Original Article

Early Postoperative Recovery by Chronic Dialysis Patients after Coronary Artery Bypass Grafting

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Objective: A faster start at rehabilitation has been a great benefit in reducing complications and costs after coronary artery bypass grafting (CABG). We studied early postoperative recovery from CABG in dialysis patients.
Methods: From January 2001 to May 2006, a total of 401 patients underwent isolated CABG at our institution. We retrospectively studied 348 consecutive elective cases, which were divided into two groups; 18 with dialysis (group D) and 330 without dialysis (group N), with respect to having meals, standing, and walking.
Results: An analysis of patient demographics revealed significant differences in gender, comorbidity of old cerebral infarction, anemia, and water balance during operation (P <0.05). Operative and in-hospital mortalities were 0% in group D. The percentages of the patients who were eating meals, standing, or walking on postoperative day (POD) 1 in group D were 88.9%, 66.6%, and 27.8%, respectively. In group N, these percentages were significantly higher: 96.1%, 85.5%, and 75.8%. But by POD 2, these values became similar. We considered that the delay of rehabilitation in group D was mainly due to hemodialysis on POD 1.
Conclusion: Early postoperative recovery from elective isolated CABG in dialysis patients delayed a day against nondialysis patients. The delay was considered a result of the inevitable dialysis on POD 1. (Ann Thorac Cardiovasc Surg 2009; 15: 243–246)

Key words: postoperative recovery, coronary artery bypass grafting, hemodialysis

Objective

Some studies show that coronary artery bypass grafting (CABG) is the most successful strategy of revascularization for dialysis patients.[1,2] On the other hand, several other studies show that there are greater complications and a higher mortality rate in CABG for dialysis patients, though the latter studies approved of CABG for them.[3–15]

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A fast start of rehabilitation after cardiac operation has the potential benefits of reducing medical costs and complications, such as atelectasis, pulmonary embolism, and disuse syndrome.[16] We performed the perioperative management for fast postoperative recovery by a team that consists of cardiac surgeons, anesthesiologists, nurses, and physical therapists. Little is known about the early phase postoperative recovery from CABG in dialysis patients. In this study, we conducted a retrospective review of the patients on chronic dialysis who underwent isolated elective CABG in terms of the early postoperative recovery.

Methods

From January 2001 to May 2006, a total of 401 patients

Table 1. Elective isolated CABG from January 2001 to May 2006

	Dialysis	Nondialysis	P value
Number	18	330	
Age (year)	42–82 (median: 64)	45–89 (median: 70)	0.139
Sex			<0.05
Male	16 (88.9%)	246 (74.5%)	
Female	2 (11.1%)	84 (25.5%)	
Comorbidity			
Hypertension	18 (100%)	224 (67.9%)	–
Diabetes	8 (40.4%)	138 (41.8%)	0.839
Old cerebral infarction	2 (11.1%)	81 (24.5%)	<0.05
Aortic aneurysm	0	14 (4.2%)	–
Peripheral artery disease	1 (5.6%)	25 (7.6%)	0.741
Anemia Hb < 10 g/dl	11 (61.1%)	17 (5.2%)	<0.05
Surgical procedure			
Anesthesia time (min) (mean ± SD)	369 ± 33	368 ± 72	0.955
Operation time (min) (mean ± SD)	298 ± 33	294 ± 60	0.809
Use of CPB			0.067
On-pump	15 (83.3%)	206 (62.4%) (containing 5 beatings)	
CPB time (min) (mean ± SD)	114 ± 25	120 ± 27	0.410
Off-pump	3 (16.7%)	124 (37.6%)	
Distal anastomosis	3 (range: 2–4)	3 (range: 1–6)	0.927
Volume balance			
Dry weight (kg) (mean ± SD)	59.6 ± 6.5	61.4 ± 31	0.435
Water balance during operation (ml) (mean ± SD)	1,326 ± 1,324	817 ± 845	<0.05
Water balance on POD 1 (ml) (mean ± SD)	266 ± 201	240 ± 281	0.609
Mortality			
Operative mortality (%)	0	0.91	–
In-hospital mortality (%)	0	1.2	–

There were more patients of male, anemia of hemoglobin level below 10 g/dl in group D. In group N, there were more with cerebral infarction (P <0.05). Water balance during operation was significantly higher in group D (P <0.05).
Hb, hemoglobin; SD, standard deviation; CPB, cardiopulmonary bypass; POD, postoperative day.

underwent CABG procedures in our institution. Among them, 348 consecutive patients who had isolated elective CABG were divided into 2 groups: 18 with preoperative dialysis (group D) and 330 without dialysis (group N). In group D, 94.4% of the patients received hemodialysis (HD) and 5.6% continuous ambulatory peritoneal dialysis (CAPD) preoperatively. The duration of dialysis ranged from 0.6 to 24.8 years (median: 7.1). We studied in both groups about when the patients started meals, when they stood up, and when they walked after the operation. In the operation, all patients were anesthetized with low-dose fentanyl and propofol. The depth of sedation was monitored by a bispectral index monitor. During the perioperative period, we treated all dialysis patients by HD. Postoperative dialysis was done on postoperative day (POD) 1. When the patients had such problems as hyperkalemia, volume overload, and acidosis, HD was also done on the operation day. Physical therapists started postoperative rehabilitation on POD 1 and proceeded with it on a day-to-day basis. Meals were started either 6 hours after extubation of a tracheal tube or on the morning of POD 1, whichever came later. All data were retrospectively reviewed on the basis of medical records. A statistical analysis of categorical variables was performed by Chi-square tests. Continuous variables were analyzed using a t-test, and a P value of less than 0.05 was considered significant. The software used Dr. SPSS® II for Windows Ver. 11.01 (SPSS Inc., USA).

