A Retrospectively Analysis of Patients Who Had Long Hospital Stay After Cardiovascular Surgery

Kardiyovalsküler Cerrahi Sonrası Uzun Süreli Hastanede Kalan Hastaların Geriye Dönük Analizi

ABSTRACT

Objective: Patients have been discharged from the hospital within four to eight days after cardiovascular surgery in recent years. The aim of this study was to determine demographic and clinical features of patients who had long hospital stay after cardiovascular surgery. Material and Methods: The study was conducted as a retrospective cohort study in a private hospital in Turkey. The sampling group was composed of 53 of total 473 patients admitted to the hospital between January and December 2006. Patients were hospitalized for nine days and more, and those over 18 years of age were included into the study. The records of this study group were retrospectively investigated to data of patients including demographic characteristics, history, laboratory values, patient diagnosis and surgery interventions. Data were evaluated using regression and chi-square tests. Results: Mean age of the patients was 59.3, 64.2% of them were male, and 90.6% had prior elective operations. Of the patients, 67.9% were obese (BMI ≥ 30kg/m2), 62.3% had coronary artery disease, 56.6% had coronary artery bypass graft surgery, 62.3% had hypertension, and 28.3% had chronic obstructive pulmonary disease. The mean length of hospitalization was 13.53 ± 10.16 days. The mean stay in the intensive care unit was 2.87 ± 2.95 days. The most complications developing postoperatively in patients were atrial fibrillation (47.2%), ventricular insufficiency (32.1%), renal insufficiency (18.9%), ventricular arrhythmia (17%), pneumothorax (9.4%), cardiac tamponade (7.5%) and respiratory problems (5.7%). Conclusion: The results of this study provide detailed information regarding demographic and clinical features of patients who had long hospital stay after cardiovascular surgery.

Key Words: Cardiovascular surgical procedures; complications; hospitalization

ÖZET


Anahtar Kelimeler: Kardiyovalsküler cerrahi prosedürler-girişimler; komplikasyonlar; yatakli tedavi

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It is estimated that every year, more than one million people throughout the world undergo cardiac surgical procedures because of cardiovascular diseases.\(^1,2\)

Cardiovascular surgical techniques have advanced in parallel with technology. However, in spite of the developments, surgical techniques, some situations resulting from patients and health care professionals also bring several risks for the development of complications in postoperative period. So as to decrease the rate of negative patient outcomes, rapid treatment and care practices have begun being accepted as the gold standard, and patients have been discharged from the hospital within four to eight days.\(^1,3,4\)

In previous studies, it was reported that patients with atrial fibrillation, ventricular insufficiency, sternal wound infection, respiratory insufficiency, neurologic insufficiency, undergoing complex cardiac surgical procedures and being readmitted to intensive care units (ICU), chronic illness, and advanced age after cardiac surgical procedures had longer hospital stay.\(^2-13\)

Based on all these data, this study was conducted to investigate the demographic and clinical features of patients who had long hospital stay after cardiovascular surgery in a private hospital.

**MATERIAL AND METHODS**

**STUDY DESIGN**

The study was conducted in a private hospital in Turkey. Retrospective cohort approach was used in the study. The sample consisted of 53 of total 473 patients admitted between January and December 2006 due to a cardiovascular surgical intervention. Length of hospital stay in all patients was nine or more days. Pediatric patients were excluded from the study, and the patients solely over 18 years of age were included.

**DATA COLLECTION**

Data of 53 patients participated in the study were obtained from the medical records, laboratory files and follow-up cards. The records of this study group were retrospectively reviewed to data including the patients’ demographic characteristics, obesity status as body mass index (BMI), preoperative diagnoses, presence of chronic illness, creatinine, hemoglobin and hematocrit levels, status of cigarette use, diseases present on admission, how the surgery was performed, type of the surgery, length of the surgery, anesthesia administered, extra corporal circulation (ECC), length of the stay in ICUs, length of mechanical ventilation, and complications developed postoperatively.

