

### A Case of Rhabdomyolysis After Intravenous Heroin Use

**Sir:** Rhabdomyolysis after intravenous heroin abuse has been reported in heroin-addicted patients.<sup>1-10</sup> However, the occurrence of this condition in first-time users is uncommon. Primary care physicians, especially those who work in hospitals, may see such presentations from time to time. We report a case of rhabdomyolysis and myoglobinuria with neurologic complication in a first-time user of intravenous heroin.

Rhabdomyolysis often may present no symptoms, even in conscious patients, and serious complications can be limited by preventive measures if it is recognized early.<sup>10</sup> Evaluation of creatine kinase activity should be considered in all cases of intoxication admitted to the hospital in light of the high incidence of rhabdomyolysis found in such cases.<sup>5,10</sup> The actual incidence of rhabdomyolysis is difficult to identify from the current literature, as most of the literature on the subject consists of case reports. One prospective study<sup>10</sup> of hospital admissions due to self-poisoning from various drugs revealed the incidence of rhabdomyolysis to be 7%. In that study, 1 case was secondary to heroin intoxication. Prolonged limb compression may lead to massive rhabdomyolysis with serious complications including hyperkalemia, hypocalcemia, and acute renal failure. Reported neurologic lesions include myelopathy, plexus neuropathy, and single or multiple mononeuropathies.<sup>5,7,11</sup>

**Case report.** Mr. A, a 36-year-old white married man, was found stuporous in his truck, with contracted pupils, and was brought by emergency medical service to the hospital in June 2000. He had a history of many years of cocaine, cannabis, and alcohol abuse. On the day of admission, he had used intravenous heroin for the first time and lost consciousness in his truck. His first-time use of heroin was ascertained from the history obtained by the primary care physician and the psychiatrist. After receiving intravenous naloxone in the emergency room, the patient regained consciousness. He complained of numbness and inability to move his right upper extremity. Mr. A's family history revealed that his father had hypertension, diabetes mellitus, and myocardial infarction. His mother suffered from depression, and his sister had undergone carotid endarterectomy at 36 years of age. The patient had no significant medical or surgical history.

Physical examination revealed weakness of the right upper extremity and a linear erythematous area on the patient's back on the right side. No sensory deficits or any other abnormalities were noted in the physical examination. Laboratory data revealed an elevated white blood cell count of 25,300/ $\mu$ L, lymphocyte count of 6000/ $\mu$ L, elevated potassium level of 6.4 mmol/L, glucose level of 35 mg/dL, creatinine level of 1.8 mg/dL, uric acid level of 10.3 mg/dL, elevated creatine kinase level of 4810 U/L, lactic dehydrogenase level of 326 U/L, cholesterol level of 257 mg/dL, creatine kinase-MB fraction of 64 U/L, and troponin level of 0.4 ng/mL.

Mr. A's toxicology results were positive for alcohol, cocaine, opiates, and cannabis. A second serum chemistry after 16 hours showed a creatine kinase level of 17,671 U/L, lactic dehydrogenase level of 935 U/L, calcium level of 8.1 mg/dL, and phosphorous level of 2.3 mg/dL. The patient's creatine kinase-MB fraction was 125 U/L, and his troponin level was 0.30 ng/mL. Results of a second troponin measurement after 3 hours were within normal range. Urinalysis

was positive for blood (+++), 6 to 10 white cells, 3 to 5 red cells, many bacteria, and 3 to 5 coarse granular casts. The patient's urine specific gravity was 1030. Results of a urine culture were negative. The patient's myoglobin level was elevated at 675  $\mu$ g/L, and his serum homocysteine level was elevated at 19  $\mu$ mol/L. A chest x-ray revealed borderline cardiomegaly with bilateral lower lobe infiltrates. An electrocardiogram (ECG) showed sinus tachycardia on admission with a ventricular rate of 130 bpm, and a second ECG after 16 hours showed sinus bradycardia with sinus arrhythmia, with a ventricular rate of 58 bpm. Results of a noncontrast computed tomographic scan of the patient's head were normal.

A diagnosis of rhabdomyolysis was made. The patient was treated with IV hydration, sodium polystyrene sulfonate, levofloxacin, and tapering doses of enoxaparin sodium. At this point, the patient was afebrile and started improving. He was able to move all extremities, even though right upper extremity weakness persisted. His white blood cell count decreased to 17,900/ $\mu$ L after 24 hours, and his serum potassium and creatine levels returned to normal range. The patient signed out against medical advice on the third day, and hence further follow-up was unavailable.

This case illustrates the significance of creatine kinase evaluation in patients with a history of substance abuse, particularly heroin. Even though rhabdomyolysis is a known complication of intravenous heroin abuse, it is not described much in the psychiatric literature. In this condition, which is a result of skeletal muscle injury, intracellular contents from myocytes leak into the plasma. Severe rhabdomyolysis may result from prolonged limb compression with serious complications of hyperkalemia, hypocalcemia, myoglobinuria, and acute renal failure. Fivefold or greater increase in serum creatine kinase in patients without apparent cardiac or brain injury is generally considered diagnostic of rhabdomyolysis.<sup>8,12</sup> Our patient had evidence of very high creatine kinase levels, high myoglobin levels, high potassium levels, and low calcium levels, all supporting the diagnosis of rhabdomyolysis.

