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Original article

QUALITY OF LIFE ASPECTS FOR PATIENTS WITH SURGICALLY CORRECTED VALVULOPATHIES AFTER CARDIAC REHABILITATION

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Abstract

Aim. In the preamble to the Constitution of the World Health Organization (1946), health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". The concept of quality of life is confused with the concept of health, but the term health is not sufficient to explain quality of life.

The aim of this study was to evaluate the quality of life of selected patients with surgically corrected valvulopathies after the cardiac rehabilitation program by applying the proposed QLHR-Q10, a questionnaire that measures the quality of life after the cardiac rehabilitation program, by examining and analyzing the answers, which the subject can give on a Likert scale.

Methods. Medical rehabilitation is defined as the totality of methods and means applied after a period of inactivity for the purpose of acquiring and reacquiring the functions pursued in the rehabilitation program.

Cardiac rehabilitation has come a long way since Wenger (1986) proposed the first cardiac rehabilitation program that recommended early mobilization and had as its main objective the transition from the supine position to the sitting position followed by corridor walking for cardiac surgery patients. At the moment, although worldwide there is a huge demand for cardiac rehabilitation programs, it has not been possible to optimize and standardize the current cardiac rehabilitation programs.

Irtelli & Durbano (2020) stated that "the most common method of measuring quality of life is the administration of questionnaires and, furthermore, that there are two types of questionnaires: generic and pathology-specific". The World Health Organization (2013) developed a cross-culturally applicable quality of life assessment resulting in the WHOQOL questionnaires, a quality-of-life assessment tool developed by the WHOQOL Group.

Results. In this study we present, analyze and interpret the data obtained from the responses of patients with surgically corrected valvulopathies to the questions of the proposed QLHR-Q10 questionnaire and the SQ100 control question questionnaire in the final assessment before discharge.

Conclusions. Although there are few studies addressing the cardiac rehabilitation of patients with surgically corrected valvulopathies, the current study highlights that following the application of cardiac rehabilitation programs and the statistical analysis of the QLHR-Q10 questionnaire, it was observed that the quality of life of the patients improved.

Keywords: valvulopathies, cardiac rehabilitation, questionnaire, quality of life.

Introduction

In the preamble to the Constitution of the World Health Organization (1946), health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

People define the concept of health differently. The athlete defines it in terms of regular physical training, the younger generation in terms of diet and the opportunity to hike outdoors, the doctor in terms of the absence of illness and the elderly in terms of maintaining personal mobility.

These perceptions of the concept of health are incomplete in the view of specialists. Related to the state of health, the concept of health represents an extremely complex branch, being analyzed from a biological, social, psychological and cultural point of view.

The concept of health is defined as "balance between a person and the environment, the unity of soul and body and the nature of the origin of disease, it was the backbone of the perception of health in ancient Greece" (Svalastog, Donev, Kristoffersen & Gajović, 2017).

Modern concepts of health define the state of health as more an individual's maximum capacity for self-realization and self-fulfillment than the absence of disease itself. This definition promoted for the first time that, in addition to physical and mental health, social well-being is an integral component of general health, because health is closely related to the social environment and living and working conditions.

According to Ethgen and Reginster (2002) the concept of health "has thus moved closer to a so-called bio-psycho-social model", a model conceived by Engel (1977), which states that "in order to understand a person's medical condition, not only biological factors but also psychological and social factors must be taken into account". The World Health

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Organization (1980) adopted the bio-psycho-social model as the basis for the International Classification of Functioning Disability and Health.

Valvulopathies are among the most common cardiovascular diseases, representing isolated pathological valvular conditions, which lead to dysfunction and changes in the structure of the valvular apparatus. Within cardiovascular diseases, valvular heart disease (valvulopathy) is a congenital defect or damage to one or more heart valves: mitral, aortic, tricuspid and pulmonary.

Increasing the level of comfort of the contemporary man in this modern society is today faced with a paradox: the high level of current comfort, combined with a growing lack of physical activity, is the main source in the appearance of many cardiovascular diseases, of which the most frequent are strokes and coronary heart disease.

According to Cieza et al. (2021) "the Global Burden of Disease study is the first study to produce global, regional and national estimates of the need for rehabilitation services and to show that at least one in three people worldwide require rehabilitation at some point in the course of their illness".

