Analysis of three statistical methods to predict the presence of carotid atheromatous plaques

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Mots-clés	Artery [6], Athérome [7], Statistics [8]
Résumé en anglais	Background: At least 15-20% of all ischemic strokes are attributable to atherosclerosis [1]. We analyzed three statistical methods for 12 traditional risk factors (TRF) i.e. age, sex, arterial pressure, Intima Media Tickness (IMT), Pulse Wave Velocity (PWV) in order to predict the presence of carotid atherosclerotic plaques. Methods: We studied 48 patients (27 men, mean age 52+/-10.9) after a vascular screening for atherosclerosis from a metabolic syndrome cohort in a retrospective way. Fourteen patients presented carotid atheromatous plaques confirmed by a trained operator using an ultrasound system. The sensitivity and specificity of the combination of the IMT and the PWV indices with other risk factors were considered using: multiple linear regressions (MLR), support vector machines (SVM) [2] and discriminant analysis (DA). The best combinations of variables were kept for each learning machine. Results: The best sensibility and specificity were obtained using DA. This method reached a sensitivity of 95+/-7% and a specificity of 73+/-36% with an area under the ROC curve equal to 0.84+/-0.35. The other methods showed a sensitivity of 73+/-13% for the MLR method and 53+/-34% for the SVM method with an area under the ROC curve of 0.72+/-0.07 and 0.74+/-0.18 respectively. Conclusion: This preliminary study shows that carotid atherosclerotic plaques could be reliably predicted using discriminant analysis method. Additional studies are needed to confirm the statistical differences observed using this method and to predict the severity of carotid atherosclerosis.
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