

ORIGINAL REPORT

# Studying the complications of bariatric surgery with intravenous contrast-enhanced multidetector computed tomography<sup>☆</sup>



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## KEYWORDS

Bariatric surgery;  
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complications;  
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tomography;  
Contrast agent

## Abstract

**Objective:** To review the complications of bariatric surgery and their diagnosis with intravenous contrast-enhanced multidetector computed tomography (MDCT).

**Material and methods:** We retrospectively studied all patients who underwent gastric bypass or sleeve gastrectomy at our center during 2013 or 2014. We classified complications into early complications (appearing within 30 days of the intervention) and late complications.

**Results:** We reviewed 155 cases and found 24 complications in 22 patients: 16 early complications (7 intraperitoneal hematomas, 5 anastomotic dehiscences, 2 intestinal obstructions, and 2 external hernias) and 8 late complications (3 internal hernias, 3 intestinal perforations, and 2 marginal ulcers). Two patients died. All of these complications were diagnosed with intravenous contrast-enhanced MDCT, except one, which required a barium transit study.

**Conclusion:** The rate of complications in bariatric surgery is high and the associated mortality is not negligible. Radiologists need to know the normal findings in these patients so they can quickly identify possible complications, most of which can be diagnosed with intravenous contrast-enhanced MDCT.

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**PALABRAS CLAVE**

Cirugía bariátrica;  
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Tomografía  
computarizada  
multidetector;  
Contraste

## Estudio de las complicaciones de la cirugía bariátrica por tomografía computarizada multidetector con contraste intravenoso

**Resumen**

**Objetivo:** Revisar las complicaciones de la cirugía bariátrica y su diagnóstico mediante tomografía computarizada multidetector con contraste intravenoso (TCMDcCIV).

**Material y métodos:** Estudio retrospectivo de los pacientes intervenidos mediante *by-pass* gástrico o gastrectomía tubular en nuestro centro durante 2013 y 2014. Las complicaciones se dividieron en precoces (durante el primer mes) y tardías.

**Resultados:** Se revisaron 155 casos y se diagnosticaron 24 complicaciones en 22 pacientes: 16 precoces (7 hematomas intraperitoneales, 5 dehiscencias anastomóticas, 2 obstrucciones intestinales y 2 hernias externas) y 8 tardías (3 hernias internas, 3 perforaciones intestinales y 2 úlceras en boca anastomótica). Dos pacientes fallecieron. Todas las complicaciones se diagnosticaron mediante TCMDcCIV, excepto una que requirió un tránsito baritado.

**Conclusión:** La tasa de complicaciones en la cirugía bariátrica es elevada y su mortalidad no es despreciable. Deben reconocerse los hallazgos normales en estos pacientes para identificar rápidamente las posibles complicaciones, diagnosticadas en su mayoría mediante TCMDcCIV.

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**Introduction**

Obesity is a chronic condition defined<sup>1</sup> as a body mass index (BMI) over 30 kg/m<sup>2</sup>. It is considered a worldwide epidemic, and in Spain it affects 16.9% of the population over 18.<sup>1-3</sup> Today, there is an important increase of bariatric surgeries due to the higher incidence rate of this condition, the lack of conservative treatment, and the improved results coming from the surgical procedures,<sup>1</sup> that not only achieve weight reductions, but also help maintain these drops, and reduce the associated comorbidity.<sup>4-6</sup> At our hospital, after positive assessment by the units of endocrinology and psychiatry, the unit of general surgery completes the surgical indication based on the patient's characteristics, such as the BMI, any associated comorbidities, the symptomatic abdominal surgical pathology, and the clinical repercussion on the quality of life of obesity.

Although complications due to bariatric surgery are growing thin,<sup>5,7</sup> patients need one multidisciplinary approach where radiologists play a fundamental role in the detection of complications, particularly thanks to the increased availability of the intravenous contrast-enhanced multidetector computed tomography (IVCE-MDCT).<sup>8-11</sup>

Our goal is to review the postoperative complications of bariatric surgery and their diagnosis using the IVCE-MDCT.

**Material and methods**

One retrospective study of all the patients operated of bariatric surgery was conducted at our center. This review was approved by our hospital clinical research ethics committee. All patients operated through gastric bypass procedure (GBP), or sleeve gastrectomy (SG) procedure for the management of their morbid obesity from January 2013 through December 2014 were included in the study. Both the clinical histories (sociodemographic variables, and

clinical evolution), and the radiologic imaging modalities conducted in these patients until December 2015 were reviewed, being the major abdominal complications derived from the radiologic diagnosis assessed and categorized into early (within the first month after the intervention), and late complications (within the second month after the intervention).

Both the IVCE-MDCT and the barium swallow study (BS) were considered diagnostic methods. Whenever the complication was acute, or the patient was hemodynamically unstable, the IVCE-MDCT was conducted. The BSs were reserved for chronic complications and cases with non-diagnostic IVCE-MDCT. Also, through the first half of the year 2013, scheduled BSs were conducted in all patients within the first 48 h after the surgical procedure, in order to rule out dehiscence of sutures, and confirm correct bowel transits. The IVCE-MDCTs were conducted using one Siemens Somatom Emotion machine, and the images were reconstructed with 2.5 mm slices. Eighty ml of intravenous contrast (IVC) were administered *Iomeron 300* (lomeprol 1 g/100 ml) at a flow rate of 2 ml/s, and a 60 second-delay. On suspicion of bleeding, triphasic studies were indicated, conducting one arterial phase with 120 ml of IVC at a flow rate of 4 ml/s. On suspicion of dehiscence of sutures or perforation, a series with oral contrast of Gastrolux was added (meglumine amidotrizoate, and sodium amidotrizoate 3.7 g/100 ml) at a 5/100 dilution. All studies were reviewed by four (4) expert radiologists included in the authorship of the paper, three of them with over 20 years of experience in abdominal radiology.

**Results**

One hundred and fifty-five (155) cases were reviewed. The sociodemographic variables are shown in [Table 1](#). There were 24 complications in 22 patients. The complications and

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