

## Original Article

# Outcomes of coronary artery bypass surgery in syrian refugees

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**Abstract:** Background: In recent years, an increasing number of individuals have become refugees as a result of wars and domestic disturbance in their countries. The struggle for life of refugees under difficult conditions, increasing health problems, and insufficient Access to health services result in the loss of human lives. The aim of the present study was to present the outcomes of coronary artery bypass surgery in Syrian refugees. Methods: We performed emergency or elective bypass surgery to 53 Syrian refugees who ran away from civil war in Syria, between 2012 and 2014. The preoperative, intraoperative, and postoperative data of the patients were evaluated. Results: Of the patients, 18.9% sustained myocardial infarction, 34% had diabetes, 28.3% had COPD, and 52.8% were smokers. Two patients had emergency surgery and 51 patients had elective surgery. In the postoperative period, five patients (9.4%) were found to have atrial fibrillation. Cerebrovascular disease was observed at three patients (5.7%) in the postoperative period, and one patient had wound infection. A total of three patients (5.7%) died. Conclusion: The authors believe that under appropriate conditions, refugee patients should also receive therapy for chronic disorders in addition to emergency interventions.

**Keywords:** Cardiac surgery, syrian refugees, coronary bypass

## Introduction

The civil war that broke out in Syria in 2011 has gradually become widespread and turned into the most staggering humanitarian crisis of the 21<sup>st</sup> century. According to the data of United Nations (UN), 4-25 million people were displaced and 2-4 million people have become refugees [1]. The Syrians have migrated to the neighboring countries due to the civil war. The refugees have mostly settled in Turkey, Lebanon, Jordan, and Iraq [2]. There is no accurate data regarding the total number of Syrian refugees living in Turkey. According to the data of the Disaster and Emergency Presidency (DEMP), more than 500000 Syrian refugees were living in Turkey as of July 2013 [3].

Food, shelter, safety, and basic health services are the initial requirement of such a large popu-

lation. However, in the ensuing periods, the immigrants require medical therapy for diseases that necessitate follow-up, such as coronary artery disease.

The present study retrospectively evaluated the outcomes of coronary artery bypass surgery performed on Syrian refugees between 2012 and 2014. In the literature search, we were not able to find any data regarding the outcomes of coronary artery bypass surgery performed on Syrian refugees. In light of the literature data, we aimed to present the results of Syrian refugees who underwent coronary artery bypass surgery.

## Methods

We performed coronary artery bypass surgery to 53 Syrian refugees at Şanlıurfa Mehmet Akif

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**Table 1.** Demographic data and preoperative risk factors

Preoperative	n	Mean ± SD
Age (year)	53	58 ± 9.23
Gender (male)	41	77.35%
Gender (female)	12	22.65%
Diabetes mellitus	18	34.0%
Hypertension	14	26.4%
Prior myocardial infarction	10	18.9%
Emergency operations	2	3.8%
Elective operations	51	96.2%
Number of smokers	28	52.8%
Chronic obstructive pulmonary disease	15	28.3%
Ejection fraction	53	51.90 ± 8.45%
Body mass index (kg/m <sup>2</sup> )	53	27.16 ± 3.42

SD: Standard deviation.

**Table 2.** Intra operative data

Intraoperative	Mean ± SD
CPB duration (minutes)	113.00 ± 33.42
Cross-clamp duration (minutes)	68.45 ± 24.50
Graftcount	2.81 ± 0.73

SD: Standard deviation, CPB: Cardiopulmonary bypass.

İnan Training and Research Hospital between 2012 and 2014. The patients' charts were retrospectively reviewed. Ethics committee approval was obtained from Harran University Ethics Committee.

The preoperative risk factors of the patients, history for myocardial infarction, and demographic data were obtained. We applied preoperative ECG, echocardiography, bilateral carotid artery color Doppler USG, and respiratory function test to all of the patients. The numbers of bypass grafts used during the operation, total operation times, and cross clamp times were recorded. Finally, postoperative causes of mortality and morbidity were determined.

