Wernicke's encephalopathy after sleeve gastrectomy: Literature review

Fernando Pardo-Aranda *, Noelia Perez-Romero, Javier Osorio, Joaquín Rodríguez-Santiago, Emilio Muñoz, Noelia Puértolas, Enrique Veloso

Hospital Universitario Mutua Terrassa, Barcelona, Spain

A R T I C L E   I N F O

Article history:
Received 23 November 2015
Received in revised form 14 January 2016
Accepted 16 January 2016
Available online 22 January 2016

Keywords:
Bariatric surgery
Sleeve gastrectomy
Wernicke's encephalopathy
Thiamine mononitrate
Pathologic nystagmus

A B S T R A C T

OBJECTIVE: To describe a case of Wernicke's encephalopathy after laparoscopic sleeve gastrectomy.

SETTING: Emergency Department and gastrointestinal surgery department.

CASE REPORT: A 20-year-old man class III obesity (BMI 50.17 kg/m²) underwent laparoscopic sleeve gastrectomy with uneventful recovery. Five weeks after surgery he was admitted in the Emergency Department because of persistent vomiting and dysphagia to solids. Esophagogastrduodenal transit and upper gastrointestinal endoscopy were requested but no relevant findings were shown. Laboratory analyses showed vitamin B1 12.2 ng/ml and 48 h following admission the patient experienced generalized weakness, sialorrhea and restrictions of actions such as reading a book. Neurological evaluation found confusion, motor ataxia, diplopy and nystagmus. A brain magnetic resonance was normal. According to low level of vitamin B1 and symptoms found in the patient a presumed diagnosis of Wernicke encephalopathy was made and parenteral thiamine 100 mg/day was started. The patient was discharged asymptomatic with oral intake of vitamin B1 600 mg per day.

CONCLUSION: Nutritional deficiencies after restrictive procedures are uncommon but easily preventable and can result in life threatening. With the upswing of bariatric surgery, surgeons and emergency physicians should be able to diagnose and treat those complications. Prophylactic thiamine should be administered to patients with predisposing factors.

© 2016 The Authors. Published by Elsevier Ltd. on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Bariatric procedures for the treatment of morbid obesity are the most commonly performed gastrointestinal operations today, more than 34,000 procedures were done all over the world in 2011. Sleeve gastrectomy has increased in prevalence from 0% in 2003 to 28% in 2011 [1].

Weight loss surgery falls into three categories: malabsorptive, restrictive or mixed. Procedures such as sleeve gastrectomy, Roux-en-Y gastric bypass or duodenal switch are the most frequently performed. Nevertheless, there are many procedures or modifications described like Fobi Pouch Gastric Bypass, laparoscopic gastric plication, adjustable gastric band, one anastomosis gastric bypass or ileal transposition [2,3].

In spite of sleeve gastrectomy has been considered a restrictive procedure, hormonal changes has been demonstrated, and continue to be the subject of further studies, meaning that the effect of this procedure is more complex than it seems to be.

Despite all the well-known advantages of these procedures, as with any major surgery, pose potential health risks, both in the short term and long term. On the one hand complications due to the surgical procedure such as stenosis of the sleeve gastrectomy, anastomotic leak, bleeding or infection, and on the other hand complications related to nutritional deficiency. With the upswing of bariatric surgery, surgeons should be able to diagnose and treat those complications.

We present a case of a young man with vitamin B1 deficiency after sleeve gastrectomy.

