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Selected Topics: Toxicology

UNINTENTIONAL INGESTION OF BUPROPION IN CHILDREN

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□ **Abstract—Background: The incidence of seizures after unintentional bupropion ingestion in children aged < 6 years has been reported as 0.2%. However, in many poison centers, > 80% of these patients are referred to the Emergency Department (ED) for evaluation. Objective: To evaluate if all unintentional pediatric bupropion ingestions require referral to a health care facility (HCF), or what fraction of these could be managed safely at home. Method: A retrospective chart review was conducted of all bupropion ingestions in children aged < 6 years for 2000–2006 from four regional poison centers. Exclusion criteria were lack of follow-up or multiple drug ingestion. Results: Of 407 patients, 209 (51%) were male. Mean age was 2.2 years (SD ± 1.0). There were 329 patients (81%) seen in a HCF, of which 143 (35%) were hospitalized; 77 patients (19%) were observed at home. Symptoms occurred in 73 patients (18%): sinus tachycardia (n = 50), nausea/vomiting (n = 32), hyperactivity (n = 17), seizure (n = 3), hallucinations (n = 2), and hypertension (n = 2). The mean heart rate of patients with sinus tachycardia (n = 50, 12.3%) was 137 beats/min (SD ± 13), with a range of 112–172 beats/min. Mean dosage of those with tachycardia was 24 mg/kg. In the 2 patients with hypertension, the maximum recorded blood pressures were 145/80 mm Hg (2-year-old boy) and 137/90 mm Hg (2-year-old girl), with heart rates of 122 and 125 beats/min, respectively. Dose ingested and patient weight was known for 218 patients. Mean dosage ingested was 12.2 mg/kg, with a range of 2.6–64 mg/kg. Eighty-eight percent of patients with a known dosage ingested < 20 mg/kg. Discussion: A high percentage of children continue to be seen in a HCF. Concern from the higher incidence of severe effects seen with intentional adult exposures may be one of the reasons for this cautious approach. Conclusion: Unintentional pediatric bupropion ingestions resulted in clinical effects that rarely required any HCF intervention. Isolated unintentional bupropion ingestion of ≤ 10 mg/kg may not require referral to a health care facility. © 2010 Elsevier Inc.**

□ **Keywords—bupropion; children; overdose; triage**

INTRODUCTION

Toxicity from bupropion overdose is primarily neurological and cardiovascular (1–4). Seizures after bupropion overdose have been previously reported in 6–21% of cases (1–4). The majority of these seizures occurred in adults with intentional exposures. In contrast to adult bupropion exposures, the outcome of unintentional ingestion of bupropion in children after exploratory behavior is generally benign (2,4–6). However, in many poison centers, 60–80% of these patients are referred to the Emergency Department (ED) for evaluation (2,3). The purpose of this study was to evaluate unintentional pediatric bupropion ingestions with a focus on incidence of clinical effects and potential recommendations for safe and appropriate disposition.

METHODS

We performed a retrospective chart review of all cases of bupropion ingestions in children aged < 6 years for the

