Obesity Surgery (2019) 29:1018–1021
https://doi.org/10.1007/s11695-018-03678-3

LETTER TO THE EDITOR

Letter: Celiac Disease Presenting After a Single Anastomosis Duodeno-Ileal Bypass and Sleeve Gastrectomy

Amelie Therrien[1,2] · Marie-Pierre Renaud[1,3] · Lilia-Maria Sanchez[4] · Louise D'Aoust[1] · Michel Lemoyne[1]

Published online: 12 January 2019

Dear Editor,

With great interest, we read the article written by Freeman and colleagues about the implications of celiac disease (CeD) among patients undergoing a gastric bypass [1]. The authors concluded that Roux-en-Y gastric bypass (RYGB) is safe for individuals with CeD. They reported on 68 patients who had abnormal serology or pathology prior to the operation, with only three individuals being diagnosed with CeD. However, acknowledging that CeD, and even celiac crisis, may be triggered following a surgery [2, 3]; it is important to know if among the 65 remaining patients with some abnormalities, new CeD cases were diagnosed after the bariatric surgery. We would also like to highlight "case 1," a 42-year-old lady, non-adherent to the gluten-free diet (GFD), who lost 100% of excess weight in the first year after surgery. These questions were raised by a recent case of CeD at our institution, presenting with excessive weight loss 4 months after a single anastomosis duodeno-ileal bypass and sleeve gastrectomy (SADI-S).

A 46-year-old woman presented in the emergency department (ED) with ongoing chronic diarrhea, steatorrhea, and nausea since her bariatric surgery 4 months earlier. Her past medical history included type 2 diabetes (T2D) complicated by allergies to several forms of insulin, cirrhosis due to non-alcoholic steatohepatitis (NASH), hypothyroidism, and psoriatic arthritis for which she was on anti-TNF drugs once a week. Her BMI was 44, and considering her difficulties to lose weight and the coexisting disorders, bariatric surgery was proposed. She previously denied any gastrointestinal symptoms except for occasional acid reflux. Low ferritin level (7 μg/L) led to a colonoscopy, which revealed two polyps. She already had two EGD for esophageal varices assessment, which also did not show any bleeding. Tissue transglutaminase antibodies (tTG) were initially low positive (7 U/mL, threshold for positivity > 8 U/mL, low positive 5–7 U/mL) on a gluten-containing diet, but deamidated gliadin peptides (DGP) IgA were elevated, 51.7 U/mL and IgG 46.8 U/mL (threshold > 30 U/mL). Duodenal biopsies were not performed before the surgery. She underwent a SADI-S with a common channel of 250 cm.

After the surgery, the patient lost 94 pounds over 4 months, which was about 62% of her excess weight. She developed loose greasy stools triggered by alimentation and associated with urgencies, nausea, anorexia, and abdominal cramping. On initial evaluation at the ED, there were no physical signs of malnutrition except for mild pedal edema. Hemoglobin and ferritin level were within normal range, the patient being on iron supplements since the surgery. Folates and vitamin B_{12} levels were also

✉ Amelie Therrien
atherri1@bidmc.harvard.edu

Marie-Pierre Renaud
marie-pierre.renaud.1@ulaval.ca

Lilia-Maria Sanchez
lilia-maria.sanchez.chum@ssss.gouv.qc.ca

Louise D'Aoust
louise_daoust@sympatico.ca

Michel Lemoyne
michel.lemoyne@sympatico.ca

[1] Department of Medicine, Division of Gastroenterology, Centre Hospitalier de l'Université de Montreal, 1051 Sanguinet, Montreal H2X 0C1, Canada

[2] Present address: Beth Israel Deaconess Medical Center, East Campus, Gastroenterology 330 Brookline Ave, Boston, MA 02115, USA

[3] Present address: Hôpital Anna-Laberge, 200 Boul Brisebois, Châteauguay J6K 4W8, Canada

[4] Department of Pathology, Centre Hospitalier de l'Université de Montréal, 1100 rue Sanguinet, Pavillon F, Montreal H2X 0C2, Canada

normal, but she had hypoalbuminemia (28 g/L), hypomagnesemia (0.61 mmol/L), low vitamin A (0.70 umol/L), and low vitamin E (13.1 umol/L). Transthyretin level was 88 mg/L. Celiac serologies were repeated, and tTG IgA was 19.7 U/mL (threshold 15 U/mL) and DGP IgA > 250 U/mL and IgG 211.8 U/mL (threshold 14.9 U/mL). EGD showed normal appearing intestinal mucosa, but histologic assessment was compatible with Marsh 3a lesions (Fig. 1a–c). 14C-glycine-cholate breath test was negative for SIBO. Thus, this presentation of CeD requiring a hospitalization could have been considered as a mild celiac crisis [2].