Results

The patients' demographics are shown in Table 1. Group D had more male patients than group N; 88.9% vs. 74.5% (P <0.05). In preoperative comorbidity, group D had more patients with anemia of hemoglobin level below 10 g/dl (61.1% vs. 5.2%). Group N had more patients with old

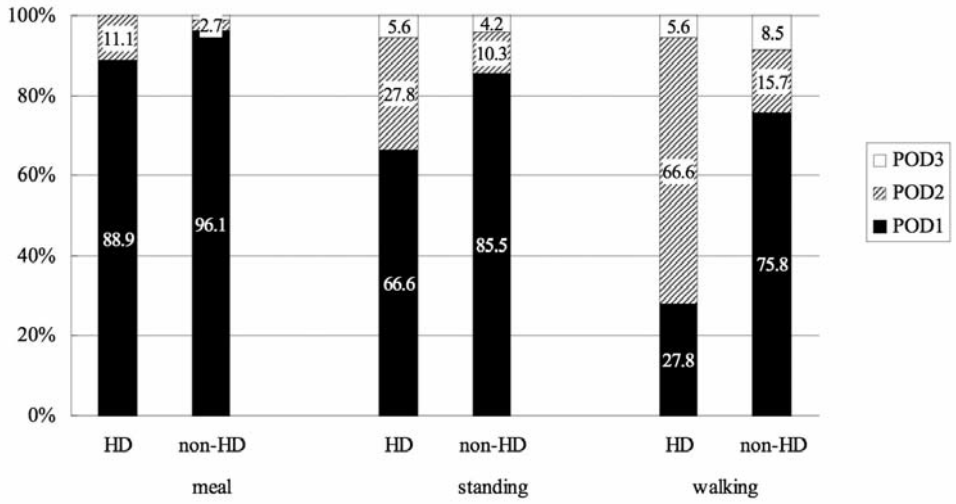

Fig. 1. In meal consumption, standing, and walking, group N recovered faster on POD 1 than group D (P <0.05). But on POD 2, the recovery became similar.
HD, hemodialysis; POD, postoperative day.

cerebral infarction (11.1% vs. 24.5%) (P <0.05). On-pump surgery was performed in 83.3% and off-pump surgery in 16.7% of group D. In terms of on-pump surgery, we performed under cardiac arrest for all patients in group D, and 2.4% of the on-pump patients in group N underwent on-pump beating surgery. The average duration of cardiopulmonary bypass (CPB) was 114 ± 25 minutes in group D and 120 ± 27 in group N. The durations of anesthesia and operation were similar in both groups. Water balance during the operation was significantly higher in group D than in group N (1,326 ± 1,324 vs. 817 ± 845) (<0.05), though they became similar on POD 1. The median number of distal anastomoses was 3.0 in both groups.

Postoperative recovery was shown in Fig. 1. On POD 1, 88.9% of the patients had meals, 66.6% stood up, and 27.8% walked in group D; 96.1% had meals, 85.5% stood up, and 75.8% walked in group N. All values were significantly higher in group N (P <0.05). By POD 2, however, the values became similar; 100% vs. 98.8% in meals, 94.4% vs. 95.8% in standing up, and 94.4% vs. 91.5% in walking. Operative and in-hospital mortalities in group D were 0%. They were 0.91% (3 of 330 patients) and 1.2% (4 of 330 patients) in group N.

With respect to complications after operation in group D, a reoperation of the sternum was required in 1 patient (5.6%), and pneumonia occurred in 1 (5.6%), a wound infection of the leg in 2 (11.1%), and transient atrial fibrillation in 6 (33.3%).

Discussion

The results showed that group N recovered faster in all situations, and all of them were statistically significant (P <0.05) on POD 1. However, they became similar by POD 2. The dialysis patients received postoperative HD on POD 1. That decreased the opportunity of postoperative rehabilitation on the day. In our institution, postoperative rehabilitation is scheduled twice a day, but the dialysis patients often underwent it only once a day because they spent 4 hours for HD. The degree of recovery was recorded on a day-to-day basis. We considered that the one-day delay of the recovery in group D was mainly due to the inevitable dialysis on POD 1. The delay didn't increase the mortality rate. Surgical procedures in both groups weren't statistically different, and water balance was similar on POD 1, though during the operation it was significantly higher in group D. These factors would not influence the one-day delay of recovery in group D.

Conclusion

In terms of the early postoperative recovery after elective isolated CABG, the outcome of the dialysis patients was delayed one day compared with that of the nondialysis patients. That was mainly because HD on POD 1 delayed the start of rehabilitation. In the elective isolated CABG patients, dialysis patients were slower in the recovery by 1 day because of HD, but they caught up with the non-HD patients on POD 2.

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