Case report

Laparoscopic gastric bypass after cardiac transplantation

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Organ transplantation requires potent antirejection medication that often results in significant weight gain [1]. Evidence has shown that morbidly obese patients who undergo organ transplantation have significantly worse patient and graft survival compared with morbidly obese patients without transplantation [2]. Permanent weight reduction in transplanted morbidly obese patients is expected to cure/improve associated diseases and reduce the risk factors for patient and graft survival. The nonoperative treatment of severe obesity rarely achieves permanent weight reduction [3]. Bariatric surgery should be considered even in transplant patients with multiple risk factors, when the long-term benefits of weight reduction are greater than the perioperative risk. Bariatric surgery has been previously reported for severe obesity after organ transplantation [4,5], including laparoscopic gastric banding after heart transplantation [6]. We report the world’s first laparoscopic gastric bypass after heart transplantation.

Case report

A 58-year-old woman with severe osteoarthritis of both knees and her left hip and poorly controlled, insulin-dependent, type 2 diabetes mellitus was referred from the Heart Failure Clinic of the McGill University Health Center to the Section of Bariatric Surgery, Division of General Surgery, McGill University Health Center for evaluation and treatment of her severe obesity. The patient had been diagnosed with idiopathic cardiomyopathy at 41 years old in 1989. Her cardiac function had continued to deteriorate, and she underwent orthotopic heart transplantation for end-stage cardiac insufficiency in 1997. At transplantation, her weight had been 90 kg and her body mass index (BMI) 33.1 kg/m². After transplantation, she received antirejection therapy, including mycophenolate mofetil, prednisone, and sirolimus, and started to gain weight progressively in the years after transplantation. She wanted to maintain a low weight and be able to walk freely, which she was not able to do because her weight kept increasing. She had tried several supervised weight management regimens, including diet restriction and exercise. All these attempts produced modest weight loss that was subsequently followed by greater gains. She became discouraged and lost her motivation.

On presentation to the Section of Bariatric Surgery multidisciplinary team in February 2005, she weighed 193.6 kg, with a BMI of 70.4 kg/m². She was unable to walk and used a wheelchair (Fig. 1). She had high blood pressure with medication (perindopril 4 mg/d, valsartan 160 mg/d, and atenolol 100 mg/d), dyslipidemia while taking pravastatin (10 mg/d), urine stress incontinence, depression while taking venlafaxine (75 mg/d), and poorly controlled, insulin-dependent type 2 diabetes mellitus (Humulin R 10-20-20-0 units and Humulin N 0-0-0-60 units and pioglitazone HCl 30 mg/d). Previous surgery included cesarean section in 1981 and 1984 and open cholecystectomy in 1981. She also had severe intertriginous dermatitis and dermolysis from chronic steroid use. All these factors presented unique operative challenges.

The risk/benefit ratio for laparoscopic Roux-en-Y gastric bypass was acceptable for this patient. The heart transplant team believed she would lose her graft and her life within 1–2 years without weight reduction surgery [7]. We decided to perform laparoscopic Roux-en-Y gastric bypass because the long-term benefit of potential weight reduction outweighed the perioperative risk. On the basis of the experience with renal transplantation in morbidly obese patients [8], we concurred with the transplant team’s recommendations that laparoscopic Roux-en-Y gastric bypass would allow her to continue her immunosuppressive medication with the least likelihood of absorption difficulties. She was instructed to consume a high-protein, low-carbohydrate diet for 2 weeks before her operation.

The anesthesia team also faced unique challenges, including a difficult airway, which was managed with awake intubation, and a denervated heart that was preload dependent. Continuous cardiac output monitoring with the use of a pulmonary artery catheter allowed for a better gauge of her fluid requirements.
Laparoscopic gastric bypass was performed using 5 ports, with a 15-mm Hg pneumoperitoneum. A 50-cm biliopancreatic limb, 100-cm Roux limb, and hand-sewn gastrotrejunoanostomy over the 32F bougie were created. Intraoperative heart function was monitored with transesophageal echocardiography. No drains or nasogastric tubes were used. We start our patients on ice chips the night of their surgery and progress to a liquid diet the following morning. Normally, our patients are discharged on the second postoperative day. In the present patient’s case, because she had a denervated heart and thus lacked the tachycardia stress response to a leak and because she required postoperative steroids, which would mask temperature and elevated white blood cell count stress responses to a leak, she was monitored for 24 hours in the intensive care unit and discharged from the hospital on the fifth postoperative day.

