

Role of Nursing in the Early Detection and Prevention of Stent Thrombosis in Patients Undergoing Coronary Angioplasty

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Abstract

Introduction: stent thrombosis is one of the serious complications after coronary angioplasty. It can present with chest pain and electrocardiographic changes or even sudden death and is characterized by angiographic or postmortem evidence of a newly formed thrombus in a previously stented segment and can occur from intraprocedurally to years after implantation. There are several risk factors, both related to the lesion and the procedure, as well as adherence to antiplatelet therapy and personal history.

The objective of this case is to present a care plan to detect and prevent stent thrombosis in patients undergoing coronary angioplasty.

Material and methods: an assessment is made through the model of the 14 needs of Virginia Henderson and the care plan is prepared with its respective diagnoses (NANDA), objectives (NOC) and interventions (NIC) with the indicators of results and activities. It will be evaluated using the Likert scale.

Results and conclusions: the following diagnoses stand out: decreased cardiac output, ineffective peripheral tissue perfusion and deficient knowledge. Nursing intervenes in the early detection of signs and symptoms that may point us towards stent thrombosis, observing any change immediately, and in its prevention, carrying out health education after angioplasty, highlighting the importance of antithrombotic treatment and in modifying modifiable risk factors.

Keywords: dravet syndrome; epsilon waves; arrhythmogenic right ventricular dysplasia; sudden unexpected death in epilepsy; scn1a gene

Introduction

Stent thrombosis is one of the serious complications after coronary angioplasty, along with intra-stent restenosis. [1]

It can present with chest pain and electrocardiographic changes, or even as sudden or asymptomatic death in the context of collateral vessels [2] and is characterized by angiographic or postmortem evidence of a newly formed thrombus in a segment with a previous stent and can take place from intra-procedure to years after implantation. [3,4]

Although it is not very frequent, its prevalence ranges from <1% early to 0.2-0.6% after one year of stent implantation, this situation usually leads to ST-elevation myocardial infarction and carries a mortality rate of up to 40%.^(1,4,5) There are several risk factors related to this pathology, both related to the lesion and the procedure and to adherence to antiplatelet

therapy and personal history: diabetes mellitus, advanced age, percutaneous coronary intervention (PCI) in acute coronary syndrome (ACS), renal failure, or left ventricular dysfunction. [2,3,4,6,7]

In relation to the role of nursing, the objective was to detect thrombosis early, knowing both the typical signs and symptoms of thrombosis and others that are not so frequent, given the high mortality, low prevalence and rapid clinical and hemodynamic deterioration in these cases. In addition, we wanted to emphasize the importance of nursing in health education for patients who have undergone coronary angioplasty so that they can follow correct adherence to antiplatelet therapy and correct modifiable risk factors. [9,10]

The objective of this case is to present a care plan to detect and prevent stent thrombosis in patients undergoing coronary angioplasty.

Clinical observation:

Description of the clinical case:

We present the case of a 67-year-old woman allergic to ciprofloxacin and with the following history: former smoker, type 2 diabetes, dyslipidemia, obesity, nephrectomy in 2003 and ischemic heart disease of debut in 2011 with lesions in the proximal anterior descending (PDA) 85%, middle right coronary artery (MDC 85%) and chronic total occlusion in posterolateral (PL CTO), for which percutaneous coronary intervention (PCI) had been performed (there are no reports of it since it was performed in another Later, in the same year, he underwent an internal to anterior descending mammary artery bypass (AMI-DA).

The patient is currently admitted for elective coronary catheterization due to progressive angina and dyspnea on exertion. He is being treated with acetylsalicylic acid, among other drugs.

