Clinical and Surgical Characteristics of Patients Undergoing Valve Replacement

Características Clínicas e Cirúrgicas de Pacientes Submetidos a Troca Valvar

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Abstract

Cardiovascular diseases have been the leading the causes of hospital admissions, being one of the main public health problems in Brazil, and one of the forms of treatment is cardiac surgery, being more prevalent in older people who have several other comorbidities associated. This study aimed to describe the clinical and surgical profile of patients undergoing valve replacement. Thus, an ambispective study was carried out with patients admitted to the Intensive Care Unit of Instituto Nobre de Cardiologia. An analysis was carried out in the patients' medical records in search of data related to their clinical and surgical profile. During the research period, 55 patients underwent valve replacement, 10 of which were excluded. Thus, 45 patients were evaluated, with 28 (62%) male participants with a mean age of 43 ± 6 years, hypertension and sedentary lifestyle were the most common comorbidities (49% and 56% respectively) and 60% with the Body Mass Index within the normal range. Regarding the surgical characteristics, the extracorporeal circulation time was 211 ± 22 minutes and the Mechanical Ventilation time was 6 ± 2 hours. Based on the findings, it can be characterized that patients undergoing cardiac valve replacement surgery are over 40 years old, male, sedentary, hypertensive.

Keywords: Thoracic Surgery. Artificial Breathing. Extracorporeal Circulation.

Resumo

As doenças cardiovasculares têm liderado as causas de internação hospitalar, sendo um dos principais problemas de saúde publica no Brasil, sendo que umas das formas de tratamento é a cirurgia cardíaca, sendo mais prevalente em pessoas com idade mais avançada, e que possuem várias outras comorbidades associadas. O presente estudo teve como objetivo descrever o perfil clínico e cirúrgico de pacientes submetidos à troca valvar. Para isso foi realizado um estudo ambispectivo com os pacientes internados na Unidade de Terapia Intensiva do Instituto Nobre de Cardiologia. Foi feita uma análise no prontuário dos pacientes na busca de dados relacionados ao seu perfil clinico e cirúrgico. Durante o período da pesquisa foram submetidos a troca valvar 55 pacientes sendo que 10 foram excluídos. Desse modo foram avaliados 45 pacientes, com 28 (62%) participantes do sexo masculino com idade média de 43 ± 6 anos, hipertensão e sedentarismo as comorbidades mais encontradas (49% e 56% respectivamente) e 60% com o Índice de Massa Corpórea dentro da normalidade. Em relação às características cirúrgicas o tempo da circulação extracorpórea 211 ± 22 minutos e o tempo de Ventilação Mecânica 6 ± 2 horas. Com base nos achados pode-se caracterizar que os pacientes submetidos à cirurgia cardíaca de troca de válvulas têm mais de 40 anos, do gênero masculino, sedentários, hipertensos.

Palavras-chaves: *Cirurgia Torácica. Respiração Artificial. Circulação Extracorpórea.*

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1 Introduction

One of the main public health problems in Brazil is related to cardiovascular diseases, leading to the causes of hospitalization and corresponding to 32.6% of deaths[1]. Cardiac surgery is a procedure performed when the probability of life is greater with surgical treatment than with clinical treatment[2].

It has significantly increased the life expectancy of the population over the years and an increase in several cardiovascular diseases is observed, specifically valve diseases, the prevalence of aortic stenosis increases with age and can be found in approximately 5% of the elderly. The treatment consists of correction, which is done by valve replacement surgery[3].

Valve replacement surgery is a standard procedure indicated for patients with valvular disease[4]. The identification of preoperative risk factors in valve replacement surgery aims to improve postoperative outcomes[5].

Taking into account the benefits of cardiac surgery, these patients may evolve with numerous postoperative complications, occurring due to surgical variables such as extracorporeal circulation (ECC), surgical trauma, general anesthesia and pleural drain position. Among these complications, pulmonary diseases such as atelectasis, pneumonia, pleural effusion and diaphragmatic dysfunction in the postoperative period are highlighted, due to decreased pulmonary volumes and capacities and decreased respiratory muscle strength[6].

The clinical profile of patients submitted to surgery

are of elderly individuals who present chronic diseases such as hypertension, diabetes, dyslipidemia, smokers and peripheral vascular diseases. Surgical treatment should be chosen after the analysis of clinical, functional, emotional and physiological factors of each patient, since with the presence of comorbidities the risk of cardiac surgery is further aggravated[7].

