

POST-OPERATIVE OF BIOPROSTHESIS AORTIC CATHETER IMPLANT: NURSING INTERVENTION

Pós-operatório de implante de bioprótese aórtica por cateter: intervenções de enfermagem
Postoperatorio de implante de bioprótesis aórtica por catéter: intervenciones de enfermería

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ABSTRACT: Aortic stenosis (AS) is the most common valvular heart disease; affects approximately 3% of the elderly population, underwent implantation of aortic bioprosthesis catheter. Nurses need to improve knowledge, to develop treatment protocols and care. **Objective:** Propose nursing interventions for postoperative patients treated for AS catheter. **Method:** Retrospective, quantitative research; composite sample of the Registro Brasileiro de Implante por Cateter de Bioprótese Valvar Aórtica, with 418 patients between January 2008 and February 2013. **Results:** The mean age was 81.5 years, 348 were in functional class III or IV cardiac arrest; complications with the highest incidence: left bundle branch block (129 patients), atrioventricular block (110) and the need for pacemaker implantation (83). **Conclusion:** We propose the nursing interventions for evaluation of neurological function, vascular, hematologic, renal, cardiac, vital signs, and pain control.

Keywords: Aortic valve stenosis. Heart valve prosthesis implantation. Bioprosthesis. Nursing assessment. Postoperative care.

RESUMO: Estenose aórtica (EAo) é a doença cardíaca valvar mais comum, afeta, aproximadamente, 3% da população idosa submetida a implante de bioprótese aórtica por cateter. Os enfermeiros necessitam aperfeiçoar o conhecimento para elaborar protocolos de atendimento e cuidados. **Objetivo:** propor intervenções de enfermagem no período pós-operatório imediato para pacientes submetidos a tratamento da estenose aórtica por cateter. **Método:** pesquisa retrospectiva, quantitativa, com amostra composta por 418 pacientes cujos dados foram fornecidos pelo Registro Brasileiro de Implante por Cateter de Bioprótese Valvar Aórtica, entre janeiro de 2008 e fevereiro de 2013. **Resultados:** a média de idade foi de 81,5 anos, 348 pacientes apresentavam classe funcional III ou IV de insuficiência cardíaca, sendo que as complicações com maior incidência foram: bloqueio de ramo esquerdo (129 pacientes), bloqueio átrio ventricular (110) e necessidade de implante de marca-passo (83). **Conclusão:** Foram propostas as intervenções de enfermagem para avaliação da função neurológica, vascular, hematológica, renal, cardíaca, parâmetros vitais e controle da dor.

Palavras-chave: Estenose da valva aórtica. Implante de prótese de valva cardíaca. Bioprótese. Avaliação em enfermagem. Cuidados pós-operatórios.

RESUMEN: La estenosis aórtica (EA) es la enfermedad valvular cardíaca más común; afecta, aproximadamente, 3% de la población de edad avanzada que se sometió a implantación del cateter bioprótesis aórtica. Hay la necesidad de mejorar el conocimiento de los enfermeros para que puedan desarrollar protocolos de tratamiento y atención. **Objetivo:** proponer intervenciones de enfermería para el postoperatorio de los pacientes tratados por catéter EA. **Método:** investigación cuantitativa retrospectiva, con muestra compuesta por 418 pacientes cuyos datos proveen del Registro Brasileiro de Implante por Cateter de Bioprótese Valvar Aórtica, entre enero de 2008 y febrero de 2013. **Resultados:** la edad media fue de 81,5 años, 348 pacientes estaban en clase III o IV de falla funcional del corazón, y las complicaciones con mayor incidencia fueron: bloqueo de rama izquierda (129 pacientes), bloqueo auriculoventricular (110) y necesidad de implantación de marcapasos (83). **Conclusión:** Se proponen intervenciones de enfermería para evaluación de la función neurológica, vascular, hematológica, renal, cardíaca, signos vitales y control del dolor.

Palabras clave: Estenosis de la válvula aórtica. Implantación de prótesis de válvulas cardíacas. Bioprótesis. Evaluación en enfermeira. Cuidados Posoperatorios.