Medical rehabilitation is defined as the totality of methods and means applied after a period of inactivity for the purpose of acquiring and reacquiring the functions pursued in the rehabilitation program. Cardiac rehabilitation has come a long way since Wenger (1986) proposed the first cardiac rehabilitation program recommending early mobilization, supine to sitting, and then corridor walking of cardiac surgery patients. At the moment, although worldwide there is a huge demand for cardiac rehabilitation programs, it has not been possible to optimize and standardize the current cardiac rehabilitation programs. In the framework of medical rehabilitation, the methodical procedures are adapted to various objectives, respecting the principle of progressivity.

Medical rehabilitation helps a person to be as independent as possible in everyday activities, thereby enabling participation in education, work, recreation and meaningful participation in family care.

In conclusion, the result of the concept of recovery are the rehabilitation programs that aim to limit the psychological and physiological effects of the condition, manage the symptoms, stabilize or regress the disease, improve the vocational and psychosocial status and increase the quality of life.

Over the years, cardiac rehabilitation programs have become an important component in a broad multidisciplinary and multi-layered framework, offering a holistic and integrative approach to the patient with cardiovascular conditions.

Definition of the concept of quality of life

The concept of quality of life is confused with the concept of health, but the term health is not sufficient to explain quality of life, so in recent years two classes of complementary measures of health have emerged: objective measures of functional health and subjective measures of health and well-being. The concept of quality of life was first defined in the social sciences, in the 70s, and has been integrated as a criterion for evaluating health and medical interventions starting from the 80s.

According to the World Health Organization (2013), quality of life is "the individual's perception of his position in life in the context of the culture and value systems in which he lives and in relation to his goals, expectations, standards and concerns"; in its documents the organization emphasizes that it manages and maintains a wide range of data collections related to global health and well-being, as mandated by our member states.

According to Irtelli & Durbano (2020), this type of definition shifts the focus from objectively definable functionality to the dimension of subjectivity; the detection of both these two aspects can be a reliable measure of the quality of life.

In recent decades, "numerous tools have been developed and applied to measure the effects of health-related quality of life in patients based on biological or physical aspects, psychological or mental aspects, and social aspects" (Canelo et al., 2021).

Irtelli & Durbano (2020) stated that "the most common method of measuring quality of life is the administration of questionnaires and, furthermore, that there are two types of questionnaires: generic and pathology-specific".

The World Health Organization's (2013) initiative "to develop a quality of life assessment therefore stems both from the need for a truly international measure of quality of life and from its reaffirmed commitment to the continued promotion of a holistic approach to health and health care".

The World Health Organization (2013) developed a cross-culturally applicable quality of life assessment resulting in the WHOQOL questionnaires, a quality of life assessment tool developed by the WHOQOL Group.

Why we measure quality of life

"In clinical or epidemiological investigation, quality of life measures makes it possible to report or compare the effects on daily life of a treatment or public health action in terms of quality of life" (Ethgen & Reginster, 2002).

Certain medical studies are useful to clinicians, but quality of life measures take into account patient preferences and make it possible to report or compare the effects of a medical treatment on quality of life with that of patients' daily lives, indicating their preference for the measures of their physical function or well-being; good clinical decisions are also based on subjective measures of the effect of care actions, thus the assessment of quality of life offers the possibility of improvement and their better application.

Methods

This study aims to evaluate the quality of life of selected patients with surgically corrected valvulopathies after the cardiac rehabilitation program.

The purpose of this study is to collect, analyze and present the results of the questionnaires of the 10 subjects who were included in the study based on the formulated criteria: patients with valvulopathies surgically corrected by minimally invasive techniques (aortic stenosis or mitral insufficiency), with good general condition and age between 55 - 65 years.

The working hypothesis of this study was that the application of a cardiac rehabilitation program leads to an increase in exercise capacity and quality of life in patients with valvulopathies surgically corrected by minimally invasive techniques.

In the medical rehabilitation through kinetic means of surgically corrected valvulopathies, physical exercise represents the motor action designed and programmed to achieve the objectives of cardiac recovery programs, such as re-education of motor skills and abilities or the development of muscle tonicity and trophicity.