**ROUTINE PROCEDURES IMPLEMENTED IN THE HOSPITAL FOR CARDIOVASCULAR SURGERY**

All surgical patients admitted to the hospital were examined by a cardiologist then cardiovascular on admission, and cardiologic intervention was decided to be performed. The patients were operated on elective or emergent conditions in collaboration with an anesthesiologist. All patients stayed in ICU for at least one day. Patients were hemodynamically stable, without bleeding, and those with normal blood gas values were separated from the mechanical ventilator as early as possible. Patients with normal hemodynamic parameters were transferred to clinics in consultation with ICU nurses, and ameliorated ones were routinely discharged from the hospital within five to eight days.

**DATA ANALYSIS**

Descriptive statistical methods of one way analysis of variance and Chi square tests were used in order to compare demographic data and measurement results of the patients in the SPSS packet program. The results were evaluated at a confidence interval of 95% and a significance level of p<0.05.

**ETHICAL PERMISSION**

Permission was obtained from the hospital administration. Anonymity of the patients and hospital were guaranteed. Approval by an ethics committee and informed consent from patients was not deemed necessary for this retrospective analysis.

**RESULTS**

The mean age rate for all patients was 59.83±12.03 (range 20–84) years in the retrospective cohort study. The cardiac surgical procedure was elective.
for 90.6% of the patients. Of the patients, about 64.2% were male, 67.9% were obese (BMI\(\geq 30\text{kg/m}^2\)), and 43.4% were active cigarette smokers in the preoperative period. Seven and a half percent had high creatinine values, 35.8% had low hemoglobin and 58.5% had low hematocrit levels (Table 1).

Patients admitted to the hospital for a cardiac problem were also frequently found to display hypertension (62.3%), diabetes (24.5%), chronic obstructive pulmonary disease (COPD) (28.3%) and cerebrovascular insufficiency (11.3%) (Table 1). About 46.6% of COPD patients had smoked before surgery.

Prior to surgery, 62.3% of the patients had coronary artery disease (CAD), 18.8% had a valvular problem, 5.6% had CAD with another pathology (CAD + mitral and tricuspid valve insufficiency, thrombus in left atrium), and 5.6% had a problem with a prosthetic valve (endocarditis and prosthetic valve thrombosis) (Figure 1).

Of the patients, 56.6% were exposed to CABG surgery, 13.2% to a complex surgical procedure (Of 6 patients, 2 had CABG with mitral valve replacement, 1 CABG with Bentall, 1 CABG with left ventricular aneurysmectomy, 1 CABG with carotis endarterectomy and patch plasty, 1 CABG with aortic valve replacement and aortic root enlargement.), 24.5% to a valvular replacement, 5.7% to surgery of ascending aorta (Figure 2). Patients with surgery of ascending aorta had the longest hospital stay (34 days) (p< 0.05).

Mean anesthesia time in these patients was 233.92\(\pm\)64.73 minutes, their mean time related to staying on pump was 89.19 \(\pm\) 38.57 minutes, and mean time for the surgical procedure was 202.26 \(\pm\) 63.87 minutes.

The mean length of hospital stay of all patients in this study group was 13.53\(\pm\)10.16 (median 10.0)
days. In the postoperative period, all the patients were transferred to ICU. Their stay in ICU was mean 2.87 ± 2.95 days (ranging from 1 to 19 days), and the patients in ICU required mean 18.25 ± 4.38 hours (range 10-35 hours) of mechanical ventilation support. After transferring to the ward, 8 patients (15.1%) were readmitted to ICU, and these patients stayed in ICU over mean 4.70±1.10 days (ranging between 1and 8 days) and were discharged after mean 20 days from the hospital (Table 1).

Patients with a chronic illness, such as diabetes, hypertension and COPD had longer ICU stay (mean rate, 4.64 ± 2.14 days) and were readmitted to ICU (p< 0.05). The rate of hospital stay in patients over 65 years old was 10 days or longer; however, the difference was found to be statistically insignificant.

The most common problems developing post-operatively in patients were atrial fibrillation (47.2%), ventricular insufficiency (32.1%), renal insufficiency (18.9%), ventricular arrhythmia (17%), pneumothorax (9.4%), cardiac tamponade (7.5%) and respiratory problems (5.7%) (Figure 3).

