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Acute diverticulitis in heart transplant recipients

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Abstract Immunosuppressed patients are susceptible to complicated diverticulitis, but reports of this complication are scarce in heart graft recipients. To estimate the prevalence of acute diverticulitis in heart graft recipients, we retrospectively reviewed the cases of diverticulitis in a series of 143 patients who underwent orthotopic heart transplantation in a period of 10 years. Six (4 %) of these developed acute diverticulitis and required colectomy. All of them were male patients and were older than 50 years. Four patients underwent urgent laparotomy and colon resection with end colostomy (Hartmann procedure). The two other patients suffered from diverticulitis without generalized peritonitis and underwent laparoscopic sigmoidectomy with direct transanal end-to-end anastomosis. The postoperative outcomes of these six patients were satisfactory. As are other immunosuppressed patients, heart graft recipients are susceptible to diverticulitis. Early surgical management may be safe in well-compensated patients.

Key words Diverticulitis, heart transplantation · Heart transplantation, diverticulitis

Introduction

Since the clinical advent of cyclosporin A in the early 1980s, orthotopic heart transplantation (OHT) has become an alternative in the treatment of end-stage cardiac failure. Nowadays, long-term survival of heart graft recipients is usually achieved, but the complications of the immunosuppressive treatment are still life-threatening [11]. Digestive complications, including hemorrhages and perforations, are frequent and often require surgical management [7, 14, 21]. Diverticulitis may classically complicate immunosuppression, but reports of this complication are scarce in heart graft recipients.

The aim of this study was to estimate the prevalence of diverticulitis in our series of heart graft recipients and to evaluate the results of early surgical management of this complication in immunosuppressed patients.

Materials and methods

We retrospectively reviewed the records of the 143 patients (mean age 54 years, range 15–71 years) who underwent OHT in the Cardiovascular Surgery Department of the University Hospital of Liège between January 1985 and December 1994. There were 115 male and 28 female patients. The standard immunosuppression regimen consisted of triple drug therapy with cyclosporin, corticosteroids, and azathioprine. In addition, a course of antithymocyte globulin (ATG) was given prophylactically in the early post-transplantation period. Rejection episodes were diagnosed by endomyocardial biopsies and were initially treated with pulse doses of cor-

Table 1 History of the patients

Case no.	Gender	Pretransplantation digestive symptoms	Etiology of heart failure	Age at transplantation (years)	Immunosuppression
1	Male	–	Hypertension Sarcoïdosis	60	Standard
2	Male	–	Ischemic	52	Standard
3	Male	–	Ischemic	55	Standard
4	Male	–	Congestive	59	Azathioprine interruption
5	Male	–	Congestive	71	Azathioprine interruption
6	Male	–	Ischemic	59	Standard

Table 2 Symptoms

Case no.	Interval between OHT and diverticulitis	Symptoms	Peritoneal irritation	Fever
1	6 months	Abdominal pain	+	–
2	8 months	Abdominal pain	–	+
3	1 month	Abdominal pain	–	–
4	5 years	Hematochezia	–	+
5	6 months	Abdominal pain	–	+
6	3.5 years	Abdominal pain	–	–

ticosteroids. ATG or monoclonal CD-3 antibodies (OKT 3) were used to treat steroid-resistant rejections.

Results

Six of our patients (4%) developed acute diverticulitis in the follow-up period and underwent colectomy. All of them were male and their mean age at OHT was 59 years (range 52–71 years; Table 1). The medical histories of the six patients showed that they were free of abdominal symtoms and pathology before the OHT. Azathioprine administration was interrupted in two of these patients because of the development of leukopenia.

Clinical features

Five of the six patients developed abdominal pain as the main symptom of diverticulitis (Table 2), but in only one case did the clinical examination show signs of peritoneal irritation. One patient was admitted to the hospital because of abrupt onset of hematochezia. The occurrence of fever was erratic. The white blood count (WBC) and the acute phase inflammatory proteins were also erratic (Table 3), but in each patient at least one of these laboratory tests was elevated.