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INTRODUCTION

Aortic stenosis (AS) is the most common valvular heart disease, affecting approximately 3% of the population more than 75 years of age. With the increasing life expectation of the Brazilian population, it is estimated that in 2030 there will be 11 million Brazilians within this age range and, consequently, approximately 350,000 patients with degenerative AS¹.

The AS obstructs the left ventricle exit flow due to the calcification of the valvular structures. With the progression of the valvular calcification, there is a development of the concentric ventricular hypertrophy and an increase of the filling pressure, which evolves to a ventricular dysfunction. The evolution of the AS is slow, which explains the occurrence of severe symptoms (chest pain, syncope, and dyspnea) after 60 years of age. When symptomatic, patients have significant worsen prognosis, with an average survival rate of 2–3 years. Therefore the importance of the early identification of symptoms or of ventricular dysfunction (ejection fraction < 50%), indicating the moment for the intervention to interrupt the natural course of the disease².

The substitution of the aortic valve by surgery, which consists of switching the valve for a biological or mechanical graft with the use of cardiopulmonary bypass and aortic clamping, has been, for decades, the treatment of choice by patients diagnosed with severe AS, providing relief of the symptoms and increased survival time. Despite being a standardized procedure, with good results and low mortality, in general, older patients are under higher risk^{3,4}.

The surgical risk is estimated according to the most used validated scores: European System for Cardiac Operative Risk Evaluation (Euro Score) and the Score Society of Thoracic Surgeons (STS). The Euro Score is a European system that identifies a series of risk factors that help preventing mortality in cardiac surgery. The prediction of mortality in percentage is calculated by adding the values assigned to each factor, which will be calculated by the Euro Score calculator. The STS provides the risk surgery mortality and morbidity after the cardiac surgery among adults, based on demographic and clinical characteristics of the patient^{2,5}.

The general criteria for the selection of patients for the transcatheter implant of valvular aortic graft are presence of severe and symptomatic AS, age more than 80 years, high probability of mortality and surgical morbidity and mortality, presence of comorbidities that increases the risk in traditional cardiac surgery, and vascular access with morphological and

anatomical conditions for the procedure by catheter, considering the approaches may be percutaneous or transventricular (transapical)³.

Such findings stimulated the study and development of new approaches for the treatment of these patients, performing the substitution of the aortic valve by a catheter. The experience acquired so far, with the use of these bioprostheses in patients with high surgical risk or contraindication to the surgery, shows that this is an effective and safe technique³.

The substitution of the aortic valve by a catheter consists of, initially, dual antiplatelet therapy and antibiotic prophylaxis. In general, the catheter intervention may be done with local anesthesia and mild sedation, however, one may choose general anesthesia, if necessary^{6,7}. The access may be obtained by puncture or dissection of the femoral or subclavian arteries, shortly after that the aortic valvuloplasty is initiated, using a pre-dilatation balloon and after the liberation of the valvular stent, at the moment of pre-dilatation by balloon, a temporary pacemaker is used to elevate the heart rate from 200 to 220 beats per minute (bpm) so that there is no displacement of the balloon at the moment of inflation. After the bioprosthesis implant, the pacemaker will be useful to keep the heart rate, in case bradyarrhythmias and total atrioventricular (AV) block would occur, then, it will be kept for at least 24–48 hours after the replacement of the aortic valve by the catheter^{6,7}.

With the increase of life expectation and a prediction that lots of elderly with AS will undergo an implantation of aortic bioprosthesis by catheter, nurses need to improve their knowledge in relation to the procedure so that protocols for treatment and care after surgery may be developed to those patients.

OBJECTIVE

To propose nursing interventions in the immediate post-operative period for patients undergoing treatment of AS by catheter.

METHOD

Retrospective, exploratory, descriptive, and quantitative research, whose data were collected through access to the database of *Registro Brasileiro de Implante por Cateter de*

Bioprótese Valvar Aórtica, conceived by the Brazilian Society of Interventional Cardiology (*Sociedade Brasileira de Hemodinâmica e Cardiologia Intervencionista* – SBHCI). The record includes patients treated since 2008 and it consists of a record of the real world in which Brazilian centers take part with experience of three or more implant cases.

