ÖZGÜN ARAŞTIRMA ORIGINAL RESEARCH

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A NEW CENTER, ISPARTA CITY HOSPİTAL OPEN HEART SURGERY: RESULT OF FİRST 106 CASES

YENİ BİR MERKEZ, ISPARTA ŞEHİR HASTANESİ AÇIK KALP CERRAHİSİ: İLK 106 VAKA SONUÇLARI

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Öz

Amaç
Isparta Şehir Hastanesi, Kalp ve Damar Cerrahisi Kliniği'nde yapılan ilk 106 açık kalp ameliyatının sonuçları değerlendirildi.

Gereç ve Yöntem
Mayıs 2018- haziran 2019 tarihleri arasında açık kalp ameliyatı yapılan toplam 106 hastanın verileri retrospektif olarak değerlendirildi. Demografik verilere bakıldığında 32(30.2%) kadın, 74(69.8%) erkek hasta olup ortalama yaş 64 ± 10 saptandı. Toplam 5 (4.7%) hastaya kapak cerrehisi, 101 (95.3%) hastaya koroner arter baypas greftleme cerrahisi uygulanmış olup bunların 5 (5%) tanesi acil şartlarda operasyona alınmışlardır.

Bulgular
Postoperatif 5 (4.7%) hastada mortalite gözlenmiştir. Toplam 4 (3.8%) hasta revizyon cerrahisine alınmıştır. İki (1.9%) hasta kanama, 1 (0.9%) hasta ventriküler aritmi nedeni ile erken revizyona, 1 (0.9%) hasta sternal ayrılma nedeni ile 7. gün revizyona alınmıştır. Toplam 4 (3.8%) hastada postoperatif nörolojik komplikasyon gelişmiştir. Hastaların yoğun bakım ünitesi ve hastanede kalış süreleri de euroSCORE risk grupları, glomerrüler filtrasyon değeri düzeyleri, kronik obstriktif akciğer hastalığı ve diabetes mellitus varlığına göre tek tek değerlendirildi. Kronik obstriktif akciğer hastalığı varlığında yoğun bakım ünitesi ve hastanede kalış süreleri anlamlı olarak uzamakta diabetes mellitus varlığında değişmemektedir.

Sonuç
Şehir hastaneleri portföyü içerisinde yeni kurulan bir açık kalp merkezi olmamıza rağmen uygun mortalite, morbidite oranları ile yoğun bakım ünitesi ve hastanede kalış süreleri literatür ve açılan merkezlerinin ilk verileri incelendiğinde ilk 106 vakamızda başarılı olduğumuzu düşünmekteyiz.

Anahtar Kelimeler: Açık kalp cerrahisi, koroner arter baypas greftleme, yeni bir kalp merkezi

Abstract

Objective
First 106 open heart operation cases evaluated in Isparta City Hospital Cardiovascular Surgery Clinic.

Materials and Methods
One hundred and six open heart surgery patients from May 2018 to June 2019 were evaluated ret-

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rospectively. Thirty two (30.2%) were female and 74 (69.8%) were male with the mean age of 64±10. Totally 5 (4.7%) were valve replacement and 101 (95.3%) were coronary artery bypass grafting, and 5 (5%) of these operations were emergent cases.

Results
Overall mortality was 5(4.7%). Reoperation rate was 4 (3.8%); 2 (1.9%) of which were re-operated for haemorrhagia, 1 (0.9%) for ventricular arrhythmia and 1 (0.9%) for late sternal dehiscence after 1 week of the first operation. Neurologic complication was occur in 4 (3.8%) patient. Glomerular filtration rate, age, ejection fraction, euroSCOREs, intensive care unit follow up time and postoperative discharging days were evaluated. In the presence of chronic obstructive pulmonary disease, intensive care unit and hospital stay periods significantly increase but they remain normal in the presence of diabetes mellitus.

Conclusion
Although our heart center is a new onset center among the city hospitals, we think that our center has had a remarkable success in the first 106 patients in terms of the morbidity and mortality rates and intensive care unit and overall hospital stay periods in comparison with the published databases.

Keywords: Open heart surgery, coronary artery bypass graft, a new heart center.

Introduction

After a heart-lung machine used by Gibbon in 1953, the techniques that had been used for open heart surgery began to develop worldwide as well as in our country (1). In Turkey, Dr. Mehmet Tekdoğan performed the first open heart surgery in 1963 at Hacettepe University (2). Open heart surgeries and open heart surgery centers began to develop and increase in our country in a harmony with the development of open heart surgery worldwide. At present time, open heart surgeries are performed with acceptable mortality and morbidity rates in many hospitals of our country.

