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Case report

Treatment of liver failure post one anastomosis gastric bypass by revising to normal anatomy: A case report

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ABSTRACT

Introduction: Obesity and the associated metabolic syndrome are global health problems. Significant weight loss after bariatric surgery can cause a substantial difference in those comorbidities in obese patients. In this case, we described a rare complication of a patient who developed acute liver failure after an uneventful one anastomosis gastric bypass treated conservatively and revision of the one anastomosis gastric bypass to normal anatomy.
Case presentation: We present a 52-year-old female known to have hypothyroidism and morbid obesity with a BMI of 45. For that, she underwent uneventful one anastomosis gastric bypass. Later, she developed liver failure and hepatic encephalopathy, which was managed conservatively and revision surgery to normal anatomy.
Discussion: Bariatric surgery plays an integral role in treating obese patients for its associated impacts, like facilitating weight loss and related metabolic syndrome improvement. The effects of bariatric surgery on liver functioning are controversial. Some malabsorptive procedures are linked to postoperative hepatic complications. However, it is uncommon in a recent new technique in bariatric surgery. Liver transplant and revision of the bariatric surgery have been described as management. However, optimal nutrition support without a liver transplant along with revision surgery is possible in experienced hands.
Conclusion: Early detection of liver impairment and early intervention by a revision to normal anatomy by an experienced surgeon is considered the safest and most effective procedure for such patients. However, late detection where liver failure occurs, liver transplantation is the only effective treatment for preventing fatal outcomes.
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1. Introduction

Obesity and the associated metabolic syndrome are global health problems. Moreover, it is associated with many comorbidities such as diabetes, cardiac and liver diseases. Most of the liver diseases associated with obesity can lead to liver failure and mortality. Significant weight loss after bariatric surgery can cause a substantial difference in those comorbidities in obese patients. Such as remission of type 2 diabetes and positive impact on liver and improves its enzymes and histology, many studies have been documented in this purpose [1].

Nonetheless, infrequent weakening of liver function was documented, a factor that might be ascribed to the sort of bariatric procedure, alongside the degree of malabsorption and malnutrition. Jejunoileal bypass, and to some lower degree, biliopancreatic diversion (BPD), is linked to higher morbidity and mortality rates, especially regarding the functioning of the liver [2]. However, it is rare in a recent new technique in bariatric surgery [3].

In this case, we described a patient who developed acute liver failure after an uneventful one anastomosis gastric bypass (OAGB) in a private hospital, treated conservatively in a tertiary hospital with a specialized liver transplant center, and then underwent uneventful revision to normal anatomy procedure in the same private hospital. This paper has been reported in line with the SCARE 2020 criteria [4].

2. Case presentation

In this report, we present a 52-year-old female known to have hypothyroidism on levothyroxine. She was morbidly obese, and her body mass index (BMI) was 45. For that, she underwent an uneventful OAGB in our hospital in October 2018; all preoperative investigation and postoperative were within normal. OAGB is a procedure consist of a restrictive longitudinal lesser-curvature gastric pouch, keeping a remnant mother stomach, and a 150–200 cm jejunal, biliopancreatic limb, bypass with gastro-jejunostomy anastomosis.

At the second follow-up two months postoperative, she had depression, food intolerance, and poor compliance to multivitamins and protein supplements. Her liver function laboratory were: serum albumin 2.87 g/dL, total bilirubin 5.2 mg/dL, direct bilirubin 4.4 mg/dL, alkaline

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phosphatase 117 unit/l. She underwent a gastroscope which showed mild gastritis; PPI started along with psychological consultation and vitamin B12. Four months after the surgery, she visited the bariatric clinic with lower limb edema, general weakness, and urinary tract infection (UTI). She was admitted, laboratory investigation showed hypoalbuminemia, hypocalcemia, and mild hypoproteinemia. Treatment of UTI was done, intravenous (IV) albumin and oral protein were given. She was advised that if she will not take her vitamin with proper feeding to do a revision to normal anatomy surgery in an early stage before deteriorating more, which she refused. She went to consult other hospitals.