The clinical outcomes are analyzed according to the *Valve Academic Research Consortium 2 (VARC 2) criteria*. To prepare VARC 2, there was a collaboration between independent academic research organizations and specialty societies (cardiology and cardiac surgery) in the USA and in Europe, including the main medical experts and representatives of the Food and Drug Administration, as well as manufacturers of supplies, that created definitions and consistent recommendations of consensus to implement clinical research programs for aortic bioprosthesis implant by catheter⁸.

Previously to the data collection, the project of research was approved by the Research Ethics Committee of the *Hospital Israelita Albert Einstein (HIAE)* via Brazil platform (CAEE 274314.9.0000.0071). The sample consists of data from 418 patients submitted to aortic bioprosthesis implant by catheter in the period from January 2008 to February 2013.

Data were collected in July 2014 with the help of a electronically monitors form, controlled by user name and password, in which it was allowed to store the demographic and clinical profile of each patient before the procedure, in addition to the immediate and late procedure results.

The description of the pre-procedure characteristics and complications during the hospitalization, considering that the qualitative characteristics described with the use of absolute and relative frequencies; and the quantitative characteristics, with the use of summary measures (mean, standard deviation, minimum, and maximum). Appropriate illustrative figures and tables were used for the presentation of the results with the participation of a professional statistician. Based on the results, nursing interventions were proposed for the postoperative period immediately after the aortic bioprosthesis implant by catheter.

RESULTS

The sample of this study consists of 418 patients submitted to the aortic valve bioprosthesis implant by catheter and inserted in the *Registro Brasileiro de Implante de Bioprótese Valvar Aórtica por cateter*. Of the total, 402 (96.1%)

patients were referred to the hospitalization sector to perform the postoperative and 16 (3.9%) patients died during the procedure.

Demographic data

The average age of the patients was 81.5 years old \pm 7.7 (73 to 103), the mean body mass index (BMI) was 26 kg/m² \pm 4.5 (16.20–49.98). By the logistic Euro Score, the mean for mortality rate was 20.2% \pm 13.7 (1.6–84.3), whereas the risk of mortality by STS was 14.1% \pm 11.5 (1.2–60.1).

Most part of the sample consists of women (218, 52.2%) submitted to treatment of AS by catheter. It was verified that 389 (93.1%) patients of this sample were White/Caucasian.

Pre-procedure clinical data

Most patients in the sample (348; 83.3%) had class III or IV cardiac arrest, according to the New York Heart Association classification.

In Table 1, the clinical history, risk factors, and higher incidence comorbidities stand out: acute kidney failure in 322 (77.0%) patients, hypertension in 307 (73.4%) patients, and coronary arterial disease in 242 (57.9%) patients.

Laboratory and imaging test results

The laboratory hemoglobin and creatinine results were considered important for the comparison and evaluation of possible hemorrhagic complication and kidney failure in the postoperative period.

The mean hemoglobin value when compared between pre- and post-procedure had a fall of 2.2 g/dL, on average. The creatinine mean value, when compared between pre- and post-implant of aortic bioprosthesis by catheter, there was an increase of 1.3–1.4 mg/dL, on average.

The data presented in Tables 2 and 3 refer to the quantitative and qualitative characteristics assessed in relation to the echocardiogram performed before the procedure.

The mean left ventricular ejection fraction was 57.8 \pm 15.2 (18–93%), the mean aortic gradient peak and mean were 84.2 and 50.9 mmHg, respectively.

According to the data in Table 3, most patients (301, 72.0%) had mild aortic regurgitation and 293 (70.0%) had mild mitral regurgitation. The electrocardiogram revealed that (Table 4) most patients (327 or 78.2%) had sinus rhythm before the

Table 1. Clinical history, risk factors, and comorbidities (n=418). São Paulo, 2014.

