or replacement during surgery. Preoperative imaging tests (computed tomography and Doppler ultrasound of the femoral vessels) can also show the origin and path of the coronary arteries, providing essential information for remodeling or reimplantation techniques and situations in which one of the coronary arteries passes behind the root (patient #5 in our series). We favor valve-sparing techniques[5,6] (David procedure [figure 1D] or Yacoub technique) in patients with normal-appearing valves and reserve replacement (prosthetic valves, Bentall procedure) for patients with dysplastic valves. Creative solutions are possible in cases of early-onset valve regurgitation after ASO.

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REFERENCES

1. Co-Vu JG, Ginde S, Bartz PJ, Frommelt PC, Tweddell JS, Earing MG. Long-term outcomes of the neoaorta after arterial switch operation for transposition of the great arteries. *Ann Thorac Surg.* 2013;95:1654–1659.
2. Lange R, Cleiziou J, Hörer J, et al. Risk factors for aortic insufficiency and aortic valve replacement after the arterial switch operation. *Eur J Cardiothorac Surg.* 2008;34:711–717.
3. Schwartz ML, Gauvreau K, del Nido P, Mayer JE, Colan SE. Long-term predictors of aortic root dilation and aortic regurgitation after arterial switch operation. *Circulation.* 2004;11:128–132.
4. Pardo C, Pita A, Pérez-Caballero R, Hosseinpour AR, Gil-Jaurena JM. A simple method of truncal valve reconstruction in children. *CTSNet.* 2019. https://doi.org/10.25373/ctsnet.8095406
5. Scheewe J, Attmann T, Hart C, Grothusen C, Voges I, Kramer HH. Neoaortic root aneurysm after the arterial switch operation with Lecompte maneuver. *Ann Thorac Surg.* 2013;96:e77.
6. Liebrich M, Scheid M, Uhlemann F, Hemmer WB. Valve-sparing reimplantation technique for treatment of neoaortic root dilatation late after the arterial switch operation: raising the bar. *Thorac Cardiovasc Surg Rep.* 2014;3:16–18.

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Stress echocardiography in nonhospital centers: need to reorganize imaging units according to guidelines on chronic coronary syndromes

Ecocardiografía de estrés extrahospitalaria: necesidad de adecuar las unidades de imagen cardiaca a la guía europea de síndrome coronario crónico

To the Editor,

Stress echocardiography is used for the diagnosis and prognostic assessment of patients with known or suspected coronary artery disease. In Spain, stress echocardiography is generally carried out in the hospital setting. The latest European Society of Cardiology (ESC) guidelines on chronic coronary syndromes recommend that patients with a pretest probability > 15% should initially be tested by noninvasive functional imaging for myocardial ischemia or coronary computed tomography angiography.[1] The ESC guidelines indicate that the choice of the initial noninvasive test used for diagnosis and to establish prognosis should be based on availability and local expertise. The new recommendation is principally spurred by the low positive and negative predictive value of conventional exercise electrocardiography compared with imaging techniques.[2]

At our center, with a catchment population of 530 000 people, implementation of the new recommendation has led to an increase in the number of stress echocardiograms and a correspondingly sharp reduction in the number of conventional exercise electrocardiography tests. This change has required an operational reorganization of the cardiac imaging unit.

In response to the growing demand for stress echocardiography, a dedicated program has been established at a specialized nonhospital health center that previously carried out conventional treadmill exercise electrocardiography tests. The nonhospital center is located 5 km from the referral hospital, and the estimated ambulance transfer time is normally 10 to 15 minutes.

Here, we report the analysis of the first 200 patients referred to the nonhospital center for stress echocardiography to diagnose coronary artery disease or assess its prognosis.

Studies were performed by a nurse and a cardiologist with expertise in cardiac imaging, and practitioners were trained in stress echocardiography and advanced life support. The stress echocardiography service is equipped with a defibrillator, oxygen equipment, an aspirator, and drugs and instruments required for advanced life support, including all material needed for orotracheal intubation.

Table 1
Baseline characteristics

Patients, N	200
Men	126 (63)
Age, y	63.9 ± 10.7
HT	94 (47)
DM	75 (37.5)
DLP	81 (40.5)
Smokers	64 (32)
Obesity	85 (42.5)
CKD	22 (11)
Previous CAD	29 (14.5)
Baseline LVEF	61.8 ± 5.9
Pretest probability	23.63 ± 14.31
Pretest probability < 5%	10 (5)
Pretest probability 5-15%	63 (31.5)
Pretest probability > 15%	127 (63.5)

CAD, coronary artery disease; CKD, chronic kidney disease; DLP, dyslipidemia; DM, diabetes mellitus; HT, hypertension; LVEF, left ventricular ejection fraction.
Unless indicated otherwise, data are expressed as no. (%) or mean ± standard deviation.

