

Gastric Ulcer Perforation in Heart-Lung Transplant Patient: A Successful Case of Early Surgical Intervention and Management

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Gastrointestinal complications may follow organ transplantation. A patient who underwent heart lung transplantation due to patent ductus arteriosus and Eisenmenger's syndrome had an episode of acute cardiac rejection and was treated with a bolus injection of methylprednisolone followed by a high oral dose of prednisone. On the 22nd postoperative day, the patient complained of acute abdominal pain with muscular rigidity and a plain chest x-ray showed free air in the right subdiaphragmatic area. Under the suspicion of bowel perforation, an emergency laparotomy was performed and the perforated stomach had a wedge-shaped resection that included the perforation. Following the laparotomy, the postoperative course was uneventful and the patient was discharged on post-laparotomy day 10.

Key Words: Ulcer perforation, heart-lung transplantation, steroid pulse therapy, acute abdomen, free air

INTRODUCTION

A significant number of gastrointestinal complications have been reported in patients with heart or heart-lung transplantations.¹⁻³ The incidence of these complications varies between 15% to 35%, with a mortality rate as high as 33%. Early detection and proper management is crucial for improved survival and therefore, clinicians must carefully search for such complications during both the hospital stay and during the follow-up of

these patients. We report our experience in the diagnosis and management of a patient who showed signs of acute surgical abdomen following heart-lung transplantation.

CASE REPORT

A 41 year-old male was diagnosed with Eisenmenger's syndrome due to patent ductus arteriosus (PDA) and ventricular septal defect. The plain chest radiograph showed increased pulmonary vasculature (Fig. 1) and the chest computerized tomography showed a hugely-dilated right pulmonary artery with an impacted thrombus (Fig. 2). Cardiac catheterization was performed, revealing pressures as follows: main pulmonary artery 130/80 mmHg (mean 109), right ventricle 130/20 mmHg, right atrium mean 20 mmHg, aorta 130/80 mmHg (mean 100). A pulmonary function test revealed a forced vital capacity of 2.84 liters (62% predicted), a forced expiratory volume in 1 second of 1.75 liters (47% predicted), and a forced expiratory flow between 25 - 75% of 0.89 liters (22% predicted).

Under general anesthesia, a bilateral thoracotomy (clamshell incision) was made, and using the cardiopulmonary bypass (CPB), PDA was divided and sutured, and the heart and both lungs were extracted. The heart-lung bloc from the donor was implanted as planned, and the total CPB time was 5 hours, with a total operating time of 9 hours and 10 minutes.

The patient underwent a cardiac and lung biopsy on postoperative day 10 which revealed

Received February 12, 2003
Accepted June 23, 2003

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Fig. 1. Preoperative chest x-ray showing a mass-like lesion in the right hilum with increased pulmonary vascularity in both lungs.



Fig. 3. Chest x-ray showing free air in the right subdiaphragmatic space at the time when the patient showed clinical signs of acute abdomen.



Fig. 2. Preoperative chest CT findings showing huge, dilated pulmonary artery with a thrombus impaction causing near total obstruction of the right pulmonary artery.

grade 3 cardiac rejection, and therefore, was treated with a one gram bolus injection of methylprednisolone for three days, followed by a high dose of oral prednisone, tapered according to the treatment protocol. On the morning of postoperative day 22, the patient complained of acute onset, persistent, severe abdominal pain, and physical examination showed abdominal tender-

ness with muscular rigidity. The laboratory data showed elevation of white blood count from 8,000 to 16,000/mm³ and the chest x-ray revealed free air in the right subdiaphragmatic space (Fig. 3).

