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Caso clínico

# Development of type 2 diabetes mellitus thirty-one years after Billroth II in a patient asking for diabetes surgery

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Abstract

**Introduction:** Diabetes surgery in obese and slim patients seems to be a superior alternative to the current medical treatment. Gastric bypass is an alternative treatment for diabetes. Nevertheless, there are still doubts whether diabetes can recur if you gain weight or if the effects are maintained over time. Other questions refer to the type of surgery to make the bypass limb length or reservoir size for the resolution of the Diabetes Mellitus.

**Presentation of case:** Male patient 69-year-old came to us in order to perform tailored One Anastomosis Gastric Bypass (BAGUA) to treat his type 2 diabetes mellitus and metabolic syndrome. He has a history of peptic ulcer treated with subtotal gastrectomy and Billroth II reconstruction 49 years ago. He currently is not obese and developed diabetes 31 years after surgery.

**Discussion:** Globally there are no reports of patients with normal BMI that after performing gastric bypass developed diabetes mellitus. There are cases where obese diabetic patients after gastric bypass improve or remits the T2DM, but it relapses due to insufficient weight loss or gain it. The patient with gastric bypass Billroth II type, should not developed diabetes. He is normal weight and not had weight gain that could be linked to the development of diabetes.

**Conclusions:** The results generated by bariatric surgery are encouraging, but still do not clarify the precise way how surgery produces rapid improvement of systemic metabolism as in diabetes, but in our patient, the effect was quite different because the gastric bypass had no protective effect against diabetes.

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Key words: Diabetes mellitus. Tailored BAGUA. Gastric bypass. Bariatric surgery. Diabetes surgery.

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## DESARROLLO DE DIABETES MELLITUS TIPO 2 TREINTA Y UN AÑOS DESPUÉS DE BILLROTH II EN UN PACIENTE QUE SOLICITA CIRUGÍA DE DIABETES

Resumen

**Introducción:** La cirugía de la diabetes en pacientes obesos y delgados parece ser una alternativa superior al tratamiento médico actual. El bypass gástrico es un tratamiento alternativo al tratamiento médico actual. Sin embargo, todavía hay dudas sobre si la diabetes puede reaparecer si hay aumento de peso o si se mantienen los efectos en el tiempo. Otras preguntas se refieren al tipo de cirugía para hacer la longitud del remanente gástrico o el tamaño del reservorio para la resolución de la Diabetes Mellitus.

**Presentación del caso:** Paciente masculino de 69 años de edad, vino a nosotros con el fin de realizar el bypass gástrico de una anastomosis a medida (BAGUA) para tratar su diabetes mellitus tipo 2 y el síndrome metabólico. Tiene antecedentes de úlcera péptica tratado con gastrectomía subtotal y reconstrucción tipo Billroth II hace 49 años. Actualmente él no es obeso y desarrolló diabetes 31 años después de la cirugía.

**Discusión:** A nivel mundial no hay reportes de pacientes con IMC normal que después de realizar un bypass gástrico desarrollaron diabetes mellitus. Hay casos en que los pacientes diabéticos obesos después del bypass gástrico mejoran o remite la DMT2, pero reaparece debido a la pérdida de peso insuficiente o reganancia de él. El paciente con un bypass gástrico tipo Billroth II, no debió desarrollar diabetes. Él tiene peso normal y no ha aumentado de peso que podría estar relacionado con el desarrollo de diabetes.

**Conclusión:** Los resultados generados por la cirugía bariátrica son alentadores, pero aún no aclaran la forma precisa cómo la cirugía produce una rápida mejoría del metabolismo sistémico como la diabetes, pero en nuestro paciente, el efecto fue muy diferente debido a que el bypass gástrico no tuvo un efecto protector contra la diabetes.

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Palabras clave: Diabetes mellitus. BAGUA a medida. Bypass gástrico. Cirugía bariátrica. Cirugía de diabetes.

## Abbreviations

BMI: Body Mass Index.

BAGUA: One Anastomosis Gastric Bypass.

T2DM: Type 2 Diabetes Mellitus.

## Introduction

Diabetes surgery in obese and slim patients seems to be a superior alternative to the current medical treatment<sup>1,2</sup>. There are still doubts whether diabetes can recur if you gain weight or if the effects are maintained over time. Other questions refer to the type of surgery to make the bypass limb length or reservoir size for the resolution of the Diabetes Mellitus<sup>3</sup>.

The first experiences come from Friedman et al.<sup>4</sup>, who in 1955 reported cases of patients after subtotal gastrectomy Billroth II type for peptic ulcer having diabetes mellitus. Patients had ulcer healing and a marked improvement of diabetes, as manifested by the reduction or elimination of insulin requirements. The same results were found with the Greenville Gastric Bypass that nobody still practices<sup>5</sup>.

Since then it has been investigated how duodenal exclusion can control diabetes, beginning a new alternative of treatment for diabetes mellitus, where several studies have followed-up diabetic patients after gastric bypass. Pories et al.<sup>6</sup> studied for 14 years to 608 patients of whom 165 were diabetic, determining that the surgery provides long-term control of diabetes.

SOS study also revealed that bariatric surgery not only cures but also prevents the onset of diabetes<sup>7</sup>.

