中文題目：利用深度學習模型結合心電圖及胸部 X 光片來診斷主動脈剝離

英文題目：A Deep-Learning Algorithm-Enhanced System Integrating Electrocardiograms and Chest X-rays for Diagnosing Aortic Dissection

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Background: Chest pain is the most common symptom of aortic dissection (AD), but it is often confused with other prevalent cardiopulmonary diseases. We aimed to develop deep-learning models (DLMs) with electrocardiogram (ECG) and Chest X-ray (CXR) features to detect AD and evaluate their performance.

Methods: This study included 43,473 patients in the emergency department (ED) between July 2012 and December 2019 for retrospective DLM development. A development cohort including 49,071 ED records (120 AD-type A and 64 AD-type B) was used to train DLMs for ECG and CXR, and 9,904 independent ED records (40 AD-type A and 34 AD-type B) were used to validate DLM performance. Human–machine competitions of ECG and CXR were conducted. Patient characteristics and laboratory results were used to enhance the diagnostic accuracy. The DLM-enabled AD diagnostic process was prospectively evaluated in 25,885 ED visits.

Results: The AUCs of the ECG and CXR models were 0.918 and 0.857 for detecting AD in a human–machine competition, respectively, which were better than those of the participating physicians. In the validation cohort, the AUCs of the integrated model were 0.882, 0.960, and 0.813 in all AD, AD-type A, and AD-type B patients, respectively, with a sensitivity of 100.0% and a specificity of 81.7% for AD-type A. In patients with chest pain and D-dimer tests, the DLM could predict more precisely, achieving a positive predictive value of 62.5% in the prospective evaluation.

Conclusions: DLMs may serve as decision-supporting tools for AD identification and facilitate differential diagnosis in patients with acute chest pain.