In April 2019, six months post-surgery, she was admitted to the intensive care unit (ICU) through the emergency department in our hospital with severe jaundice and liver impairment leading to liver failure along with hepatic encephalopathy (HE). She was intubated due to decreased consciousness level and transferred to a tertiary hospital where there is a specialized liver transplant center. Her liver biopsy showed non-alcoholic steatohepatitis, and her brain magnetic resonance imaging showed a HE pattern. She also suffered from pulmonary edema, which required mechanical ventilation with a tracheostomy tube. She was managed conservatively in the ICU. Also, she had non-convulsive status epilepticus managed with antiepileptic medications and critical illness polyneuropathy following with neurology at that hospital.

After three months of stabilization, in July 2019, she was transferred with a tracheostomy tube back to our hospital for revision to normal anatomy. Her liver function laboratory on admission were serum albumin: 2.6 g/dL, and total bilirubin: 2.39 mg/dL. She had four days of preoperative preparation with condensed enteral feed and intravenous albumin, magnesium, phosphate, thiamin, and vitamin B12. Also, we carried a medical consultation regarding her liver condition and psychiatric consultation before the surgery. She underwent uneventful revision to normal anatomy by the same bariatric surgery team—this surgery was by laparoscopic approach on the same previous surgical scars. The surgeon transected the upper border of the gastro-jejunostomy anastomosis with a 60 mm stapler line to separate the intestine from the gastric pouch. Then the surgeon created two gastrostomies in the lower end of the gastric pouch and another in the remnant mother stomach. Two 60 mm stapler line loads created an anastomosis between the gastric pouch and the remnant mother stomach. Then the surgeon closed the gastrostomy opening with double layers by 2-0 Vicryl continuous suture, and 2-0 silk interrupted. Lastly, a nasogastric tube was inserted to rule out leakage by pushing 300 cc of methylene blue, and a drain was inserted. Her liver function laboratory post-operatively were: serum albumin 3.58 g/dL, and total bilirubin 0.5 mg/dL. Fig. 1 shows the liver in the revision surgery. Fig. 2 shows the procedure of revision to normal anatomy.

Fig. 1. This figure shows a cirrhotic liver in the second surgery, the revison of OAGB to normal anatomy.

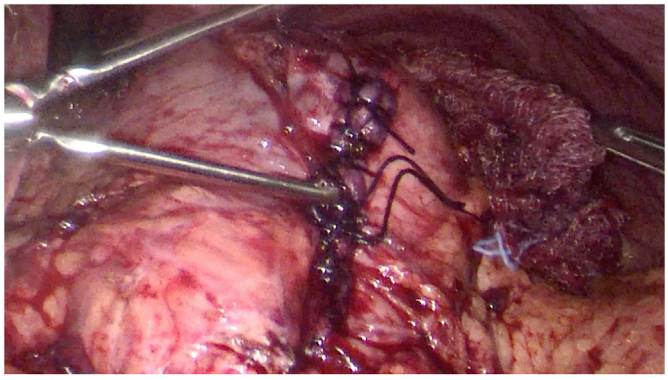

Fig. 2. This figure shows the stomich after the revision to normal anatomy surgery.

Post-operatively she was transferred to ICU with all supports, IV magnesium, albumin, and phosphorus. Then she was shifted to a clear liquid diet on day four postoperative through a nasogastric tube. She was discharged on day eight post-operatively on a stable condition on a full liquid diet, vitamins, antiepileptic, and thyroid medications with two visits to the clinic two weeks post-discharge. On week two post-discharge, she had started a pureed diet, satisfied, taking all her vitamins and protein supplements.

Three weeks later, she deteriorated and was admitted to the previous tertiary hospital with refeeding syndrome (RFS). She was treated in ICU with intubation and all supportive managements. She was managed conservatively, recovered, and discharged home in stable condition.

