Early use of beta blockers in patients with cocaine associated chest pain

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ABSTRACT

Background: The most common symptom of cocaine abuse is chest pain. Cocaine induced chest pain (CICP) shares patho-physiological pathways with the acute coronary syndromes (ACS). A key event is the increase of activity of the adrenergic system. Beta blockers (BBs), a cornerstone in the treatment of ACS, are felt to be contraindicated in the patient with CICP due to a potential of an “unopposed alpha adrenergic effect (UAE)”.

Objectives: Identify signs of UAE and in-hospital complications in patients who received BB while having cocaine induced chest pain.

Methods: We performed a retrospective review of 378 patients admitted to a medical unit because of CICP. Twenty six of these were given a BB at the time of admission while having CICP. We compared these patients to a control group paired by age, sex, race and history of hypertension who did not received a BB while having CICP. Blood pressure, heart rate, length of stay and in-hospital cardiovascular complications were compared.

Results: No statistically significant differences were found between the two groups except for a longer length of stay in the case group. This was felt to be due to unrelated causes.

Conclusions: This study does not support the presence of an UAE in patients with continuing CICP and treated early with BB. There were no in-hospital cardiovascular complications in the group of patients who had an early dose of BB while having CICP.

Implications: BB appeared safe when given early on admission to patients with CICP.

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1. Introduction

Cocaine is one of the most common drugs found in patients who seek EHC. In 2006, six million Americans aged 12 and older had abused cocaine in some form [1]. Cocaine is a potent vasoconstrictor ([2–4], Blaho, Merigian et al. 1996, Chang, Walsh et al. 2011). Some of its effects include hypertension, coronary vasospasm, accelerated atherosclerosis and myocardial infarction ([5], Chang, Walsh et al. 2011).

The most common symptom of cocaine abuse is chest pain [6]. CICP shares many of the common patho-physiologic pathways with acute coronary syndromes ([2,7], Freeman and Feldman 2008). The use of BB, a cornerstone of the treatment of acute coronary syndromes has been thought to be contraindicated in patients using cocaine [8]. This is mainly because of theoretical UAE that can lead to hypertensive complications in patients intoxicated with the drug [6]. There are some reports of death associated with the use of beta blockers in patients using cocaine [9]. Coronary vasoconstriction was induced in one study when volunteers inhaled cocaine while intra-coronary propranolol was being infused [10]. Also, there have been reports of increased levels of cardiac biomarkers in patients who were given beta blockers while having cocaine induced chest pain [11].

Recent studies have been published showing that BB can be safely used in patients admitted for cocaine induced chest pain. ([5,12,13], Ibrahim, Maselli et al. 2013).

Continuing chest pain in patients who test positive for cocaine may be a marker for the continuing presence of the drug’s systemic effects. We tried to observe the effects of the administration of BB early on admission which theoretically should have resulted in unopposed alpha stimulation. As a secondary endpoint we followed troponin levels during the admission and the patient’s length of stay.

2. Methods

We performed a retrospective review of all the medical records of patients admitted to a medical unit for cocaine induced chest pain to rule out acute coronary syndrome from June 2006 to June of 2009. All patients had a final diagnosis of cocaine induced chest pain and a positive urine test for cocaine metabolites.

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Comparison of the blood pressure and heart rate in patients that received and did not receive beta blockers early on admission.

| Time          | Blood pressure and heart rate in patients that received beta blockers | Blood pressure in patients that did not receive beta blockers | P value |
|---------------|---------------------------------------------------------------------|----------------------------------------------------------------|---------|
|               | Average (95% CI)                                                   | Average (95% CI)                                               |         |
| 0 to 1 h      | Systolic 147.8 (136.5 to 159.1)                                     | Systolic 135.5 (127.9 to 143.1)                                | 0.0647  |
|               | Diastolic 88.5 (80.9 to 96.0)                                       | Diastolic 82.5 (77.7 to 87.3)                                  | 0.1730  |
|               | Mean 108.2 (99.9 to 116.4)                                          | Mean 100.17 (94.8 to 105.6)                                   | 0.0966  |
| 1–3 h         | Heart rate 86.4 (80.7 to 92.1)                                      | Heart rate 87.6 (81.8 to 93.4)                                 | 0.7786  |
|               | Systolic 131.1 (126.1 to 143.9)                                     | Systolic 133.1 (124.2 to 142.4)                                | 0.8053  |
|               | Diastolic 80.01 (72.9 to 87.3)                                      | Diastolic 77.5 (72.4 to 82.8)                                  | 0.5951  |
|               | Mean 96.42 (91.0 to 105.8)                                          | Mean 96.1 (89.9 to 102.3)                                     | 0.6662  |
|               | Heart rate 79.63 (75.3 to 83.9)                                     | Heart rate 79.1 (74.3 to 83.9)                                 | 0.8911  |
| 3 to 6 h      | Systolic 126.7 (118.3 to 135.2)                                     | Systolic 130.1 (123.9 to 136.4)                                | 0.5177  |
|               | Diastolic 75.57 (68.7 to 81.5)                                      | Diastolic 76.9 (72.3 to 81.6)                                  | 0.7150  |
|               | Mean 92.62 (86.4 to 98.9)                                           | Mean 94.7 (90.2 to 99.1)                                      | 0.5893  |
|               | Heart rate 73.11 (68.7 to 77.6)                                     | Heart rate 75.8 (71.1 to 80.5)                                 | 0.4222  |
Emergency Department. Because of this we can theorize that these patients were at increased risk of suffering from acute cocaine toxicity and therefore at increased risk of having adverse effects from the beta blocker [20], this was not observed in our study. Interestingly the patients in our study who received beta blockers were more hypertensive and tachycardic on admission than the control group however in the group that received a BB both heart rate and blood pressure were lower at 6 and 12 h blockers compared to the group that did not receive a beta blocker.

Our study has several limitations. Because this is a retrospective review of medical records, the patients did not have a standardized protocol for follow-up after therapy with beta blockers was started. Different beta blockers were used, and administration was both intravenous and oral. Also it is important to state that the beta blockers were given to patients with acute cocaine induced chest pain and were discontinued after determining the presence of cocaine metabolites in the urine. The test for the presence of cocaine metabolites in the urine is a qualitative analysis and we cannot estimate the amount of cocaine ingested by the patients in either group.

Our study does not support the theory of an UAE in patients who received BB while having CICP in the Emergency Department. Our conclusions are supported by not finding a statistical difference in troponin levels or cocaine associated complications either group.

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Table 3

| Time    | Number of patients with Troponins (+) among those that received beta-blockers (mean value) | Number of patients with Troponins (+) among those that did not receive beta-blockers (mean value) | P value |
|---------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------|
| 0–3 h   | 7/26 (0.1631)                                                                             | 7/32 (0.5406)                                                                               | 0.8900  |
| 3–6 h   | 4/26 (0.0923)                                                                             | 5/32 (0.0372)                                                                               | 0.7612  |
| 6–12 h  | 3/26 (0.0130)                                                                             | 5/32 (0.0597)                                                                               | 1.000   |

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