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## Clinical Scenario

CC: C/o chest pain when arrested by the police

31 yo man who claims a history of "heart murmur", "irregular heart rhythm", and an MI 2 years ago s/p revascularization in "St. Matthews hospital" in Albany (when called to confirm records found no such hospital), indulges in polysubstance abuse including cocaine, heroin, EtOH, and tobacco, was in his USOH (unlimited ET) when he developed chest pain after using cocaine. He claims that the pain was pressure-like, radiates to the left arm, associated with nausea/diaphoresis, and worsens with exertion. However, he also says that the pain is reproducible by palpation and worsens by deep inspiration. He was able to run to multiple subway stations to find his girlfriend as he is having this chest pain and was arrested on the subway by police while using cocaine. After the arrest, he c/o chest pain which he claimed to be relieved by nitroglycerin. He was admitted to CPMC ER. His initial vitals were significant for HTN and tachycardia which resolved. EKG was normal, troponin negative x 2. He was given ASA, ativan, and nitropaste.

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## Search

Searched on Medline with keyword "cocaine" with subheading "adverse effect", "poisoning", "toxicity", then limited to English and human yielded 1768 articles. Then searched on Medline with keyword "chest pain" with subheading "chemically induced", "diagnosis", and "economics", limited to English and human yielded 1201 results. Combining these two yielded 23 results, one of which, "Validation of a Brief Observation period for patients with cocaine-associated chest pain" by Weber et al in NEJM 2003; 348:510-517, Feb 6, 2003 will be presented.

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## I. Are The Results Valid?

### A. Primary guide

#### 1. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?

- Enrolled consecutive patients from January 1, 1998, to January 1, 2000, with following characteristics:

- a) 18 years or older,
- b) patients who reported that they had used cocaine during the week before presentation or if the results of toxicologic urine screening revealed cocaine metabolites (all patients under age 50 with CP as chief complaint got urine tox).
- c) chest pain is chief complaint

History is assessed by a closed ended questionnaire that was reported to have "excellent inter-rater reliability in this population."

Excluded:

- a) patient whose chest pain is clearly explained by non-cardiac causes (local trauma...etc)
- b) high-risk patients defined as those whose initial electrocardiogram suggested the presence of ischemia or acute myocardial infarction, ST-segment elevation or depression of 1 mm or more that persisted for at least one minute; elevated serum levels of cardiac markers; recurrent ischemic chest pain; or hemodynamic instability.

EKG changes is put into one of six categories with the use of a closed-question instrument. The possible classifications were as follows: normal, nonspecific ST-T changes, abnormal but not diagnostic of

ischemia, diagnostic of ischemia or previous infarction not known to be old, diagnostic of ischemia or previous infarction known to be old, or suggestive of acute myocardial infarction (Cohen's kappa, 0.69; weighted kappa, 0.95)

Cardiac markers were measured at the time of presentation in the emergency department and three, six, and nine hours after presentation. Patients had continuous 12-lead monitoring. Initially, all patients who are troponin negative at 9hrs into the protocol underwent a stress test, but due to the low rate of positive stress tests, this was later on discontinued (158/302 were stressed, positive 3% of the time).

1. The individuals in the study are well-defined (of note, used very "hard" criteria- EKG changes, positive enzymes, HD instability to exclude these patients).

2. They are representative of the underlying population:

-consecutively recruited

-Hurley hospital is a 463 bed tertiary teaching hospital in Flint, Michigan.

-The authors claims that their patient population is representative. In the Prospective multicenter evaluation of cocaine-associated chest pain, following characteristics noted: The patients had a median age of 33 years. The majority were male (71.5%), non-white (83.3%), cigarette smokers (83.3%) who used cocaine regularly. Chest pain began a median of 60 minutes after cocaine use and persisted for a median of 120 minutes. Chest pain was most frequently described as substernal (71.3%) and pressure-like (46.7%). Shortness of breath (59.3%) and diaphoresis (38.6%) were common.

## 2. Were patients all at similar point in their illness?

No. Risk is highest right after use, 68% in this population used it in the last 24 hrs.