The patient started a GFD and loperamide. Stool consistency and frequency significantly improved; however, she was still having some steatorrhea 3 months later. Pancreatic enzymes supplements were added. EGD and intestinal biopsies were repeated 4 months after initial diagnosis of CeD, showing significant improvement (Fig. 1d, e). After 5 months of GFD, tTG normalized, and DGP decreased at 83.2 U/mL (IgA) and 67.4 U/mL (IgG). Vitamin A and E levels normalized 7 months after beginning supplementation. Finally, the patient's weight has stabilized at 69 kg, having loss a total of 14 kg in 6 months (compared previously to 43 kg in 4 months).

We described a case of initially asymptomatic CeD with coexisting morbid obesity, NASH cirrhosis and T2D, that developed classical CeD after undergoing bariatric surgery. In this patient, DGP serology seemed to be a more reliable marker than tTG.

Newly diagnosed CeD cases have been previously described in the pre-operative work-up of obese patients for bariatric surgery, as well as presenting after a malabsorptive surgery [1, 4–6]; to our knowledge, this is

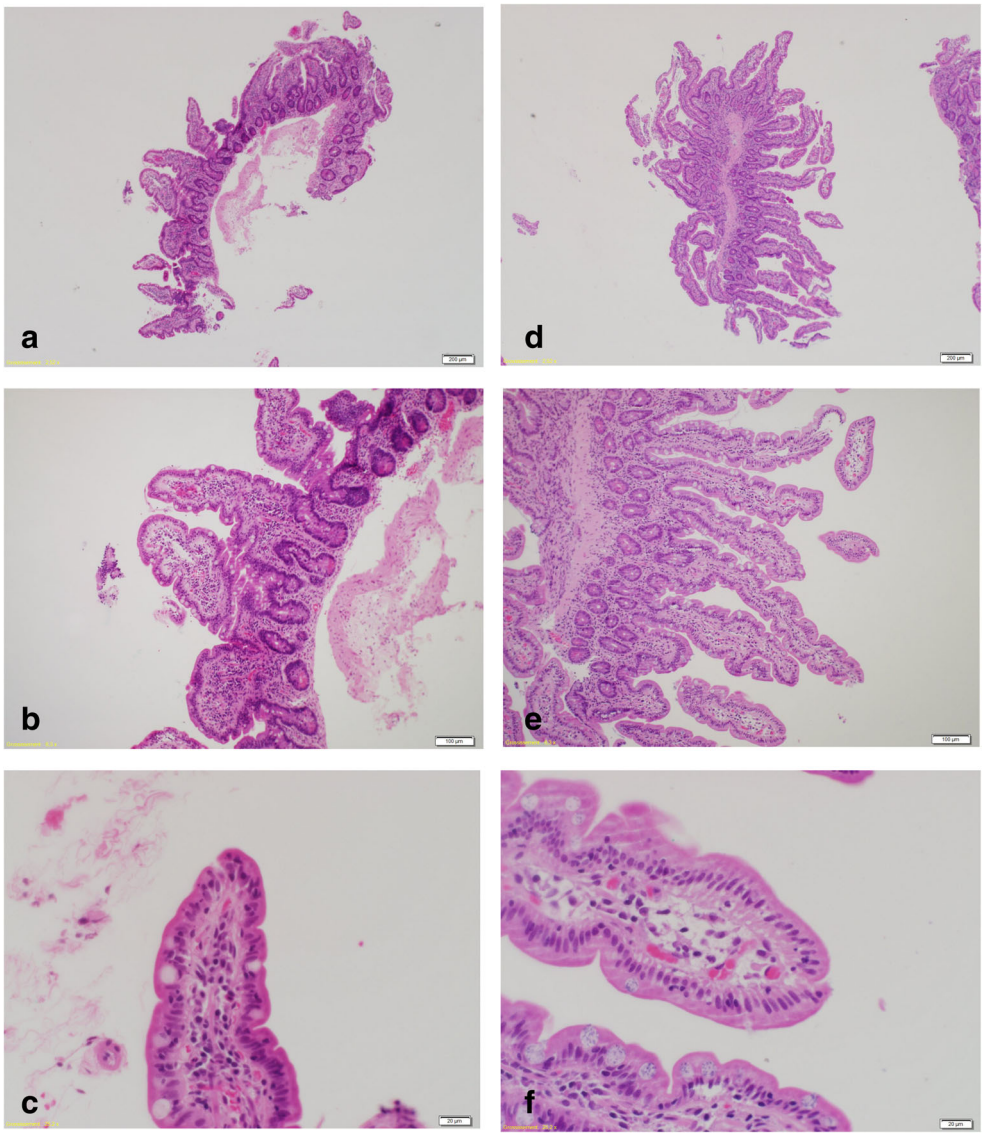

Fig. 1 Histologic features at diagnosis and after initiation of gluten-free diet. Photomicrographs depicting: **a** and **b** intestinal mucosa with mild villous atrophy and crypt hyperplasia (HE, × 4, and × 10, respectively). **c** Zoomed-in view: villus with significant intra-epithelial lymphocytosis (> 40 IEL/100 enterocytes) (HE, × 40). **d** and **e**: Complete mucosal recovery (HE, × 4, and × 10, respectively). **f** Zoomed-in view: villi without significant intraepithelial lymphocytosis (HE, × 40). HE hematoxylin-eosin. Microscope: Olympus BX53

the first case of CeD presented following SADI-S. Acknowledging that up to 40% of celiac disease patients are either overweight or obese at the time of diagnosis [7], it could become a more frequent issue in the near future, with some surgical considerations. Freeman and colleagues have shown that patients with well-controlled celiac disease have a similar evolution than the general bariatric surgery population [1]; however, others have proposed systematic pre-operative screening for CeD, to preconize restrictive compared to malabsorptive surgery for these patients [4, 8].

SADI-S is a recent technique combining a restrictive and a malabsorptive approach. Diarrhea is a common complication, as for vitamin A and iron deficiency [9]. Protein malnutrition was reported in up to 34% of patients [9]. Expected excess weight loss (EWL) is 30% at 3 months, 55% at 6 months, 70% at 1 year, and up to 85% at 2 years [9]; our patient's excess weight was 69 kg, and she lost 62% in the first 4 months. Accordingly, "case 1" presented by Freeman and colleagues showed an EWL significantly higher than current reported average after gastric bypass [10].

