Clinical correlates and outcomes of methamphetamine-associated cardiovascular disease among hospitalised patients in California

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Topic(s):
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Background: Methamphetamine abuse is a growing public health crisis, affecting an estimated 33 millions users worldwide. It is associated with the development of several cardiac pathologies, however the incidence and predictors of cardiovascular disease among methamphetamine users remains unclear.

Purpose: We aim to describe the clinical characteristics of methamphetamine users identified from a large cohort of hospitalised patients. Through comparison of methamphetamine users who develop cardiovascular disease (CVD) with those who do not, we aim to identify predictors of these cardiac conditions.

Methods: We studied the clinical and sociodemographic characteristics (via ICD-9 codes) of methamphetamine users using a database of hospitalised patients in California, captured by the Healthcare Cost and Utilization Project (HCUP) between 2005–2011. We used Cox proportional hazards model for incidence of methamphetamine-associated cardiac pathologies (pulmonary hypertension, congestive heart failure, stroke and myocardial infarction) among methamphetamine users.

Results: Amongst 20,249,026 persons in HCUP, we identified n=66,199 patients as methamphetamine users. Methamphetamine users were younger (33±11.6 years) and more frequently male (63.3%) when compared to non-users (45±19.5 years, 44.4% male). They were also more likely to smoke (26% vs 4%) and concurrently abuse alcohol (7% vs 1%).

Methamphetamine use was associated with a 32% increased risk of CVD (HR 1.32, CI 1.26–1.38); higher than those who abuse alcohol (HR 1.28, CI 1.27–1.38), but lower than in those who abuse cocaine (HR 1.47, CI 1.40–1.54), when compared to non-users. Of the 4 CVD types studied, methamphetamine use was most strongly associated with the development of congestive heart failure (HR 1.53) and pulmonary hypertension (HR 1.42). Whilst male gender (HR 1.73) was a significant predictor of myocardial infarction among methamphetamine users, female gender was not found to be a significant risk factor for the development of any of the studied pathologies. Chronic Kidney Disease (HR 2.38, CI 1.74–3.25) and hypertension (HR 2.26, CI 2.03–2.51) were the risk factors most strongly associated with development of CVD among methamphetamine users.

A Kaplan-Meier plot was constructed (figure 1), comparing the time-to-event for development of CVD among users of either methamphetamine, alcohol or cocaine, with non-users. Methamphetamine and cocaine users both had a higher incidence of CVD after 5 years, when compared to those who abuse alcohol only.

Conclusions: Methamphetamine users are at increased risk of CVD when compared to the general hospitalised population. They have a similar risk of CVD as users of cocaine and a higher risk than those who abuse alcohol. Whilst male gender appears to be a risk factor for myocardial infarction among methamphetamine users, there was no significant association found between female gender and the development of CVD in this population.
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A Kaplan-Meier plot was constructed (figure 1), comparing the time-to-event for development of CVD among users of either methamphetamine (Met), alcohol (EtOH) and cocaine, compared with non-users.

Conclusions: Methamphetamine users are at increased risk of CVD when compared to the general hospitalised population. They have a similar risk of CVD as users of cocaine and a higher risk than those who abuse alcohol. Whilst male gender appears to be a risk factor for myocardial infarction among methamphetamine users, there was no significant association found between female gender and the development of CVD in this population.

Figure 1. Kaplan-Meier plot demonstrating time-to-event for development of cardiovascular pathology amongst users of methamphetamine (Met), alcohol (EtOH) and cocaine, compared with non-users.