Biopsy-proven progressive fatty liver disease nine months post mini-gastric bypass surgery: A case study

Mohammad Ali Kalantar Motamedi a, Nasser Rakhshani b, Alireza Khalaj c, Maryam Barzin d, e

a Obesity Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran
b Gastrointestinal and Liver Disease Research Center, Iran University of Medical Sciences, Tehran, Iran
c Obesity Treatment Center, Department of Surgery, Shahed University, Tehran, Iran

A R T I C L E   I N F O

Article history:
Received 21 June 2017
Received in revised form 31 July 2017
Accepted 31 July 2017
Available online 18 August 2017

Keywords:
Mini-gastric bypass
Bariatric surgery
Hepatic insufficiency
Non-alcoholic fatty liver disease
Case report

A B S T R A C T

INTRODUCTION: Mini-gastric bypass (MGB) is a popular bariatric procedure. Its effect on non-alcoholic fatty liver disease (NAFLD), however, has not yet been comprehensively studied.

PRESENTATION OF CASE: A 57-year-old non-alcoholic female with a body mass index of 42.8 kg/m² underwent MGB without any incident. A concurrent liver biopsy showed an NAFLD activity score (NAS) of 2/8 without fibrosis. She presented at postoperative month eight with edema, vague abdominal pain, nausea, and vomiting and was hospitalized. Her BMI had dropped to 25.7 kg/m². Her blood workup revealed mild anemia, mildly elevated liver enzymes, and hypoalbuminemia (2.5 g/dL). Liver ultrasound revealed grade-2 fatty liver. She received parental nutrition and intensive nutrient supplementation. Nevertheless, with regard to unsuccessful supportive measures and rising liver enzymes, revisional surgery—gastrogastronomy—was performed. Her liver biopsy demonstrated a NAS of 7/8 at the time of revisional surgery. Her postoperative course was uneventful and she was discharged after one week.

DISCUSSION: Bariatric surgery has shown favorable results regarding improvement of NAFLD in morbid obesity. This beneficial effect has been linked to the amount of weight loss. However, case reports have shown deteriorating liver function and NAFLD even after significant weight loss. They all have in common significant weight loss in a relatively short period of time. There may also be a connection between specific bariatric surgery procedures and this phenomenon.

CONCLUSION: Future studies comparing the effect of various bariatric procedures, including MGB, are necessary to help clinicians decide the optimal procedure for patients with this liver condition.

© 2017 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

While bariatric surgery is widely accepted as the treatment of morbid obesity, effectively lowering body weight and resolving obesity-related comorbidities, the choice of bariatric technique is still debatable, as many factors must be taken into account. Compared to the gold standard Roux-en-Y gastric bypass (RYGB), laparoscopic mini-gastric bypass (MGB) is a relatively new and popular method in some centers, owing to its easier technique, shorter learning curve and operative times, impressive weight loss (WL), and lower complications [1].

This technique incorporates a long gastric tube created from the incisura angularis to the angle of His over a 36-F bougie and an antecolic loop gastroenterostomy approximately 200 cm distal to the ligament of Treitz, causing malabsorption and consequently WL. More than 200 cases have been performed in our center with successful results; however, WL is sometimes achieved at the price of malnutrition and its related problems. Its effect on liver function, moreover, has not specifically been studied yet, including its possible effect on non-alcoholic fatty liver disease (NAFLD).

We hereby present a case of morbidly obese patient undergoing MGB, who showed biopsy-proven progression of NAFLD nearly nine months after surgery. This work has been reported in line with the SCARE criteria [2].

2. Presentation of case

A 57-year-old middle-eastern nonalcoholic morbid obese female presented to our bariatric center with an initial body mass index (BMI) of 42.8 kg/m² (weight = 118 kg, height = 166 cm) and obesity related health problems including hypertension (under treatment with metoprolol and captopril) and diabetes mellitus (diagnosed 6...
months previously and under control at the time of presentation by lifestyle modifications). She was taking 50 mcg levothyroxine pills daily for hypothyroidism and was euthyroid. She had been selected as part of the Tehran Obesity Treatment Study (TOTS), which enrolls and follows up morbidly obese patients requiring surgical intervention [3].

Her preoperative evaluations revealed grade-I fatty liver with increased liver echogenicity and span in ultrasonography. Other evaluations including cardiac, pulmonary, and blood biochemistries were insignificant. Viral markers were also negative for hepatitis viruses. Moreover, no other cause for liver disease was identified. She underwent MGB without any incidents, and wedge and needle liver biopsies were performed at the time of the operation (Table 1). The biopsy was assessed by a specialized liver pathologist using hematoxylin & eosin, Masson’s trichrome, and Iron staining, and was scored according to the NAFLD activity score (NAS) criteria [4], which is the sum of steatosis grade (0–3), hepatocyte ballooning grade (0–2), and lobular inflammation grade (0–2) in microscopic assessment (Table 1). Result showed a score of 2 from a possible maximum of 8. Steatosis was seen in 5–33% of the specimen and inflammation in <2 foci/200x, with no signs of ballooning. Moreover, there were no features of fibrosis (Fig. 1A).