Despite weakly elevated tTG and the lack of symptoms, there could have been intestinal lesions many years before the diagnosis. The use of anti-TNF for the psoriatic arthritis could have modulated the clinical and serological intensity of CeD; these drugs have shown some efficacy in refractory CeD [11]. Bariatric surgery might have triggered symptoms due to the diminution of the absorption surface and an increase in the intestinal permeability [5]. The rapid normalization of intestinal biopsies is surprising, and perhaps the first biopsies were taken in the bulb and pre-anastomotic duodenal area while follow-up biopsies taken more distally in the ileal limb. It may also be explained by the patchiness of mucosal involvement in CeD [12]. Nonetheless, the patient showed favorable clinical and serological evolution with GFD.

DGP IgA and IgG were more sensitive than tTG in that patient, as previously reported among a cohort of individuals with negative tTG serology, but positive DGP and histologic diagnosis of CeD [13]. Even though it has not been studied specifically among overweight individuals, some evidences suggest that DGP IgA could be more sensitive and better correlate with villous atrophy than tTG [14, 15]. Among possible explanations, some patients, especially at early stages, may have more tTG deposits in the mucosa than circulating tTG [16, 17].

In conclusion, we believe that bariatric surgery in untreated CeD may lead to excessive weight loss and a risk of celiac crisis. We would be very interested to know if any of the 65 patients mentioned by Freeman and colleagues with previous abnormalities developed CeD after their bariatric surgery.

Acknowledgements The authors would like to thank Monika Shpokayte for proofreading the manuscript.

Authors' Contributions AT and ML wrote the letter. MPR and LD edited the letter. LMS interpreted the pathology slides. AT is the guarantor of the letter. All authors have approved the final letter.

Compliance with Ethical Standards

Conflict of Interest The authors disclose no conflict of interest in relation to this work. Dr. Louise D'Aoust is on an advisory board for Shire for the use of teduglutide in short bowel syndrome. This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors. Dr. Amelie Therrien was supported by phase 1 award from Fonds de Recherche Santé Québec (FRQS) *Programme FRQS/MSSS de formation pour médecins résidents en médecine spécialisée visant une carrière en recherche*.

