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CASE REPORT | ENDOSCOPY

Ischemic Renal Injury Complicating Intragastric Balloon Insertion

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ABSTRACT

A 25-year-old obese woman experienced ischemic renal injury as a complication of intragastric balloon (IGB) insertion for weight reduction. Although IGB is associated with a low risk of renal injury in the form of acute renal failure, this presentation has never been reported. The patient responded well to treatment, with complete clinical and radiologic resolution after balloon removal. She did not have an apparent cause of renal ischemia other than a significant compression of the renal vessels by the balloon as seen on imaging.

INTRODUCTION

Obesity is among the most common nutritional disorders that are rising rapidly around the world. Worldwide, >1.4 billion adults are considered overweight or obese and either have or are at increased risk of potentially disabling conditions.[1-2] Of all available treatment methods for obesity—e.g., lifestyle modification, behavioral therapy, weight-loss programs, pharmacological regimens, and weight-loss surgery—bariatric surgery remains the most effective.[3]

Intragastric balloons (IGBs) for weight loss were first introduced to the U.S. market in 1985. However, these early IGBs were withdrawn from the U.S. market due to adverse events associated with their use, including gastric wall damage, small bowel obstruction related to spontaneous balloon deflation and migration, as well as failure to demonstrate efficacy.[4] In the early 1990s, the BioEnterics intragastric balloon, currently known as the Orbera IGB (Apollo Endosurgery, Austin, Texas), was developed. The Orbera is an elastic balloon made of silicone, filled with 450–700 mL saline solution. The deflated balloon comes preloaded on a catheter, which is blindly advanced transorally into the stomach. Under direct endoscopic visualization, the balloon is then inflated by injecting saline solution mixed with methylene blue through the external portion of the catheter. The balloon is typically implanted for 6 months and then retrieved endoscopically.[5] Since evolving from being filled with air to being filled with saline, IGBs are now considered a safe and effective therapy for overweight and obese patients with a body mass index (BMI) >27 kg/m^2.[6] Few studies have reported renal failure in patients who underwent IGB.[7-10]

CASE REPORT

A 25-year-old woman with a history of bronchial asthma and obesity (body weight 103 kg, BMI 36.63 kg/m^2) was referred by her primary care physician to our department for IGB insertion. Her baseline creatinine and blood urea nitrogen levels were normal (65 umol/L and 3.5 mmol/L, respectively). Her upper endoscopy examination was unremarkable. An Orbera IGB was inserted and filled with 600 mL normal saline mixed with methylene blue as per standard protocol. She had no immediate post-procedure complications except for few episodes of nausea and vomiting, which were treated with ondansetron.

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Figure 1. Abdominal computed tomography showing (A) direct compression of the left renal vein by the intragastric balloon (arrow), (B) a wedge-shaped hypodense area in the left kidney consistent with ischemic injury (arrow), and (C) an enlarged left kidney with perirenal fat stranding.

On day 40 post-IGB insertion, she presented to the emergency department with a 2-day history of left-flank pain associated with nausea but no vomiting. Initial laboratory work showed normal complete blood count, lipase, creatinine, and blood urea nitrogen. Urinalysis revealed clear, light-yellow urine, and white blood cells and red blood cells were within normal ranges. At the time of evaluation, she had a body weight of 93 kg (BMI 32.17 kg/m^2), representing a 10% loss of her pre-IGB body weight.

Non-contrast computed tomography (CT) of the abdomen (stone protocol) performed to rule out renal stones was unremarkable. Abdominal CT with intravenous contrast showed a fully distended IGB that directly compressed the left renal vein. The left kidney was enlarged (11.73 cm), with a wedge-shaped hypodense area in the renal cortex and peri-renal fat stranding (Figure 1). Multiple well-defined, rounded hypodense lesions in the spleen were consistent with cysts. Otherwise, the right kidney, liver, pancreas, and adrenal glands were normal.

The patient underwent urgent upper endoscopy for IGB removal. The gastric mucosa was intact and healthy with no evidence of trauma, ulcers, perforation, or bleeding (Figure 2). The balloon was deflated and removed successfully. She was observed for 24 hours, during which her symptoms entirely resolved. Urine cultures came back negative.

To avoid the risk of radiation exposure and intravenous contrast, magnetic resonance imaging of the abdomen was done 1 week after balloon removal for interval follow-up. A previously noted left renal hypodense lesion resolved with no focal areas of decreased enhancement (Figure 3). The renal vessels

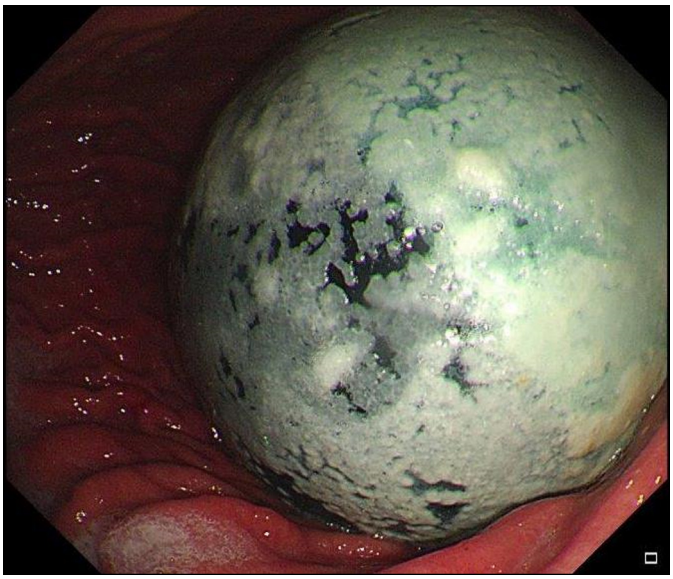

Figure 2. Endoscopic view of intragastric balloon prior to removal.

Figure 3. Magnetic resonance imaging of the kidney 1-week after balloon removal showing resolution of ischemia.

were patent and of normal caliber. Benign splenic cysts were observed as well.

DISCUSSION

This case report presents an unusual and previously unreported renal complication of IGB. Most previously reported complications of IGB have been acute post-insertion intolerance symptoms.[11] The presentation of acute abdominal pain raised a concern for possible IGB-related complications such as gastric wall perforation, pancreatitis, and bowel obstruction, which was ruled out by radiological studies.

Milone et al.[7] reported IGB placement complicated by renal injury and acute renal failure. In their report, the patient had acute renal failure shortly after IGB insertion due to vomiting and dehydration. In another report, 2 diabetic patients had acute renal failure and metabolic acidosis that developed within 2 weeks after IGB insertion.[8] The development of acute renal failure in these cases was attributed to vomiting, dehydration, and metformin administration. The risk of renal injury may be greater in patients with established chronic kidney disease.[12]

Our case is different in that the renal complication developed late compared to previously reported cases of renal injury. In addition, the patient's renal function was completely normal. Other possible causes of renal injury, including dehydration, infection, stones, and thrombosis, were ruled out. The only possible mechanism underlying the development of renal injury in this patient is the significant compression of the renal vein by the IGB, which was radiologically evident. Immediate endoscopic removal of the balloon resulted in quick and complete clinical and radiological resolution of renal ischemia. This is the first reported case of IGB-induced renal ischemia. Direct compression of the adjacent renal vein by the IGB, as shown on CT, was the likely cause of venous congestion of the left kidney, which ultimately led to renal ischemia.

DISCLOSURES

Author contribution: ES Aljahdli wrote the manuscript and is the article guarantor.

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Informed consent was obtained for this case report.

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