In her latest follow-up in September 2020, the patient was doing well, and her liver investigation was within normal values. Alanine transaminase was 39 unit/l, aspartate transaminase was 31 unit/l, and albumin was 37 g/L. Fig. 3 shows the timeline for the patient.

The institution approved writing this case report. Moreover, the patient gave consent for writing and publishing this report.

3. Discussion

Cases of obesity have been prevalent over the years, with non-alcoholic steatohepatitis condition increasing its occurrence. Thus, bariatric surgery plays an integral role in treating obese patients for its associated impacts like facilitation of weight loss, improvement of related metabolic syndrome, and regulation of cardiovascular risk factors [5]. However, the effects of bariatric surgery on liver functioning are controversial. Malabsorptive procedures like the BPD are linked to postoperative hepatic complications. On the other hand, some cases of controls cardiovascular associated risk factors and improvement of severe liver failures in minor series have been published [6].

Geerts et al. [7] published a study on a Belgian multicenter with a series of 10 patients with liver failure following bariatric surgery. This included BPD in 9 patients, along with intestinal bypass and subsequent liver transplants [7]. D'Albuquerque et al. [8] also published cases of 3 patients with bariatric surgery history who underwent BPD, later developing liver failure. All of them underwent liver transplants between 7 and 24 months later [8].

The pathological process of liver failure after bariatric surgery is inadequately comprehended. Multiple factors have been postulated to contribute to its pathogenesis. One of the primary factors entailed the malabsorption of nutritional components, particularly amino acids. This results in the potential accumulation of hepatic fat via the increased mobilization of surrounding free fatty acids alongside the decreased synthesis of apolipoprotein-B-100 [9]. Correspondingly, liver failure might occur due to the high availability of carbohydrates in the afferent loop lumen. Subsequently, the higher affinity of bacteria in the blind loop could potentially result in the production of significant amounts of endogenous ethanol production after bariatric surgery, possibly leading to liver dysfunction