Variables	n	% valid
Angina	322	77.0
Syncope	307	73.4
Coronary artery disease	242	57.9
Acute myocardial infarction	222	53.1
Stroke	160	38.3
Carotid disease	142	34.0
Chronic obstructive pulmonary disease	133	31.8
Aortic aneurysm	106	25.4
Diabetes mellitus	97	23.2
Dyslipidemia	94	22.5
Hypertension	73	17.5
Peripheral vascular disease	72	17.2
Porcelain aorta	65	15.6
Hematologic disorder	62	14.8
Acute kidney failure	61	14.6
Neurological disease	41	9.8
Pulmonary hypertension	39	9.3
Other comorbidities	33	7.9
Permanent pacemaker	31	7.4
Implantable defibrillator	31	7.4
Coronary artery bypass grafting	26	6.2
Aortic valvuloplasty	25	6.0
Aortic valve replacement	22	5.3
Percutaneous coronary intervention	13	3.1
Other cardiac treatments	02	0.5

* Patients might have more than one clinical Record, risk factor or comorbidities.

Table 2. Quantitative data of the pre-procedure echocardiography aortic bioprosthesis implant by catheter. São Paulo, 2014.

Pre-procedure echocardiography	Mean	SD	Minimum	Maximum
Left ventricular ejection fraction (%)	57.8	15.2	18	93
Aortic peak gradient (mmHg)	84.2	25.2	8	165
Mean aortic gradient (mmHg)	50.9	16.1	10	98

procedure. As for the AV block, 59 (14.1%) patients had first degree AV block. Regarding conduction disorders, 52 (12.5%) patients had left bundle branch block (LBBB) before intervention.

Note that the CT angiography of thoracic and abdominal vessels is an imaging test complementary to the evaluation and selection of aortic bioprosthesis implant by catheter, therefore 234 (56.0%) patients underwent this test before intervention.

Complications associated to the post-procedure aortic bioprosthesis implant by catheter

The mean hospitalization was 12.6 days. As for the complications associated to the post-procedure (Table 5), 31 (7.7%) patients died, 25 (6.2%) of those occurred due to cardiovascular reasons. The complications with the most incidences were LBBB (129 patients, 30.1%), AV block (110 patients, 27.4%), and need for pacemaker implant (83 patient, 20.6%).

Nursing interventions in the immediate postoperative aortic bioprosthesis implant by catheter

Based on the results, after the clinical and demographic profile description of the post-procedure complications

Table 3. Qualitative data of the pre-procedure echocardiogram of aortic bioprosthesis implant by catheter. São Paulo, 2014.

Pre-procedure echocardiogram	n	%
Aortic regurgitatio		
Absent	57	13.7
Mild	301	72
Moderate	42	10
Severe	10	2.4
Without information	8	1.9
Mitral regurgitation		
Absent	41	9.9
Mild	293	70
Moderate	66	15.8
Severe	10	2.4
Without information	8	1.9
Total	418	100

Table 4. Qualitative data of the pre-procedure electrocardiogram of aortic bioprosthesis implant by catheter. São Paulo, 2014.

Pre-procedure electrocardiogram	n	%
Sinus	327	78.2
Pacemaker	36	8.7
Atrial fibrillation / Atrial flutter	52	12.4
Without information	3	0.7
Atrioventricular block (AV block)		
No AV block	339	81.1
First degree	59	14.1
Second degree	1	0.2
Second degree - Mobitz II	1	0.2
Total AV block	2	0.5
Without information	16	3.9
Conduction disorders		
Right bundle branch block (RBBB)	26	6.2
Left bundle branch block (LBBB)	52	12.5
Antero superior divisional block (ASDB)	23	5.5
RBBB + ASDB	19	4.5
No disorder	282	67.5
Without information	16	3.8
Total	402	100.0

Table 5. Complications associated to the post-procedure aortic bioprosthesis implant by catheter. São Paulo, 2014.

Complications during hospitalization	n	%
Left bundle branch block	122	30.4
Atrioventricular block	106	26.4
Pacemaker	82	20.4
Hemorrhagic complication	48	12.0
Vascular complication	26	6.5
Death	25	6.2
Poor positioning of the graft	22	5.5
Need for implant of a second graft	20	5.0
Migration/embolization of the graft	13	3.2
Stroke	10	2.5
Kidney failure	06	1.5
Ventricular perforation	04	1.0
Mitral dysfunction	01	0.2
Compromising of the ostium	01	0.2

* Patients might have more than one complication during the hospitalization period.

presented, nursing interventions were proposed for the postoperative period based on the clinical tool of Nursing Intervention Classification (NIC) and in international literature (Chart 1)^{9,10}.