Under the impression of an ulcer perforation, an emergency laparotomy was performed. Gastric dilatation with thick food materials were noted in the stomach and some food materials and a moderate amount of dirty reactive fluid was found in the lesser sac. Perforated ulcer was noted at the greater curvature of the stomach 12 centimeters from the pylorus, and a wedge resection of the stomach that included the perforated site was performed using a 90 mm gastrointestinal stapler. A gastrointestinal tube was inserted into the jejunum, and the abdominal cavity was closed after 20,000 ml of irrigation. Examination of the pathologic specimen revealed multifocal pinpoint mucosal erosions and a shallow ulceration, covered by necroinflammatory exudates and serosal inflammation with edema. The postoperative course was uneventful, and the patient was discharged on post-laparotomy day 10 with a tolerable soft diet and good general condition.

DISCUSSION

Heart and lung transplantation is an accepted treatment for patients with end-stage cardiac and pulmonary disease. Survival rates are improving, although rejection and primary graft failure are the main causes of early death. The increased numbers of heart and heart-lung transplantation centers and the increased survival rates seen in recent years have produced many survivors being followed through the out-patient clinic. The incidence of gastrointestinal complications after cardiopulmonary bypass in patients without transplantation has been reported as 0.6% to 11%.⁴⁻⁶ Most often, the presentation time with gastrointestinal complications occurs during the first 6 months after the transplantation when the highest immunosuppression was given.

Gastric and duodenal ulceration is common after the CPB surgery, with gastrointestinal hemorrhage accounting 35% to 61% of abdominal complications.^{4,7} However, transplanted patients carry an additional risk of bowel ulceration caused by treatment with immunosuppressive medications, notably prednisone. Visceral perforation has been reported by many centers performing thoracic transplantations^{8,9} and the mortality rates vary from 0% to 50%. However, a mortality rate of 70% associated with colon perforation has been reported, suggesting that colon perforation associated with steroid treatment is a particularly dangerous complication.

Corticosteroids are known to cause gastroduodenal ulceration and bleeding by their disruption of the cytoprotective gastric mucosal barrier.^{10,11} Dayton, et al.¹⁰ retrospectively studied patients with gastroduodenal ulcer perforation associated with steroid treatment and reported a high association of ulcer perforation, following the steroid pulse therapy. However, since there are numerous causes of ulcer perforation we decided to perform a wedge resection in order to acquire tissue for pathologic confirmation of the cause. The gastrointestinal complication was diagnosed as a drug-related type V gastric ulcer, according to Johnson's gastric ulcer classification.¹²

Another factor which needs to be addressed is that clinical manifestations of patients taking steroids may have been obscured due to depressed

inflammatory responses.^{13,14} Although fever and abdominal tenderness is usually present, the absence of leukocytosis, muscular guarding, or rebound tenderness often lead to a delay in the diagnosis and subsequent prompt treatment. Thus, non-specific abdominal discomfort is often the only signs of surgical abdomen in transplant patients receiving steroids. This patient, however, showed abdominal tenderness and muscular guarding leading to early diagnosis and treatment. The masking effects of immunosuppression, the preoperative catabolic state, and associated toxicities of immunosuppressive drugs, in addition to some of abdominal complications which may occur after CPB, hinder accurate, early diagnosis which is of utmost importance in patient survival.

Surgical stress and prolonged hospitalization-related ulcers are other important causes of acute upper gastrointestinal bleeding.¹⁵ Ulcer prophylaxis with antisecretory agents such as H₂ receptor antagonists or proton pump inhibitors have been reported to decrease the risk of stress-related mucosal damage and UGI bleeding in high-risk patients.^{16,17}

The mortality rate as a direct result of gastrointestinal complications in all heart and heart-lung transplant recipients was less than 1% and the operative mortality in patients requiring surgical intervention was 8%.¹⁸ The contribution of the general surgeon in managing patients with abdominal complications after the thoracic transplantations must be emphasized. Since patients have higher survival rates from intestinal perforation only if the perforation was recognized early and treated promptly, an early, aggressive exploratory laparotomy in patients with uncertain diagnosis might prove a better approach to treatment² than to wait for the symptoms to be aggravated.

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