

State of the Art Percutaneous Procedure: Octogenarian Patient Successfully Submitted, in a Single Session, to a Pulmonary Valvotomy, Coronary Stent Implant and Permanent Pacemaker Implant

Wilson Albino Pimentel Filho, Milton de Macedo Soares Neto, Gil Vicente Cividanis, Rubens Vaz Feijó Júnior
Instituto de Cardiologia de São Paulo - São Paulo, SP - Brazil

This report describes a case involving an 82 year old patient with mild renal insufficiency, severe pulmonary valve stenosis (PVS), severe anterior descending artery stenosis and complete atrioventricular block, who successfully underwent, in a single session, coronary angioplasty and a stent implant, pulmonary valvotomy and a permanent pacemaker implant.

Coronary percutaneous interventions with stent implants are extensively used in the treatment of coronary patients, including octogenarians¹⁻⁵. PVS, frequently diagnosed and treated during childhood or adolescence, is rarely found in octogenarian patients. Percutaneous treatment of PVS is a safe and efficient procedure⁶.

A cardiac conduction system disease in an octogenarian is common and an indication for a permanent pacemaker implant is frequently recommended.

Our report refers to an octogenarian patient with severe PVS, a serious lesion in the mid third of the anterior descending artery and complete atrioventricular block (CAVB). This patient was submitted successfully to three consecutive procedures in the cardiac catheterization laboratory: pulmonary valvotomy, coronary stent implant and permanent pacemaker implant.

CASE REPORT

The patient is an 82 year old male in good general condition, with dyspnea for two months, progressively increasing from moderate to mild exertions. A physical examination presented blood pressure (BP) of 150/90 mmHg, cardiac frequency of 60 beats per minute and a systolic ejection murmur ++/4 over the pulmonary area radiating toward the left sternal edge. The chest x-rays show a cardiac silhouette within normal limits, pulmonary

vasculature within normal limits, prominent dilation of the pulmonary artery trunk, pulmonary parenchyma within normal limits, blunted cardiophrenic and costophrenic angles. An electrocardiogram, taken ninety days earlier, revealed a sinus rhythm, CF of 60 bpm, SAQRS between 90 and 180 degrees and an increased strain on the right chambers. The laboratory tests presented creatinine levels of 2.3 mg/ml and urea of 60 mg/ml. The echocardiogram revealed severe PVS and an alteration in the left ventricle relaxation phase.

The procedure was performed after renal preparation. The patient was adequately hydrated and given 600 mg of N-acetylcysteine every twelve hours, maintaining the drug administration for 48 hours.

The hemodynamic study confirmed severe pulmonary valve stenosis with a systolic gradient of 80 mmHg (PT = 20/10 mmHg and RV = 100/8 mmHg). anterior descending artery presented eccentric stenosis, 70% ulcerated in its mid third; the other arteries presented discrete wall motion irregularities. The left ventricle (LV) presented normal contractile function. The renal preparation was performed before the procedure with adequate hydration and previous administration of N-acetylcysteine for 48 hours as well as antiplatelet therapy with ASA and clopidogrel in the normal dosages. There was a reduction in the levels of creatinine and urea to 1 mg/ml and 40 mg/ml, respectively.

On the day of the procedure, during admission, the patient presented a 2nd degree, type 2 atrioventricular block. In the hemodynamic laboratory the patient presented complete atrioventricular block and CF of 40 bpm before the start of the procedure. Sedated and monitored, the left femoral vein was punctured, the 6F introducer was positioned and a temporary pacemaker wire was implanted. By means of a venous puncture to the right, an 8F introducer was positioned over which the Lehman catheter was passed to perform the PT-RV pressure pullback. Next,

Mailing Address: Milton de Macedo Soares Neto • Rua Tibiriçá, 11 – Gonzaga – 11055-250 – Santos, SP - Brazil
E-mail: miltonms@cardiol.br

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an angiography of the right ventricle (RV) was performed that showed PVS and prominent dilation of the pulmonary artery. Through a puncture in the right femoral artery, a Judkins 3.5 guide catheter was inserted and a 0.014 inch guide wire was passed through it to directly place the Express II 3.5 x 13 stent implant with a pressure of 14 atmospheres (fig. 1). Subsequently, an extra stiff 0.35 by 220 cm guide wire was positioned distally to the pulmonary artery and the 25 x 40 mm balloon was advanced to perform the pulmonary valvotomy. Complete ablation of the isthmus was achieved with the procedure (fig. 2) and the systolic gradient between the RV and the PT was reduced to 15 mmHg.

Approximately 150 ml of nonionic contrast agent was used, however, due to the previous renal insufficiency a right heart ventriculography was not performed after the procedure. Both the coronary angioplasty and the pulmonary valvotomy procedures were completed within 120 minutes. While still in the hemodynamic lab, immediately following the procedures, the surgery team performed the permanent pacemaker implant.