Isparta City Hospital, which is established with collaboration of Ministry of Health and private sector, is the second city hospital that has been founded as 'City Hospital' in Turkey. In our article, we aim to evaluate the results of the first 106 open heart surgery cases from May 2018 to June 2019 performed at Isparta City Hospital founded with the coordination of İstanbul Siyami Ersek Hospital. This study is the first study that evaluates the results of open heart surgical cases among all new onset city hospitals in Turkey.

Materials And Methods

One hundred and six patients' data that included open heart surgery between may 2018 and june 2019 was retrospectively evaluated. The study was started after obtaining the permission numbered 29.11.2019/317 from the local ethics committee of Isparta Süleyman Demirel University. The written consent form was obtained from all patients. Detailed medical history, physical examination and routine blood tests, echocardiogram, electrocardiogram, carotid doppler ultrasonography (CDU), chest radiograms and respiratory function tests were performed on all patients that were planned to have an open heart surgery. Internal medicine consultation was requested from patients who had a previous diagnosis of diabetes mellitus (DM) and patients who did not have a diagnosis of DM but whose fasting blood glucose was >126 mg/dl and the diagnosis of DM was confirmed. Patients who had previously received antihypertensive treatment and those who had >130/85 mm/Hg blood pressure during clinical follow-up were considered hypertensive (HT) patients. Patients on routine hemodialysis program were evaluated as chronic kidney failure. Further examination of stenosis was done on the patients that had 40% or more stenosis in CDU, with carotid computed tomography and angiogram if needed. All patients that had Chronic Pulmonary Obstructive Disease (COPD) were evaluated by a chest physician with pulmonary function test or by arterial blood gas examination and those who could not perform pulmonary function tests were evaluated with physical examination.

Median sternotomy was applied in all patients. Except in beating heart surgery, cardiopulmonary bypass was performed by using aortocaval cannulation technique in all patients. Cardiac arrest was achieved by using cold blood cardioplegia and topical hypothermia. Cardiac arrest maintained by using intermittent antegrade cold blood cardioplegia infusions. In patients that had low ejection fraction (EF), multi vessel disease (MVD) and poor ventricular function, continuous retrograde cold blood cardioplegia infusion was given in addition to antegrade intermittent cold blood cardioplegia. Left internal mammary artery (LIMA) was used in 98 patients. Only in 3 patients that needed emergent surgery, LIMA was not used for grafting. In 1 patient, LIMA was not used due to the older age and serious sternal osteoporosis. Saphenous vein graft was used

for grafting of other coronary arteries. Warm blood cardioplegia was given in all patients just before removing the cross-clamp. All proximal anastomosis were performed by using side clamp. All early postoperative patient follow ups were done in third degree cardiovascular surgery intensive care unit. After cardiac and hemodynamic stabilization, all patients were taken to the cardiovascular surgery service following the removal of all chest tubes, central venous lines and urinary catheters.

Statistical Analysis:
IBM SPSS 22.0 package program (IBM Corp., Armonk, NY, USA) was used for statistical analysis. The normal distribution of the quantitative data was analyzed through Kolmogorov-Smirnov and Shapiro-Wilk tests. Descriptive data were expressed as mean (standard deviation), median (min-max), number and frequency. Mann-Whitney U test was used for the comparison of the quantitative data of the 2 groups that did not present normal distribution. Fisher's Exact tests were used for the comparison of the qualitative data. The Kruskal-Wallis test was used to compare the quantitative data of the 3 groups with no normal distribution. If statistical significance had been obtained in Kruskal-Wallis test, Tamhane's test would have been used in post-hoc analyzes inorder to find the group causing the difference. Spearman correlation analysis was performed to identify the factors associated with recurrent disease. A two-tailed p-value <0.05 was considered as statistically significant.

Results

Open heart surgery was performed on 32 (30.2%) women and 74 (69.8%) male, totally 106 patients between may 2018 and june 2019. Postoperative mortality rate was 5 (4.7%). Three (3%) of these 5 cases (5%) were emergent surgical procedure for having hemodynamic instability. These 5 patients all died because of low cardiac output state caused by serious cardiac decompensation. Totally 4 (3.8%) patients were re-operated. Two of them (1.9%) were taken for haemorrhagia, 1 (0.9%) for ventricular arrhythmia in early postoperative period, and 1 (0.9%) for sternal dehiscence late on 7th postoperative day. Postoperative neurologic complication was seen in 4 (3.8%) patients and among these patients, 1 (0.9%) patient had carotid stenosis and after transient ischemic attack, no neurologic deficit remained. In the 2 (1.9%) of these 4 patients, hemiplegia was seen but all neurologic deficits recovered without causing any neurologic deficits. One (0.9%) patient developed permanent hemiplegia despite physiotherapy.