The medical rehabilitation program included the trinomial: pulmonary rehabilitation protocol, cardiac rehabilitation protocol and musculoskeletal rehabilitation protocol.

In this study, we applied the proposed QLHR-Q10 questionnaire, a questionnaire that measures the quality of life after the cardiac rehabilitation program, by examining and analyzing the answers that the subject can give on a Likert scale, and the control question questionnaire SQ100.

The QLHR-Q10 questionnaire includes a selection of questions, 10 in number, grouped into four areas of interest:

1. Health perceptions;
2. Physical health;
3. Daily activities;
4. Lifestyle.

The questions in the QLHR-Q10 questionnaire refer to how important various aspects of the patient's life are after the surgical correction of valvulopathies and the completion of the medical rehabilitation program in the hospital.

Results

In this chapter we present, analyze and interpret the data obtained from the responses of patients with surgically corrected valvulopathies to the questions of the proposed QLHR-Q10 questionnaire and the SQ100 control question questionnaire in the final assessment before discharge.

Analysis of data from the QLHR-Q10 Questionnaire

Table 1. Descriptive statistics

	Average	Median	Standard deviation	Min	Max	Skewness	Std. error skewness	Kurtosis	Std. error kurtosis	Shapiro-Wilk W	Shapiro-Wilk p
Perc_Calitate	3.2	3	0.632	2	4	-0.132	0.687	0.179	1.33	0.794	0.012
Perc_Sănătate	2.9	3	0.738	2	4	0.166	0.687	-0.734	1.33	0.833	0.036
Sănătate_Mers	3.7	4	0.483	3	4	-1.04	0.687	-1.22	1.33	0.594	<.001
Sănătate_Urcat	3.6	4	0.516	3	4	-0.484	0.687	-2.28	1.33	0.64	<.001
Sănătate_Durere	2.9	3	0.738	2	4	0.166	0.687	-0734	1.33	0.833	0.036
AF_Energie	3.5	3.5	0.527	3	4	0	0.687	-2.57	1.33	0.655	<.001
AF_ActivZ	3.7	4	0.675	3	5	0.434	0.687	-0,283	1.33	0.802	0.015
AF_Somn	3.6	3.5	0.699	3	5	0.78	0.687	-0.146	1.33	0.781	0.008
Stil_ExFiz	3.7	4	0.823	2	5	-0.806	0.687	1.24	1.33	0.841	0.045
Stil_Cardio	4.6	5	0.516	4	5	-0.484	0.687	-2.28	1.33	0.64	<.001
QLHR-Q10	73.6	74	5.15	64	80	-0.898	0.687	0.108	1.33	0.901	0.227
SQ100	70.5	70	5.5	60	80	-0238	0.687	0.907	1.33	0.92	0.359
Age	60.7	62	4.32	55	65	-0.23	0.687	-2.16	1.33	0.807	0.018

The analysis of the data series contains as a first step the descriptive statistics from Table 1 where all our variables are discrete and measured on a Likert interval scale, with values between 1 and 5, so we can analyze the mean.

The analyzed values from Table 1 are:

1. Average/Median showing the central tendency of each individual series;
2. The standard deviation denotes the degree of dispersion of the data. In general, it compares with values of central tendency. In the case of our variables, it is reasonable;
3. The standard error of Skewness (0.687) is small and the standard error of Kurtosis (1.33) exceeds the value of 1, so the kurtosis is too high for certain variables (Sanatate_Urcat, AF_Energie, Style_Cardio);

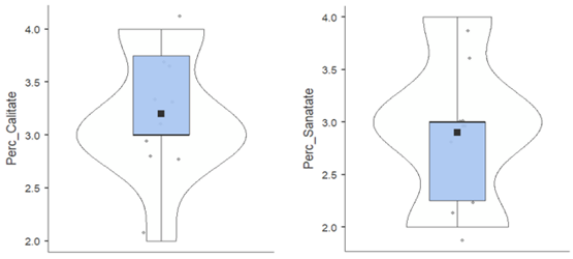
4. Kurtosis values evaluate the sharpness of the graph. Values in the range [-1.96; 1.96] denotes a graph that closely approximates the Gaussian curve of the normal. Very sharp curves are observed for Sanatate_Urcat, AF_Energie, Stil_Cardio, age because the patients' ages are advanced, included in the interval [55, 65];
5. Skewness values evaluate the shift of the graph to the left or right from the normal values. Values in the range [-1.96; 1.96] denotes a graph that closely approximates the Gaussian curve of the normal. All of our variable values fall within this range;
6. Min and Max – represent the minimum and maximum values respectively contained in our data series;
7. Range – represents the difference between the maximum values and the minimum values.