### *Surgical technique*

The sternum was opened with median sternotomy incision. The left internal mammary artery (LIMA) and saphenous vein graft (SVG) was harvested simultaneously. Following systemic heparinization, the LIMA was prepared and was kept in papaverine-soaked sponge until its use. The cardiopulmonary bypass was initiated with aortic and right atrial cannulations. Following a

period of cooling to 28-32°C, the aorta was cross-clamped and cardioplegic arrest was established with blood cardioplegia was repeated every 20 minutes. Distal anastomoses were performed during cardiac arrest. The aortic clamp was opened and the proximal anastomoses were performed under a partial aortic clamp. Following the warming period, the cardiopulmonary bypass was terminated and the chest was closed after completion of hemostasis.

### *Statistical analysis*

Minimum-maximum values and mean ± standard deviation were calculated using SPSS 15.0 software (SPSS, Chicago, LL, USA).

## Results

In this retrospective study, a total of 53 Syrian refugee patients (41 males and 12 females, mean age: 58 ± 9.23 years), who had coronary artery bypass surgery between 2012 and 2014 were included in this study. Of the patients, two (3.8%) had emergency surgery and 51 (96.2%) underwent elective surgery. In the preoperative period, ten cases (18.9%) sustained myocardial infarction.

Of the cases, 14 (26.4%) had concurrent hypertension and 18 (34.0%) had diabetes mellitus. Twenty-eight patients (52.8%) were smokers. The rate of COPD (chronic obstructive pulmonary disease) was 28.3% (n=15).

The mean BMI (Body Mass Index) was 27.16 ± 3.42. The mean preoperative left ventricular ejection fraction (LVEF) was 51.90 ± 8.45 (Table 1).

The mean cardiopulmonary bypass time was 113.00 ± 33.42 minutes. The mean cross clamp time was 68.45 ± 24.50 minutes. The mean number of bypass graft was 2.81 ± 0.73 (Table 2).

In the postoperative period, five patients (9.4%) developed atrial fibrillation. The mean volume of drainage was 1047 ± 598.76 ml at postoperative Day 1.

Cerebrovascular disease was observed in three (5.7%) of patients and one patient developed

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**Table 3.** Postoperative morbidity-mortality data

Postoperative	n	%
Atrialfibrillation	5	9.4
Stroke	3	5.7
Bleeding	1	1.8
Revisionalsurgery	1	1.8
Superficial wound site infection	1	1.8
Mortality	3	5.7

wound infection in the postoperative period (Table 3).

The mortality rate was 5.7% (n=3). Two patients died due to low cardiac output after the operation, and the other patient died at day 12 after the operation due to multiple organ failure.

### Discussion

In today's world, the problem of refugee situation affects many people in many continents and in many countries. Although the type of health problems experienced by the refugees changes from one country to another, access to water, nutrition, shelter, and health services continue to be the major requirements. The rates of mortality and morbidity increase significantly in the absence of basis requirements [4]. Emergency and elective surgical interventions are performed in the refugee camps around the world, when necessary [5].

In a study on Afghan refugees conducted in Iran, 103 refugee patients underwent kidney transplantation between 1998 and 2006. The authors stated that the outcomes were similar to those achieved for the citizens of Iran [6].

The refugees fleeing from the civil war in Syria are living in various refugee camps located in the neighboring countries such as Turkey, Iraq, Lebanon, Jordan, and Egypt [7].

Simple surgical interventions and resolving emergency health problems are initially effective; however, refugees particularly require more extensive surgical interventions in the later period due to chronic illnesses.

In this regard, coronary artery bypass surgery is an extensive intervention. The current literature search did not reveal any data regarding the outcomes of coronary artery bypass surgery

performed in Syrian refugee patients. The authors consider that the current study has significant contribution to the literature.

Smoking, obesity, lipid disorders, HT, DM, and family history are important risk factors for coronary artery disease. Cigarette smoking is known to be associated with a 2-to-3-fold higher risk of coronary artery disease. The risk of developing coronary artery disease is further increased by combination with other risk factors [8]. With regards to risk factors for coronary artery disease, smoking was the most commonly encountered risk factor with a rate of 52.8%.