Glomerular filtration rates (GFR), age, EF, euroSCOREs, intensive care unit follow up days and postoperative discharging days were evaluated (Table 1).

Valve surgery was performed in 5 (4.7%) and coronary bypass surgery was performed in 101 (95.3) patients. Five (5%) of these were emergent surgical procedure. Valve type and coronary bypass vessels listed in Table 2.

DM was seen in 60 (56.6%), HT in 49 (46.2%) and COPD was seen in 52 (49.1%) patients and these comorbid factors were determined as the most common comorbidities among our patients. Distribution of the comorbidities was listed in Table 3.

All patients classified by using Ministry of Health Social Security Institution euroSCORE risk scoring form. According to this system; 43 patients were determined as low risk group (0-3 points), 44 of them were in moderate (4-6 points) and 19 of them were in high risk group (7 points and up). Two mortality (4.7%) in low risk, 2 mortality (4.5%) in moderate, and 1 mortality (5.3%) in high risk group patientswas seen (Table 4).

Table 1 Review Parameters

	Median (min – max)
Age (mean±SD)	64±10
EF	60 (25 – 65)
GFR	86 (36 - 108
Euro Score	4 (0 – 13)
ICU Stay Time	3 (1 – 22)
Day of Discharged	7 (4 – 62)

EF: Ejection Fraction GFR: Glomerular Filtration Rate ICU: Intensive Care Unit

Patients' intensive care unit and hospital stay days were examined according to their euroSCORE, GFR, COPD and DM presence. Patients that had COPD had longer hospital stays and intensive care unit follow ups. But hospital stay and intensive care unit follow up periods were not changed among diabetic patients (Table 5). There were no statistical correlation found between GFR and intensive care unit follow up days and hospital stay days (r/p: 0.045/0.649 and -0.111/0270). There was no statistical significance between euroSCORE risk groups and intensive care stay periods (p:0.963) but hospital stay days seemed to increase when euroSCORE risk group increased (p:0.018) (Table 6).

Table 2 Operations

Type of Operations	
	n (%)
CABG x 1	4 (3.8%)
CABG x 2	15 (14.2%)
CABG x 3	56 (52.8%)
CABG x 4	23 (21.7%)
CABG x 5	3 (2.8%)
AVR	3 (2.8%)
MVR	2 (1.9%)

CABG: Coronary Artery Bypass Graft AVR: Aortic Valve Replacement MVR: Mitral Valve Replacement

Table 3 Comorbidities

Comorbidities	
	n (%)
Diabetes Mellitus	60 (56.6%)
Hypertension	49 (46.2%)
Chronic Pulmonary Obstructive Disease	52 (49.1%)
Carotid Stenosis	15 (14.2%)
Parkinson's Disease	1 (0.9%)
Diabetic Food	1 (0.9%)
Chronic Renal Failure	1 (0.9%)
Hyperthyroidism	2 (1.9%)
Hypothyroidism	2 (1.9%)
Epilepsy	2 (1.9%)
Peripheral Artery Disease	2 (1.9%)

Table 4 Distribution of patients according to risk groups and mortality rates

		Euro Risk Group		
		Low Risk	**Modarate Risk**	**High Risk**
		n (%)	**n (%)**	**n (%)**
Exitus	**No**	41 (95.3%)	42 (95.5%)	18 (94.7%)
	Yes	2 (4.7%)	2 (4.5%)	1 (5.3%)

Table 5 Effect of DM and COPD on ICU stay and discharge time

		ICU Stay Time [Median (min – max)]	Day of Discharged [Median (min – max)]
Diabetes Mellitus	**No**	3 (2 – 21)	7 (5 – 62)
	Yes	2 (1 – 22)	7 (4 – 22)
	p-value	[a]0.118	[a]0.560
COPD	**No**	2 (1 – 5)	7 (4 – 62)
	Yes	3 (1 – 22)	8 (5 – 33)
	p-value	[a]0.034*	[a]0.027*

[a]Mann-Whitney U test. *p<0.05 ICU: Intensive Care Unit COPD:Chronic Obstructive Pulmonary Disease

Table 6 Effect of EuroSCORE risk group onICU stay and discharge periods

	EuroSCORE Risk Group			
	Low Risk	**Modarate Risk**	**High Risk**	
	[Median (min – max)]	**[Median (min – max)]**	**[Median (min – max)]**	**p-value**
ICU Stay Time	3 (1 – 9)	3 (2 – 21)	3 (1 – 22)	[a]0.963
Day of Discharged	7 (4 – 62)	8 (5 – 33)	7 (5 – 22)	[a]0.018*

[a]Kruskal Wallis test. *p<0.05 ICU: Intensive Care Unit

Discussion

In recent years cardiovascular diseases have become a leading cause of mortality among the midlife and older patients and 30% cause of all mortality causes worldwide (3). According to Turkish Statistic Institution (TUIK), cardiovascular diseases were the leading cause of mortality (40.4%) in Turkey (4). According to TEKHARF (Türk Erişkinlerinde Kalp Hastalığı ve Risk Faktörleri) study performed in our country, there were about 3-3.5 million coronary artery patients in Turkey (5). Along with its benefit to the economy of the country, performing open heart surgeries in cities where coronary patients lived was important with regard to early intervention and ease of access to operation facilities (6). For this reason many open heart performing centers began to emerge in Turkey.