-some patients in this study have more cardiac risk factors then others

Characteristic	Value	Characteristic	Value
<b>Mean (±SD) age — yr</b>	37.6±9.3	<b>Characteristics of chest pain (cont.)</b>	
<b>Male sex — no. (%)</b>	198 (66)	<b>Associated symptoms‡:</b>	
<b>Race or ethnic group — no. (%)</b>		Shortness of breath	190 (63)
Black	211 (70)	Diaphoresis	104 (34)
Hispanic	7 (2)	Palpitations	41 (14)
White	75 (25)	Nausea	90 (30)
Other or unknown	9 (3)	Vomiting	24 (8)
<b>Cardiac risk factors — no. (%)<sup>*,†</sup></b>		Syncope	8 (3)
Hypertension	51 (17)	<b>Vital signs at presentation — no. (%)</b>	
Hypercholesterolemia	12 (4)	<b>Systolic blood pressure</b>	
Family history of coronary artery disease	93 (31)	≥140 mm Hg	109 (36)
Diabetes mellitus	10 (3)	>90–139 mm Hg	187 (62)
Current tobacco use	255 (84)	≤90 mm Hg	6 (2)
<b>Medical history — no. (%)<sup>*</sup></b>		<b>Diastolic blood pressure</b>	
Self-reported chest pain	137 (45)	>90 mm Hg	55 (18)
Myocardial infarction	6 (2)	≤90 mm Hg	247 (82)
Congestive heart failure	3 (1)	<b>Heart rate</b>	
Arrhythmias	4 (1)	>100 beats/min	67 (22)
<b>Characteristics of chest pain — no. (%)</b>		60–100 beats/min	218 (72)
<b>Location</b>		<60 beats/min	17 (6)
Substernal	226 (75)	<b>Respiratory rate</b>	
Left side only	55 (18)	>25 breaths/min	13 (4)
Right side only	10 (3)	10–25 breaths/min	289 (96)
Other or unknown	11 (4)	<b>Electrocardiogram</b>	
<b>Quality</b>		Normal	122 (40)
Pressure, tightness, or squeezing	174 (58)	Nonspecific ST-T changes	121 (40)
Sharp or stabbing	80 (26)	Abnormal but not diagnostic of ischemia	42 (14)
Aching or dull	18 (6)	Diagnostic of ischemia known to be old	11 (4)
Burning or sensation of indigestion	10 (3)	Diagnostic of ischemia not known to be old	6 (2)
Other or unknown	20 (7)		
Pleuritic component	70 (23)		

\* Cardiac risk factors and previous medical problems were reported by the patients.

† Several patients had more than one cardiac risk factor. Twenty-five patients had no cardiac risk factors (8 percent), 165 had one risk factor (55 percent), 85 had two risk factors (28 percent), 23 had three risk factors (8 percent), and 4 had four or more risk factors (1 percent).

‡ Some of the patients had more than one symptom.

### 3. Was follow up sufficiently long and complete?

- debatable whether sufficiently long. Used cardiovascular death and non-fatal MI as end point. On one hand, would like to prevent MI for more than 1 month. On the other, most users of cocaine continue to abuse the drug so it is unclear whether future event could truly be prevented.
- Follow-up is sufficiently complete. Before discharge, ask patients to provide contact. 82% of the patients were directly contacted. Able to contact friends/relatives/PMD of another 15% of the patients, all of whom are in touch with the patient at the time.

### 4. Was there adjustment for important prognostic factors?

-No adjustment for previous cardiac disease, presence of cardiac risk factors, or time of onset of pain s/p use, difference of pharmacologic treatment in the ER (93% got ASA, 90% got nitrates, 30% got benzos, and 1% got b-blockers).

## II. What Are The Results?

<b>Outcome</b>	<b>No. of Patients</b>	<b>Percent (95% CI)*</b>
Death from cardiovascular causes	0/302	0 (0–0.99)
Ventricular dysrhythmias	0/256	0 (0–1.2)
Nonfatal myocardial infarction	4/256	1.6 (0.1–3.1)
Recurrent chest pain	63/255	24.7 (19.4–30.0)
Recurrent cocaine use	64/254	25.2 (19.9–30.5)
Cocaine counseling after discharge	21/251	8.4 (4.9–11.8)

\* CI denotes confidence interval.

**Table 4. Characteristics of the Four Patients with Nonfatal Myocardial Infarction during the 30-Day Follow-up Period.**

Characteristics at Presentation	Findings on Initial Evaluation	Diagnoses at Discharge	Cardiac Medications at Discharge	Course after Discharge
42-year-old male smoker; taking no medications	Acute myocardial infarction ruled out; abnormal result on dipyridamole stress testing; after admission, nonocclusive disease found on catheterization	Noncardiac chest pain, alcoholic cardiomyopathy, diabetes mellitus	Aspirin, insulin	Continued to use cocaine after initial evaluation; had a myocardial infarction despite nonocclusive coronary artery disease
39-year-old female smoker with hypertension and congestive heart failure; taking digoxin, furosemide, spironolactone, and captopril	Acute myocardial infarction ruled out	Noncardiac chest pain, hypertension, alcoholic cardiomyopathy	Aspirin, digoxin, furosemide, spironolactone, captopril	Continued to use cocaine after initial evaluation; had a myocardial infarction; was found to have nonocclusive coronary artery disease
58-year-old male smoker with diabetes mellitus; taking metoprolol and glyburide	Acute myocardial infarction ruled out; indeterminate result on exercise stress test and then a normal result on dipyridamole sestamibi scanning	Noncardiac chest pain, diabetes mellitus	Aspirin, glyburide	Continued to use cocaine after initial evaluation; was referred for outpatient cardiac catheterization; 3 days after discharge and before catheterization, he presented with a myocardial infarction; was found to have two-vessel coronary disease on catheterization; underwent coronary-artery bypass grafting
41-year-old male smoker with hypertension; taking aspirin and atenolol	Acute myocardial infarction ruled out	Noncardiac chest pain, hypertension	Aspirin	Continued to use cocaine after initial evaluation; had a myocardial infarction; was found to have severe two-vessel disease on catheterization; underwent angioplasty of both vessels

### III. Will The Results Help Me In Caring For My Patients?

#### 1. Were the study patients similar to my own?

Yes

#### 2. Will the results lead directly to selecting or avoiding therapy?

Would be nice to have a chest pain unit for brief observation

Young patients without significant cardiac risk factors in this group except smoking can probably be d/c without a stress test.