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years 2000–2006 from four regional poison centers. Exclusion criteria were lack of follow-up to a known outcome or multiple drug ingestion. The selection group of children < 6 years of age is a standard age bracket utilized by poison centers. This age group was selected for study because 1) the overwhelming majority of ingestions in this age group are unintentional, often due to exploratory behavior, and 2) bupropion data on this age group are limited, suggesting a need for a triage guideline for this age group. Data extracted from the charts included age, gender, patient weight, drug(s) ingested, time of ingestion, dose ingested, clinical effects reported, therapies provided, and medical outcome. Dose ingested was obtained by history, which included calculation by pill count of medication missing or by observed amount ingested. In cases where the history of dose ingested was not clearly documented, the dose was considered unknown. Values for hypertension and tachycardia were age adjusted. Tachycardia was conservatively defined as: ages 1–3 years > 120 beats/min, and 4 to < 6 years > 110 beats/min. This is the mean heart rate for these age groups (7). Hypertension was defined as: ages 1–3 > 120/70 mm Hg, and ages 4 to < 6 > 120/80 mm Hg. Patients managed at home (outside of a health care facility [HCF]) were followed by telephone periodically through the day after the ingestion, with inquiries about the occurrence of symptoms and the condition of the child. Clinical effects such as tachycardia and hypertension were not assessed in these home patients. However, general outcome and obvious clinical effects that a parent could assess such as vomiting, hallucinations, hyperactivity, and seizures were assessed. As this was a retrospective study, the decision on whether to refer a child to a HCF or manage at home was made independently by the individual four poison centers before data collection. Analysis of dosage in patients with and without symptoms was done using a non-parametric two-sample test for means (Mann-Whitney/Wilcoxon). Statistical analysis was performed using EpiInfo version 3.4.1 (Centers for Disease Control and Prevention, Atlanta, GA). The medical outcome categories used were those utilized by the American Association of Poison Control Centers (8). The definitions for medical outcome were defined as: no effect (no signs or symptoms as a result of the exposure); minor effect (signs or symptoms were minimally bothersome and resolved rapidly, e.g., vomiting); moderate effect (signs or symptoms were more pronounced, more prolonged, or more systemic in nature but did not require specific intervention, e.g., hyperactivity, sinus tachycardia, moderate hypertension); major effect (signs or symptoms were life-threatening or required specific intervention, e.g., seizures) or death (death resulted from the exposure or direct complication of the exposure).

This study was approved by the individual Institutional Review Boards of the participating poison centers involved in the study.

RESULTS

There were 407 patients who met entrance criteria and were included in the analysis, of which 209 (51%) were male. The mean and median ages of the patients were 2.2 years (SD ± 1.0) and 2 years, respectively.

There were 329 patients (81%) initially seen in a HCF, of which 143 (35%) were hospitalized (Figure 1). The remaining 77 patients (19%) were observed at home with telephone follow-up.

Clinical effects occurred in 73 patients (18%) (Table 1). Three patients (0.7%) experienced seizures in this case series, with ages of 1 year, 2 years, and 5 years. Single seizures occurred in 2 patients; these were brief and self-limiting, although 1 patient received lorazepam. The single patient with multiple seizures was initially seen in the ED for a seizure, evaluated, and diagnosed with a febrile seizure and discharged home. The child returned 3 h later with a second seizure, with the additional information of a potential bupropion ingestion. This child received lorazepam and no further seizures occurred. The mean heart rate (HR) of patients with sinus tachycardia (n = 50, 12.3%) was 137 beats/min (SD ± 13), with a range of 112–172 beats/min. The mean dosage of patients with sinus tachycardia was 24 mg/kg. There were 6 children with tachycardia with HRs > 150 beats/min (> 2 SD from the mean HR for age group) (6/50, 12%), of which 4 had a known dosage ingested: mean dosage was 49 mg/kg. In the 3 1-year-old children, mean maximum HR and dosage ingested were 159 beats/min and 52 mg/kg, respectively. In the 2-year-old child with a HR > 150 beats/min and a known dosage, maximum HR and dosage ingested was 170 beats/min and 40 mg/kg, respectively. In the 2 patients with hypertension, the maximum recorded blood pressures were 145/80 mm Hg (2-year-old girl, dose unknown) and 137/90 mm Hg (2-year-old boy, 150 mg, 11 mg/kg), with associated HRs of 122 and 125 beats/min, respectively. The child with reported QT pro-

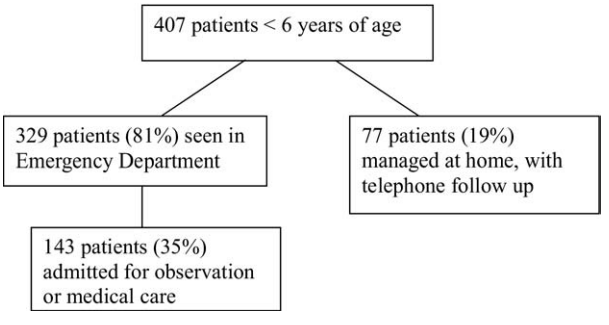

Figure 1. Location of patient management.