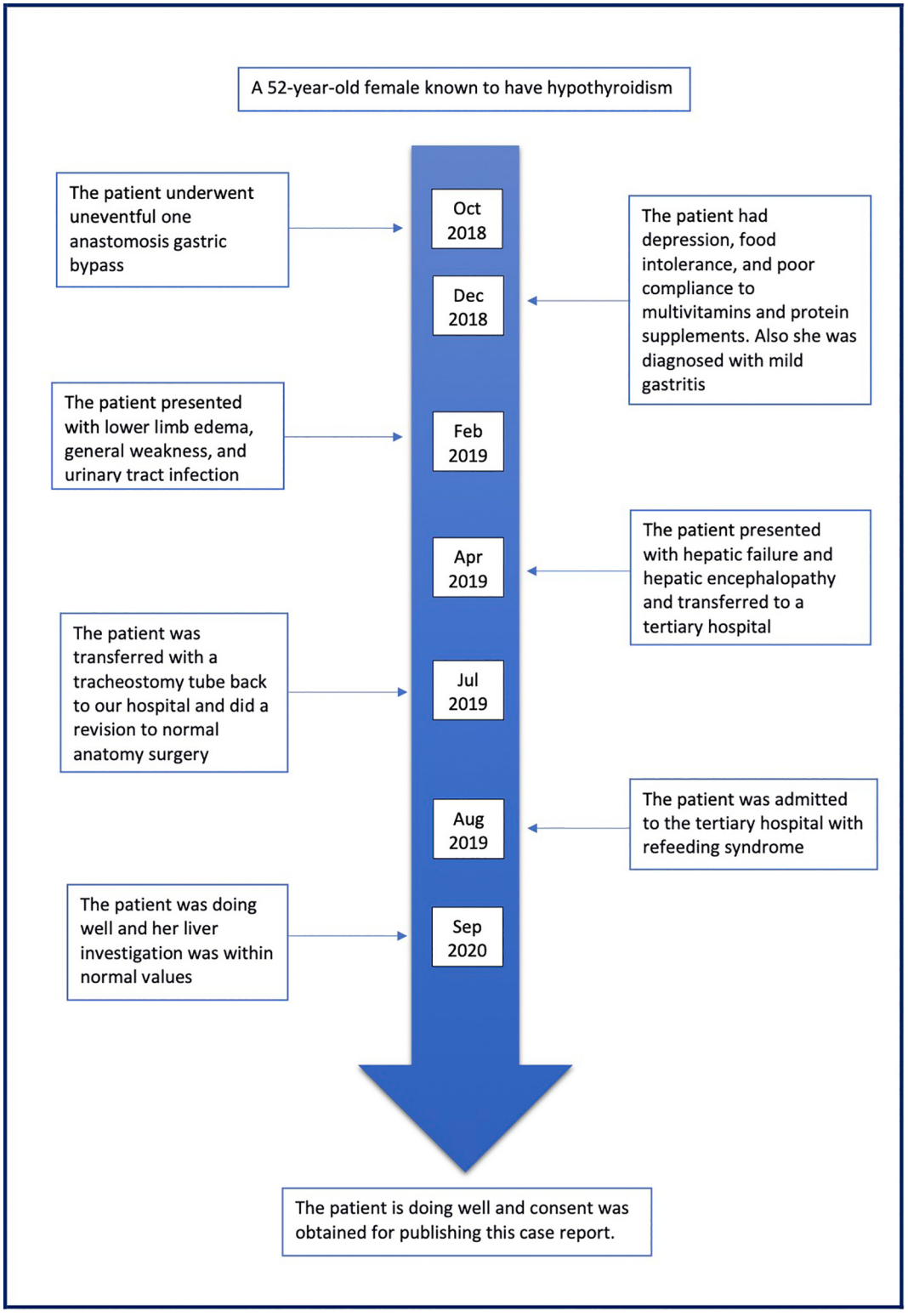

Fig. 3. This figure shows the timeline for the patient.

[9]. Bacterial overgrowth of the left out intestinal segment could also injure the mucosa facilitating bacterial translocation responsible for hepatocellular damage [7]. The major factors that stimulate these processes include bile absence in the affected segments, lessened gastric acid excretion, and modified intestinal motility. The mentioned factors are intensified by the severe weight loss that produces adipocytes' utilization implicating inflammatory mediators release, which in the long run favors lipotoxicity engaged in steatohepatitis [6].

The treatment of liver failure following bariatric surgery in most cases comprises impromptu liver transplantation and bariatric surgery revision to avert the failure of the transplanted liver [9]. Sagredo et al. [10] reported the only case of severe liver failure following a bariatric surgery successfully treated through nutrition support without liver replacement as in our case. In contrast, the reversal to normal structure seemed safe and effective in this environment but should only be deliberated after the failed intensive medical management [10]. The procedure can be

considered after the patient stabilizes and under experienced hands, as in our case, the patient undertook an uneventful reversal to normal anatomy after stabilizing with intensive medical treatment.

Sleeve gastrectomy is the most common bariatric surgery, followed by Roux-en-Y gastric bypass (RYGB). Eleven randomized control trials (RCT), a systematic review, and meta-analysis of observational and RCT compared bariatric surgeries to medical treatment of type 2 diabetes showed superiority in the surgical management in the remission of type 2 diabetes. In dyslipidemias, two meta-analyses compared RYGB with sleeve gastrectomy showed a higher reduction in dyslipidemia in RYGB than sleeve gastrectomy. Furthermore, RYGB and Sleeve gastrectomy have a higher triglyceride reduction than intensive medical management in a large RCT. Several studies showed an improvement in hypertension, sleep apnea, osteoarthritis, and reduction in the risk of all types of cancer after bariatric surgeries [11].