A first elective catheterization was performed for progressive angina and dyspnea on exertion. Severe lesions were observed in the bisector (85%), so PCI was performed with drug-eluting stent implantation. During the procedure, 85 mg of intracoronary sodium heparin was administered and, at the end of PCI, 30 minutes after implantation, the patient presented with sudden dyspnea and a drop in atrial fibrillation (AF), rapidly progressing to cardiogenic shock. We started vasoactive drugs (noradrenaline and dobutamine) and returned to the ward where a coronary angiography confirmed that there was thrombosis of the previously placed stent. The thrombus is aspirated and simple PCI is performed. An OFDI (optical frequency domain imaging) was performed, which showed a well-placed and expanded stent, so the stent thrombosis was attributed to insufficient antiplatelet/anticoagulation. Intracoronary tirofiban and heparin sodium and 300 mg clopidogrel are loaded orally. In addition, an intra-aortic balloon is placed.

Nursing care. Care planning.

An assessment is carried out through Virginia Henderson's 14 needs model and the care plan is prepared with their respective diagnoses (NANDA), objectives (NOC) and interventions (NIC) with the indicators of results and activities.

Assessment of the 14 needs according to virginia henderson's model:

- Need for oxygenation and circulation:** patient with 50%-15l' ventimask, correct saturations. Hemodynamically unstable,

prone to hypotension, rapid AF and signs of peripheral hypoperfusion.

- Need for nourishment/hydration:** absolute diet until stabilization.
- Need for removal:** Patent bladder catheter carrier.
- Need for mobilization:** bedridden patient, at absolute rest.
- Need for rest/sleep:** no assessment is possible.
- Need to dress/undress:** no assessment possible.
- Need for thermoregulation:** afebrile.
- Need for hygiene and skin protection:** damp and cold skin. No skin lesions.
- Need for security:** assessment is not possible.
- Need for communication:** the patient expresses that she is choking and short of breath.
- Need for beliefs and values:** no valuation is possible.
- Need to work/perform:** no assessment is possible.
- Need for leisure:** no assessment is possible.
- Need to learn:** the patient requires health education on pharmacological treatment, a balanced diet, regular physical activity, etc. Next, the care plan is described following the NANDA-NIC-NOC taxonomy and evaluated using the Likert scale[8](Table 1).

Nursing diagnoses according to NANDA - NIC - NOC taxonomy

- NANDA [00029] Decreased cardiac output R/C, alteration in preload, afterload or contractility of the heart, M/P, cold and sweaty skin, shortness of breath/dyspnea, anxiety/agitation.
- NANDA [00204] Ineffective peripheral tissue perfusion, R/C, alteration of skin characteristics, decreased peripheral pulses, M/P, absence of pulses, cold and clammy skin.
- NANDA [00126] Poor knowledge R/C misinterpretation of information M/P request for frequent information.

NANDA [00029] Decreased cardiac output R/C impaired preload, afterload or contractility of the heart, M/P cold and sweaty skin, shortness of breath/dyspnea, anxiety/agitation	
<p>NOC [00400] Heart Pump Effectiveness Indicators:</p> <ul style="list-style-type: none"> - [040001] Blood Pressure in Expected Range (B Scale) Re:1 Re:4 Ro:4 - [040003] Heart failure in the expected range (scale b) Re:1 Re:5 Ro:3 - [080204] Respiratory rate (scale b) Re: 2 Re: 5 Ro: 5 	<p>CIN [4254] Management of Cardiac Shock:</p> <ul style="list-style-type: none"> - Watch for signs and symptoms of decreased cardiac output. - Maintain optimal preload by administration of IV fluids or diuretics, as appropriate. - Administering positive contractility-positive inotropic drugs, as applicable. <p>CIN [4044] Cardiac Care: Acute:</p> <ul style="list-style-type: none"> - Assess chest pain (intensity, location, irradiation and duration). - Monitor the ECG for ST changes, as appropriate.
NANDA [00204] Ineffective peripheral tissue perfusion, R/C, alteration of skin characteristics, decreased peripheral pulses, M/P, absence of pulses, cold and clammy skin.	