DISCUSSION

The sample in this research consisted of 418 patients submitted to AS treatment by catheter, average age of 81.5 years, mostly females. A study carried out under the Brazilian perspective of the AS in elderly presented itself in Brazil for 2025, in which it is estimated that a population of 30 million Brazilian elderly, with mean life expectancy of 76 years of age, 3% with atherosclerotic AS (i.e., about 50 cases for each cardiologist)¹¹.

By the logistic Euro Score, the mean mortality risk was $20.2 \pm 13.7\%$, and by the STS it was $14.1 \pm 11.5\%$. According to the Risk Score for Decision Making in Valve Heart Disease (*Escore de Risco an Tomada de Decisão em Cardiopatia Valvar*), the use of risk scores has the function of predicting postoperative mortality, becoming useful tool, easy to apply and which offer objective data on the situation of the patient¹².

The VARC 2 describes a risk classification for mortality based on calculated values of STS risk scores. For the mortality risk, STS estimated values $<4\%$ are considered low risk; between 4% and 10%, intermediate risk; $>10\%$, high risk; and $>15\%$, very high risk. One patient is considered at extreme risk if at least two cardiovascular surgeons from an excellence tertiary center deny operating on them because of prohibitive operational risks. It is estimated that the combined risk of morbidities $>50\%$ is irreversible¹³.

Some pathologies or clinical conditions, despite not being analyzed due to high risk scores, contribute in a decisive way for surgical contraindication. They are severe liver disease, severe collagen disease, use of immunosuppressive drugs, cancer, chemotherapy, chest deformities, hostile chest by previous irradiation or prior surgeries, and fragility index of the patient¹².

The NYHA classifies the HF according to the severity of symptoms reported by the patient, with the score from I to IV, evaluating the symptomatic effect of the disease, stratifying the limitation degree imposed by them in daily life activities¹⁴.

In this study, 83.3% patients were in CF III and IV of ICC, according to the NYHA. Therefore, this classification

is useful to evaluate life quality and to determine the best moment for interventions¹⁴.

The DAC was present in 57.9% patients in this study. A recent research on the influence of the DAC, according to the SYNTAX score in the clinical results of patients submitted to the transcatheter aortic valve implantation, showed that it is common existence of DAC and severe AS.

This association occurs due to similarity in the pathogenesis among such diseases and, besides that, share risk factors, such as advanced age, hypertension, hypercholesterolemia, diabetes, and chronic kidney disease¹⁵.

Results obtained in a research that also evaluated the prevalence of HAS in elderly in Brazil demonstrate the behavior of the disease in a period of 5 years.

Chart 1. Nursing intervention for postoperative of aortic bioprosthesis implant by catheter.

Neurological function evaluation (compare to the patient's neurological prior history)
- To evaluate signs of stroke (asymmetry of the face, loss of motor strength and sensitivity, slurred speech, time and space disorientation, reactivity, size and asymmetry of the pupils);
- To evaluate neurological scale (Glasgow) every 3 hours, for 24 hours, then once a day.
Vascular and hematological evaluation
- To evaluate pulse, peripheral perfusion, coloration and heat of members and presence of bruising or bleeding in the place with the compressive bandage, after returning from the intervention, every 15 minutes during the first hour; every 30 minutes during the second hour; each hour after the third one, for 3 hours; and then, every 3 hours.
- To supervise the presence of bruising and outline the extension of the bruising with a pen;
- To guide and keep the limb at rest during the 12 hours after the procedure;
- To monitor the baseline hemoglobin and platelets once a Day or as needed;
- To collect pre-transfusion samples if there is reporting of pre-procedure anemia, important bleeding during the procedure or if there is a progressive decrease in the hemoglobin or platelets rates;
- To supervise the schedules for antiplatelet therapy, observing if there is not an interaction with other drugs;
- To evaluate possible bleeding (oral mucosa, urine, feces, and bruises).
Kidney function evaluation (compare to the patient's prior clinical history)
- To control the administration of intravenous fluid according to the medical prescription (1 liter of saline solution during 8 to 12 hours, depending on the cardiac function) after returning from intervention;
- To perform water balance;
- To perform daily weighting of the patient in fasting;
- To evaluate the presence of swelling in upper and lower limbs;
- To evaluate kidney function (in case of patients with average kidney function, it is expected a diuresis of >0.5 mL/kg/h);
- To monitor laboratory tests of urea, creatinine, and electrolytes, at least once a day.
Vital parameters evaluation
- To keep multi-parameter monitoring (cardiac, heart rate, blood pressure, oxygen saturation), after returning from intervention, every 15 minutes in the first hour; every 30 minutes in the second hour; then, every hour.
Cardiac function evaluation
- To advise bed rest within the first 24–48 hours;
- To advise not to raise arms over shoulder height while using external pacemaker;
- To verify the proper connection for the external pacemaker and the correct cable connection;
- To monitor changes with the conduction and/or the rhythm;
- To monitor cardiac enzymes through blood four times a day (CPK, CKMB, Troponin);
- To continuously monitor 12-lead electrocardiogram.
Pain evaluation
- To perform a comprehensive survey of the pain, so that it includes location, onset, duration, frequency, intensity and precipitating factors by the visual analogue scale every 3 hours;
- To medicate with prescribed painkillers according to the intensity of pain and to reevaluate the score until 1 hour after the administration of the painkiller;
- To supervise sudden flank, back and groin pain, which may indicate vascular complication and must be carefully evaluated.

