

## Challenges on the management of hypoparathyroidism following gastric bypass surgery

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### Abstract

Postsurgical hypoparathyroidism is characterized by hypocalcemia and hyperphosphatemia, which results from low parathyroid hormone. The management of hypoparathyroidism may be particularly difficult in patients with malabsorption syndromes, as following bariatric surgery, despite adequate calcium and vitamin D supplementation.

The authors present a 52 years-old female patient with iatrogenic postsurgical hypoparathyroidism following total thyroidectomy for benign multinodular goiter. She was stable under therapy with oral calcium, cholecalciferol and calcitriol until gastric bypass surgery five years after the initial diagnosis. Since then she maintained hypocalcemia in spite of increased dosage of calcium carbonate and vitamin D. However, after starting therapy with pancreatic enzymes her calcemia improved and remained stable.

The administration of exocrine pancreatic enzymes resulted in improved calcemia values in this case. Pancreatic enzymes might contribute to increase intestinal absorption of calcium and vitamin D supplements in patients with hypoparathyroidism.

### Keywords

Hypoparathyroidism; gastric bypass; calcium; vitamin D; pancreatin.

### Abbreviations

PTH: Parathyroid hormone.

## Introduction

Iatrogenic post-surgical hypoparathyroidism is a rare complication of total thyroidectomy [1]. It manifests by hypocalcemia and hyperphosphatemia with inappropriately low levels of Parathyroid Hormone (PTH). Treatment consists of calcium and vitamin D administration, in order to optimize intestinal calcium absorption [2].

Calcium and vitamin D absorption after gastric bypass surgery is impaired, leading to greater difficulty in the management of calcemia in patients with hypoparathyroidism [3,4]. Thus, electrolyte monitoring is particularly important in these cases and therapy adjustment should be considered.

Treatment with exocrine pancreatic enzymes has been shown to improve serum calcium in patients with hypoparathyroidism after bariatric surgery [5]. In the following case addition of pancreatic enzymes resulted in better control of serum calcium and allowed a reduction in calcium and vitamin supplements dosages.

## Case Presentation

The authors present a 52-year-old female patient, who was referred to an endocrinology appointment by her primary physician because of non-controlled post-surgical hypoparathyroidism.

The patient had undergone total thyroidectomy for benign multinodular goiter seven years prior, of which resulted definitive iatrogenic hypoparathyroidism, stabilized under calcium, cholecalciferol and calcitriol supplementation. Five years after total thyroidectomy, given her obesity and arterial hypertension, she was proposed to bariatric surgery (gastric bypass), which motivated significant body weight loss.

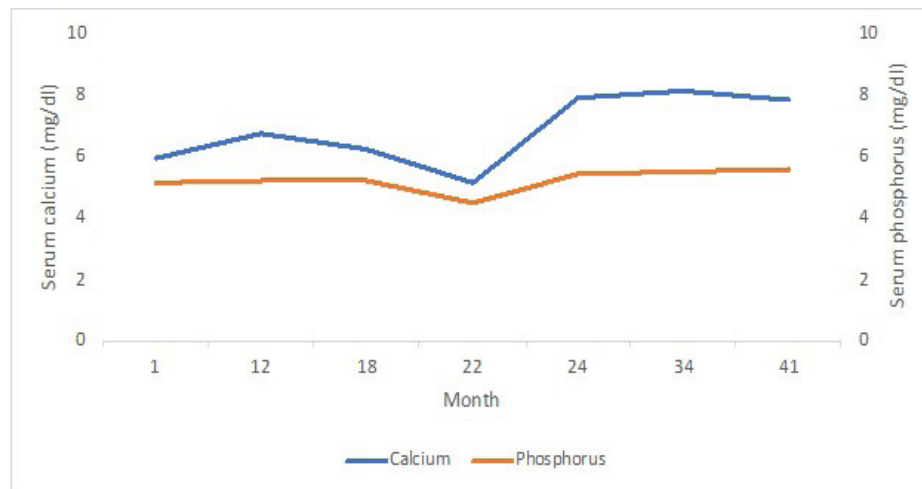
At the time of the first appointment after gastric bypass she was treated with calcium carbonate 1800 mg/day, cholecalciferol 1200 IU/day, calcitriol 0.75 µg/day, levothyroxine 100 µg/day, and multivitamin supplement (cyanocobalamin + pyridoxine + thiamine). The patient mentioned symptoms of perioral paresthesia and of her hands. She did not report diarrhea, vomiting or any other gastrointestinal symptoms. She followed a restrictive diet in accordance to her weight loss plan.

Laboratory findings corroborated the diagnosis: serum calcium 5.9 mg/dl (reference: 8.8 to 10.2 mg/dl), ionized calcium 3.12 mg/dl (reference: 4.5 to 5.3 mg/dl), phosphorus 5.1 mg/dl (reference: 2.5 to 4.5 mg/dl), magnesium 1.8 mg/dl (reference: 1.6 to 2.6 mg/dl) and PTH 3.2 pg/ml (reference: 18.5 to 88.0 pg/ml).

Despite the increase of calcium dosage to 4500 mg per day, the patient maintained calcemia below 7.0mg/dl.

Three years after the gastric bypass surgery, she started treatment with pancreatin (10000 units of lipase, 8000 units of amylase and 600 units of protease), taken with the main meals. Four months later, there was an increase of calcemia levels to 7.4mg/dl, and 12 months later calcemia levels were stable at 8.1

mg/dl (Figure 1).