She was under routine postoperative follow-up at 1, 3, 6, and 12 months, and received supplementation for vitamins and minerals (Pharmaton®, Boehringer Ingelheim Inc., Ingelheim am Rhein, Germany), as well as ursodiol, regularly. She was also following her post-operative protocol of at least 70–100 g/day of protein intake without any difficulties. Her blood indices and WL results are provided in Table 2.

At postoperative month eight, she presented with edema, vague abdominal pain, nausea, and vomiting and was admitted. She had lost significant weight during this period, approximating her ideal body weight (BMI = 25.7 kg/m², excess weight loss = 95.9%). Her blood workup revealed mild anemia, mildly elevated liver enzymes, as well as moderate to severe hypoaalbinemia (2.5 g/dL). Hepatitis markers were rechecked and confirmed negative. A liver ultrasound study revealed grade-II fatty liver. Upper endoscopic assessment was insignificant and showed the small stomach pouch.
with mild erythema at gastro-jejunal anastomosis site. Other evaluations failed to find an etiology for her liver dysfunction. She received total parenteral nutrition and intensive intravenous protein, lipid, and nutrient supplementation. Her condition had not improved one week later, with rising liver enzymes, at which time revisional surgery was decided. A gastrogastrectomy was performed successfully, and another liver biopsy done concurrently, demonstrating a NAS of 7/8 (Table 1). Steatosis was seen in 33–66% of the specimen with >4 foci/200× of inflammation and prominent ballooning. No features of fibrosis were present (Fig. 1B).

She began to recover afterwards, and her liver function normalized. She was discharged from the hospital after one week in good health.

3. Discussion

NAFLD is an extremely prevalent counterpart of morbid obesity, in up to 90% of this population, and ranges from mild fatty liver changes and steatosis to non-alcoholic steatohepatitis (NASH), with the possibility of progression to liver fibrosis with longstanding disease [5]. Bariatric surgery in general has shown impressive results on resolution of this condition, in up to 85% of the patients [6]. However, evidence regarding the effect of various bariatric techniques on NAFLD is comprehensive, and nearly nonexistent regarding MGB. This report provides a probably unprecedented effect of liver function, proven by histology.

This overall beneficial effect of bariatric surgery has been shown in different parameters of the liver function, including histologic features of NAFLD, asparate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase, and gamma glutamyl transferase [6,7]. This improvement has been shown to be similar in the few available studies between malabsorptive (RYGB) and restrictive techniques (sleeve gastrectomy) [8,9], with the exception of adjustable gastric banding, which demonstrated lower improvement rates [10]. This can probably be explained by the lower WL achieved by this procedure.

The association between improvement of NAFLD and the magnitude of WL has been consistently observed in the literature [6]. However, it is suggested that NAFLD improvement could be through non-weight dependent mechanisms as well [11], and a
link was also observed between significant improvement of NAS and ALT normalization much sooner than significant WL goals have been achieved [12]. On the other hand, three case reports have been published for deteriorating liver function after bariatric surgery despite successful weight loss results, one after bilio-intestinal bypass surgery [13], another after biliopancreatic diversion surgery [14], and the third was a patient of ours after MGB. The present case, however, is surprising because it shows severe deterioration of liver histology from NAS 2–7, as early as nine months after surgery.

Although there is no convincing explanation for this presentation, rapid WL is a common feature; our patient achieved her ideal body weight in as early as 9 months. There may also be a link between the mechanism of weight loss and specific bariatric procedures, as shown in a study of comparison between RYGB and MGB in 50 patients, where MGB patients demonstrated significantly poorer liver function tests at one year, despite better WL results [15]. In addition, the surgical technique itself is of particular importance and will affect the postoperative course. Similar to what Lee et al. reported in their experience with a tailored bypass limb length according to BMI [16], we suggest individualizing the MGB surgical technique in each patient by measuring bowel length during the operation and then deciding the length of bypassed limb. This may lead to a more controlled and sustained WL, which can help minimize unfavorable postoperative events.

4. Conclusion

This case report serves to highlight the importance of future comprehensive studies comparing the effect of different procedures on liver function, NAFLD, and NASH. Their results may consequently affect the choice of bariatric technique for individuals with liver conditions such as NAFLD.

Conflict of interest

None.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

This study has been approved by the Human Research Review Committee of the Endocrine Research Center, Shahid Beheshti University of Medical Sciences, No. 2ECRIES 93/03/13.

Consent

Informed consent was obtained from the individual included in the study. Ethical approval for this study was obtained from the Human Research Review Committee of the Endocrine Research Center, Shahid Beheshti University of Medical Sciences (No. 2ECRIES 93/03/13).

