

Herbal ecstasy: cardiovascular complications of Khat chewing in pregnancy

K. M. KUCZKOWSKI

Summary : Chewing fresh leaves of the Khat plant (*Catha edulis Celestrasae*) is a widespread habit (also practiced by women, even during pregnancy) with a deep-rooted tradition in East Africa and the Arabian Peninsula. With the influx of immigrants from East Africa and the Arabian Peninsula khat chewing has been imported into other countries including Europe the United States. The major pharmacologically active constituent of the fresh khat leaves is cathinone. Khat (also known as herbal ecstasy) is chewed for its central nervous system stimulant properties, which resemble amphetamine. Cardiovascular complications from cathinone use may therefore be similar to those of amphetamine. I herein present the first reported case of a pregnant patient who developed chest pain, tachycardia, and hypertension following khat-chewing session.

Key words : Khat plant ; *Catha edulis* ; khat ; herbal ecstasy ; cathinone ; khat chewing ; pregnancy ; complications ; chest pain ; tachycardia ; hypertension ; obstetric anesthesia.

INTRODUCTION

Fresh leaves of the khat tree (*Catha edulis Celestrasae*) are habitually chewed for their euphoric properties in East Africa and parts of the Middle East (Arabian Peninsula) (1). This deep-rooted socio-cultural tradition has recently spread to East African and Middle Eastern communities in Europe and the United States (2, 3). Many reproductive age women continue to chew khat during pregnancy and lactation (4). The major pharmacologically active constituent of the fresh khat tree leaves is (–)–S-cathinone (1). (–)–S-Cathinone is regarded as an amphetamine-like sympathomimetic amine. Cardiovascular complications from cathinone use may therefore be similar to those of amphetamine (5, 6). I herein present the first reported case of a parturient who presented with chest pain, tachycardia, and hypertension following khat-chewing session.

REPORT OF CASE

A 22-year-old, 156 cm, 52 kg, gravida 1, para 0, previously healthy female [specifically, no risk factors for cardiovascular disease (e.g., structural heart disease, hypertension, dysrhythmias) could be found] was admitted to the Labor and Delivery (L & D) suite with palpitations, headache, and chest pain at 32 weeks gestation. The patient had recently immigrated to the United States (from East Africa) and spoke no English. She had no known drug allergies. The course of her pregnancy had been uneventful (specifically, there were no symptoms of pregnancy-induced hypertension). Her admission blood pressure was 135/90 mm Hg, heart rate 96 beats/minute and respiratory rate 20 breaths/minute. The breath sounds were clear to auscultation and the heart tones were normal. Examination of the gravid abdomen was unremarkable. Fetal heart rate was 150 beats/minute and reassuring. Maternal electrocardiogram (ECG) taken shortly after she had reported the symptoms of chest pain revealed the presence of sinus tachycardia with occasional (< 6 ectopic beats/minute) premature ventricular complexes. No signs of ischemia and/ or infarction were present. No previous ECG was available for comparison. Other diagnostic (laboratory) studies including electrolytes, glucose, hemoglobin and hematocrit were

K. M. KUCZKOWSKI, M.D., Assistant Clinical Professor of Anesthesiology and Reproductive Medicine, Director of Obstetric Anesthesia.

Departments of Anesthesiology and Reproductive Medicine, University of California San Diego, San Diego, California, USA.

Correspondence address : Krzysztof M. Kuczkowski, Department of Anesthesiology, UCSD Medical Center, 200 W. Arbor Drive, San Diego, CA 92103-8770. Tel. : (619) 543-5720. Fax : (619) 543-5424. E-mail : kkuczkowski@ucsd.edu.

all normal. The initial working diagnosis of pregnancy-induced hypertension was ruled out by the absence of clinical symptoms of the disease (e.g., sustained hypertension, edema) and routine liver (e.g., hypercoagulability) and kidney (e.g., proteinuria) function tests, which were normal. The urine drug screen, however, showed trace amount of "amphetamine-like" substance. Our differential diagnosis included new onset dysrhythmias vs. illicit substance (e.g., cocaine) intake (which was denied by the patient, and excluded by the urine drug screen). The headache, palpitations (dysrhythmias), and chest pain, all resolved with supportive (e.g., hydration) treatment. She remained normothermic. Consultation with the cardiologist was obtained and it was determined that no further investigation (e.g., serum cardiac enzymes levels) was necessary. Upon further questioning the patient admitted to a recent (two hours prior to admission) khat (fresh leaves, small amount – half the customary dose) chewing at family gathering. Her further L & D stay was uneventful and she was discharged to home.

DISCUSSION

Fresh leaves from khat trees (*Catha edulis Celestrasae*) are chewed daily by over 20 million people on the Arabian Peninsula, and in several East African countries (7). Chewing khat is a popular social habit, which has also spread to Middle Eastern and East African communities in the United States, Canada and Western Europe (3). Khat consumption, traditionally confined to a certain segment (e.g., adult men) of the population, has today become popular among all segments of the population (including reproductive age women) (8).

