

Acetylcholine provocation test with resting full-cycle ratio, coronary flow reserve, and index of microcirculatory resistance give definite answers and improve health-related quality of life

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Chest pain is a common ailment in clinical practice, but the optimal approach is still challenging and the subject of debate.^{1,2} A 56-year-old woman with a history of arterial hypertension and dyslipidemia complained of atypical chest pain in the last 7 months, mostly after exertion or at night. Electrocardiogram and echocardiography showed no ischemia. Nevertheless, due to a positive treadmill test, coronary angiography was performed, which revealed normal coronary arteries. During the second consultation, a working diagnosis of ischemia and no obstructive coronary artery disease was made. The following procedures were planned: resting full-cycle ratio (RFR), coronary flow reserve (CFR), index of microcirculatory resistance (IMR) as well as a provocative test with acetylcholine.³ Parameters were assessed using the CoroFlow software (Coroventis, Uppsala, Sweden) and the pressure-temperature sensor guidewire PressureWire X (Abbott Laboratories, Abbott Park, Illinois, United States).

At the beginning of the whole procedure, a 200-mg bolus of nitroglycerin was administered intracoronary. Firstly, to exclude flow-limiting coronary artery disease, we assessed RFR and the value was 1 (FIGURE 1A). CRF and IMR were derived in real time by coronary thermodilution at rest and during hyperemia. To induce steady-state maximal hyperemia, an intravenous infusion of adenosine (140 µg/kg/min) was administered via a large peripheral vein.

To obtain thermodilution, we manually injected 3 ml of normal saline (at room temperature) into the coronary artery via the guiding catheter.

The assessment in the left anterior descending artery revealed CFR of 4.3 (reference range >2–2.5) and IMR of 11 U (reference range ≤25 U) (FIGURE 1B). Then, the acetylcholine provocation test was performed. It disclosed the pronounced spasm in the distal part of the anterior descending artery accompanied by chest pain and ST-segment elevation (FIGURE 1C–1E).

The most important observation from the presented case is that thorough, simultaneously used invasive tests allow to establish the right diagnosis. Application of the new software and coronary devices also makes the procedure swift and lasting no much longer than classic coronary angiography. We decided to perform an acetylcholine test at the end of the procedure, similarly to the CorMicA trial; however, some authors choose to perform this test at the beginning of the procedure.^{4,5}

The right diagnosis allows to modify and intensify pharmacotherapy, which improves symptoms and quality of life. Our patient has remained asymptomatic up to now (12 months) with improved quality of life based on the 36-Item Short Form Health Survey (SF-36) and the Seattle Angina Questionnaire. To our knowledge, this is the first case in Poland showing simultaneous use of RFR, CFR, IMR, and provocative test with acetylcholine in the catheterization laboratory.

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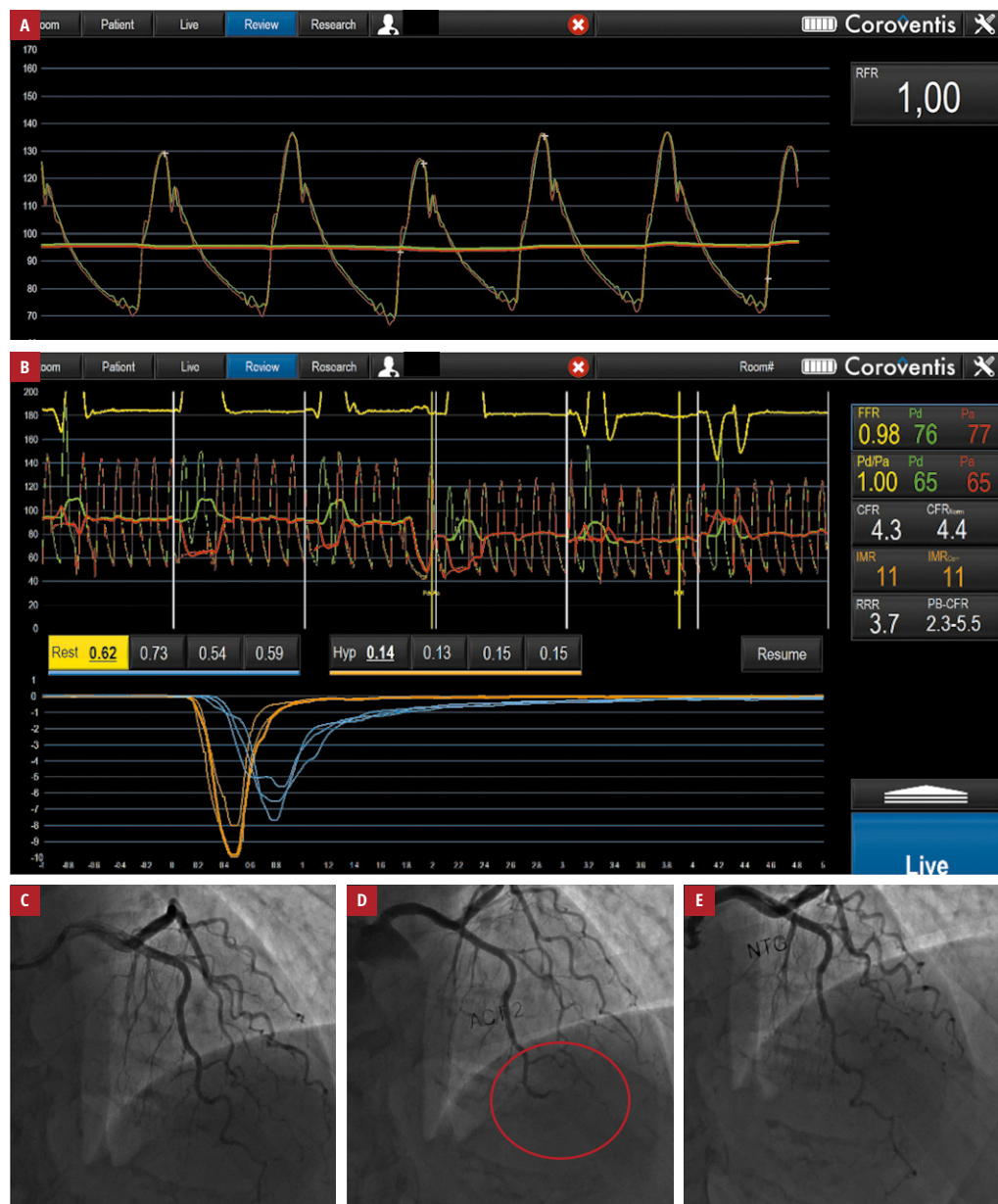


FIGURE 1 A – measurement of resting full-cycle ratio (RFR); B – measurement of coronary flow reserve (CFR) and index of microcirculatory resistance (IMR) with a wireless PressureWire (Abbott Laboratories, Abbott Park, IL) and CoroFlow software (Coroventis, Uppsala, Sweden); C – provocative test with acetylcholine, baseline view; D – the acetylcholine provocation test: at a dose of 50 mg of acetylcholine, a spasm in the distal part of the left descending artery occurred (red circle). E – provocative test with acetylcholine. The spasm was relieved by the administration of nitroglycerin.

ARTICLE INFORMATION

NOTE An online identifier was assigned to JB (ORCID iD, <https://orcid.org/0000-0002-8724-5611>).

CONFLICT OF INTEREST None declared.

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