Abstracts

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Background: Using CV events during the follow-up period (ROC) analyses were performed on 740 patients for MRPP model for MRPP (ROC) analyses were performed on 740 patients for MRPP and APMHR, using CV events during the follow-up period (ROC) analyses were performed on 740 patients for MRPP and APMHR, using CV events during DSE. However, an APMHR of 89.3% demonstrated a statistically valid model, suggesting a better termination end-point than the previously unverified 85% APMHR during DSE where subjective measures such as fatigue do not apply.

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Background: Dobutamine stress echocardiography (DSE) is a commonly used diagnostic stress test for the assessment of various cardiac pathologies on patients unable to perform exercise. Unlike exercise, there is no reliable subjective termination end-point such as fatigue to rely on. Consequently, DSEs are often concluded at a predetermined age predicted maximal heart rate (APMHR) such as 85%, however the validity of this practice is undefined. The aim of this study was to assess if the maximum rate pressure product (MRPP) and APMHR are valid measures of future cardiovascular (CV) events during DSE.

Methods: Following exclusions, receiver operating curve (ROC) analyses were performed on 740 patients for MRPP and APMHR, using CV events during the follow-up period (3.7 ± 1.3 years) as the outcome variable.

Results: ROC analyses failed to produce a statistically valid model for MRPP (p = 0.130, area under curve (AUC) = 0.556) with a sensitivity and specificity of 24.8% and 90.2% respectively at the optimal cut point (151.47 MRPP). To the contrary, analyses of APMHR demonstrated a heart rate percentage of 89.3 to be a useful predictor of future CV events with a sensitivity and specificity of 70.3% and 60.1% respectively (p < 0.0001, AUC 0.680).

Conclusion: The current study demonstrates MRPP as a poor measure of CV event prediction during DSE. However, an APMHR of 89.3% demonstrated a statistically valid model, suggesting a better termination end-point than the previously unverified 85% APMHR during DSE where subjective measures such as fatigue do not apply.

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S350

Are Rate Pressure Product and Age Predicted Maximum Heart Rate Rate Predictors of Future Cardiovascular Events During Dobutamine Stress Echocardiography?

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Background: Dobutamine stress echocardiography (DSE) is a commonly used diagnostic stress test for the assessment of various cardiac pathologies on patients unable to perform exercise. Unlike exercise, there is no reliable subjective termination end-point such as fatigue to rely on. Consequently, DSEs are often concluded at a predetermined age predicted maximal heart rate (APMHR) such as 85%, however the validity of this practice is undefined. The aim of this study was to assess if the maximum rate pressure product (MRPP) and APMHR are valid measures of future cardiovascular (CV) events during DSE.

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Conclusion: The current study demonstrates MRPP as a poor measure of CV event prediction during DSE. However, an APMHR of 89.3% demonstrated a statistically valid model, suggesting a better termination end-point than the previously unverified 85% APMHR during DSE where subjective measures such as fatigue do not apply.

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S351

Artificial Intelligence Methods for Real-Time Pharmacovigilance Monitoring to Predict Adverse Cardiac Events

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Background: Machine learning methods have previously been applied in pharmacovigilance monitoring, but have focused on natural language processing of text data. Our aim was to apply artificial intelligence methods to linked administrative data to predict major adverse cardiac events from medications at the population level. Our goal was to see if we could detect the increased risk of cardiovascular events and death from rofecoxib that led to its withdrawal from the market in 2004.

Methods: We identified, from Pharmaceutical Benefits Scheme data, patients in Western Australia who were supplied with Cox-2 inhibitors between 01-01-2003 and 31-12-2004. Using linked hospital admissions and death data, patients who died or were admitted within 30 days after the first supply were excluded. Variables from the linked data were used as inputs, and acute coronary syndrome (ACS) admissions or death within one year after the first supply were outputs. We applied artificial neural networks, decision trees and random forests to build models, and measure and optimise their performance.

Results: There were 42,695 patients in the cohort, and 2805 died or were admitted for ACS during follow-up. The multi-layer neural network model yielded the best predictive performance with an area under the receiver operating characteristic curve of 0.73.

Conclusion: Machine learning models applied to linked administrative data have the potential to be used in real-time pharmacovigilance monitoring. Further work is required to optimise the models to improve predictive performance, but our analysis shows that such models would have detected rofecoxib as a drug for close monitoring.

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