

## Examining the Relationship between Cocaine and Heart Failure

Purpose: The purpose of this learning activity is to make nurses aware that among a younger patient population, without previous cardiovascular symptoms, illicit drug abuse is a common cause of Heart Failure.

Upon completion of this course the nurse will be able to:

1. Define the “Readiness to Change” Model of Behavioral Change.
2. Identify the different educational needs of younger heart failure patients abusing drugs.
3. Explain the Six Stages of Behavioral Change.

Heart failure is the most common adult cause of hospitalization, with more than one million hospitalizations annually in the U.S. (Rosamond et al.) According to the American Heart Association (AHA), approximately two million Americans, most of whom are Medicare enrollees, have heart failure (Rosamond et al., 2007). The heart failure population, also has one of the highest readmission rates ranging from 25 to 50% within six months of a hospitalization (Jerant, Azari, & Nesbitt, 2001). This results in direct and indirect costs of more than \$33 billion per year in the U.S.(Rosamond et al.).

There is one subset group of younger heart failure adults: persons who have abused cocaine. Of interest, the acute decompensated heart failure national registry (ADHERE) registry has reported that drug use is the most frequent variable associated with younger decompensated persons presenting to the emergency room (96% cocaine use, 5% methamphetamine use). Cocaine abuse is one of the most commonly used illicit drugs; it accounts for half a million visits per year to the emergency room (McCord, et al, 2008). Use of this drug in the United States is widespread: approximately 25 million Americans have used the drug. It is estimated that at least 5 million Americans use the drug regularly. Thus, cocaine users with heart failure are younger with an average age of 58 versus 63 for non-drug users (Bart, 2010). Patients with stimulant drug use are more likely to have  $\geq 3$  hospitalizations within a 6 month period and drug abusers are more likely to have lower ejection fractions than non users (median, 23% versus 40%). Interestingly, cocaine users also have a lower prevalence of hypertension, coronary artery disease and a lower left ventricular ejection fraction (Bart). Bart also reported that cocaine users have a 6 month hospital readmission rate of 57% compared to nonusers. Hospital

admissions for the cocaine user typically occur as an admission for decompensated heart failure.

**Physiology:**

Cocaine may affect the heart in different ways depending on the purity of the substance, contaminants in the drug preparation, adjuvants in the drugs of abuse, route of delivery and chronicity of drug abuse. Typically, cocaine causes systolic dysfunction in long-term users. In heart failure, there are two types of dysfunction: systolic and diastolic. Systolic dysfunction is characterized by decreased ejection fractions, and ischemic heart disease. Systolic heart failure leads to decreased stroke volume and cardiac output. Diastolic heart failure in the general population is more common among females; it is failure of the ventricle resulting in pulmonary symptoms, such as pulmonary congestion.

It is believed that ingesting cocaine stimulates platelet hyperaggregability and increases thromboxane production (Awtry, & Philippides, 2010). Some pathological studies have shown contraction band necrosis in the hearts of patients with cocaine cardiomyopathy (Tazelaar, Karch, & Stephens, 1987). This pathology suggests that chronic catecholamine stimulation may play a role in the development of cocaine cardiomyopathy. In autopsy results, Virmani, Robinowitz and associates (1989) reported that of 40 cocaine using patients, cocaine may have exerted direct toxic effects on the myocardium, resulting in myocardial inflammation, interstitial fibrosis, ventricular dilation, and clinical heart failure. Lange and others (1989) found that intranasal cocaine, even in low doses, produced large reductions in coronary vessel diameter and large increases in coronary vascular resistance in patients with and without preexisting atherosclerotic lesions. These vascular effects of cocaine occurred despite marked increases in myocardial oxygen demand. Cocaine in essence created an imbalance between oxygen supply and demand, increasing the probability for ischemic events and cardiac arrhythmia's.

The exact amount and duration of cocaine use necessary to develop heart failure is not well known (Awtry & Philippides, 2010). Thus, it becomes important for the health care team to ask about a history of drug abuse during any assessment, but particularly if the person presenting with heart failure is less than 50 years of age. The symptoms for the drug user will be similar to other heart failure patient

symptoms: sudden onset of shortness of breath, lower extremity edema, anxiety, nausea and or fatigue. Some patients may also present in full pulmonary edema or in cardiogenic shock (Awtry & Philippides).

