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



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## ABSTRACT

**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/m<sup>2</sup> 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/m<sup>2</sup>. 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 parenteral nutrition and intensive nutrient supplementation. Nevertheless, with regard to unsuccessful supportive measures and rising liver enzymes, revisional surgery –gastrogastrostomy– 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.

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## 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/m<sup>2</sup> (weight = 118 kg, height = 166 cm) and obesity related health problems including hypertension (under treatment by metoprolol and captopril) and diabetes mellitus (diagnosed 6

**Abbreviations:** RYGB, Roux-en-Y gastric bypass; MGB, mini-gastric bypass; WL, weight loss; NAFLD, non-alcoholic fatty liver disease; BMI, body mass index; NAS, NAFLD activity score.

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**Table 1**  
Liver biopsy reports at the time of primary and revisional surgeries (at 9 months) and NAFLD activity score (NAS).

Biopsy details				MGB	Revisional surgery (9 months)
Item	Extent	SCORE			
Steatosis	Grade <sup>a,b</sup>	<5%	0		
		5–33%	1	✓	
		>33–66%	2		✓
		>66%	3		
	Location	Zone 3	0	✓	✓
		Zone 1	1		
		Azonal	2		
	Microvesicular steatosis <sup>b</sup>	Panacinar	3		
		Not present	0	✓	
		Present	1		✓
Inflammation	Lobular inflammation <sup>a,b</sup>	No foci	0		
		<2 foci/200x	1	✓	
		2–4 foci/200x	2		
		>4 foci/200x	3		✓
	Microgranulomas <sup>b</sup>	Absent	0	✓	
		Present	1		✓
	Large lipogranulomas	Absent	0	✓	✓
		Present	1		✓
	Portal inflammation <sup>c</sup>	None to minimal	0		✓
		More than minimal	1	✓	
Liver cell Injury	Ballooning <sup>a,b</sup>	None	0	✓	
		Few balloon cells	1		
		Many cells/prominent ballooning	2		✓
	Acidophil bodies	None to rare	0	✓	✓
		Many	1		
	Pigmented macrophages <sup>c</sup>	None to rare	0		✓
		Many	1	✓	
	Megamitochondria	None to rare	0	✓	✓
		Many	1		
	Other findings	Mallory's hyaline	None to rare	0	✓
Many			1		
Glycogenated nuclei <sup>b</sup>		None to rare	0	✓	
		Many	1		✓
Iron deposition		Absent	0	✓	✓
		Present	1		
Fibrosis stage	None	0	✓	✓	
	Perisinusoidal or periportal	1			
	Mild, zone 3, perisinusoidal	1A			
	Moderate, zone 3, perisinusoidal	1B			
	Portal/periportal	1C			
	Perisinusoidal and portal/periportal	2			
	Bridging fibrosis	3			
	Cirrhosis	4			
Total score			2	7	

<sup>a</sup> Components of liver biopsy used in NAS calculation.

<sup>b</sup> Signifying deterioration.

<sup>c</sup> Signifying improvement.

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 (0–3) 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/m<sup>2</sup>, excess weight loss = 95.9%). Her blood workup revealed mild anemia, mildly elevated liver enzymes, as well as moderate to severe hypoalbuminemia (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

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