Based on the evaluations that were made among new-onset open heart surgery centers; Demirtaş and colleagues (7) and Fındık and colleagues found that CABG was the most frequent operation that was performed in cardiovascular surgery clinics at the rates of 89.5% and 82.8% respectively (8) In our clinic, CABG is also the leading operation at the rate of 95.3%.

According to metaanalysis of 22 centers; Guida and colleagues found the mortality rate at 2.95% (9). Fındık and colleagues, Demirtaş and colleagues and Kocabeyoğlu and colleagues reported these mortality rates 3.6%, 3.2% and 6.2% respectively (7,8,10). We have 4.7% mortality rate with 5 patients in our clinic and when we exclude the emergent cases, our mortality rate decrease to 1.94% with 2 patients. Our mortality rate is in the range of overall mortality rates that were published in literature.

The mean EF was 60% in our 106 patients. Among these patients EF <40% was detected in 14 cases. According to the assessments of the new-onset clinics in Turkey that had reported their EF values, EF values in our clinic was detected higher (8,10). In the study of Kocabeyoğlu and colleagues among these centers, <40% EF was detected in 25 cases and a total of 195 cases were evaluated (10). In the meantime, in the study of Fındık and colleagues, <30% EF was found in 10 patients out of 500 patients (8). Even though our average EF value is high, the rates of patients with <40% EF are similar when evaluated over total cases.

We have mortality rate of 2 (4.7%) patients in low risk, 2 (4.5%) in moderate risk and 1 (5.3%) in high risk group. According to Kocabeyoğlu and colleagues, Demirtaş and colleagues, in high risk group, there was found 12.5% and 3.2% mortality rates respectively (7,10). There is a discordance of the rates between these publications and our study and we think that this discordance is due to the usage of different score systems and the inadequacy of the scoring system that is used by Social Security Institution.

Reoperations after open heart surgery are usually performed due to many complications including haemorrhagia, cardiac tamponade, malignant arrhythmias due to early graft occlusions and low cardiac output states. Haemorrhagia is the leading cause of the reoperations after open heart surgery with the rate of 80% (11). In our clinic, we have 4 reoperations, 2 (1.9%) for haemorrhagia, 1 (0.9%) for malignant arrhythmia and 1 (0.9%) for late sternal dehiscence after a week from the first operation, respectively. Among these patients, we have 1 (25%) mortality caused by low output state that was re-operated for haemorrhagia. The other re-operated 3 (%75) patients recovered uneventfully and discharged from hospital. According to Kaiser and colleagues postoperative reoperation rate is found to be 3.9% (12). Fındık and colleagues, Ateş and colleagues found mortality rates at 3% and 3.39% respectively (8,13). In our study, reoperation rate is in the range of recent studies with the rate of 3.8%.

Neurologic complications can be seen in CABG operations at rate of 3.1%. These complications increase the mortality rates as well as hospital stay periods and decrease the cost effectiveness (14). We have 4 (3.8%) neurologic complications in our clinic. Two of these patients (1.9%) that developed right hemiparesis stayed in intensive care unit 3 to 7 days and discharged without any sequel at 10th and 13th postoperative days, respectively. One patient (0.9%) that developed left hemiplegia stayed 4 days in intensive care unit and discharged from hospital at postoperative 64th day with hemiplegia sequel.

Fındık and colleagues reported 2.7±1.5 (2-27) days in intensive care unit, and 7.1±1.7 (4-28) days in hospital (8). Demirtaş and colleagues reported 3.4±1.7 days in intensive care unit and 7.2±3.7 days in hospital (7). And also according to Yasım and colleagues that reported from an evaluation of a new-onset center, overall intensive care unit stay was found 1.36±0.57 (1-4) and hospital stay was found 3±3 (1-22) days (13). In our study we found intensive care unit stay 3±3 (1-22) days and 8.44 ±2.54 days of hospital stay, correlated with the studies that had been reported before in literature.

Conclusion

Although our heart center is new onset among the city hospitals we think that our center has had a remarkable success in the first 106 patients in terms of morbidity and mortality rates and intensive care unit and overall hospital stay days in comparison with the published databases. We also think that the quantity and diversity of our cases will increase in future days.

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