Table 2
Exercise test variables

Atropine	27 (13.5)
Positive echocardiography test	30 (15)
Positive echocardiography test with previous CAD	5 (17.2)
Positive electrocardiography test	12 (6)
MET	7.3 ± 2.4

CAD, coronary artery disease; MET, metabolic equivalents.
Data are expressed as no. (%) or mean ± standard deviation.

All tests were performed on a treadmill using the Bruce method or the modified Bruce method. To increase diagnostic efficiency, a 1 mg intravenous dose of atropine was given to patients with no contraindications and with a very low estimated probability of achieving submaximal heart rate due to low functional capacity or nonwithdrawal of rate-reducing medication.[3] Contrast echocardiography was used in all patients with a suboptimal acoustic window.

Baseline patient characteristics are summarized in table 1. Mean pretest probability according to the 2019 ESC guidelines[1] was 23.63% ± 14.31%. Of the patients studied, 127 (63.5%) had a pretest probability > 15%. No adverse events were recorded during the tests.

The stress echocardiography results are summarized in table 2. Test results were positive in 15% of patients (n = 30). Of these patients, only 40% (n = 12) had positive results in the exercise electrocardiography test. Of the positive echocardiography tests, 4 could not be evaluated electrocardiographically due to the presence of underlying conduction disorders.

Atropine was given to 27 patients (13.5%) in accordance with the safety warnings for this drug. The indications for atropine were as follows: 22 patients took beta-blockers on the day of the test or the day before, 1 was under treatment with more than 1 rate-reducing drug, and 4 were not taking rate-reducing medication but had low functional capacity. No adverse effects were observed.

In Spain, stress echocardiography is the most widely available imaging test for the detection of ischemia. Restricting this test to the hospital setting limits the capacity of health services to respond to the growing demand for this procedure.

In our experience, the use of stress echocardiography in a specialized nonhospital center staffed with trained personnel is safe, allows health services to respond to the growing demand for this test, and increases diagnostic efficiency.

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REFERENCES

1. Knuuti J, Wijns W, Saraste A, et al. 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes. The Task Force for the diagnosis and management of chronic coronary syndromes of the European Society of Cardiology (ESC). *Eur Heart J.* 2020. http://dx.doi.org/10.1093/eurheartj/ehz425.
2. Knuuti J, Ballo H, Juarez-Orozco LE, et al. The performance of non-invasive tests to rule-in and rule-out significant coronary artery stenosis in patients with stable angina: a meta-analysis focused on post-test disease probability. *Eur Heart J.* 2018;39:3322–3330.
3. Peteiro J, Garrido I, Monserrat L, Aldama G, Salgado J, Castro-Beiras A. Exercise echocardiography with addition of atropine. *Am J Cardiol.* 2004;94:346–348.

https://doi.org/10.1016/j.rec.2020.04.027
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Endocardial autonomic denervation in a patient with neurally mediated syncope and severe cardioinhibitory response

Denervación autonómica endocárdica en paciente con síncope neuromediado y respuesta cardioinhibitoria grave

To the Editor,

We present the case of a male patient, a 45-year-old cattle farmer, with presyncopal and syncopal episodes; the last of these events resulted in head trauma. In addition, he had paroxysmal atrioventricular block (AVB) with prolonged pauses, always at rest (figure 1, asterisk). Given his age and the high number of sudden-onset syncopal episodes, we considered that echocardiography and magnetic resonance imaging would be valuable (despite not being specifically recommended in clinical practice guidelines). These techniques ruled out structural heart disease and signs of sarcoidosis. Due to his occupation, we also tested for Lyme disease, which was negative. Adequate tachycardization was seen with exercise (during telemetry monitoring), as well as a syncopal (cardioinhibitory) response in the tilt table test. The proposed management was autonomic modulation via radiofrequency ablation of the ganglionated plexi.

The procedure was performed under mild sedation. Electroanatomical mapping (Biosense Webster, United States) of the left and right atrium (RA) performed with a multipolar catheter (figure 2A-D) failed to identify any notable low-voltage (< 0.5 mV) areas. The patient had a baseline AH interval of 120 milliseconds (figure 2E). The multipolar catheter was then replaced with an ablation catheter, used to apply high-frequency pacing (10-second bursts at 20 Hz for 25 mA/ms) in the region of the ganglionated plexi to identify vagal responses. Because this procedure was sometimes complicated by the induction of atrial fibrillation, anatomical sites of possible relevance were ablated (in the RA, the junction of the superior vena cava [SVC] with the RA in the posterior region and the coronary sinus [CS] ostium [figure 2A]; in the left atrium, the anterosuperior antral region of the right superior pulmonary vein [contralateral to the SVC application] and the left superior pulmonary vein [figure 2B], the posteroinferior region of the left inferior vein [figure 2C], and the area of the ligament of Marshall at its insertion into the CS [figure 2D]). During the radiofrequency ablation, prolonged asystoles were sometimes obtained, up to 9.4 seconds (figure 2F). The AH interval after the ablation was