



Intracoronary Injection of Ergonovine Documented Coronary Spasm but not Intracoronary Injection of Acetylcholine

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Abstract

A 71-year-old Japanese man was admitted to our hospital due to chest pain for further investigations. We performed coronary arteriography because of suspecting coronary spasm. The patient was diagnosed as vasospastic angina by the ergonovine test but not the acetylcholine test. Supplementary use of a pharmacological agent is necessary for documenting coronary spasm in the cardiac catheterization laboratory.

Keywords: Vasospastic angina; Acetylcholine; Ergonovine

Introduction

As a pharmacological agent, cardiologists use an Ergonovine (ER) and Acetylcholine (ACh) according to the formulated guidelines [1,2]. However, ACh acts by way of muscarinic cholinergic receptor, while ER acts through serotonergic receptor. Different medicines may have the potential to induce different coronary responses. Sensitivity and specificity of intracoronary ACh testing in patients with variant angina is 90% and 99%, respectively [3], while sensitivity and specificity of intracoronary ER test in patients with rest angina is 56% to 100% and 99% to 100%, respectively. Furthermore, serious major complications of intracoronary ACh testing had approximately two times higher than that of intracoronary ER tests (0.95% (148/15527) vs. 0.51% (11/2173), $p=0.0386$) [4]. However, both intracoronary tests of 17700 cases had two myocardial infarctions (0.01%) and one death (0.006%).

Case Presentation

A 71-year-old Japanese male patient with resting and effort chest pain who was admitted to the hospital for further evaluation. He had a history of smoking for 15 years but not a current smoker, while he had neither diabetes mellitus, dyslipidemia nor hypertension. Sublingual nitroglycerine was quickly effective to suppress his chest pain attacks. Computed tomography coronary angiography showed mild stenosis (50%) at mid Right Coronary Artery (RCA), whereas thallium adenosine myocardial scintigraphy disclosed no ischemia. Treadmill exercise test at maximum heart rate of 152/min disclosed neither ischemic ECG change nor chest symptom. We performed coronary angiography because of suspecting Vasospastic Angina (VSA). After non-obstructed coronary stenosis was found, intracoronary injection of 20/50/100/200 mg ACh into the Left Coronary Artery (LCA) and 20/50/80 mg ACh into the RCA revealed no provoked spasm (Figures 1A, 1B, 1E and 1F). Intracoronary ER 64 mg into the LCA for 2 min disclosed no coronary constriction (Figure 1D), whereas intracoronary injection of 40 mg ER into the RCA revealed total spasm at the mid RCA accompanied by usual chest pain and ST elevation (2.0 mm) on inferior leads (Figure 1H). After the administration of 300 mg nitroglycerine, we found non-obstructed coronary arteries (Figure 1C, 1G).

Discussion

We diagnosed the patient with VSA and single vessel spasm by ER test but not ACh test. If we performed just ACh testing, we have missed to diagnose the patient as VSA. According to our previous report, the coincidence of provoked spasm artery between intracoronary ACh and ER in the same patients was 55%, whereas the coincidence of provoked spasm-sites and spasm-configurations between the two agents was just 13% of the provoked spasm [5]. Furthermore, ER

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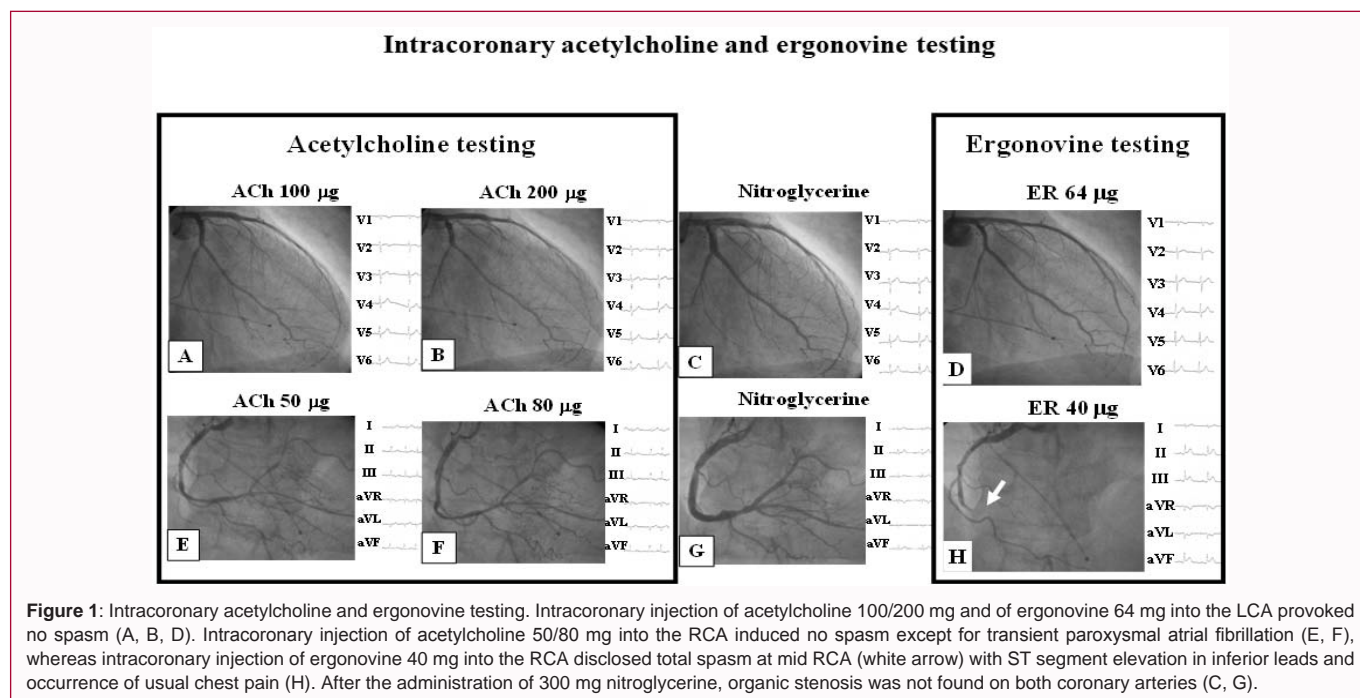
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provoked more focal and proximal spasms, while ACh provoked more diffuse and distal spasms. Many cardiologists do not understand this striking difference between the two agents, because majority of physicians employed each one pharmacological agent as a spasm provocation material in the cardiac catheterization laboratory. Each pharmacological agent may have a potential to reproduce one side of inducible spasm. After cardiologists observe a negative ACh test when they suspect VSA, an additional intracoronary administration of ER may be one option for vasoreactivity testing. A single spasm provocation test has some limitations of documenting clinical spasms, and we recommend supplementary spasm provocation tests whenever possible.

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