Diagnostic markers for discriminating between acute aortic dissection and acute myocardial infarction during the pre-hospital phase: analysis of 3,195 cases

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Both acute aortic dissection (AAD) and acute myocardial infarction (AMI) present with chest pain and are life-threatening diseases that require early diagnosis and treatment for better clinical outcome. However, two critical diseases in the very acute phase are sometimes difficult to differentiate, especially prior to arrival at the hospital for urgent diagnosis and selection of specific treatment.

The aim of our study was to clarify the diagnostic markers acquired from the information gathered from medical history taking and physical examination for discriminating AAD from AMI by using data from the Tokyo Cardiovascular Care Unit (CCU) Network database.

We examined the clinical features and laboratory data of patients with AAD and AMI who were admitted to the hospital in Tokyo between January 2013 and December 2015 by using the Tokyo CCU Network database. The Tokyo CCU Network consists of >60 hospitals that fulfil certain clinical criteria and receive patients from ambulance units coordinated by the Tokyo Fire Department. Of 15,061 patients diagnosed as having AAD and AMI, 3,195 with chest pain within 2 hours after symptom onset (537 AAD and 2,658 AMI) were examined. The patients with out-of-hospital cardiac arrest were excluded.

We compared the clinical data of the patients with chest pain who were diagnosed as having AAD and AMI. The following indicators were more frequent or had higher values among those with AAD: female sex (38% vs. 20%, P<0.001), systolic blood pressures (SBPs) at the time of first contact by the emergency crew (142 mmHg vs. 127 mmHg), back pain in addition to chest pain (54% vs. 5%, P<0.001), history of hypertension (73% vs. 58%, P<0.001), SBP ≥150 mmHg (39% vs. 22%, P<0.001), back pain combined with SBP ≥150 mmHg (23% vs. 0.8%, P<0.001), and back pain with SBP <90 mmHg (4.5% vs. 0.1%, P<0.001). The following data were less frequently observed among those with AAD: diabetes mellitus (7% vs. 28%, P<0.001), dyslipidaemia (17% vs. 42%, P<0.001), and history of smoking (48% vs. 61%, P<0.001). The multivariate regression analysis suggested that back pain with SBP ≥150 mmHg (odds ratio [OR] 47; 95% confidence interval [CI] 28–77; P<0.001), back pain with SBP <90 mmHg (OR 68, 95% CI 16–297, P<0.001), and history of smoking (OR 0.49, 95% CI 0.38–0.63, P<0.001) were the independent markers of AAD. The sensitivity and specificity of back pain with SBPs of ≥150 mmHg and back pain with SBPs <90 mmHg for detecting AAD were 23% and 99%, and 4% and 99%, respectively.

In patients with chest pain suspicious of AAD and AMI, "back pain accompanied by chest pain with SBP ≥150 mmHg" or "back pain accompanied by chest pain with SBP <90 mmH" is a reliable diagnostic marker of AAD with high specificity, although the sensitivity was low. The two SBP values with back pain are markers that may be useful for the ambulance crew at their first contact with patients with chest pain.