<p>NOC [1101] Tissue Integrity: Skin and Mucous Membranes Indicators:</p> <ul style="list-style-type: none"> - [110111] Tissue perfusion (scale a) Re:1 Re:5 Ro:4 - [110113] Skin integrity (scale a) Re:1 Re:5 Ro:5 	<p>CIN [3590] Skin Surveillance:</p> <ul style="list-style-type: none"> - Observe the color, heat, swelling, pulses, texture, and if there is edema and ulcerations in the extremities. - Keep an eye on the color and temperature of the skin. <p>NIC [4064] Circulatory Care: Mechanical Assistive Device:</p> <ul style="list-style-type: none"> - Assist in the insertion and implantation of the device. - Administer blood thinners or antithrombotics, as appropriate. - Check the device regularly to ensure proper operation.
<p>NANDA [00126] Poor Knowledge R/C Misinterpretation of Information M/P Request for Frequent Information</p>	
<p>NOC [1830] Knowledge: Managing Heart Disease Indicators:</p> <ul style="list-style-type: none"> - [183013] Importance of Weight Management (Scale I) Re:2 Re:4 Ro:3 - [183021] Therapeutic Effects of Medication (Scale A) Re:1 Re:5 Ro:5 	<p>IAS [5606] Individual Teaching:</p> <ul style="list-style-type: none"> - Assess the patient's current level of knowledge and understanding of content. - Give the patient time to ask questions and express concerns. <p>NIC [5602] Teaching: Disease Process:</p> <ul style="list-style-type: none"> - Discuss lifestyle changes that may be necessary to avoid potential complications and/or control the disease process. - Describe the rationale for control/therapy/treatment recommendations.
<p>Legend: RI: initial result RE: expected result RO: result obtained Likert scales to assess outcome indicators Scale a: 1- Severely compromised 2- Substantially compromised 3- Moderately compromised 4- Slightly compromised 5- Not compromised Scale b: 1- Severe deviation from the normal range. 2- Substantial deviation from the normal range. 3- Moderate deviation from the normal range. 4- Slight deviation from the normal range. 5- No deviation from normal range Scale i: 1- Extensive 2- Substantial 3- Moderate 4- Scarce 5- None</p>	

Table 1: Nursing diagnoses according to NANDA - NIC - NOC taxonomy

The main problems of collaboration (CP) are described below (Table 2):

<p>Table 2: Collaboration Issues</p>
<p>Ineffective peripheral tissue perfusion s/a balloon counterpulsation carrier</p>
<p style="text-align: center;">CIN [2660] Management of Impaired Peripheral Sensitivity</p> <ul style="list-style-type: none"> ● Check the hot/cold discrimination. ● Observe for paresthesias, tingling. ● Discuss or identify the causes of abnormal sensations or changes in sensation. <p style="text-align: center;">[3590] Skin Surveillance</p> <ul style="list-style-type: none"> ● Monitor: color, temperature, texture, sensitivity, hair, edema, signs of ulceration, skin hydration. <ul style="list-style-type: none"> ● Look for areas with signs of tissue hypoxia (ischemia) and/or necrosis. <ul style="list-style-type: none"> ● Observe pressure zones or friction. <ul style="list-style-type: none"> ● Record changes in the skin or mucous membranes. ● Monitor tissue perfusion and pedal pulses every two hours. ● Record the frequency of inflation and the increased tension every hour. ● Device maintenance: charged batteries and helium level monitoring.
<p>Hemorrhage s/a balloon insertion</p>

- Keep an eye on the insertion point of the device every two hours.
- In case of light bleeding, change the hemostatic dressing and/or perform a femoral compression.

Infection with a urinary catheter carrier

- Monitor the correct patency of the bladder catheter.
 - Keep an eye on the device's pressure points.
 - Perform proper periprobe hygiene every shift.
- Assess signs and symptoms of infection or sepsis: fever, malaise, chills, increased white blood cell count.
- Administer/apply the prescribed pharmacological treatment according to the medical regimen (antibiotic therapy).

Evolution And Conclusion Of The Case:

The patient was admitted to the Cardiac Intensive Care Unit (ICU) after the second PCI and with a balloon counterpulsation, which could be removed 24 hours after implantation. Subsequently, mobilization was initiated and the treatment was adjusted, being possible the discharge to the ward with telemetry one week after admission and the discharge home after 10 days. During admission, the patient presented with paroxysmal AF, so anticoagulation with apixaban was initiated.