In the literature, coronary artery disease was reported to be accompanied by COPD in 11 to 25.8% of the patients who underwent coronary artery bypass surgery [9]. The presence of COPD increases mortality and morbidity in patients undergoing coronary artery bypass surgery [10].

The rate of COPD was 28.3% in the present patient group, and this rate was considerably higher than that reported in the literature. The authors consider that this could be explained by higher rate of smokers in the present study.

Low BMI has been associated with high mortality in patients that underwent coronary artery bypass surgery [11]. The mean BMI of the patients was  $27.16 \pm 3.42$ , and this corresponded to the normal weighted BMI category.

The intraoperative mortality in coronary artery bypass surgery varies depending on the presence of diabetes. The rate of mortality is 4.6% in diabetic patients and 2.7% in non-diabetics [12]. Furthermore, the rate of cardiovascular death was reported to be 2-to-6-fold higher in patients with DM compared to non-diabetic population [8].

A significant proportion (34%) of the present patient group had comorbid DM. As another risk factor for coronary artery disease, the rate of HT was 26.4%.

The age of the patient significantly affects mortality in coronary artery bypass surgery. There are studies in the literature that reported a 0% mortality rate among patients aged below 40 years [13]. However, there are also studies that reported an operative mortality rate up to 8.9%

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in patients aged above 70 years [14]. Some other studies on special patient groups such as Jehovah's witnesses reported a mortality rate up to 14% [15]. The present patient group mostly consisted of elderly people, and the mean age was  $58 \pm 9.23$  years.

The rate of re-admission to the intensive care unit after initial discharge from the intensive care unit was reported to be 2.7% following open heart surgery. The mortality rate can be as high as 26% in this patient group. The primary reasons for re-admission to the intensive care unit include cardiovascular instability, respiratory problems, hemorrhage, and cardiac tamponade [16]. The rate of mortality can be as high as 61.5% if the patient is in cardiogenic shock prior to coronary artery bypass surgery [17]. The rate of mortality was 5.7% (n=3) in the current patient group. The first case of mortality was moved to the intensive care unit after the patient developed respiratory difficulty during the postoperative follow-up in the regular ward. However, this patient was lost due to multi-organ failure at day 12 postoperatively. This patient also had COPD and DM. The second case of mortality underwent an emergency operation, and the patient developed cardiogenic shock. This patient was lost in the early postoperative period due to low cardiac output. The other patient underwent revision surgery in the early postoperative period due to high volume of discharge. This patient was also lost due to low cardiac output one day after the operation.

Although the frequency of AF depends on the status of preoperative EF, the studies in the literature have reported a rate of 10-11% for AF after the operation [18]. The most common cause of morbidity was AF occurring in 9.4% of the patients in the postoperative period. The rate of postoperative AF observed in the present study was similar to that reported in the literature. The second most common complication in the present study was cerebrovascular disease that occurred in 5.7% of the patients.

One patient (1.8%) required revision surgery due to hemorrhage and another patient developed wound infection. The patient that underwent revision surgery was soon lost in the early postoperative period due to low cardiac output syndrome. The patient that developed wound infection recovered with debridement and antibiotherapy.

A study conducted in Turkey evaluated 1004 patients, who underwent coronary artery bypass surgery. The mean age was  $63.4 \pm 3.23$  years, and the rate of mortality was 4.58% [19]. The rate of mortality in coronary artery bypass surgery in various age groups was reported to range between 3.6% and 8.9% in studies from different locations around the world [14]. The mean age was  $58 \pm 9.23$  years in the present patient group, and the rate of mortality was 5.7%. According to these results, the authors consider that the current study achieved an acceptable mortality rate.

Coronary artery bypass surgery is currently performed in many countries throughout the world. In general, the rates of morbidity and mortality were parallel to those reported in the literature. However, the authors did not find any study in the literature that evaluated the outcomes of coronary artery bypass surgery performed on Syrian refugees. The authors consider that the current study contributes to the literature.

### Conclusion

In conclusion, we believe that despite the challenge condition, refugees should also receive all the necessary therapy for chronic heart diseases in addition to emergency interventions.

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### Disclosure of conflict of interest

None.

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