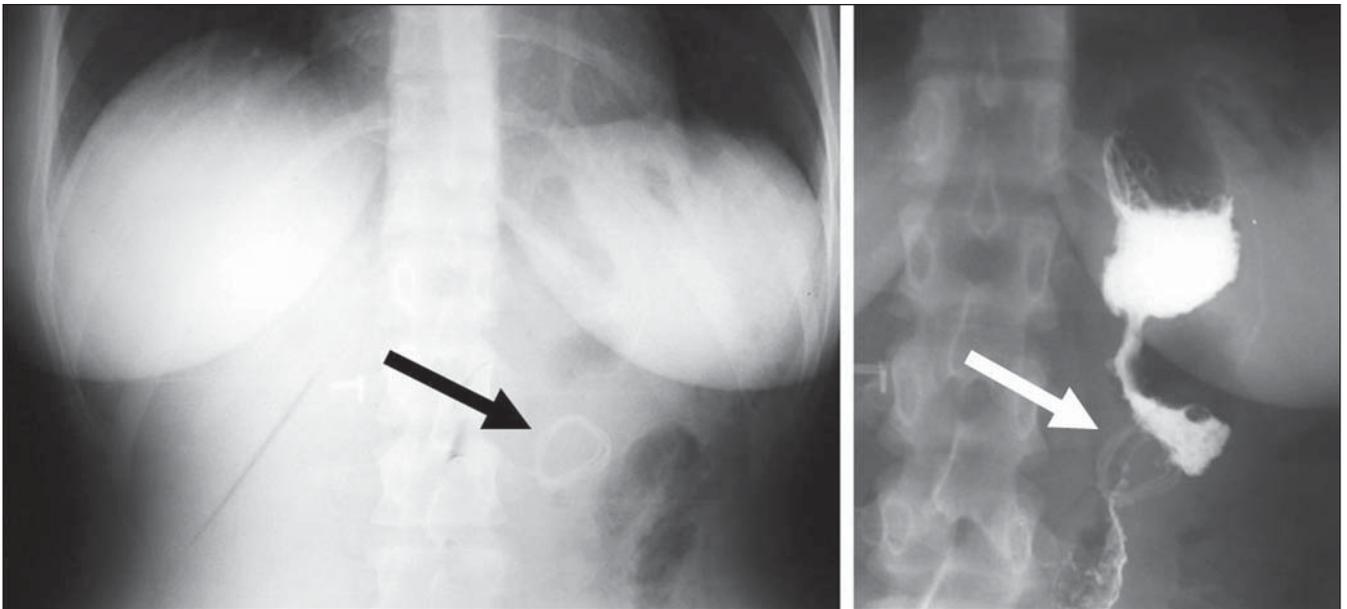


Figure 4. Posteroanterior radiograph showing the caudal sliding of the silicone ring (arrows).

sphincter function may be related to some cases of postoperative gastroesophageal reflux disease⁽⁶⁾ (Figures 2 and 3).

In the present casuistic, 4.8% of patients presented sliding of the silicone ring, and in 2.4% of cases, the ring could not be visualized because of its removal due the patient's intolerance. Closset et al., who have followed-up 214 patients, have reported the ring removal in 4.2% of cases⁽¹⁵⁾. Plain radiography plays an extremely significant role in the definition of the silicone ring presence and topography (Figure 4).

Stenosis of gastrojejunal anastomosis was found in only one patient (2.4%), a little below the percentages reported by the literature (3–27%)⁽¹⁴⁻¹⁸⁾. DeMaria et al. have evaluated 281 patients and reported this event in 6.6% of cases⁽¹⁷⁾.

Ulcers may be caused by exposure to gastric acids from the gastrojejunal anastomosis or by ischemia. Studies in the literature report ulcers occurrence in 1% to 5% of cases, however, no case of ulcer was found in the present study⁽¹⁴⁻¹⁷⁾.

The present study has found one case of

bezoar (2.4%), while the literature reports a 1.9% incidence⁽¹⁹⁾. Also, one case of enterocutaneous fistula was found, while Capella et al. report a low incidence of this complication⁽²⁰⁾.

CONCLUSION

In the present study, upper gastrointestinal series has clearly demonstrated postoperative alterations in patients submitted to Fobi-Capella surgery. Gastroesophageal reflux disease (19.5%) and hiatal hernia

(17%) cannot be attributed to the surgery, considering that a preoperative examination was not performed.

The radiological technique has been considered as satisfactory. The plain radiograph is mandatory for demonstrating the silicone ring presence and topography.

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