Therefore, it is necessary to know the profile of patients who are candidates for cardiac surgery, as well as the most common complications in the postoperative period. Also aiming at reducing the time and stay in the ICU and, consequently, the considerable decrease in costs and medications.

The objective of the present study is to describe the clinical and surgical profile of patients undergoing valve replacement.

2 Material and Methods

This is an ambispective study carried out in a cardiology referral hospital in a city in the interior of Bahia, from March 2019 to May 2019. The study was approved by the Research Ethics Committee of Faculdade Nobre de Feira de Santana – Bahia, Legal Opinion number 2.002.971. All participants signed a Free and Informed Consent Term.

2.1 Inclusion and Exclusion criteria

According to the inclusion criteria, patients aged 18 years or over were selected, both genders and submitted to heart valve replacement surgery with sternotomy and extracorporeal circulation. As exclusion criteria, patients with insufficient data on the medical records and associated surgeries.

2.2 Study protocol

The patients who fulfilled the inclusion criteria were evaluated through data collected in the medical records. The data were: age, gender, height, weight, extracorporeal circulation (ECC), mechanical ventilation (MV), surgery time, surgery character, drain number, systemic arterial hypertension (SAH), diabetes mellitus (DM), dyslipidemia (DLP), sedentary lifestyle and type of surgery. And, the body mass index (BMI) to be calculated, one must have the patient's weight (in kg) and height (in meters). The calculation uses the weight (kg) divided by the height (meter) squared, the formula used followed that of the general population. Surgical data were collected through the surgical chart.

2.3 Statistical analysis

The *Statistical Package for the Social Sciences* (SPSS) version 20.0 was used for analysis. The data were expressed as mean and standard deviation, absolute value and percentage.

3 Results and Discussion

During the study period, 55 patients were submitted to valve replacement, 10 of whom were excluded, 8 due to lack of data in the medical records and 2 due to associated surgery. Thus, 45 patients were evaluated, 28 (62%) male and mean age of 43 ± 6 years. The main comorbidity found was SAH with 22 (49%) patients and most of the patients were eutrophic 27 (60%). All values for clinical characteristics are expressed in Table 1.

Table 1 - Clinical data of the patients studied

Variables	n (%)
Gender Male Female	28 (62%) 17 (38%)
Age (years)	43 ± 6
Comorbidities Systemic Arterial Hypertension Diabetes Mellitus Dyslipidemia Sedentary lifestyle Smoking	22 (49%) 12 (27%) 8 (18%) 25 (56%) 5 (11%)
Body Mass Index Eutrophic Overweight Obesity	27 (60%) 9 (30%) 9 (30%)

Source: The authors.

Regarding surgical characteristics, the mean ECC time was 55 ± 11 minutes and VM 6 ± 2 hours. Table 2 shows the other values.

Table 2 - Surgical data of the patients studied

Variable	Mean and standard deviation
Number of drains	1.7 ± 0.4
Surgery time (minutes)	211 ± 22
ECC time (minutes)	55 ± 11
MV time (hours)	6 ± 2

ECC - extracorporeal circulation; MV - Mechanical ventilation.
Source: The authors.

In this study, it was aimed to describe the clinical and surgical characteristics of patients undergoing cardiac valve replacement surgery in a referral hospital in Feira de Santana, BA. A predominance of male patients (62%) and older than 40 years, submitted to heart valve replacement and hypertensive surgery, was observed.

Systemic arterial hypertension, smoking and sedentary lifestyle are associated with predisposition of cardiovascular diseases. In the study by Cani et al.[9] there was also a predominance of male gender in patients submitted to cardiac surgery of myocardial revascularization . In contrast, in the study by Moraes et al.[10] , the predominance was female, and all of these patients had valvular disease of rheumatic origin. Cardiac surgery is more common in men, because cardiovascular diseases affect more men than women, although in the last 10 years, the severity of cardiovascular diseases has increased dramatically in the female population, due to the habits and lifestyle adopted by women, they are smoking more, consuming more animal fat, accumulating a double or triple work period, among other factors.

Regarding the MV time, in the present study, an average

of 6 hours was verified, this shows that the age factor has a correlation directly proportional to the MV time, since this datum was lower than that found in the study by Cordeiro et al.[11] where the mean was 8 hours, and this would be justified by the fact that the individuals were older than 75 years, with reduced ventilatory capacity. Whereas in the study herein, the individuals had an average age of 40 years. The shorter the patient stays in MV, the better the prognosis, because MV causes worsening of pulmonary capacity and reduces muscle strength.