The prevalence did not follow a linear trend, increasing every analyzed year, predominantly among female elderly with low education¹⁶.

In this study, 77.0% patients had IRA, an important factor, considering that, before the procedure, when comparing the mean values of pre- and post-procedure creatinine (up to 72h after the intervention), there was an mean increase of 0.1 mg/dL, once the aortic bioprosthesis implant by catheter is an intervention in which an iodinated contrast agent is used, which is nephrotoxic¹⁷.

The IRA is a complication related to the increase of morbidity and mortality, besides, prolonging hospitalization, as presented in a study involving 415 patients predicting acute kidney failure after percutaneous aortic valve implant¹⁷.

It is noteworthy, that the mean hemoglobin value, compared in pre- and post-procedure, presented a mean decrease of 2.2 g/dL. Besides that, the mean hemoglobin value before the procedure was 11.7 g/dL, according to the definition of the World Health Organization (hemoglobin <12.0 g/dL for women and <13.0 g/dL for men), once it is considered an anemia parameter¹⁸.

In a study involving 1,696 patients with AS submitted to treatment due to aortic bioprosthesis implant by catheter, the prevalence of preoperative anemia was 57%. In 60% cases, the indication of transfusion of blood products was not related to the evident bleeding during or after the procedure but to base anemia instead. This way, the need for blood transfusion was related to early mortality¹⁸.

The echocardiography is the most important way to confirm the diagnosis and quantify the severity of the disease. This test shows calcified and thickened aortic valve leaflets, and quantifies the VE mass, the VE ejection fraction, and the maximum and medium transvalvular pressure gradients. Thus, the echocardiography provides important information for evaluation and indication of procedures of aortic bioprosthesis implant by catheter¹⁹.

The CT angiography is used to provide higher information of anatomic aspects of the aortic valve and surrounding structures, such as coronary arteries, aorta, and peripheral arteries, allowing the choice of size and type of adequate bioprosthesis and vascular access for the implant¹⁹.

In this study, at the end of the procedure, there was success of the device after the implant of the aortic bioprosthesis by catheter in most of the cases (362 patients, 86.6%). The success of the implant of bioprosthesis valve is defined as an only bioprosthesis implanted in the correct

place with adequate functioning¹³. The highest incidence complications were LBBB (129 patients, 30.1%), AV block (110 patients, 27.4%), and the need for pacemaker implant (83 patients, 20.6%).

The complications follow the criteria and definitions established by the VARC 2. There are considered complications related to the aortic bioprosthesis implant by catheter such as cardiovascular death, myocardial periprocedure infarctation (<72 hours), myocardial spontaneous infarctation (>72 hours), stroke (transient ischemic attack, major and minor ischemic stroke, major and minor hemorrhagic stroke), hemorrhagic complications (hemorrhages with risk of death or incapacity, bleeding), acute kidney failure (stages 1, 2, and 3), vascular complications, new conduction or blocking atrioventricular disorders, need for MPD implant, acute coronary obstruction, coronary ostium impairment, embolization, displacement of native leaflets, new mitral valve dysfunction, new interventricular communication, perforation or rupture of the root of the aorta, endocarditis, hemolysis, VE perforation, migration/embolization of the graft, and need to implant a second graft (valve-in-valve)¹³.

