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After hepatitis C cure, kidney problems linked to cocaine use

29 March 2018

- **Kidney health usually stabilizes for most people after hepatitis C is cured.**
- **Injecting cocaine after cure associated with rapid decline in kidney health.**
- **Healthcare providers urged to investigate causes of declining kidney health.**

Co-infection with hepatitis C virus (HCV) occurs among some HIV-positive people due to shared routes of infection.

HCV infects the liver and in many cases this causes chronic infection and inflammation within this organ. HCV also infects some cells of the immune system and chronic HCV infection causes inflammation and activation of the immune system. Over time, healthy liver tissue is gradually replaced with useless scar tissue in a process called fibrosis. As more of the liver becomes scarred, it becomes increasingly dysfunctional. As a result, the risk for developing complications increases, including lack of energy, internal bleeding, abdominal infections, difficulty with memory and thinking clearly, liver failure, liver cancer and death.

Today, antiviral therapy for HCV consists of pills or tablets taken every day, usually for between eight and 12 weeks. These treatments are highly effective, with cure rates in clinical trials reaching 95% or greater.

Curing HCV can result in many benefits, including the following:

- improved quality of life
- decreased risk for liver-related complications
- better control of pre-diabetes or diabetes
- improved chances of survival

Focus on the kidneys

The health of the kidneys tends to degrade in people with HIV-HCV co-infection. Researchers with the Canadian Co-Infection Cohort sought to study changes in kidney health among people who were cured of HCV. They expected that after HCV cure, the health of the kidneys would stabilize, and this did happen to some people. However, for people who used cocaine after being cured of HCV, the health of their kidneys declined at a relatively rapid pace.

The researchers encouraged doctors and nurses to monitor the kidney health of their patients who are cured with a commonly used assessment called eGFR (estimated glomerular filtration rate). Should eGFRs decline at a relatively rapid rate (suggestive of kidney injury and dysfunction), the researchers recommended that clinicians refer their cocaine-using patients to substance-use treatment services.

Study details

The Canadian Co-Infection Cohort is an observational study that monitors the health of co-infected people across Canada. For the present analysis, researchers used data collected between January 2003 and December 2016.

Researchers focused on data from 384 people who initiated HCV therapy and who were cured. The researchers compared data from the cured people with data from 768 people who were not cured (from the same study) and who were demographically similar to the people who were cured. Information about substance use was self-reported during interviews or in questionnaires.

The average profile of participants upon entering the study was as follows:

- age – between 45 and 55 years
- 22% female, 78% male
- 12% injected cocaine; 18% inhaled cocaine
- 12% injected opioids; 17% took opioids by other means
- 18% consumed what the researchers termed “hazardous” quantities of alcohol
- CD4+ count – 530 cells/mm³
- proportion with detectable viral loads – 9%
- proportion with prior AIDS-related illness – 29%
- current use of tenofovir DF – 56%
- duration of HIV infection – 21 years
- proportion with higher-than-normal blood pressure – 15%
- proportion with diabetes – 7%
- eGFR level – 91 (in a healthy person, eGFR is usually greater than 90)

Results

After participants were cured, researchers found that eGFR levels declined faster among people who injected cocaine. If these trends were to continue, researchers expected that after five years eGFR levels would be distributed as follows:

- people who injected cocaine – eGFR: 76
- people who did not use street drugs – eGFR: 86

Recall that at the start of the study all participants had eGFRs within the healthy range. An eGFR value of 76 puts them within stage 2 kidney disease. However, as the decline of eGFR that accompanies the regular injection of cocaine is fairly constant, at least in the present study, continued use of cocaine can cause the kidneys to decline further.

Bear in mind

The findings from the Canadian analysis are similar to those reported in recent studies with people co-infected with HIV and HCV in Italy and Switzerland.