Radiological investigations, surgical management, and outcome

Routine abdominal radiography showed free air beneath the diaphragm in three of the six patients (Table 3). Two of these patients (cases 1 and 6) underwent urgent laparotomy, which revealed a perforated sigmoid diverticulitis. For the third patient (case 3), the computed tomographic (CT) scan of the abdomen was inconclusive, and diverticulitis was diagnosed at the time of laparotomy. The abdominal CT scan for the second patient demonstrated acute diverticulitis. These four patients underwent sigmoid colon resection with left-end colostomy (Hartmann procedure; Table 4). The postoperative course was complicated by delayed wound closure and evisceration in one patient , and surgical repair was required. All of these patients underwent reintegration of the colostomy, which was complicated by acute rejection and pulmonary edema in the second patient, and by reversible, acute renal failure in the third patient.

In the fourth and fifth patients, the CT scans of the abdomen demonstrated colonic diverticulitis with parietal abscess or mesenteric inflammation, but without perforation. These patients underwent fluid restoration, bowel rest, and broad spectrum intravenous antibiotherapy. After a few days of preparation, elective one-stage laparoscopic-assisted colectomies with primary end-to-end transanal anastomosis were performed. Postoperative outcomes for these two patients were uneventful.

Patient 2 fell into a depressive neurosis, refused psychiatric support, and deliberately interrupted immunosuppression. He died from rejection 7 months after reintegration. The other five patients were alive and in New York Heart Association (NYHA) functional class I or II after a mean follow-up period of 1.5 years (range 6 months to 3 years). None of them had a recurrence of abdominal pathology.

Table 3 Laboratory tests and radiological findings

Case no.	White blood count (/mm^3)	Fibrinogen (g/l)	C-Reactive protein (mg/l)	Abdominal radiograph	Abdominal CT scan	Diagnosis
1	Normal	5.25	Normal	+	Not performed	Laparotomy
2	12000	4	11	–	+	CT scan
3	Normal	16.5	22.7	+	–	Laparotomy
4	11800	4.08	20	–	+	CT scan
5	11200	Normal	61	–	+	CT scan
6	20600	Normal	Normal	+	Not performed	Laparotomy

Table 4 Surgical management and outcome

Case no.	Surgical procedure	Complications of colectomy	Interval between colectomy and reintegration (months)	Complications of reintegration	Outcome
1	Hartmann	–	6	–	Alive
2	Hartmann	–	3	Acute rejection	Deceased
3	Hartmann	Evisceration	6	Acute renal failure	Alive
4	Laparoscopic colectomy	–			Alive
5	Laparoscopic colectomy	–			Alive
6	Hartmann	–	6	–	Alive

Pathology

In the six cases, the pathological analysis of the resected colon confirmed acute diverticulitis with abscesses. No evidence of cytomegalovirus (CMV) infection or malignancy were described.

Discussion

Colonic diverticulosis occurs frequently in Western Europe and in the United States. Its prevalence appears to be related to the patient's age, and it appears to increase significantly after the age of 50 [12]. Most patients with diverticulosis remain asymptomatic throughout their lifetimes, but some develop acute inflammation or hemorrhage. Many need surgical management to treat these complications and to avoid recurrence.

Immunocompromised patients are susceptible to acute diverticulitis. In patients without transplants, long-term use of steroid therapy is associated with a high risk of acute colonic diverticulitis and perforation [5]. This fact is attributed to steroidal inhibition of the inflammatory response and to alteration of the fibroblastic activity. In graft recipients, the combination of the immunosuppressive drugs may favor complicated diverticulitis. In kidney recipients, the incidence of perforated diverticulitis has been estimated at between 0 % and 3 % [3, 6, 10, 19, 22]. Complications of diverticular disease were reported in about 18 % of the renal recipients who were over 50 years of age and were known to have diverticulosis [4]. This diverticulitis may be promoted by immunosuppression, opportunistic infection of the colonic lumen [1], or CMV infection of the digestive tract [2, 9, 18].