ECC time observed was an average of 55 minutes, being lower than the study by Torratti et al.[12] who presented an average of 85 minutes, being justified by the fact that the individuals have other comorbidities. The shorter the ECC time the less the chances of complications will be, considering that ECC is the cause of postoperative pulmonary alterations. With the use of this circulation there is an inflammatory response contributing to the onset of pulmonary disorders and inflammatory process.

The presence of comorbidities further aggravates the risks and prognosis of cardiac surgery. In this study, all patients presented some type of comorbidity, being SAH the most prevalent and compared with the study by Dordetto et al.[13] it was observed that the same also presented a prevalence of SAH. Systemic arterial hypertension is a chronic disease characterized by high blood pressure levels in the arteries, this high pressure causes the heart to exercise a greater effort than normal to distribute blood to the whole body, being SAH of the main risk factors for heart failure.

In the present study, the individuals were eutrophic. The normality of this sample is justified by the low level of diabetes mellitus and dyslipidemia, being such comorbidities associated with overweight and obesity. Whereas in the study by Bastos et al.[14] a high body mass index was evidenced, indicating overweight and obesity, being justified by being a sample composed of elderly individuals with a mean age of 80 years, and with several comorbidities associated with them, DM, DLP, sedentary lifestyle among others. In the study by Costa et al.[15] it was examined that a high BMI in the preoperative period of myocardial revascularization or valve replacement can be considered a risk predictor for surgical reintervention.

The study by Silveira et al.[16] obtained an average of 180 minutes, being CRM the most prevalent, the difference in surgery time may be due to several factors, such as the type of surgery. In this study, the mean time was higher than that of the study mentioned above, where the mean time was 211 minutes. Taking into account that the shorter the time of surgery the shorter the ECC time will be, and consequently the shorter the time the patient will need ventilatory support. As stated above, the shorter the ECC time and the MV time, the better the prognosis of the patient.

Soares et al.[17] in a study with 211 patients, 39 of whom underwent heart valve replacement surgery, demonstrated the prevalence of major postoperative complications in cardiac surgery. In the above-mentioned study, the most frequent complications were pulmonary complications, related to the need for tracheal intubation and mechanical ventilation for more than 48 hours after surgery. Since the use of mechanical ventilation is associated with higher morbidity and mortality, in addition to increased ICU stay. The study by Cordeiro et al.[18] has shown that prolonged MV time has a negative impact on peripheral muscle strength in patients submitted to cardiac surgery, which is necessary, due to the action of sedative drugs depressing the respiratory center, however, the presence of the ventilatory prosthesis causes worsening of pulmonary capacity and reduction of muscle strength.

In a study carried out by Valle et al.[19] morbidity and mortality were assessed in patients over 75 years of aortic valve stenosis surgery, and in the study it was concluded that aortic valve surgery is related to morbidity and mortality in older patients a little higher than in younger patients, and that one of the causes is that older patients usually have other associated diseases, therefore, the patients' age and clinical conditions influence in the postoperative period.

In this study, most patients were sedentary. The study by Carlucci et al.[20] showed that sedentary individuals have twice the risk of having an infarction when compared to active individuals. As technology advances, modern society is increasingly exposed to comfort and self-indulgency, which leads people to a sedentary life, a habit that is considered an important risk factor for the development of cardiovascular diseases.

Several complications may occur in patients submitted to cardiac surgery using extracorporeal circulation (ECC), highlights Dienstmann et al.[21] may be related to anesthetic handling, surgery or ECC itself. The most frequent complications are bleeding, low cardiac output, respiratory dysfunctions, renal dysfunctions, neurological alterations and infections, the latter being observed in the postoperative period, and, according to Machado et al.[22] the inflammatory process developed by ECC may compromise the pre-operative evolution.

This study presents as limitations the fact it was performed through analysis of medical records, with a small sample of 45 patients and limited in time. The research could be done with contact with patients, such as interviews, questionnaires and others, with a longer period of time, the sample would also be larger.

4 Conclusion

Based on the findings, it can be characterized that the patients studied at the referral hospital in Feira de Santana are over 40 years old, male, sedentary, hypertensive, and submitted to heart valve replacement surgery.

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