The researchers stated that “HCV has been implicated as an important risk factor for metabolic, cardiovascular, kidney and neurological [problems].” It is likely that a combination of related factors also plays a role in the development of these problems, including chronic inflammation and immunological activation of the immune system.

The researchers stated that other factors not directly related to HCV that likely play a role in the previously mentioned problems include “drug and alcohol use, poor nutrition and HIV-related issues.” The researchers added that certain co-existing health problems found in some co-infected people—cardiovascular disease and chronic kidney disease—may not necessarily improve when HCV is cured.

Note that in the present study participants had HIV-HCV co-infection for about two decades and had normal eGFR levels upon entering the study. This suggests that HCV infection was not an important contributor to kidney injury.

The researchers noted that cure of HCV may have more of a positive impact on the kidney health of certain populations, such as some people of African descent with certain genes, people with extensive scarring of the liver (cirrhosis), or people with diabetes. However, the researchers found that there were insufficient numbers of these people in their study, so they cannot draw firm conclusions about the impact of HCV cure in them.

Cocaine vs. cocaine with contaminants

The stimulant cocaine temporarily raises blood pressure and heart rate and narrows blood vessels. This increases the heart’s need for oxygen while simultaneously reducing the oxygen available, which can cause chest pain. Also, researchers have found that the risk of a heart attack is significantly increased within the first hour after exposure

to cocaine. As the kidneys filter blood, these organs are rich in blood vessels. Therefore, the use of cocaine has the potential to injure the kidneys.

Cocaine can also injure muscle cells, and muscles in the chest that are injured by cocaine may be the cause of some of the chest pain that users may experience. Also, the heart is a large muscular pump and cocaine's impact on muscle tissue may in part explain its cardio-toxic effect in some users. Cocaine can also cause abnormal heart rhythm. The use of cocaine is also associated with an increased risk for stroke.

Cocaine is diluted, or "cut," with other substances. These substances can vary over time and from one city to another and from one supplier to another. To better understand how cocaine injures the kidneys, researchers have tested purified cocaine in laboratory experiments with human kidney cells. They found that even relatively low concentrations of cocaine can cause kidney cells to die. Therefore, cocaine is directly toxic to the kidneys.

From time to time, authorities have found batches of cocaine cut with the veterinary drug levamisole. This drug can also cause kidney injury. So, it is possible that people who use cocaine contaminated with levamisole are at heightened risk for kidney injury.

Moving forward

As mentioned earlier, cure of HCV is associated with many benefits. The Canadian Co-Infection Cohort researchers encourage doctors and nurses who monitor patients cured of HCV and who have declining eGFRs to investigate the cause of declining kidney health. In cases where kidney injury is caused by cocaine use, the researchers urge doctors to refer these substance-using patients to other healthcare professionals who can help them begin the process of recovery from stimulant use.

Stages of kidney disease

eGFR is useful for assessing kidney health and, specifically, how well the kidneys are functioning. Here are the [U.S. National Kidney Foundation](#) stages of kidney disease graded by eGFR levels:

- Stage 1: eGFR of 90 or greater – normal kidney function
- Stage 2: eGFR between 89 and 60 – mild loss of kidney function
- Stage 3a: eGFR between 59 and 45 – mild-to-moderate loss of kidney function
- Stage 3b: eGFR between 44 and 30 – moderate-to-severe loss of kidney function
- Stage 4: eGFR between 29 and 15 – severe loss of kidney function
- Stage 5: eGFR less than 15 – kidney failure

Resources

[Canadian study links cocaine to kidney injury and dysfunction in some users](#) – *CATIE News*

[Kidney Health](#) – *A Practical Guide to a Healthy Body for People Living with HIV*

[Ask the Experts: Kidney Health](#) – *The Positive Side* (Winter 2012)

[Kidneys Take Centre Stage](#) – *The Positive Side* (Winter 2012)

—Sean R. Hosein

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Production of this content has been made possible through a financial contribution from the Public Health Agency of Canada.

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