Based on the clinical history of the patient, in the knowledge acquired on the procedure of aortic bioprosthesis implant by catheter, and how the possible complications in this elderly population are given, it becomes impossible to plan fulltime nursing assistance to meet the needs for this high complexity patient's needs²⁰.

The patient submitted to the AS treatment by catheter will receive nursing care, initially, in an intensive care unit²⁰.

It is the role of the nurse to manage the assistance, having specialized knowledge on this new procedure, which decreases time of permanence and promotes shorter time of hospitalization in intensive care and, consequently, less hospitalization time in general in relation to the conventional procedure. They should also have knowledge on the previous history of the patient, so that, then. It is possible to greet and evaluate them in the unit, focusing in their highest priorities²¹.

This study presents nursing interventions for the immediate postoperative period, so that the nursing care may guide and help them when guiding their team properly as for the care needed in bed rest and in early detection of the possible complications related to the procedure²⁰.

The nursing team has a fundamental role in ensuring education and emotional support to patients and their families²⁰.

CONCLUSION

This study, conducted with 418 who underwent aortic valve bioprosthesis implant by catheter and inserted in the *Registro Brasileiro de Implante de Bioprótese Valvar Aórtica por Cateter*, allowed the following conclusions: as for the description of the clinical history of the patients, the average age was 81.5 ± 7.7 years old, most of the samples (52.2%) consisted of women, the mean mortality risk was $20.2 \pm 13.7\%$ by the logistic Euro Score and $14.1 \pm 11.5\%$ by the STS, 83.3% patients presented class III or IV heart failure before the procedure, the risk factors with higher incidence included acute

kidney failure (77.0%), hypertension (73.4%), and coronary artery disease (57.9%).

There was success of the device after the aortic bioprosthesis implant by catheter in most of the cases (86.6%), the complications related to the procedure of higher incidence were LBBB (30.1%), AV block (27.4%), and need of definitive pacemaker implant (20.6%).

Nursing interventions were proposed for the immediate postoperative period of aortic bioprosthesis implant by catheter related to the evaluation of neurological, vascular, hematologic, kidney, cardiac functions, vital signs, and pain control.