Health Perceptions

Health perception consists of 2 variables Percep_Calitate (Question: How would you rate the quality of your life?) and Percep_Sanatate (Question: How do you feel about your health?). The average for the perception of the quality of life Percep_Calitate is 3.2, with a small standard deviation (SD) of 0.63 and tends to take values towards 4, so we could say that patients are rather satisfied.

In Figure 1a we notice that the area of the graph is larger in the upper part. The mean on the perception of personal health Percep_Sănatate is 2.9 with a small SD of 0.73 and tends to take values towards 2, so we could say that patients are rather dissatisfied (table 1). In Figure 1b we notice that the area of the graph is larger in the lower part. Shapiro-Wilk p=0.012 and p=0.036 (table 1) denotes that the variables are normally distributed. The Shapiro-Wilk test statistic (Calc W) is basically a measure of how well the ordered and standardized sample quantiles match the standard quantiles.

In our case Percep_Calitate W=0.789 and Percep_Sanatate W=0.833 *demonstrate a strong fit, so the normality test is valid*.



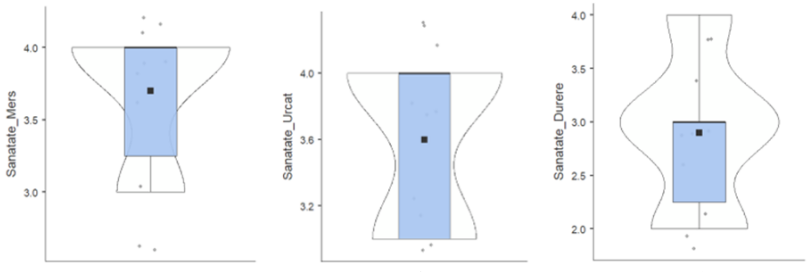
a) b)

Figure 1. Health Perceptions

Physical health

Physical health consists of 3 variables Sănătate_Mers (Question: How do you feel after 5 minutes of easy walking?), Sănătate_Urcat (Question: How do you feel after climbing a floor?) and Sănătate_Durere (Question: To what extent do you feel that physical pain prevents you from doing what you need to do on a daily basis?). The average for the sensations after 5 min of light walking Sănătate_Mers is 3.7 with a small SD of 0.48 and tends to take values towards 4, so we could say that patients feel rather good after walking. In Figure 2a we notice that the area of the graph is larger in the upper part. The mean of sensations after climbing a floor Sănătate_Urcat is 3.6 with a small SD of 0.51 and tends to take values between 3 and 4, so we could say that patients feel rather good after climbing a floor. Figure 2b represents patients' opinions on this matter. The mean of physical pain that prevents patients from carrying out daily activities Sănătate_Durere is 2.9 with a low SD of 0.73 and tends to take small values, towards 2, so we could say that patients do not feel comfortable in carrying out various physical activities daily (table 1). In Figure 2c we notice that the area of the graph is larger in the lower part. Shapiro-Wilk p<0.01 and p=0.036 denotes that the variables are normally distributed.

The Shapiro-Wilk test statistic Sănătate_Urcat W=0.594, Sănătate_Urcat W=0.64 and Sănătate_Durere W=0.833 *demonstrate a strong fit, so the normality test is valid*.



a) b) c)

Figure 2. Physical health

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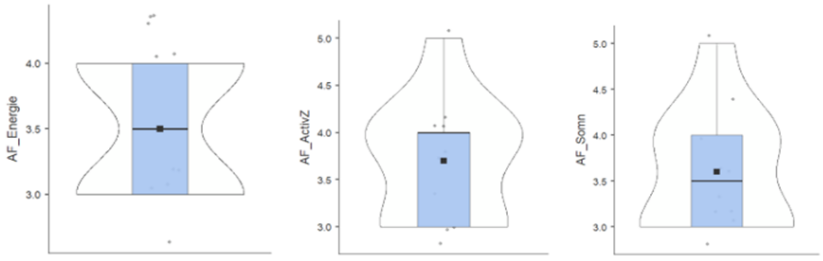
Daily activities