In our series of heart transplant recipients, 4 % developed diverticulitis and underwent colectomy. This high rate did not agree with that reported in the literature; in follow-up, diverticulitis was reported as a complication suffered by 0 %–2.5 % of all heart graft recipients [7, 14, 15, 20, 21]. All of our recipients who developed diverticulitis were male. This fact was not related to the difference in age between male and female recipients. The mean age of the female population was 55.5 years and did not differ from the global series. All of our recipients who developed diverticulitis were older than 50, and their mean age was 59 years at OHT. None of them had a past history of diverticulosis or abdominal symptoms. None of these cases of diverticulitis was associated with CMV infection or recurrence.

Diverticulitis in immunosuppressed patients is associated with very high morbidity and mortality related to impaired response to sepsis and to late diagnosis [16]. In nonimmunocompromised patients, mild peridiverticular inflammation occurs, and the entire perforation is usually walled off by the pericolic fat, the mesentery, and the omentum. In transplant recipients, the perforation is not sufficiently contained by the adjacent tissues, and free perforation with generalized peritonitis may supervene. Moreover, delayed diagnosis of intestinal perforation is frequent in immunosuppressed patients. The pain and the clinical signs of peritoneal irritation was attenuated by immunosuppression in our patients. Laboratory tests may be helpful, but the WBC

and/or the acute phase inflammatory proteins may be misleading in immunosuppressed patients [21], as in our series. Abdominal radiographs may show perforation [22], but the abdominal CT scan is of greater value in determining the occurrence and the stage of pericolic inflammation, perforations, or abscesses [13].

The management of diverticulitis in heart transplant recipients should not be delayed. If colonic perforation occurs before diagnosis, surgical treatment is required as soon as possible, in association with intravenous broad spectrum antibiotic therapy and eventually reduction of immunosuppression. In this case, a two-stage procedure with resection of the colon and end colostomy must be performed (Hartmann procedure) [8]. Four of our patients underwent this course of treatment with satisfactory results. For patients 4 and 5, diverticulitis was suspected and its presence was confirmed by CT scan before perforations occurred. These patients underwent fluid restoration, bowel rest with nasogastric suction and systemic broad spectrum antibiotherapy for a few days. This preparation allowed elective, one-stage, laparoscopic-assisted colectomy with primary end-to-end transanal anastomosis. We used a technique of laparoscopic-assisted colon resection similar to the procedure described by Plasencia et al. [17]. Postoperative outcomes were uneventful.

Diverticulitis in heart transplant recipients can sometimes be prevented. The first step in prevention should be diverticulosis screening in heart graft candidates and this should include a barium enema examination in the routine pretransplant check-up for candidates aged 40 or more, as advised for renal recipients [4, 10]. The high rate of diverticulitis in our heart transplant recipients raises the question of the desirability of pretransplant colectomy in patients who have developed diverticulitis in the past. This prophylactic major abdominal surgery is advisable for kidney recipients [6]. However, safe prophylactic colectomy cannot be performed in heart transplant candidates with terminal heart failure [21]. The prevention of complicated diverticulitis in these patients should perhaps consist of close medical attention after transplantation in order to diagnose and to treat early diverticulitis. Laparoscopic colectomy may be performed without the need for end colostomy in recipients whose diverticulitis is not complicated by perforation and peritonitis at the time of diagnosis.