### **Drug History Assessment:**

Nurses should be competent in obtaining drug histories from their patient's. A drug history should include use and frequency, as well as patterns and habits in combining drugs (this includes alcohol). Self-reported use is the primary method of assessing for substance abuse in the health care setting. The Alcohol, Smoking, Substance Involvement Screening Test (ASSIST) questionnaire can be used in the acute care setting. It is a seven question tool that provides basic screening related to substance abuse. Question 1 asks about the lifetime use of substance/s. Question 2 asks about use in the past 3 months. Question 3, 4,5 asks about each substance. Questions 6 and 7 asks about each substance and concern by family that the person may be abusing (WHO, 2006).

There are several methods that can be used to address the drug abuse while the patient is in the acute setting: brief intervention is one such method. The timing of the intervention will need to vary depending on the patient's symptomology and degree of fatigue, shortness of breath and or agitation. A brief intervention may consist of a short face to face intervention with a psychologist or a counselor. The psychologist or counselor should focus education on motivational factors that may be used to avoid cocaine, or a therapist can be engaged to teach behavioral change skills, with the goal of reducing cocaine use.

### **Stages of change**

Developed almost 20 years ago, Carlo C. DiClemente and J. O. Prochaska, introduced a six-stage model of change to help professionals understand addiction problems and motivation to change. Their model is based on observations of how people go about modifying problem behaviors such as smoking, overeating and problem drinking. The following levels of motivation have been identified:

- Being uninterested, unaware or unwilling to make a change (precontemplation)

- Considering a change (contemplation)
- Deciding and preparing to make a change

The six stages of the model are:

- Precontemplation
  - During the precontemplation stage, heart failure patients may be in denial, they may not even realize that the instructions apply to them personally.
- Contemplation
  - During the contemplation stage nurses may hear comments such as “I know I should, BUT . . .” The nurse can assist the client in the contemplation stage by actually providing showing pictures of a heart before and after cocaine use. The nurse can further assist the client during this stage by providing positive reinforcement regarding how well they are doing in relation to cutting down on the drug abuse.
- Determination
  - During the determination stage, the person with drug abuse will need additional counseling that may be provided with the help of the discharge nursing team. Reinforcement should be centered on drug abstinence.
- Action
  - The action stage will occur after the person has been discharged from the hospital, the acute setting staff should follow up with praise and reinforcement of the change in behavior. Staff can reinforce fluids, sodium or drug abstinence.
- Maintenance (Maintaining the desired behavior change)

The patient can be encouraged to maintain a diary showing a consistent reduction in drug use, or showing he or she is making all of the visits to the psychiatrist.

- Termination

In this stage, the patient completes the goal.

In summary, before a patient is enrolled in any class or intervention, readiness to change should be assessed. If the patient verbalizes they are ready to change, then the healthcare organization should facilitate assistance in removing the risky behavior. Additionally, teaching strategies will also need to include education similar to those of other heart failure patients, with emphasis regarding low sodium foods, low sodium drinks (not using sports drinks), fluid overload avoidance, medication adherence, and daily weight instructions. The instructions need to be specifically customized to be relevant to the life style of the younger patient.

Depending on the fiduciary capabilities of the client, and readiness to change, the importance of taking prescribed heart failure medication should be emphasized. The nursing assessment should direct the nurse in obtaining appropriate resources/referrals. Some clients may find that they prefer to use their money on illicit drug versus prescribed medication that may assist in controlling symptoms. The substance using client may need very different resources. Nursing and social workers may need to work together to determine fiduciary assistance.

The following is a true case study of a 33 year old user of cocaine who was having his first admission for acute decompensated heart failure (ADHF). A 33 year old, overweight African American man was admitted to a heart failure unit. The man had a positive history of cocaine use, with the most recent use being less than 30 days ago. The man had been admitted through the emergency room with a diagnosis of ADHF. Upon stabilization and transfer to the unit, the physician ordered a 2 gram low sodium, and one liter restricted fluid diet. No education had been provided during acute diuresis. After 5 hours of the admission, the patient sent his girlfriend to get him a bacon, egg and cheese biscuit, with a large cup of coffee. The fact that the patient has ordered a fast food breakfast that

is loaded with salt, fat and a 400 ml cup of coffee at one sitting indicates the person has no concept of the disease pattern. It is only through careful assessment of readiness that a behavioral change can be successfully implemented. The nurse caring for the drug abuse/heart failure patient should provide empathetic reflective listening while assisting the patient through the process of contemplating to make a change in behavior.

In summary, the young heart failure patient without a history of coronary artery disease should be assessed for drug abuse. Specific interventions to increase success rates with compliance of discharge instructions should include assessing readiness to change as well as a concise drug use history. The illicit drug using heart failure patient will require successful engagement for relevant and sustainable changes to occur.

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