Daily activities are assessed by 3 variables AF_Energie (Question: Do you have enough energy for your daily life?), AF_ActivZ (Question: How satisfied are you with your ability to carry out your daily activities?) and AF_Somn (Question: How well do you sleep?). AF_Energie averages 3.5 with a small SD of 0.52 and tends to take values between 3 and 4, so we could say that patients have energy for daily activities. In Figure 3a we notice that the surface of the graph extends between 3 and 4. The average AF_ActivZ is 3.7 with a small SD of 0.67 and tends to take values between 3 and 5, so we could say that patients feel rather well in their daily activities. In Figure 3b we notice that the area of the graph is larger in the lower part. The average regarding AF_Somn is 3.6 with a small SD of 0.69 and tends to take small values, towards 3, so we could say that the patients sleep soundly (table 1). In Figure 3c we notice that the area of the graph is larger in the lower part.

Shapiro-Wilk p=0.015, p=0.008 and p=0.045 (table 1) denotes that the variables are normally distributed. The Shapiro-Wilk test statistic AF_Energie W=0.65, AF_ActivZ W=0.802 and AF_Somn W=0.781 *demonstrate a strong fit, so the normality test is valid*.



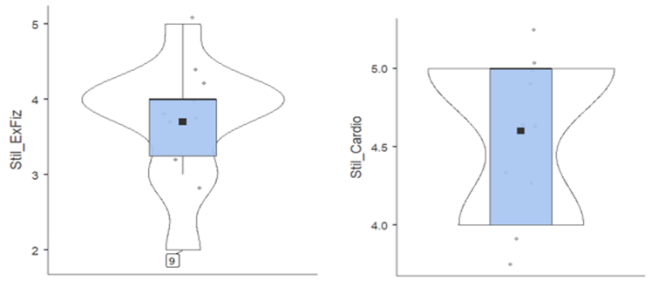
a) b) c)

Figure 3. Daily activities

Lifestyle

Lifestyle is assessed by 2 variables Stil_ExFiz (Question: How much time do you spend exercising per day?) and Stil_Cardio (Question: How important is it to continue the cardiac rehabilitation program at home?). The Stil_ExFiz daily exercise time average is 3.7, with a small SD of 0.82 and tends to take values towards 4, so we could say that patients exercise daily. In Figure 4a we notice that the surface of the graph is condensed between 3 and 4, with extensions towards 2 and 5. The average regarding the continuation of the medical rehabilitation program is 4.6 with a small SD of 0.51 and tends to take values towards 5, so we could say that patients pay attention to the continuation of the program of medical rehabilitation. In Figure 4b we notice that the area of the graph is larger in the lower part, between values 4 and 5.

Shapiro-Wilk p=0.045 and p=0.000 (table 1) denotes that the variables are normally distributed. The Shapiro-Wilk test statistic (Calc W) is basically a measure of how well the ordered and standardized sample quantiles match the standard quantiles. The statistic will take a value between 0 and 1, with 1 being a perfect match. In our case Stil_ExFiz W=0.84 and Stil_Cardio W=0.64 *demonstrate a strong fit, so the normality test is valid*.



a) b)

Figure 4. Lifestyle

SQ100 Total Score - Control Question

To the question "Evaluate, on a scale from 0 to 100, the quality of your life at present" an average of 70.5 was obtained with SD=5.5, so patients consider that they lead a normal life if we relate the 70 points to the maximum of 100. Shapiro -Wilk p=0.018, W=0.807 (table 1) denotes that the *variables are normally distributed*.

In Figure 5 we note that most patients gave answers in the 60-80 range.