The best bariatric surgary to achieve weight loss is debated among several studies [11]. It is essential to keep in mind the community aspect in choosing the type of surgery. Dietary manipulation as drinking high caloric, high sweet beverages could preclude the optimal weight loss in some restrictive bariatric procedures. Also, the social aspect is essential in choosing the type of surgery.

Follow-up after bariatric surgary is of paramount importance. Several avoidable complications can be easily avoided with simple instruction during follow-ups. Encouragement of ambulation can prevent venous thromboembolism in the short term follow up, and preserve the optimal weight and prevent sarcopenia in the long term follow-ups. Also, in follow-ups, the treating team can easily prevent vitamins, minerals, and essential trace elements deficiencies by ensuring proper supplementation. Psychological support and identify mental distress are necessary for follow-ups. Preoperative mental distress has been recorded in bariatric patients. Although mental symptoms improvement is proportional to weight loss after bariatric surgeries, 4% of patients are newly prescribed antidepressants. Mental evaluation during follow-ups is essential to early referral to a psychiatric expert to avoid devastating complications [12].

International organizations accredit hospitals as a center of excellence in bariatric surgeries. This accreditation ensures better outcomes compared to non-accredited centers [13]. It is essential that patients seek bariatric surgeries in the accredited center because when complications happen, the highly skilled accredited center and surgeon can safely manage these complications with proper multidisciplinary team management.

RFS is a sensitive health issue common in malnourished patients with subnormal BMI following parenteral, oral, and enteral nutritional recommencement. RFS mirrors the adjustment from catabolic to anabolic metabolism [14]. A decrease in serum levels of potassium, magnesium, and phosphate- an acute electrolyte disruption- can lead to life-threatening situations [15]. As per the national institute for health and care excellence guidelines, the main risk factors linked to the development of RFS are unpremeditated weight loss of >15% for the last 3 to 6 months, a BMI < 16 kg/m, insufficient nutritional intake for more than ten countable days, and low potassium, phosphate or magnesium levels before feeding [16].

In the acute phase in patients with RFS, feeding jejunostomy is a valuable means of promoting the absorption of proteins, as it prevents feeding formula regurgitation [14]. In cases with chronic weight loss following bariatric surgery, when they resume increased food consumption after achieving adequate weight loss, obese patients are at high risk for evolving RFS. This can happen especially to patients with postoperative complications in particular [14].

4. Conclusion

Liver failure is reported as a rare consequence in patients who have undergone bariatric surgery for obesity, especially in OAGB. Early detection of liver impairment and early intervention by a revision to normal anatomy by an experienced surgeon is considered the safest and most effective procedure for such patients. Therefore, clinicians should know hepatic dysfunction risk and diagnosis following the various types of bariatric surgery procedures. Sufficient nutritional supplementation alongside the strict monitoring of liver functioning tests is irrefutably necessary for morbid obesity patients. In cases with late detection where liver failure occurs, liver transplantation is the only effective treatment for preventing fatal outcomes.

5. Patient perspective

After the first procedure, the bariatric surgery team ensured that the patient knew her course and the importance of adhering to the recommended diet. After her first adverse event, she was assured and her family by the bariatric team regarding her further management. She and her family were in continuous contact with the treating team, even after being admitted to the tertiary hospital. She and her family were satisfied by the coordinated and optimum management between the two hospitals. Until drafting this paper, she and her family were contacted, and they were satisfied with her condition.

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Ethical approval

The institution approved writing and publishing this research.

Consent

An informed written consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

Ahmed Nasser Al-Garzaie Study concept, Writing the paper, Literature review.

Hana Alzahrani Writing the paper, Literature review.

Sharifah A. Othman Writing the paper, Data collection, Literature review.

Abdullah A. Alqarzaie Writing the paper, Data collection, Literature review.

Research registration

N/A.

Guarantor

Dr. Ahmed Nasser Al-Garzaie.

Provenance and peer review

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Declaration of competing interest

The authors have no conflict of interest.

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