CLINICAL RESEARCH STUDY

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Cocaine-related Aortic Dissection: Lessons from the International Registry of Acute Aortic Dissection

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ABSTRACT

BACKGROUND: Acute aortic dissection associated with cocaine use is rare and has been reported predominantly as single cases or in small patient cohorts.

METHODS: Our study analyzed 3584 patients enrolled in the International Registry of Acute Aortic Dissection from 1996 to 2012. We divided the population on the basis of documented cocaine use (C+) versus noncocaine use (C-) and further stratified the cohorts into type A (33 C+/2332, 1.4%) and type B (30 C+/1252, 2.4%) dissection.

RESULTS: C+ patients presented at a younger age and were more likely to be male and black. Type B dissections were more common among C+ patients than in C- patients. Cocaine-related acute aortic dissection was reported more often at US sites than at European sites (86.4%, 51/63 vs 13.6%, 8/63; $P < .001$). Tobacco use was more prevalent in the C+ cohort. No differences were seen in history of hypertension, known atherosclerosis, or time from symptom onset to presentation. Type B C+ patients were more likely to be hypertensive at presentation. C+ patients had significantly smaller ascending aortic diameters at presentation. Acute renal failure was more common in type A C+ patients; however, mortality was significantly lower in type A C+ patients.

CONCLUSIONS: Cocaine use is implicated in 1.8% of patients with acute aortic dissection. The typical patient is relatively young and has the additional risk factors of hypertension and tobacco use. In-hospital mortality for those with cocaine-related type A dissection is lower than for those with noncocaine-related dissection, likely due to the younger age at presentation.

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KEYWORDS: Acute aortic dissection; Cocaine; Outcomes

Acute aortic dissection is a lethal cardiovascular disease with many associated comorbidities and has a high mortality rate even when properly treated. Cocaine use is a known risk factor for an acute aortic dissection. Such patients may present to unsuspecting physicians or emergency departments, particularly in urban areas where cocaine use is more common.[1] However, if not properly identified, patients with acute aortic dissection associated with cocaine use may

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have worse short- and long-term outcomes, particularly in the setting of recurrent cocaine use after a dissection, which increases the risk of subsequent aortic rupture and re-dissection.[2] Little is known about the implications of cocaine on aortic dissection, because prior studies are predominately limited to small single-center case reports or case series.

In 2002, the International Registry of Acute Aortic Dissection (IRAD) published a brief report on aortic dissection associated with cocaine use. The IRAD identified 5 patients (0.5%)[3] with aortic dissection with documented cocaine use who were enrolled in the registry at that time. The IRAD's small percentage of patients with a history of cocaine use contrasted that from a study performed by Hsue et al,[4] in which 14 (37%) of 38 patients with dissection chronically used cocaine and presented to a single urban US public hospital.[2,4] We attempt to more precisely define the clinical features, imaging, diagnosis, and outcomes among 63 consecutive cocaine-using patients enrolled in the IRAD.

CLINICAL SIGNIFICANCE

- Some 1.8% of patients with an acute aortic dissection who were enrolled in the International Registry of Acute Aortic Dissection had a history of cocaine use.
- Patients with cocaine-related aortic dissection were more likely to be younger and to use tobacco. Their cocaine use, hypertensive state, and tobacco use collectively induce a dissection at an age that an acute aortic dissection would be less common.
- Patients with long-term, cocaine-related aortic dissection were more likely to experience rehospitalizations.

METHODS

Study Population

This analysis examines patients enrolled in the IRAD, for which the rationale and methodology have been published.[5] Thirty IRAD data-collection centers, representing 11 countries, contributed patients for this study. Acute type A aortic dissection was defined on the basis of Stanford classification as any dissection involving the ascending aorta, and acute type B aortic dissection was defined as any dissection not involving the ascending aorta, each presenting within 14 days of symptom onset. Consecutive patients at each IRAD center were identified prospectively at presentation or retrospectively by searching hospital discharge diagnosis records or surgical, pathology, and echocardiology databases. A cocaine-using patient was defined as a patient who uses cocaine to the detriment of his/her health and social functioning.

For this study, the IRAD patient population was divided into type A and B dissection cohorts. Within these cohorts, patients were further stratified by the presence or absence of cocaine use as defined in the IRAD lexicon and specified earlier (Figure 1).

Data Collection

Data on 290 variables were recorded on a standardized form that included information on patient demographics, history, clinical presentation, physical findings, imaging study results, details of medical and surgical treatment, and patient outcomes. Data forms were reviewed internally for completeness and face validity and entered into an online database.

Yearly follow-up data were obtained up to 5 years after discharge using standardized forms. Collected data included variables on clinical, imaging, and vital status. At each enrolling hospital, study investigators obtained approval from their ethics or institutional review board to participate in the IRAD and its follow-up study.

Statistical Analysis

This study compared patients with documented cocaine use with those without known cocaine use. Data are shown as frequencies and percentages, and as mean ± standard deviation or median and interquartile range. Missing data were not defaulted to negative, and denominators reflect only reported cases. Categoric variables were compared using a Pearson's chi-square test or Fisher exact test where appropriate. Continuous variables with normally distributed data were compared using the Student *t* test. Variables with a skewed distribution were compared using the Mann-Whitney *U* test. Kaplan-Meier analysis was performed to analyze long-term survival and freedom from aortic-related rehospitalization. *P* values $\leq .05$ were deemed as significant. SPSS Version 20.0 (IBM Inc, New York, NY) was used for all analyses.

RESULTS

Patient Demographics and History

This study investigated 3584 patients enrolled in the IRAD from 1996 to 2012. Within this group, 63 (1.8%) were

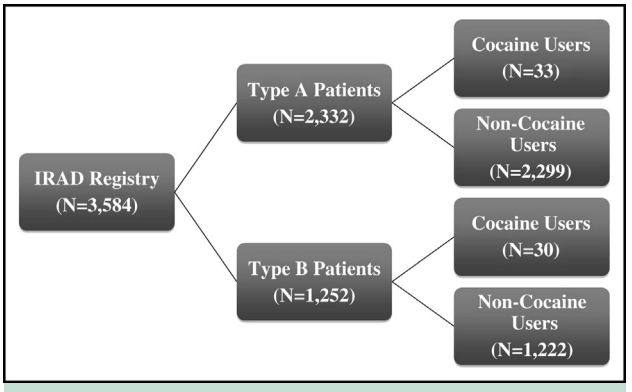

Figure 1 Patient population. IRAD = International Registry of Acute Aortic Dissection.