Author contribution

MAKM – data collection and interpretation, writing the paper, critical revision of the manuscript. MB – study design, data collection and interpretation, critical revision of the manuscript. NR – data collection, final approval of the manuscript. AK – IFSO-certified surgeon, data collection, final approval of the manuscript.

Guarantor

Maryam Barzin, MD, PhD.

References

[1] W.J. Lee, K.H. Ser, Y.C. Lee, J.J. Tsou, S.C. Chen, J.C. Chen, Laparoscopic Roux-en-Y vs. mini-gastric bypass for the treatment of morbid obesity: a 10-year experience, Obes. Surg. 22 (12) (2012) 1827–1834.
[2] R.A. Agha, A.J. Fowler, A. Saeta, I. Barai, S. Rajmohan, D.P. Orgil, et al., The SCARE statement: consensus-based surgical case report guidelines, Int. J. Surg. 34 (2016) 180–186.
[3] M. Barzin, F. Hosseinpahan, M.A. Motamedi, P. Shapoori, P. Arian, M.A. Daneshpourg, et al., Bariatric surgery for morbid obesity: Tehran Obesity Treatment Study (TOTS) rationale and study design, JMRIR Protoc. 5 (1) (2016) e8.
[4] D.E. Kleiner, E.M. Brunt, M. Van Natta, C. Behling, M.J. Contos, O.W. Cummings, et al., Design and validation of a histological scoring system for nonalcoholic fatty liver disease, Hepatology 41 (6) (2005) 1313–1321.
[5] Guidelines WGOG. Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis: World Gastroenterology Organisation, 2012. Available from: http://www.worldgastroenterology.org/NALFD-NASH.html.
[6] G.lassailly, R. Caiazzo, D. Bush, M. Pigeaye, H. Verkindt, J. Lahreche, et al., Bariatric surgery reduces features of nonalcoholic steatohepatitis in morbidly obese patients, Gastroenterology 149 (2) (2015) 379–388, quiz e15–6.
[7] G. Bower, T. Toma, L. Harling, L.R. Jiao, E. Efthimiou, A. Darzi, et al., Bariatric surgery and non-alcoholic fatty liver disease: a systematic review of liver biochemistry and histology, Obes. Surg. 25 (12) (2015) 2280–2289.
[8] D. Fryichael, R. Corcelles, C. Daigle, M. Boules, S. Brethauer, P. Schauer, Effect of Roux-en-Y gastric bypass and sleeve gastrectomy on nonalcoholic fatty liver disease: a comparative study, Surg. Obes. Relat. Dis. 12 (1) (2016) 127–131.
[9] P. Praveen Raj, R.M. Gomes, S. Kumar, P. Senthilnathan, P. Karthikeyan, A. Shankar, et al., The effect of surgically induced weight loss on nonalcoholic fatty liver disease in morbidly obese Indians: NASHOST prospective observational trial, Surg. Obes. Relat. Dis. 11 (6) (2015) 1315–1322.
[10] R. Caiazzo, G.lassailly, E. Leteurteur, G. Baud, H. Verkindt, V. Raverdy, et al., Roux-en-Y gastric bypass versus adjustable gastric banding to reduce nonalcoholic fatty liver disease: a 5-year controlled longitudinal study, Ann. Surg. 260 (5) (2014) 893–898, discussion 8–9.
[11] G. Bower, T. Athanasiou, A.M. Isla, L. Harling, J.V. Li, E. Holmes, et al., Bariatric surgery and nonalcoholic fatty liver disease, Eur. J. Gastroenterol. Hepatol. 27 (7) (2015) 755–768.
[12] C.J. Ooi, P.R. Burton, L. Doyle, J.M. Wentworth, P.S. Bhathal, K. Sikaris, et al., Effects of bariatric surgery on liver function tests in patients with nonalcoholic fatty liver disease, Obes. Surg. 27 (6) (2017) 1533–1542.
[13] D. Sgambato, G. Corticelli, I. De Sio, A. Funaro, A. Del Prete, C. de Sio, et al., Liver failure in an obese middle-aged woman after biliointestinal bypass, World J. Clin. Cases 1 (1) (2013) 52–55.
[14] L.A. D’Albuquerque, A.M. Gonzáles, R.C. Wahle, E. de Oliveira Souza, J.M. Mancero, A. de Oliveira e Silva, Liver transplantation for subacute hepatocellular failure due to massive steatohepatitis after bariatric surgery, Liver Transpl. 14 (6) (2008) 881–885.
[15] R. Kruschitz, M. Lugert, C. Kienbacher, M. Trauner, C. Klammer, K. Schindler, et al., The effect of Roux-en-Y vs. Omega-loop gastric bypass on liver, metabolic parameters, and weight loss, Obes. Surg. 26 (9) (2016) 2204–2212.
[16] W.J. Lee, W. Wang, Y.C. Lee, M.T. Huang, K.H. Ser, J.C. Chen, Laparoscopic mini-gastric bypass: experience with tailored bypass limb according to body weight, Obes. Surg. 18 (3) (2008) 294–299.

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.