Cocaine, Amphetamine, and Cannabis Use Increases the Risk of Acute Myocardial Infarction in Teenagers

Multiple adult-related studies have confirmed the increased risk of acute myocardial infarction (AMI) in cocaine, amphetamine, and cannabis users. Since there are limited data involving the risk of these substances with AMI in teenagers, we hereby conducted a retrospective analysis using the "2012 Kids' Inpatient Database, Healthcare Cost, and Utilization Project, Agency for Healthcare Research and Quality" and their partners which consisted of more than 1,000 US hospitals.[1]

The age of study was set from 13 to 19. The International Classification of Diseases, Ninth Revision, Clinical Modification codes for AMI, cocaine dependence and abuse, amphetamine dependence and abuse, and cannabis dependence and abuse were used.[2] Chi-square tests were performed on SPSS 20, and logistic regressions were also calculated.

A total of 333 weighted (238 unweighted) cases of AMI were registered in the database. Twenty cases also had a history of cocaine use, while 53 and 15 used cannabis and amphetamine, respectively, as shown in Table 1. Simple logistic regression was further used, and the odds ratio of AMI was 5.033 with cannabis (95% confidence interval [CI] 3.477 to 7.284, p <0.01), 7.442 with cocaine (95% CI 3.930 to 14.093, p <0.01), and 4.108 with amphetamine (95% CI 2.156 to 7.827, p <0.01) in teenagers. The mortality rate in teenage AMI patients was 12.1% (40 deaths).

Table 1
Statistical representation of the risk of AMI with cocaine, cannabis, and amphetamine use

Characteristic	AMI	*p* Value	OR, 95% CI
Cocaine use			
Yes	20	<0.01	7.442, 3.930-14.093
No	313		
Cannabis use			
Yes	53	<0.01	5.033, 3.477-7.284
No	280		
Amphetamine use			
Yes	15	<0.01	4.108, 2.156-7.827
No	318		

There are multiple pathways involved in the pathogenesis of AMI with the use of either of these drugs. Cocaine and amphetamine can inhibit the reuptake of norepinephrine which leads to an increase in blood pressure as well as heart rate. As a result, the myocardial demand for oxygen will increase. They can also cause coronary vasospasm leading to decreased oxygen delivery, thus potentiating the risk for AMI.[3] Cannabis can cause vasodilation that leads to reflex tachycardia. Several studies have shown that there is also an increased risk of coronary arterial vasospasm with cannabis use.[4]

Kamleshun Ramphul, MD[a,*]
Stephanie G. Mejias, MD[b]
Jyotsnav Joynauth, MD[c]
[a] Shanghai Jiao Tong University School of Medicine, Shanghai, China
[b] University Iberoamericana Unibe School of Medicine
[c] Zhejiang University
[*] Corresponding author. Tel: +23058283027; fax: +23058283027.
(adramphul@hotmail.com)
17 October 2018
26 October 2018

1. HCUP Kids' Inpatient Database (KID). Healthcare Cost and Utilization Project (HCUP). 2012. Agency for Healthcare Research and Quality R, MD. [cited 2018 10th October]. Available from: www.hcup-us.ahrq.gov/kidoverview.jsp
2. HCUP Clinical Classifications Software (CCS) for ICD-9-CM. Healthcare Cost and Utilization Project (HCUP). 2006-2009. Agency for Healthcare Research and Quality R, MD. [cited 2018 10th October]. Available from: www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp.
3. Egred M, Davis GK. Cocaine and the heart. *Postgrad Med J* 2005;81:568–571.
4. Franz CA, Frishman WH. Marijuana use and cardiovascular disease. *Cardiol Rev* 2016;24:158–162.

https://doi.org/10.1016/j.amjcard.2018.10.019