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Letter to the Editor

Coronary atherothrombosis in cardiac arrest survivors without ST-segment elevation on ECG

Out-of-hospital cardiac arrest (OHCA) is frequently caused by coronary artery disease. Immediate coronary angiography and *ad-hoc* percutaneous coronary intervention (PCI) improve survival in OHCA patients. Recent European Society of Cardiology and American Heart Association guidelines recommend (class I, level B) performing an urgent coronary angiography only if ST-segment elevation (STE) is present on ECG.[1,2] However, after OHCA, ECG[3] and even conventional coronary angiography alone could fail to detect an acute coronary syndrome (ACS) leading to costly exams and inappropriate treatment.

We investigated the value of 3-vessel optical coherence tomography (OCT) in survivors of OHCA without obvious non-cardiac cause and without STE on ECG when coronary arteries were angiographically mildly diseased (30–70% stenosis), to diagnose plaque rupture, plaque erosion or thrombus, characteristics highly correlated with ACS.[4,5]

All OHCA survivors addressed to our center were included in the prospective Parisian Region Out of Hospital Cardiac Arrest (PROCAT) registry. The PROCAT registry was approved by our local ethics committee and, according to French law, our institutional review board waived the need for written informed consent. All OCT images were analyzed by 2 experienced investigators blinded to the angiographic data and clinical presentations.

Between January 2016 and October 2017, 199 consecutive patients with resuscitated OHCA were included in our center (Fig. 1). Sixty-seven patients with various non-cardiac causes, like respiratory disorders, pulmonary embolism, neurologic disorders and haemorrhage, were excluded. The remaining 132 patients without obvious extra-cardiac cause of OHCA underwent systematic emergent coronary angiography irrespective of ECG findings.

Mean age was 61.8 (13.4) years, 74% were male, no-flow was 4.7 (4.3) minutes and low-flow 21.7 (9.8) minutes, 64% had a shockable rhythm and bystander cardiopulmonary resuscitation (CPR) was initiated in 75% of the patients. Among the 72 patients (55%) without STE on ECG, 32 had mild atheroma, six had an acute complete thrombotic occlusion, and only 34 had angiographically normal coronary arteries. Nine patients with prior coronary bypass or chronic total occlusion were excluded from the study and one patient did not undergo OCT for technical reasons. Among the remaining 22 patients studied by 3-vessel OCT, plaque rupture, plaque erosion and thrombus were present in six (27%), eight (36%) and 13 patients (59%), respectively. At least one section of OCT exhibiting plaque rupture, plaque erosion or thrombus was present in 13 patients (59%). There were no complications related to intravascular imaging. Overall survival with Cerebral Performance Category (CPC)-score 1–2 at one month was 47%. Taken together, 26% (n = 19) of OHCA patients without STE on ECG had at least one feature of an ACS on OCT or an acute complete thrombotic occlusion.

In conclusion, at least one out of four OHCA patients without STE on ECG and without a clear alternative diagnosis had coronary features characteristic of an ACS. These patients could have been misdiagnosed and inappropriately treated in case of symptomatic treatment alone. The systematic use of coronary angiography and the selective use of OCT may guide physicians to improve diagnosis, treatment and prognosis in survivors of ACS-induced OHCA.

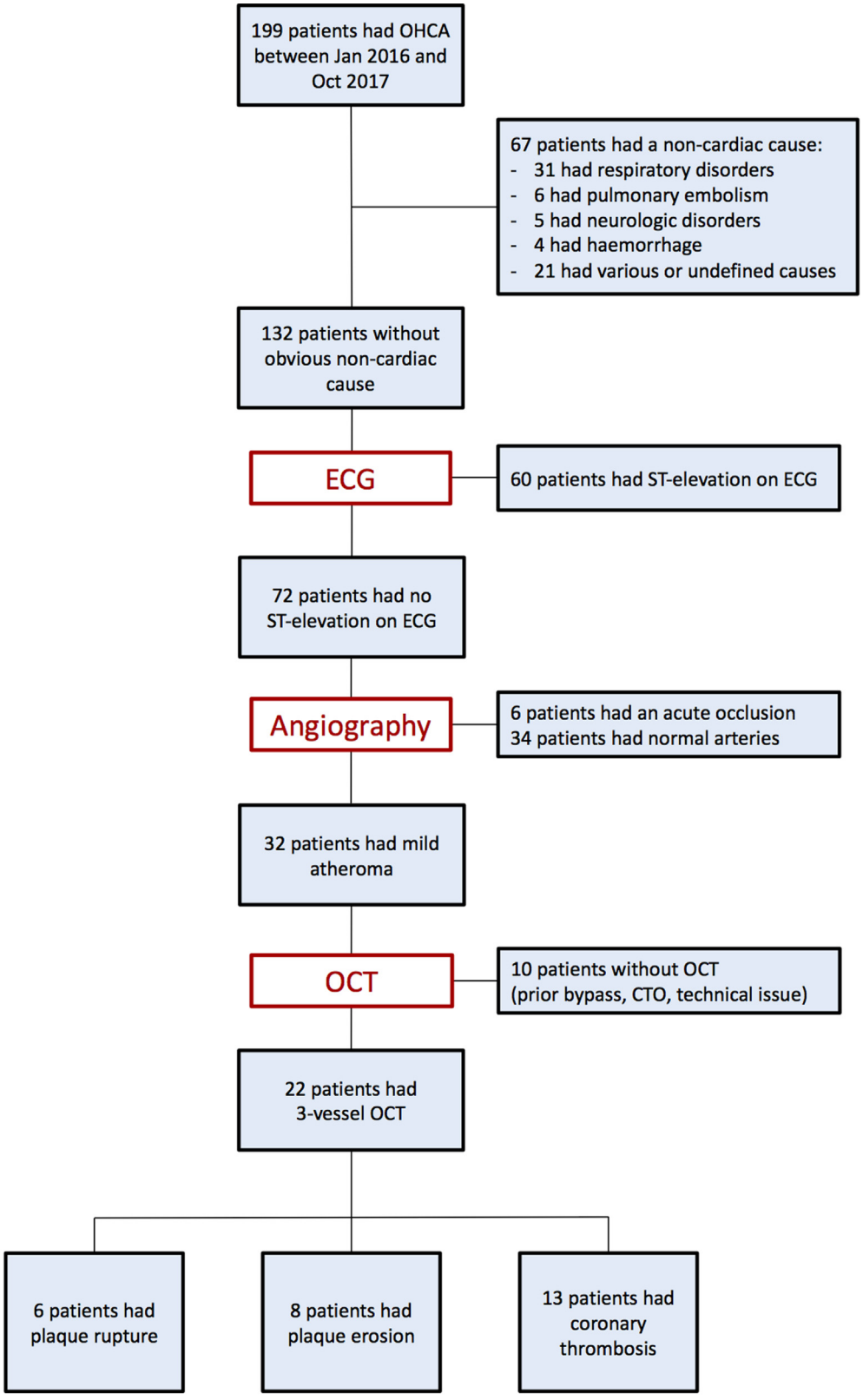

Fig. 1 – Study flowchart.
OHCA: Out-of-hospital cardiac arrest; OCT: optical coherence tomography.

Disclosures

All the authors listed above have nothing to disclose.

Conflicts of interest

The authors declare that they have no conflict of interest.

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