2. Clinical case

A 20-year-old man class III obesity (body mass index 50.17 kg/m²) underwent laparoscopic sleeve gastrectomy. He had an uneventful recovery and was discharged on the second postoperative day. According to our bariatric surgery protocol, the patient was to stay on liquids for three weeks, followed by soft food for two weeks. Five weeks after surgery the patient was admitted in the Emergency Department because persistent vomiting and dysphagia to solids. Esophagogastrduodenal transit (Fig. 1) showed good contrast pass and complications such as stenosis or other lesions were ruled out. The patient was discharged with
oral antiemetic (metoclopramide) and placed under outpatient follow-up. Because of persistent clinical symptoms an upper gastrointestinal endoscopy (Fig. 2) was requested but no relevant findings were shown, except for mucosal edema. The patient was readmitted to the hospital with electrolyte replacement and intravenous anti-inflammatory drugs, 2 months after surgery. At the time of readmission the patient had lost 27 kg relative to his presurgery weight and a blood sample was drawn. 48 h following admission the patient continued to suffer from recurrent vomiting and experienced generalized weakness, sialorrhea and restrictions of actions such as reading a book. Neurological evaluation found confusion, motor ataxia, diplopy and nystagmus in all gaze position. A presumed diagnosis of Wernicke encephalopathy was made and parenteral thiamine 100 mg/day was started. Blood sample drawn at the time of the readmission shown: calcium 10.15 mg/dL, total protein 72 g/L, albumin 4.32 g/dL, vitamin B12 539 pg/mL, vitamin B1 12.2 ng/mL, (RL 35–91 ng/mL), vitamin B6 34.7 ng/mL, folic acid 3.11 ng/mL, retinol 0.38 mg/L, vitamin D 23 ng/mL, ferritin 640 ng/mL, transferrin 2.01 g/L, transferrin saturation 67%, GOT 200 UI/L, GPT 217 U/L and GGT 159 U/L. A brain magnetic resonance (Fig. 3) was normal. According to low level of vitamin B1 and symptoms found in the patient the diagnosis of Wernicke encephalopathy was confirmed. On the next day the patient started to feel better, the fourth day of treatment diplopy disappeared and motor ataxia and nystagmus were almost undetectable. Vomits went away and he started to eat in accordance with our protocol. At discharge the patient was asymptomatic and was prescribed oral
intake of vitamin B1 600 mg per day. The patient had follow-up every 2 months to evaluate his disease. 12 months after surgery, he was totally recovered with no signs of Wernicke encephalopathy and he presented a BMI of 30.81 kg/m².

3. Discussion

Long-term results of pathophysiology in the gastrointestinal tract after surgical alterations of gastrointestinal function are still not known [4].

Bariatric surgery can be classified as a restrictive procedure, a malabsorptive procedure or both. Nutritional deficiencies are a consequence of alterations in the structure of the gastrointestinal tract, in which food is rerouted avoiding the first part of small bowel, as in duodenal switch, or as a delay in mixing the food with bile and pancreatic enzymes as in Roux-en-Y gastric bypass.

On the other hand, sleeve gastrectomy has nearly regular intestinal absorption and, despite evidence based data on necessity of supplementation after this procedures does not exist in literature [5], nutritional deficiencies may also occur due to reduce food intake, inadequate diet, vomits or prolonged parenteral feeding [6]. Therefore, nutritional deficiencies after restrictive procedures must not be underestimated.

Malnutrition after bariatric surgery is related to protein deficiency. Guidelines of the Endocrine Society recommend that patients should ingest 60–120 g of protein per day, especially after malabsorptive procedures [7].

Wernicke’s encephalopathy (WE) has been thought of a disease of alcoholics, but it is also found in other scenarios such as chronically undernourished, cachexia in patients with cancer and more recently described post bariatric surgery.

It is an acute neurological disorder due to deficiency in vitamin B1 and is characterized by the triad ophthalmoplegia and nystagmus, motor ataxia, and confusion, but only 16% of the patients exhibit all three features at the same time [8].

Thiamine deficiency has been discovered in up to 49% patients after gastric bypass, nonetheless there are few case reports in the literature after sleeve gastrectomy [9].

Despite 94% of WE cases were seen within 6 months after surgery, this disease may appear three weeks after surgery, especially when the patient progress to solid foods suffering from vomits, or even long-term after 72 weeks of surgery [6,10].

In spite of risk factors after sleeve gastrectomy are not well established, WE may be caused by restriction of oral intake, persistent vomiting, prolonged parenteral nutrition and use of 5% glucose serum to treat vomits.

In our case, Esophagogastrroduodenal transit showed good contrast pass and stenosis was ruled out, therefore persistent vomits were likely due to mucosal edema.

A presumptive diagnosis must be done in patients with any symptom described and treatment with thiamine must be started.
Is mandatory a blood sample to measure level of vitamin B1 to confirm the diagnosis.

Brain magnetic resonance may be used to support the diagnosis showing hyperintense areas on T2 (medial thalamus, periventricular zone or mammillar bodies), but low sensitivity prevents exclude the diagnosis when no changes are demonstrated, as in our case [11].

Laparoscopic sleeve gastrectomy is a safe procedure with low morbidity rate 5.2% and a mortality rate of 0.36% [12]. Bleeding or staple line leaks continue to be the most serious complications and occur in 1–3% of cases [13].

A study of Bellanger and Greenway [14], found vomits and dehydration only in 5 of 529 after laparoscopic sleeve gastrectomy. Himpens found vomits in 18% of patients treated with sleeve gastrectomy [15].