The patient was released 48 hours after the procedures, asymptomatic and with his heartbeat regulated by the pacemaker.

In a follow-up telephone conversation one year later with the patient's regular doctor, we were informed that the patient remained asymptomatic.

DISCUSSION

Octogenarian patients represent a special subgroup of the elderly. Life expectancy limits are a consequence of an advanced age that hinders any survival analyses. Risks and benefits must be considered independently for each patient when they are submitted to invasive procedures as well as a critical analysis of the patient's general health condition and approximate life expectancy.

In octogenarians, a coronary stent implant is a therapeutic option for patients with coronary disease that do not respond to medicinal treatment. Global mortality rates for this subgroup of patients using this revascularization method vary between 2.2% and 3.5% for elective cases and 14.1 % for acute syndromes that include unstable angina and acute myocardial infarction.

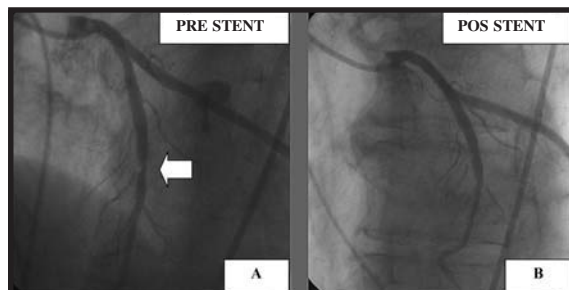


Fig. 1 - A) Left anterior descending artery lesion (arrows); B) repair of stenosis after the stent implant

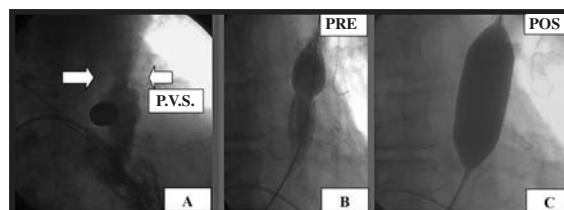


Fig. 2 - A) Severe PVS (arrows); B) balloon inflated and isthmus at the stenosis location; C) stenosis repaired

The factors that are directly related to the elevation of this mortality rate are: severe multiartery coronary disease, diminished left ventricle function, presence of insulin-dependent diabetes, renal insufficiency and the need to perform emergency interventions.

Our patient did not have a history of diabetes, the coronary disease was in a single vessel, the left ventricle function was normal and the stent implant was an elective procedure which resulted in a highly satisfactory angiography result.

Renal insufficiency, or creatinine levels > 1.5 in elderly patients submitted to percutaneous interventions, is associated with a higher comorbidity rate and is an independent indicator of more adverse coronary events^{7,8}. Recent publications have emphasized, on a regular basis, the beneficial effects of administering N-acetylcysteine before any procedures^{9,10}. The success of the procedure depends on previous knowledge of the renal insufficiency condition. Special considerations that should be arranged beforehand include the use of the lowest quantity of contrast agent possible, preferably in doses that do not exceed 2 ml/kg, and the use of nonionic or low osmolality contrast agents, associated with keeping the patient adequately hydrated^{11,12}. These renal protection measures were rigorously followed in our patient.

PVS is rarely found in octogenarian patients and there is only one other documented case in the world medical literature¹³. When this coronary condition is diagnosed in childhood or adolescence, the treatment of choice is a percutaneous pulmonary balloon valvotomy, provided there is a favorable anatomical situation. Pulmonary valvotomy in an elderly patient is also considered the best therapeutic option. Of course anatomical aspects will be considered as, for example, the presence of severe calcification and/or large deformities of the valve annulus and/or cusps.

Our patient did not present excessive pulmonary valve deformities nor exaggerated calcification in the region of the valve commissures. Therefore, the valve dilation was completed successfully using the conventional balloon technique.

A permanent pacemaker implant is an effective treatment for complete atrioventricular block^{14,15}. In octogenarians, complaints of general weakness, dyspnea and temporary loss of consciousness caused by various degrees of atrioventricular blocks are common. Nevertheless, intermittent complete atrioventricular blocks are at times difficult to diagnose and are often found in

symptomatic elderly patients. Therefore, a complete and careful examination of the patient including Holter electrocardiography monitoring over a 24 hour time frame is warranted in these circumstances.

Diagnosis of the 2nd degree atrioventricular block for our patient was made during hospital admission and deteriorated to a complete atrioventricular block in the coronary catheterization laboratory a few minutes before the start of the procedures. Consequently, as a first

measure, a temporary pacemaker was implanted and subsequently the procedure was discussed with the coronary surgeon who successfully implanted the permanent pacemaker after the pulmonary valvotomy and coronary angioplasty were successfully completed.

In conclusion, to our knowledge, this is a rare case and to date no other similar case has been published making it the target of great scientific interest.

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