Two weeks after surgery, her incisions had healed without infection, and she was able to walk with greater ease. She had had no problem with a soft diet and no difficulty in taking all her immunosuppressive medications, with normal blood levels (sirolimus 5.3 ng/mL and mycophenolate mofetil 4 μg/L). She was followed up regularly by the bariatric surgery multidisciplinary team and the heart failure clinic. She continued to lose weight. At her last follow-up at 2 years, 2 months postoperatively, she had lost 109.5 kg, representing an 84% excess weight loss and 53% excess BMI loss, and her BMI was 30.9 kg/m². She was normotensive, had discontinued her antidepressant medication, and discontinued her insulin, continuing only with metformin 500 mg twice daily. Her last hemoglobin A1c was 5.1% compared with 9.3% preoperatively, and her dyslipidemia values were as follows: cholesterol 3.72 mmol/L, triglycerides 0.91 mmol/L, high-density lipoprotein 1.61 mmol/L, and low-density lipoprotein 2.01 mmol/L. Her quality of life was markedly improved, and she participated regularly in the Transplant Paralympics, where she won a

Discussion

The development of obesity and hyperlipidemia after heart transplantation has not yet been fully defined. Most transplanted patients tend to gain weight owing to multiple etiologies [9,10], including the use of corticosteroids [11] and cyclosporine [12], genetic factors, and lack of exercise. Early on, transplanted patients have been noted to have exaggerated appetites during rehabilitation from their chronic disease. These expected changes should be treated with early diet and behavioral modifications. Weight-reducing drugs such as sibutramine and orlistat are contraindicated for patients with severe cardiac disease. Orlistat significantly influences the metabolism of cyclosporine [13]. In cases in which these measures fail to prevent weight gain [14], the severely obese transplant patient might be a candidate for bariatric surgery [15]. In nontransplanted morbidly obese patients, bariatric surgery has been shown to result in significant improvement in cardiovascular disease [16], diabetes [17], and lipid abnormalities [18].

It is known that the disease process culminating in heart transplantation is itself associated with early death from cardiovascular disease. The contributing effect of obesity in transplanted patients keeps these patients at a very high risk of cardiovascular death [19] and is a compelling argument for early intervention with bariatric surgery. Bariatric surgery might also treat post-transplant diabetes mellitus related to the use of steroids, because it reduces or eliminates insulin requirements in obese patients [20–22]. In heart transplant patients, evidence has suggested that coronary atherosclerosis is immunologically mediated and that hyperlipidemia is a significant contributor to this process [23].
Steroids, cyclosporine A, diabetes mellitus, and obesity can each accelerate the development of atherosclerosis.

Insufficient data are available from published studies to determine the best weight reduction surgery for the transplant patient who is required to take antirejection medications for life. The jejunoileal bypass has been shown to reduce cyclosporine absorption in an unpredictable fashion, as determined by Knight et al. [24] in 1 patient with jejunooileal bypass who then required heart transplantation for cardiomyopathy. Gastric bypass requires a weight-adjusted cyclosporine dose increase from 1.8 to 3.5 mg/kg/d to maintain similar fluorescent polarization immune assay (TDX) trough cyclosporine levels [25]. Our patient obtained target serum levels of her antirejection medications, revealing that they were not significantly affected by the gastric bypass. Throughout the 2-year follow-up period, we found no evidence of cardiac rejection. It seems reasonable to conclude that a gastric bypass procedure can be done safely in heart transplant patients when the potential benefit exceeds the risk of the procedure, as well of its side effects.

Finally, we recognize the very-high-risk nature of this case and suggest that such cases be done in centers with extensive experience in bariatric surgery and appropriate multidisciplinary teams, not only in bariatric surgery, but also cardiology, solid organ transplantation, infectious diseases, and critical care. The bariatric surgery program at McGill University has been in existence since 1963 and is based in a quaternary care teaching hospital that includes transplantation, cardiology, and critical care missions and is designated as a supraregional center for bariatric surgery in the Province of Quebec. Successful outcomes such as documented in this case report require meticulous attention to preoperative preparation and fine tuning of immunosuppressive regimens, intraoperative care, and a multidisciplinary strategy for long-term immunosuppressive management and overall care.

Disclosures

The authors claim no commercial associations that might be a conflict of interest in relation to this article.

References