Nevertheless, GarcíaCaballero et al.<sup>2</sup> has shown that the resolution of diabetes mellitus is not only present in obese but also in normal weight patients even with C-peptide zero to whom eliminates the use of fast-acting insulin and reduces to a minimum the necessity of long-acting insulin enhancing glycemic control<sup>8</sup>.

In this context, we have experienced a case where a man came to us asking for diabetes surgery and the preoperative study found that the patient had been operated 49 years before for Billroth II because of duodenal ulcer. The patient have always had normal BMI.

## Presentation of case

Male patient 69-year-old came to us in order to perform the tailored One Anastomosis Gastric Bypass (BAGUA) to treat his type 2 diabetes mellitus (T2DM) and metabolic syndrome. He has a history of peptic ulcer treated surgically with gastrectomy and Billroth II reconstruction 49 years ago. Then he developed T2DM 18 years ago, who despite intensive medical treatment based on oral hypoglycemic and insulin has not achieved an adequate control of blood glucose. He had also arterial hypertension and dyslipidemia.

Physical examination is weight of 66 kg, height 1.70 m, BMI 22.8 and TA 181/82.

His treatment is irbesartan 300 mg, metformin 850 mg, 20 mg omeprazole, ramipril 10 mg, aspirin 100 mg, atorvastatin 20 mg, 10 mg lercanidipine, 27 IU insulin glulisine and 24 IU insulin glargine per day.

Laboratory levels are glucose 192 mg/dL, triglycerides 100 mg/dL, cholesterol 160 mg/dL, HDL 41 mg/dL, LDL, 99 mg/dL, HbA1c 7.8% and C-peptide 2.14 ng/mL.

The oesophagogram shows minimum gastroesophageal reflux, Billroth II gastrectomy with wide gastroenterostomy and fast transit to the jejunum. The duodenal afferent loop shows no fill (figs. 1 and 2).

## Discussion

Globally there are no reports of patients with normal BMI that after performing gastric bypass develop diabetes mellitus. There are cases where obese diabetic patients after gastric bypass improve or remits the T2DM, but it relapses due to insufficient weight loss or gain it.

The existing series of patients worldwide usually have remission of diabetes mellitus in obese patients<sup>6,7</sup>.

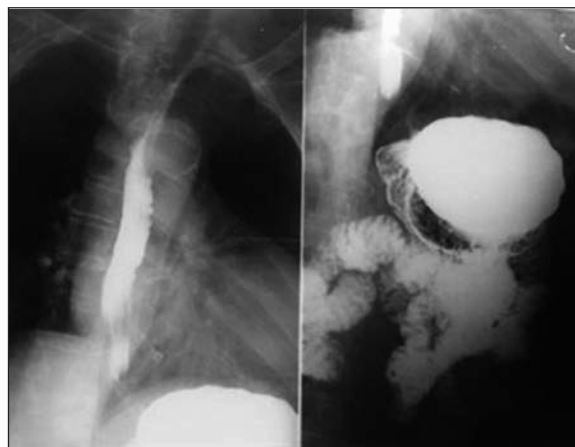


Fig. 1.—

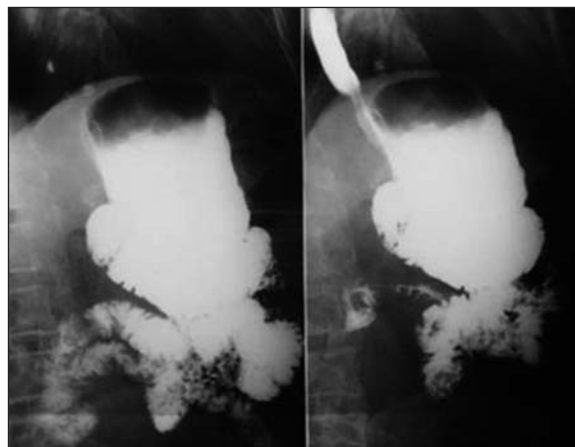


Fig. 2.—

However, there are few studies on normal weight patients. They are operated with the premise that if bariatric surgery improves diabetes in obese patients, also can be applied to normal weight patients achieving resolution of diabetes<sup>9</sup>. However all these studies have limitations due to their structure, type of surgical procedures, BMI, time following, etc.

Questions remain without response as either how surgery helps in diabetes or which surgical procedure is appropriate<sup>1</sup>.

Our patient with a gastric bypass Billroth II type should not develop diabetes. He is normal weight and not had weight gain that could be linked to the development of diabetes. He has also a reorganization of the gastrointestinal tract with appropriate hormonal modulation, but he developed diabetes. The new data generated are encouraging, but still do not clarify the precise way about how bariatric surgery produces rapid improvement of systemic metabolism<sup>10</sup>, which is the challenge for future research.

## Conclusion

The results generated by bariatric surgery worldwide are encouraging, but not clear precisely how the surgery produces rapid improvement of systemic metabolism. It is well known that bariatric surgery causes improvement and/or resolution of various diseases such as diabetes, and some authors mention that gastric bypass is protective against the onset of diabetes, but in our case, the effect was very different because gastric bypass had no protective effect against diabetes.

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