References

1. Arabia FA, Rosado LJ, Huston CL, Sethi GK, Copeland JG (1993) Incidence and recurrence of gatrointestinal cytomegalovirus infection in heart transplantation. Ann Thorac Surg 55: 8–11
2. Arvnitakis C, Malek G, Uehling D, Morrissey JF (1973) Colonic complications after renal transplantation. Gastroenterology 64: 533–538
3. Bardaxoglou E, Maddern G, Ruso L, Siriser F, Campion JP, Le Pogamp P, Catheline JM, Launois B (1993) Gastrointestinal surgical emergencies following kidney transplantation. Transpl Int 6: 148–152
4. Benoit G, Moukarzel M, Verdelli G, Hiesse C, Buffet C, Bensadoun H, Charpentier B, Jardin A, Fries D (1993) Gastrointestinal complications in renal transplantation. Transpl Int 6: 45–49
5. Canter JW, Shorb PE (1971) Acute perforation of colonic diverticula associated with prolonged adrenocorticosteroid therapy. Am J Surg 121: 46–51
6. Carson SD, Krom RA, Uchida K, Yokota K, West JC, Weil R (1978) Colon perforation after kidney transplantation. Ann Surg 188: 109–113
7. Colon R, Frazier OH, Kahan BD, Radovancevic B, Duncan JM, Lorber MI, Van Buren CT (1988) Complications in cardiac transplant patients requiring general surgery. Surgery 103: 32–38
8. Finlay IG, Carter DC (1987) A comparison of emergency resection and staged management in perforated diverticular disease. Dis Colon Rectum 30: 929–933
9. Gangahar DM, Ligget SP, Casey J, Carveth SW, Reese HE, Buchman RJ, Breiner MA (1988) Case report: two episodes of cytomegalovirus-associated colon perforation after heart transplantation with successful result. J Heart Transplant 7: 377–379
10. Hognestad J, Flatmark A (1976) Colon perforation in renal tranplant patients. Scand J Gastroenterol 11: 289–292
11. Hosenpud JD, Novick RJ, Breen TJ, Daily OP (1994) The registry of the international society for heart and lung transplantation: eleventh official report – 1994. J Heart Lung Transplant 13: 561–570
12. Hughes LE (1969) Postmortem survey of diverticular disease of the colon. I. Diverticulosis and diverticulitis. Gut 10: 336–351
13. Labs JD, Sarr MG, Fishman EK, Siegelman SS, Cameron JL (1988) Complications of acute diverticulitis of the colon: improved early diagnosis with computerized tomography. Am J Surg 155: 331–335
14. Merrell SW, Ames SA, Nelson EW (1989) Major abdominal complications following cardiac transplantation. Arch Surg 124: 889–894
15. Parascandola SA, Wisman CB, Burg JE, Davis PK (1989) Extracardiac surgical complications in heart transplant recipients. J Heart Transplant 8: 400–406
16. Penn I, Brettschneider L, Simpson K, Martin A, Starzl TE (1970) Major colonic problems in human homotransplant recipients. Arch Surg 111: 807–809
17. Plasencia G, Jacobs M, Verdeja JC, Vimonte M (1994) Laparoscopic-assisted sigmoid colectomy and low anterior resection. Dis Colon Rectum 37: 829–833
18. Shuster LD, Cox G, Bhatia P, Miner PB (1989) Gastric mucosal nodules due to cytomegalovirus infection. Dig Dis Sci 34: 103–107
19. Siegel RR (1972) Gastrointestinal complications after renal transplantation. Lancet I: 36–37
20. Steck TB, Durkin MG, Costanzo-Nordin MR, Keshavarzian A (1993) Gastrointestinal complications and endoscopic findings in heart transplant patients. J Heart Lung Transplant 12: 244–251
21. Steed DL, Brown B, Reilly JJ, Peitzman BP, Griffith BP, Hardesty RL, Webster MW (1985) General surgical complications in heart and heart-lung transplantation. Surgery 98: 739–744
22. Thompson WM, Seigler HF, Rice RP (1975) Ileocolonic perforation: a complication following renal transplantation. Am J Roentgenol Radium Ther Nucl Med 125: 723–730