Informed Consent The patient written informed consent was obtained for the publication of this letter.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

1. Freeman LM, Strong AT, Sharma G, et al. Implications of celiac disease among patients undergoing gastric bypass. Obes Surg. 2018;28(6):1546–52. https://doi.org/10.1007/s11695-017-3046-2.
2. Jamma S, Rubio-Tapia A, Kelly CP, et al. Celiac crisis is a rare but serious complication of celiac disease in adults. Clin Gastroenterol Hepatol. 2010;8(7):587–90. https://doi.org/10.1016/j.cgh.2010.04.009.
3. Maple JT, Pearson RK, Murray JA, et al. Silent celiac disease activated by pancreaticoduodenectomy. Dig Dis Sci. 2007;52(9):2140–4. https://doi.org/10.1007/s10620-006-9598-y.
4. Cuenca-Abente F, Nachman F, Bai JC. Diagnosis of celiac disease during pre-operative work-up for bariatric surgery. Acta Gastroenterol Latinoam. 2012;42(4):321–4.
5. Pane A, Orois A, Careaga M, et al. Clinical onset of celiac disease after duodenal switch: a case report. Eur J Clin Nutr. 2016;70(9):1078–9. https://doi.org/10.1038/ejcn.2016.65.
6. Marini JM, Coghlan E, Laferrere L, et al. Severe malnutrition and celiac disease following gastric bypass surgery. Int J Case Reports Med. 2014;2014:1–5. https://doi.org/10.5171/2014.130992.
7. Ukkola A, Maki M, Kurppa K, et al. Changes in body mass index on a gluten-free diet in coeliac disease: a nationwide study. Eur J Intern Med. 2012;23(4):384–8. https://doi.org/10.1016/j.ejim.2011.12.012.
8. de Angelis N, Carra MC, Vincenzi F. Gluten-free diet in obese patients with celiac disease: an enemy of the bariatric surgeon? Obes Surg. 2012;22(6):995–6. https://doi.org/10.1007/s11695-012-0626-z.
9. Shoar S, Poliakin L, Rubenstein R, et al. Single anastomosis duodeno-ileal switch (SADIS): a systematic review of efficacy and safety. Obes Surg. 2018;28(1):104–13. https://doi.org/10.1007/s11695-017-2838-8.
10. Puzziferri N, Roshek 3rd TB, Mayo HG, et al. Long-term follow-up after bariatric surgery: a systematic review. JAMA. 2014;312(9):934–42. https://doi.org/10.1001/jama.2014.10706.
11. Costantino G, della Torre A, Lo Presti MA, et al. Treatment of life-threatening type I refractory coeliac disease with long-term infliximab. Dig Liver Dis. 2008;40(1):74–7. https://doi.org/10.1016/j.dld.2006.10.017.

12. Murray JA, Rubio-Tapia A, Van Dyke CT, et al. Mucosal atrophy in celiac disease: extent of involvement, correlation with clinical presentation, and response to treatment. Clin Gastroenterol Hepatol. 2008;6(2):186–93; quiz 25. https://doi.org/10.1016/j.cgh.2007.10.012.
13. Hoerter NA, Shannahan SE, Suarez J, et al. Diagnostic yield of isolated deamidated gliadin peptide antibody elevation for celiac disease. Dig Dis Sci. 2017;62(5):1272–6. https://doi.org/10.1007/s10620-017-4474-5.
14. de Chaisemartin L, Meatchi T, Malamut G, et al. Application of deamidated gliadin antibodies in the follow-up of treated celiac disease. PLoS One. 2015;10(8):e0136745. https://doi.org/10.1371/journal.pone.0136745.
15. Lau MS, Mooney PD, White WL, et al. The role of an IgA/IgG-deamidated gliadin peptide point-of-care test in predicting persistent villous atrophy in patients with celiac disease on a gluten-free diet. Am J Gastroenterol. 2017;112(12):1859–67. https://doi.org/10.1038/ajg.2017.357.
16. Tosco A, Maglio M, Paparo F, et al. Immunoglobulin A anti-tissue transglutaminase antibody deposits in the small intestinal mucosa of children with no villous atrophy. J Pediatr Gastroenterol Nutr. 2008;47(3):293–8. https://doi.org/10.1097/MPG.0b013e3181677067.
17. Gatti S, Rossi M, Alfonsi S, et al. Beyond the intestinal celiac mucosa: diagnostic role of anti-TG2 deposits, a systematic review. Front Med (Lausanne). 2014;1:9. https://doi.org/10.3389/fmed.2014.00009.