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Original Research

Patient body image, self-esteem, and cosmetic results of minimally invasive robotic cardiac surgery

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HIGHLIGHTS

- Cosmetic outcomes of robot-assisted vs. open cardiac surgery were evaluated.
- Body image, self-esteem, and patient-rated scar satisfaction were assessed.
- Robotic-assisted surgery yields better cosmetic outcomes and patient satisfaction.

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ABSTRACT

Background: Patient-reported outcome measures reveal the quality of surgical care from the patient's perspective. We aimed to compare body image, self-esteem, hospital anxiety and depression, and cosmetic outcomes by using validated tools between patients undergoing robot-assisted surgery and those undergoing conventional open surgery.
Materials and methods: This single-center, multidisciplinary, randomized, prospective study of 62 patients who underwent cardiac surgery was conducted at Hospital from May 2013 to January 2015. The patients were divided into two groups: the robotic group ($n = 33$) and the open group ($n = 29$). The study employed five different tools to assess body image, self-esteem, and overall patient-rated scar satisfaction.
Results: There were statistically significant differences between the groups in terms of self-esteem scores (**p = 0.038**), body image scores (**p = 0.026**), overall Observer Scar Assessment Scale (**p = 0.013**), and overall Patient Scar Assessment Scale (**p = 0.036**) scores in favor of the robotic group during the postoperative period. Robot-assisted surgery protected the patient's body image and self-esteem, while conventional open surgery decreased these levels but without causing pathologies. Preoperative depression and anxiety level was reduced by both robot-assisted surgery and conventional open surgery. The groups did not significantly differ on Patient Satisfaction Scores and depression/anxiety scores.
Conclusion: The results of this study clearly demonstrated that a minimally invasive approach using robotic-assisted surgery has advantages in terms of body image, self-esteem, and cosmetic outcomes over the conventional approach in patients undergoing cardiac surgery.

1. Introduction

Median sternotomy (MS) is the standard surgical approach for most cardiac operations, but minimally invasive techniques such as robot-assisted cardiac surgery have become increasingly common for the surgical treatment of many types of cardiac diseases over

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the last decade [1,2]. This is because minimally invasive cardiac surgery has many advantages over conventional open (CO) surgery, with no known detrimental effects. In addition, minimally invasive surgical techniques may provide better cosmetic outcomes because the scars left by full-length sternotomy may be a source of concern for some patients [3].

With the above in mind, the aim of this study was to assess the effects of robot-assisted surgery (RAS) on body image (self-satisfaction with appearance), self-esteem, hospital anxiety and depression (HAD), and cosmetic outcomes by using validated testing methods.

2. Patients and methods

A prospective, randomized, controlled, single-center study was performed between May 2013 and January 2015. Patients who underwent surgery using robotic techniques comprised the robotic group. Patients who underwent surgery using CO techniques comprised the open group. Whether patients underwent RAS or CO procedures depended on anatomical matching for RAS, such as thoracic adhesions, arterial-vein pathology for cannulation, thoracic deformities, obesity, and others. The estimated sample size and the time interval required to carry out the research were determined using a power analysis based on previous studies and the number of patients who had previously undergone operations by the surgical team performing the study [4]. The sample size for two groups was calculated based on a significance level of 0.05 and a power of 80%. Results of the power analysis showed that 28 cases in both groups were required. A total of 80 eligible cases were screened during the study period. Eight people refused to participate in the study. Two cases in the robotic group required conversion to open procedures, as they had thoracic adhesions. For that reason, these patients were excluded from the study. In eight cases, follow-up could not be accomplished during the postoperative period because communication could not be established with the patients. Finally, 62 patients were included in the study; the robotic group included 33 patients and the open group included 29 patients. The primary endpoints for this research were patient body image, self-esteem, and cosmetic results. The secondary endpoint was the depression and anxiety state. The patients were randomized before surgery by using a simple randomization technique. The allocation ratio was 1:1.

Written informed consent was obtained from all patients. This study was also performed according to the Good Clinical Practice Guidelines and the Declaration of Helsinki. The study design was based on the CONSORT guidelines and approved by the Ethical Committee of our hospital.

2.1. Operative techniques

Pre-, intra-, and post-operative transesophageal echocardiographic studies were performed in all patients. The wounds were closed using the same suturing materials in both groups (Vicryl 4.0, Doğsan, Inc.; Turkey). The skin was closed intradermally in all patients.

2.1.1. The open group

A conventional full sternotomy with limited skin incision was performed (Fig. 1). A midline skin incision was started just below the level of the angulus sterni and extended to just above the level of the xiphoid process. We employed aortic-bicaval cannulation and standard cardiopulmonary bypass with moderate hypothermia (32 °C) and cardioplegic arrest in all patients.

Fig. 1. Postoperative photograph of the scar at the 6-month follow-up in a patient who underwent an open procedure.

2.1.2. The robotic group

Under general anesthesia, each patient was positioned with the right chest elevated approximately 30° and with the right arm relaxed at the side. The first port (camera port) was placed in the fourth intercostal space on the anterior axillary line. This first port was also utilized for CO_2 insufflation. Two additional ports were created (one in the third and one in the fifth intercostal space) on the mid-axillary line for introducing the robotic arms. An additional port was placed anterior to the camera port in the fifth intercostal space on the midclavicular line for the fourth arm and atrial retractor (Intuitive Surgical, Inc., CA). A service port (2–3 cm) was placed in the fourth intercostal space on the posterior axillary line. This port was used for introducing sutures into the chest cavity and for aspirating blood. A transthoracic aortic Chitwood clamp (Fehling, Inc.) was introduced into the thorax through the third intercostal space in the mid-axillary line. The right common femoral artery and vein were exposed using an oblique groin incision. Cannulation was done through the right femoral artery with the right jugular vein and right femoral vein. After docking the robotic arms and opening the pericardium, cardiopulmonary bypass was initiated. Total cardiopulmonary bypass was established by clamping both venae cavae, using non-traumatic endoscopic