Patients were transferred back to ICU from the ward for monitoring after revision (25%), for anuria and hypotension (37.5%), ventricular tachycardia (12.5%), cerebrovascular attack (12.5%) and respiratory insufficiency (12.5%) (Figure 4).

**DISCUSSION**

Rapid treatment and care practices have begun being accepted as the gold standard, and patients have been discharged from the hospital within four to eight days after cardiovascular surgery in recent years. However, routine discharge procedures take place on 8th day following cardiac surgical procedures at private hospital. In this retrospective cohort study, of the 473 patients undergoing a cardiovascular surgery, 11.2% had a prolonged hospital stay with mean 13.53 ± 10.16 days. In similar studies, it has been reported that 5-37% of patients after the performance of a cardiac surgery have prolonged hospital stay beyond 7 days up to 14 days.4,14,15

There is a direct correlation between demographic and the preoperative clinical features of patients undergoing a cardiovascular surgery and the length of time for recovery in the postoperative period. In several previous researches, it has been emphasized that the preoperative presence of diabetes, advanced age, decreased left ventricular ejection fraction, cerebrovascular insufficiency, renal problems, COPD, and active cigarette smoking have an effect on the developments of various risks of postoperative complications, prolonged hospital stay and increased mortality rate.3,16-19 Our study finding is that patients had chronic illnesses such as cerebrovascular insufficiency, diabetes, hypertension and COPD, were also obese and active cigarette smoking.

In two different studies, Tamis and Steinberg,3 and Lazar et al.4 similarly reported that patients undergoing complex cardiac surgical procedures had longer hospital stay ranging from 13.2 to 21 days. In another study, patients undergoing valve replacement therapy had longer hospital stay than CABG patients.20 Similarly, in our study, patient were undergone a complex surgical procedures
(CABG with valvular surgery and additional procedure).

It is the standard procedure for patients undergoing cardiac surgical procedures to be transferred to ICUs postoperatively. However, Heimrath et al.5 stated that staying in ICU for more than 48 hours after CABG surgery plays a significant role in the possibility of the patients’ need to be readmitted to ICUs and in prolonging hospital stay. They also reported that mean length of hospital stay in these patients was 11 days (ranging from 7 to 18 days). Among the findings of the current study, it was determined that patients who had stayed more than 48 h in ICUs were experienced longer stays more than 9 days in the hospital. Bardell et al.8 also determined that the most frequent reasons why patients are readmitted to ICU are respiratory insufficiency, cardiac problems, such as cardiac arrest, arrhythmia, bleeding, hypotension, and sepsis. It was determined that the findings that 15.1% of the patients were readmitted to ICU were in parallel with those in the study performed by Bardell et al.8 Similarly, in our study, patients with a chronic illness, such as diabetes, hypertension and COPD had longer ICU stay (mean rate, 4.64 ± 2.14 days) and were readmitted to ICU (p< 0.05).

In the current study, the most complications developing postoperatively in patients were atrial fibrillation, ventricular insufficiency, respiratory problems, and renal insufficiency. In recent studies, the most common problems, such as atrial fibrillation, arrhythmia, respiratory insufficiency, renal insufficiency, prolonged mechanical ventilation, pneumonia, cerebrovascular attack, wound infection, sepsis, endocarditis, renal insufficiency, neurologic disorders, and myocardial infarction were determined to be influential in hospital staying of the patients for longer than seven days and in mortality rate in the postoperative period.2,3,12,14,21,22 In a study by Tamis and Steinberg3 with 216 CABG patients, the most common postoperative complication was atrial fibrillation, and only this complication caused hospital stay of the patients to become longer by 3.2 +/- 1.7 days, meaning average 9 days longer hospital stay. In researches in the literature related to the causes of complications developing in the postoperative period, attention has been focused on the roles played by the factors, such as advanced age, stroke, infection, and hemodynamic instability.3,10,12,18,19,23

CONCLUSION

The results of this study provide detailed information regarding demographic and clinical features of patients who had long hospital stay after cardiovascular surgery. The results can have a positive effect on early recognition of complications and initiation of treatment and care interventions without delay and shortening length of hospital stay.

REFERENCES