The patient did not present other complications to highlight, applying the care plan without incidents, requiring more support from the nursing team during the first days: help in mobilization by being the carrier of a balloon counterpulsation and later, of a femoral compression. From the third day of admission, the patient was practically autonomous in carrying out activities of daily living, waiting to be discharged to the hospitalization ward and adjusting pharmacological treatment. The nursing staff carried out an exhaustive education, both to the patient and to the family, about healthy habits and risk factors that should be modified, and emphasis was placed on the new antiplatelet treatment that she had to continue taking and the importance of not abandoning it, as well as possible signs and symptoms that could warn of a new case of thrombosis and how to act in that case.

Once discharged, the pharmacological treatment was changed to clopidogrel and apixaban, always maintaining acetylsalicylic acid.

Discussion

The role of nursing in this case consists of the early detection of signs and symptoms compatible with stent thrombosis and the rule out of other possible causes (hypoglycemia, acute pulmonary edema). One of the most important parts would be the constant and accurate assessment of vital signs, such as the monitoring of the patient, being able to observe any change immediately, early electrocardiogram, appearance of the patient and other possible signs of worsening of cardiac function. Also part of this work would be the review of the pharmacological treatment that the patient has received so far, giving greater importance to the antiplatelet treatments administered in the last few hours.

In these procedures it is important to assess and maintain a correct anticoagulation intraoperatively, as well as at the end it is necessary to verify among the medical and nursing staff that is administered to the patient the loading dose of antiplatelet agent, as well as in the following days of hospital admission the correct dose of double antiplatelet therapy must be maintained. Prior to hospital discharge, this new treatment should be used to ensure correct adherence by the patient, also informing family members, if necessary, of the possible symptoms they may present in order to try to avoid stent thrombosis or early detection.

During the case, we encountered several difficulties in relation to the objective described above. Firstly, and in relation to the early detection of thrombosis. Despite the high training of the nursing staff in cardiology and, specifically, in hemodynamics, at first the signs and symptoms presented by the patient led us to other possible diagnoses, such as acute pulmonary edema, having fallen into atrial fibrillation and that the patient did not present chest pain typical of thrombosis. but dyspnea and signs of poor peripheral perfusion.

Another difficulty, in this case in relation to the prevention of thrombosis, was that we found that during the first hours of the patient's admission, it was not possible to carry out an exhaustive health education since she could not provide the necessary attention to understand the importance of the treatment and the healthy habits she had to follow; so it had to be postponed for a few days, when the patient was already on the ward, carrying out the activities of daily living by herself.

The rate of thrombosis and restenosis has decreased over the years after the introduction of drug-eluting stents and the use of intracoronary imaging techniques, in addition to the prolonged use of dual antiplatelet therapy on some occasions⁽⁶⁾. Despite this, and although the number of patients who present thrombosis after coronary angioplasty is very low, we know that the outcome can be fatal, so from the nursing point of view we must find effective methods to achieve the involvement of the patient and family members in the continuity of healthy habits and pharmacological treatment.

An effective method could be, from a post-procedure unit, in which patients who undergo an elective coronary angioplasty remain and where possible doubts are resolved, in addition to carrying out such education, through the delivery of an informative leaflet with the importance of the treatment and the care to be followed after the procedure.

The scant current scientific evidence that we find regarding health education for patients undergoing coronary angioplasty is based on literature reviews and from it we can draw several conclusions. [11-14] The education carried out can have beneficial effects on the immediate acquisition of knowledge but they are not sustained over time, so a continuous education, both from the cardiologist consultation and from nursing and primary care medicine, should have long-term effects. On many occasions time is limited and the stress factors that the patient presents at that time make it more difficult to assimilate the changes to follow. Therefore, one avenue to be developed in future research could be the relationship between greater knowledge of the disease and the importance of treatment follow-up by patients, related to the rate of hospital readmissions and complications derived from the same treatment.

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