The pleasure derived from khat chewing is attributed to the euphoric actions of (–)-S-cathinone (natural/herbal ecstasy), a sympathomimetic amine with properties similar to amphetamine (9). Although cathinone is restricted in Britain under the Misuse of Drugs Act 1971, khat possession and use are not (3). Cathinone increases heart rate and blood pressure through norepinephrine release from peripheral neurones similar to amphetamine (9). Controlled human studies have shown increases in arterial blood pressure after chewing khat coinciding with increased plasma cathinone concentrations (10). Cardiovascular complications from cathinone use may therefore be similar to those of amphetamine. The temporal relation

between use of amphetamine (11) or its analogue, "ecstasy" (3,4-methylenedioxymethamphetamine, MDMA) (5, 6), and myocardial ischemia/infarction and dysrhythmias, respectively, is well documented. Myocardial ischemia/infarction could be precipitated by the increased myocardial oxygen demands from cardiac stimulation and peripheral vasoconstriction by cathinone and coronary vasoconstriction. AL-MOTARREB *et al.* studied the impact of khat chewing on cardiovascular physiology and demonstrated that khat chewing is a potential risk factor for myocardial ischemia (7).

JANSSON *et al.* investigated the effects of khat chewing on uteroplacental blood flow in animal model (4). Placental blood flow was reduced by 10% 75 minutes and by 24% 180 minutes after khat ingestion. The authors concluded that khat chewing in pregnancy might reduce placental blood flow, and impair fetal development (4). ISLAM *et al.* studied the embryotoxic and teratogenic potential of chronic khat ingestion in pregnant rats; khat extract was administered daily at increasing doses of 125, 250 and 500 mg/kg/day beginning on the sixth day of gestation. The authors concluded that khat consumption in pregnancy retarded fetal growth and induced musculoskeletal abnormalities in a dose-dependent manner (12).

The author of this report is not aware of any other reports documenting the occurrence of cathinone-induced cardiovascular toxicity (hypertension, dysrhythmias, chest pain) in an otherwise healthy parturient. Since pregnancy increases the cardiovascular toxicity of sympathomimetic drugs, khat chewing (pharmacologically active constituent cathinone is a natural sympathomimetic amine) by pregnant women should be considered a significant risk factor for cardiovascular morbidity.

References

1. Al-Motarreb A., Baker K., Broadley K. J., *Khat, pharmacological and medical aspects and its social use in Yemen*, PHYTOTHER. RES., **16**, 403-413, 2002.
2. Toennes S. W., Harder S., Schramm M., *et al.*, *Pharmacokinetics of cathinone, cathine and norephedrine after the chewing of khat leaves*, BR. J. CLIN. PHARMACOL., **56**, 125-130, 2003.
3. Griffiths P., *Qat use in London, a study of qat use among a sample of Somalis living in London*. Home Office drugs prevention initiative. London, Home Office, 1998.
4. Jansson T., Kristiansson B., Qirbi A., *Effect of khat on uteroplacental blood flow in awake, chronically catheterized, late-pregnant guinea pigs*, J. ETHNOPHARMACOL., **23**, 19-26, 1988.
5. Henry J. A., Jeffries K. J., Dawling S., *Toxicity and deaths from 3,4-methylene dioxymethamphetamine ("ecstasy")*, LANCET, **340**, 384-386, 1992.

6. Kuczkowski K. M., Benumof J. L., *Amphetamine abuse in pregnancy, anesthetic implications*, ACTA ANAESTHESIOL. BELG., **54**, 161-163, 2003.
7. Al-Motarreb A., Al-Kebisi M., Al-Adhi B., Broadley K. J., *Khat chewing and acute myocardial infarction*, HEART, **87**, 279-280, 2002.
8. Selassie S. G., Gebre A., *Rapid assessment of drug abuse in Ethiopia*, BULL. NARC., **48**, 53-63, 1996.
9. Kalix P., *Cathinone, a natural amphetamine*, PHARMACOL. TOXICOL., **70**, 77-86, 1992.
10. Widler P., Mathys K., Brenneisen R., *et al.*, *Pharmacodynamics and pharmacokinetics of khat, a controlled study*, CLIN. PHARMACOL. THER., **55**, 556-562, 1994.
11. Bashour T. T., *Acute myocardial infarction resulting from amphetamine abuse, a spasm-thrombus interplay ?*, AM. HEART J., **128**, 1237-1239, 1994.
12. Islam M. W., al-Shabanah O. A., al-Harbi M. M., al-Gharably N. M., *Evaluation of teratogenic potential of khat (Catha edulis Forsk.) in rats*, DRUG CHEM. TOXICOL., **17**, 51-68, 1994.