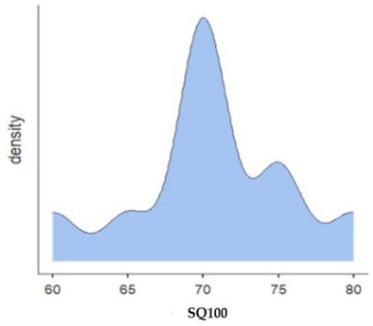
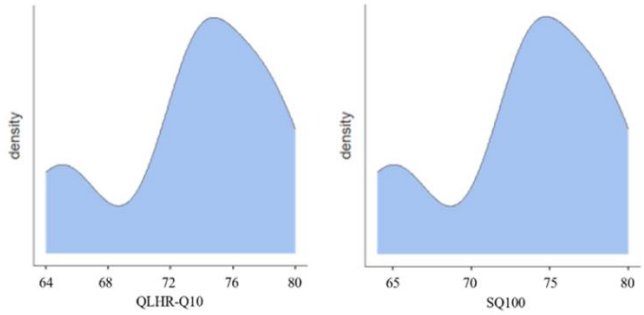


Figure 5. SQ100 Total Score - Control Question

QLHR-Q10 total score versus SQ100 total

The total QLHR-Q10 score of the 10 questions has a mean of 73.6 with a small SD of 5.15, and for the SQ100 the mean is 70.5 with a small SD of 5.5 (table 1). In Figure 6a and 6b we see an identical curve, where more than half of the patients have a good opinion about their quality of life, scoring between 70-80 and 72-80, respectively. Shapiro-Wilk p=0.227, W=0.901 (table 1) denotes that the *variables are normally distributed*.



a) b)

Figure 6. QLHR-Q10 total score versus SQ100 total

If we analyze the difference between the means of QLHR-Q10 (73.6) and SQ100 (70.5) we notice that it is small (3.10) and statistically insignificant because p=0.224. So, there is coherence/consistency between the total score on the QLHR-Q10 test and the final question SQ100 (table 2 and figure 7).

T-test for paired variables

Table 2. Paired Samples T-Test

			statistic	df	p	Mean difference	SE difference		Effect Size
QLHR-Q10	SQ100	Student's t	1.31	9.00	0.224	3.10	2.373	Cohen's d	0.413

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} \neq 0$

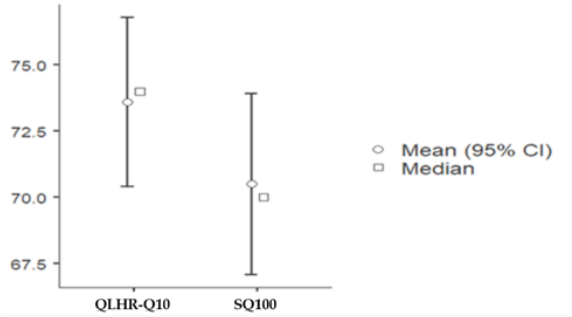


Figure 7. Difference between QLHR-Q10 and SQ100 averages

Future directions

The methods and clinical data that inform the cardiac rehabilitation of patients with surgically corrected valvulopathies will continue to evolve. We intend to continue, update and analyze studies on the quality of life of patients with surgically corrected valvulopathies after cardiac rehabilitation.

Conclusion

The concept of quality of life is the consideration, formalization and quantification of the perception of health by patients with surgically corrected valvulopathies after cardiac rehabilitation. The evaluation and use of the quality of life concept facilitates the optimization of treatment choices by taking into account individual needs and makes it possible to use the economic evaluations needed today to improve the management of health systems.

The research also verified the existence of significant links between the quality of life felt by the patients at the time of discharge and the results recorded in the case of the different functional parameters of the investigated body.

If we analyze the difference between the means of QLHR-Q10 (73.6) and SQ100 (70.5) we notice that it is small (3.10) and statistically insignificant because p=0.224. So, there is coherence/consistency between the total score on the QLHR-Q10 test and the final question SQ100.

The mean of 70.5 obtained in the current quality of life assessment (SQ100) represents a benchmark that patients consider that they lead a normal life if we relate the 70 points to the maximum of 100.

Today, quality of life measurement methods has begun to be used more and more, adding to the clinical, biological criteria and investigative tools needed to evaluate the medical service, providing more and more an evaluation of treatments from the point of view of view of the quality of life.

Authors' contribution

All authors contributed equally to this study and should be considered as main authors.

Throughout the research process, in this study we declare that the ethical principles of the research were respected, the participation being voluntary, consented, ensuring the anonymity of the patients included in the study and the confidentiality of the data.

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