As we have seen, persistent vomiting after surgery can lead to Wernicke’s encephalopathy with a 20% mortality rate when it is undertreated. It takes several days to obtain the results of thiamine level, and it is important not to delay treatment. Therefore, thiamine must be started as soon as possible, even with a presumptive diagnosis. Definitive diagnosis will be confirmed if patient symptoms improved with the treatment.

Parenteral supplementation with thiamine (100 mg/day) should be initiated in the patient with active neurological symptoms. After a 7–14 days course, an oral preparation (10 mg/day) can be used until neurological symptoms resolve [7].

To conclude, nutritional deficiencies after restrictive procedures can result in life threatening. These deficiencies are easily preventable, surgeons should be aware of this complication and patients should be warned in the presence of triggers. We believe that prophylactic thiamine should be administered to patients with predisposing factors.

Conflicts of interest

The Authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sector.

Ethical approval

A written and signed informed consent from the patient has been obtained and approved for our ethical committee.

Consent

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images.

Authors’ contributions

F.P. drafted the manuscript. N.P.R. and N.P. participated in the design of the case. J.R., J.O. and E.M. participated in its design and coordination and E.V. helped to draft the manuscript. All authors read and approved the final manuscript.

Guarantor

All authors accept full responsibility for the work.

References

[1] H. Buchwald, D.M. Oien, Metabolic/bariatric surgery worldwide 2011, Obes. Surg. 23 (April (4)) (2013) 427–436.
[2] A.A. Gumbs, M. Gagner, D. Dakin, et al., Sleeve gastrectomy for morbid obesity, Obes. Surg. 17 (2007) 962–969.
[3] Mohammad Talebpour, Seyed Mohammad Kalantar Motamed, Atieh Talebpour, Hamed Vahidi, Twelve year experience of laparoscopic gastric plication in morbid obesity development of the technique and patient outcomes, Ann. Surg. Innov. Res. 6 (2012) 7.
[4] S.V. Lakhani, et al., Small intestinal bacterial overgrowth and thiamine deficiency after Roux-en-Y gastric bypass surgery in obese patients, Nutr. Res. 28 (2008) 293–298.
[5] Nicole Pech, Frank Meyer, Hans Lippert, Thomas Manger, Christine Stroh, Complications and nutrient deficiencies two years after sleeve gastrectomy, BMC Surg. 12 (2012) 13.
[6] E.T. Aasheim, Wernicke encephalopathy after bariatric surgery. A systematic review, Ann. Surg. 248 (2008) 714–720.
[7] J. Moy, A. Pompos, C. Dakin, M. Parikh, M. Gagner, Laparoscopic sleeve gastrectomy for morbid obesity, Am. J. Surg. 196 (2008) e56–e59.
[8] G. Sechi, A. Serra, Wernicke’s encephalopathy: new clinical settings and recent advances in diagnosis and management, Lancet Neurol. 6 (2007) 442–455.
[9] G. Ziegler, M.A. Sirveaux, L. Brunaud, N. Reibel, D. Quilliot, Medical Follow up after bariatric surgery: nutritional and drugs issues. General recommendations for the prevention and treatment of nutritional deficiencies. Diabetes Metab. 35 (Pt. 2 (6)) (2009) 544–557.
[10] J. Sullivan, R. Hamilton, M. Hurford, et al., Neuro-ophthalmic findings in Wernicke encephalopathy after gastric bypass surgery, Neuro-ophthalmology 30 (2006) 85–89.
[11] G. Zucchi, M. Gallucci, J. Capelades, L. Regnicolo, B. Tumiati, T.C. Giadas, W. Bottari, J. Mandrioli, M. Bertolini, Wernicke encephalopathy: MR findings at clinical presentation in twenty six alcoholic and nonalcoholic patients, AJNR Am. J. Neuroradiol. 28 (2007) 1328–1331.
[12] R. Sánchez-Santos, C. Maduey, A. Baltasar, et al., Short- and midterm outcomes of sleeve gastrectomy for morbid obesity: the experience of the Spanish national registry, Obes. Surg. 19 (2009) 1203–1210.
[13] N. Basso, G. Casella, M. Rizzello, et al., Laparoscopic sleeve gastrectomy as first stage or definitive intent in 300 consecutive cases, Surg. Endosc. 25 (2011) 444–449.
[14] D.E. Bellanger, F.L. Greenway, Laparoscopic sleeve gastrectomy, 529 cases without a leak: short-term results and technical considerations, Obes. Surg. 21 (February (2)) (2011) 146–150.
[15] J. Himpens, et al., Long-term results of laparoscopic sleeve gastrectomy for obesity, Ann. Surg. 252 (2010) 319–324.

Open Access

This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.