**Figure 1:** Serum calcium and phosphorus since admission.

## Discussion

Liposoluble vitamins' deficiency, decreased intestinal absorption of calcium and secondary hypoparathyroidism all have multifactorial etiology in patients who underwent gastric bypass surgery. First, the absorption of liposoluble vitamins and calcium is impaired, since the duodenum and jejunum are derived from the normal course of the food through the digestive tract [6]. Second, the biliopancreatic diversion contributes to lower absorption of these vitamins [7]. Third, the smaller gastric volume justifies the decrease of acidity which impairs the absorption of most calcium salts [8]. Fourth, patients submitted to obesity correction procedures may consume less calcium-based foods due to reduced gastric tolerance.

In physiological conditions these changes lead to secondary hyperparathyroidism, allowing the maintenance of the serum concentration of calcium through bone resorption [9]. However, in the absence of appropriate PTH levels, as in hypoparathyroidism, to preserve normocalcemia the dosage of vitamin D and calcium supplements may be increased. In patients with previous post-surgical hypoparathyroidism, therapy management based on supplementation with calcium and vitamin D can be particularly difficult after gastric bypass surgery.

Supplement absorption can be optimized through treatment with pancreatic enzymes, as it was previously demonstrated in the presented case report. Panazzolo and collaborators reported in 2014 a similar case, in which the treatment with pancreatic enzymes allowed the reduction of calcium and vitamin D supplemental dosages to keep a stable calcemia [5]. Given the increased risk of nephrocalcinosis [10], the dosage of elemental calcium should be the least amount necessary to keep calcemia at the inferior limit of the normal range[2].

Correction of hypomagnesaemia contributes for the stabilization of serum calcium levels [11], as does supplementation with the active form of vitamin D [12].

Considering the difficulties in the management of hypoparathyroidism in patients submitted to gastric bypass surgery, therapy with recombinant PTH can be considered [13]. However, the limited availabi-

lity and high cost of the drug, as well as the lack of evidence in these specific situations, constitute obstacles to its introduction.

In situations where we have refractoriness to all therapeutic measures and severe and symptomatic hypocalcemia, reversal of gastric bypass may be a possible alternative.

## Conclusion

The described case report shows the difficulty in the management of post-surgical hypoparathyroidism in patients with malabsorption syndromes, particularly the ones submitted to gastric bypass. The increase of intestinal absorption of vitamin D and oral calcium through supplementation with pancreatic enzymes can contribute to the management of this disease.

## References

1. Edafe O, Balasubramanian SP. Incidence, prevalence and risk factors for post-surgical hypocalcaemia and hypoparathyroidism. *Gland Surg.* 2017; 6: S59-S68.
2. Bollerslev J, Rejnmark L, Marcocci C, Shoback DM, Sitges-Serra A, van Biesen W, et al. European Society of Endocrinology Clinical Guideline: Treatment of chronic hypoparathyroidism in adults. *Eur J Endocrinol.* 2015; 173: G1-G20.
3. Lupoli R, Lembo E, Saldalamacchia G, Avola CK, Angrisani L, Capaldo B. Bariatric surgery and long-term nutritional issues. *World J Diabetes.* 2017; 8: 464-474.
4. Lespessailles E, Toumi H. Vitamin D alteration associated with obesity and bariatric surgery. *Exp Biol Med.* 2017; 242: 1086-1094.
5. Panazzolo DG, Braga TG, Bergamini A, Pires B, Almeida H, Kraemer-Aguiar LG. Hypoparathyroidism after Roux-en-Y gastric bypass - a challenge for clinical management: a case report. *J Med Case Rep.* 2014; 8: 357.
6. Corbeels K, Verlinden L, Lannoo M, Simoens C, Matthys C, Verstuyf A, et al. Thin bones: Vitamin D and calcium handling after bariatric surgery. *Bone Rep.* 2018; 8: 57-63.
7. Slater GH, Ren CJ, Siegel N, Williams T, Barr D, Wolfe B, et al. Serum Fat-Soluble Vitamin Deficiency and Abnormal Calcium Metabolism After Malabsorptive Bariatric Surgery. *J Gastrointest Surg.* 2004; 8: 48-55.
8. Miguel GA, Fernández EG, Díaz-Guerra GM, Zanuy MAV, Zapata AP, Vigo FC, et al. Recalcitrant hypocalcaemia in a patient with post-thyroidectomy hypoparathyroidism and Roux-en-Y gastric bypass. *Obes Res Clin Pract.* 2016; 10: 344-347.
9. Wei JH, Lee WJ, Chong K, Lee YC, Chen SC, Huang PH, et al. High Incidence of Secondary Hyperparathyroidism in Bariatric Patients: Comparing Different Procedures. *Obes Surg.* 2018; 28: 798-804.
10. Mitchell DB, Regan S, Cooley MR, Lauter KB, Vrla MC, Becker CB, et al, Mannstadt M. Long-Term Follow-Up of Patients with Hypoparathyroidism. *J Clin Endocrinol Metab.* 2012; 97: 4507-4514.
11. Fuss M, Cogan E, Gillet C, Karmali R, Geurts J, Bergans A, et al. Magnesium administration reverses the hypocalcaemia secondary to hypomagnesaemia despite low circulating levels of 25-hydroxyvitamin D and 1,25-dihydroxy vitamin D. *Clin Endocrinol (Oxf).* 1985; 22: 807-815.
12. Babey M, Brandi ML, Shoback D. Conventional Treatment of Hypoparathyroidism. *Endocrinol Metab Clin North Am.* 2018; 47: 889-900.
13. Ramakrishnan Y, Cocks HC. Impact of recombinant PTH on management of hypoparathyroidism: a systematic review. *Eur Arch Otorhinolaryngol.* 2016; 273: 827-835.

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