REFERENCES

1. Brito Júnior FS, Abizaid A, Almeida BO, Caixeta A, Tarasoutchi F, Grube E, et al. Implante por cateter de bioprótese valvar para tratamento de estenose aórtica: experiência de três anos. *Arq bras cardiol.* 2012;99(2):697-705
2. Tarasoutchi F, Montera MW, Grinberg M, Barbosa MR, Piñeiro DJ, Sánchez CRM, et al. Diretriz Brasileira de Valvopatias – SBC 2011. I Diretriz interamericana de valvopatias – SIAC 2011. *Arq bras cardiol.* 2011;97(5 Supl 1):1-67.
3. Brito Júnior FS, Lemos Neto PA, Siqueira D, Sarmento-Leite R, Mangione JA, Carvalho LA, et al. Consenso de especialistas sobre o implante por cateter de bioprótese valvares para o tratamento da estenose aórtica de alto risco cirúrgico: relato da sociedade brasileira de hemodinâmica e cardiologia intervencionista. *Rev Bras Cardiol Invasiva.* 2011;19(2):200-7.
4. Gaia DF, Palma JH, Ferreira CBN, Souza JAM, Agreli G, Guilhen JCS, et al. Implante transapical de valva aórtica: resultados de uma nova prótese brasileira. *Rev Bras Cir Cardiovasc.* 2010;25(3):293-302.
5. Roques F, Michel P, Goldstone AR, Nashef SAM. The logistic EuroSCORE. *Eur Heart J.* 2003;24:1-2.
6. Brito Júnior FS, Siqueira D, Sarmento-Leite R, Carvalho LA, Lemos Neto PA, Mangione JA, et al. Racional e desenho do registro brasileiro de implante de bioprótese aórtica por cateter. *Rev Bras Cardiol Invasiva.* 2011;19(2):145-52.
7. Brito Júnior FS, Carvalho LA, Siqueira D, Dias JC, Mangione JA, Leite RS, et al. Acesso pela artéria subclávia para implante por cateter da bioprótese valvar aórtica Corevalve®: dados do registro brasileiro. *Rev bras cardiol Invasiva.* 2012;20(3):247-52.
8. Leon MB, Piazza N, Nikolsky E, Blackstone EH, Cutlip DE, Kappetein AP et al. Standardized endpoint definitions for transcatheter aortic valve implantation clinical trials. *J Am Coll Cardiol.* 2011;57(3):253-69.
9. Raiten JM, Gutsche JT, Horak J, Augoustides JGT. Critical care management of patients following transcatheter aortic valve replacement. *F1000 Research.* 2013;2(62):1-8.
10. Bulechek GM, Butcher HK, Dochterman JM. Classificação das intervenções de enfermagem (NIC). 5ª ed. Porto Alegre: Artmed; 2010.
11. Grinberg M, Accorsi TAD. Aortic stenosis in the elderly: a Brazilian perspective. *Arq Bras Cardiol.* 2009;92(2):e36-e39.
12. Ferreira MCM. Implante valvar aórtico percutâneo: a importância da seleção de pacientes [Internet]. *SOCERJ*; 2013 [citado 2014 Out 02]. Disponível em: <http://socerj.org.br/implante-valvar-aortico-percutaneo-a-importancia-da-selecao-de-pacientes/>
13. Kappetein AP, Head SJ, Génèreux P, Piazza N, Van Mieghem NM, Blackstone EH, et al. Updated standardized endpoint definitions for transcatheter aortic valve implantation: the Valve Academic Research Consortium-2 consensus document. *Eur Heart J.* 2012; 33:2403-18.
14. Pereira DAG, Rodrigues RS, Samora GAR, Lage SM, Alencar MCN, Parreira VF, et al. Capacidade funcional de indivíduos com insuficiência cardíaca avaliada pelo teste de esforço cardiopulmonar e classificação da *New York Heart Association*. *Fisioter Pesq.* 2012;19(1):52-6.
15. Stefanini GG, Stortecky S, Cao D, O'Sullivan CJ, Gloekler S, Buellesfeld L, et al. Coronary artery disease severity and aortic stenosis: clinical outcomes according to SYNTAX score in patients undergoing transcatheter aortic valve implantation. *Eur Heart J.* 2014;35(37):2530-40.

16. Mendes GS, Moraes CF, Gomes L. Prevalência de hipertensão arterial sistêmica em idosos no Brasil entre 2006 e 2010. *Rev Bras Med Fam Comunidade*. 2014;9(32):273-8.
17. Yamamoto M, Hayashida K, Mouillet G, Meguro K, Watanabe Y, Dubois-Rande JL, et al. Renal function-based contrast dosing predicts acute kidney injury following transcatheter aortic valve implantation. *JACC Cardiovasc Interv*. 2013;6(5):479-86.
18. Nuis RJ, Sinning JM, Rodés-Cabau J, Gotzmann M, Van Garsse L, Kefer J, et al. Prevalence, factors associated with, and prognostic effects of preoperative anemia on short and long term mortality in patients undergoing transcatheter aortic valve implantation. *Circ Cardiovasc Interv*. 2013;6(6):625-34.
19. Falcão G. Substituição percutânea da válvula aórtica (TAVI) em doentes com estenose aórtica: revisão bibliográfica e análise da casuística do CHVNG [dissertação]. Covilhã: Universidade da Beira do Interior; 2011.
20. Stortecky S, Buellesfeld L, Wenaweser P, Windecker S. Transcatheter aortic valve implantation: prevention and management of complications. *Heart [Internet]*. 2012 [cited 2014;98(supl 4):52-64.
21. Alves AFG, Grassia RCF, Carvalho R. Cirurgia robótica de revascularização miocárdica: em busca de evidência científica no uso da tecnologia do século XXI. *Rev SOBECC*. 2012;17(3): 31-42.