The mechanism and etiologies of rhabdomyolysis include excessive physical exertion, muscle ischemia, direct muscle injury, infection, drugs and toxins, potassium depletion, acute immune disorders, endocrinologic disorders, and other miscellaneous causes.<sup>13</sup> Drugs causing muscle ischemia and rhabdomyolysis include opiates, ethanol, benzodiazepines, barbiturates, and cyclic antidepressants.<sup>6</sup> The mechanisms of rhabdomyolysis in heroin addicts include local compression with muscle ischemia produced by prolonged immobilization (most common), direct myotonic effects of heroin, skeletal muscle vasoconstriction, and immunologic reaction.<sup>1,2,4-6,8</sup> Though the only neurologic lesion in our patient was a monoparesis, many other types of neurologic complications including myelopathy, plexus neuropathy, mononeuropathy, unilateral or bilateral weakness or paralysis and distal paresthesia, leukoencephalopathy, spinal cord vasculitis, polyradiculoneuropathy, Brown-Séquard syndrome, and neurogenic bladder have been described in the literature.<sup>8</sup>

Rhabdomyolysis may occur in drug-addicted patients with or without muscle swelling or limb compression. Awareness of this complication, a high index of suspicion, and routine screening of creatine kinase will assist in the diagnosis and prompt treatment of this condition, thus reducing the morbidity and mortality.

*The authors report no financial affiliation or other relationship relevant to the subject matter of this letter.*

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## Management of Bipolar Disorder in Primary Care Versus Psychiatric Settings

**Sir:** Dr. Ira Glick's article<sup>1</sup> well summarized the clinical challenges faced by primary care providers as information on the bipolar spectrum of mood disorders grows. I appreciate his reference to our work on the prevalence of bipolar disorders in this setting.<sup>2</sup> The information on burden of illness, longer-term consequences, and the consequences of missed diagnosis and misdiagnosis is well said. Primary care physicians, who have

been referred to as the "de facto U.S. mental and addictive service system," must begin to see depressed and anxious syndromes as an opportunity for differential diagnosis. When bipolar illness is identified, it demands focused treatments of proven efficacy.

I must disagree with Dr. Glick, however, when he characterizes bipolar illness as one "best managed in a psychiatric setting" and referral as the "best course of action."<sup>1(p30)</sup> Dr. Glick did not identify his specialty area, but a cursory look at the prevalence data, the sad state of affairs regarding bipolar illness in psychiatry itself, and the obstacles to referral suggest that uniformly referring bipolar patients is not a practical solution.

If current estimates of a 3.7% bipolar prevalence in the U.S. population<sup>3</sup> are correct, a policy of uniform referrals for bipolar patients is practically impossible, especially in rural settings where community mental health centers are already overwhelmed. Moreover, estimates suggest that psychiatrists miss bipolar illness most of the time on patients' initial presentation. In one published survey by Hirschfeld et al.,<sup>4</sup> bipolar illness was misdiagnosed on 70% of initial opportunities—usually as major depression—and 35% of patients treated by psychiatrists waited 10 years for a correct diagnosis. The mean number of misdiagnoses was 3.5. The mean number of psychiatric consultations needed to correctly diagnose bipolar illness was 4. In another cohort examination by Goldberg and Ernst,<sup>5</sup> poor functioning and suicide attempts made the correct diagnosis of bipolar disorder by psychiatrists less likely!

Generalists are well placed to diagnose bipolar disorder and perfectly capable of performing the advanced pharmacotherapeutic interventions necessary to treat bipolar patients. Competent clinicians should always practice within the boundaries of training, experience, and proven ability. Whether it is antidepressants in the 1990s or mood stabilizers in 2004, motivated clinicians can and do take on new skills to benefit their patients and improve the quality of their practice. Many in our setting already regularly screen and treat bipolar patients, reserving consultations and referrals for those who remain diagnostic dilemmas, refractory to first- or second-order interventions, or too ill to be cared for in a primary care setting.

I welcome the time when psychiatry and primary care integrate into a seamless delivery system to offer services when and where they are best applied. Until professional training programs and the payers of health care "grow up" into the reality of mental health and health care, I will assess depressed and anxious patients, make rational diagnoses, triage, treat, and adjust both diagnosis and treatment as indicated based on symptoms, treatment response, and acuity—always seeking to improve my game for the benefit of my patients.

*Dr. Manning reports no financial affiliation or other relationship relevant to the subject matter of this letter.*

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### Dr. Glick Replies

**Sir:** I appreciate Dr. Manning's careful reading of my article. I agree that the diagnosis of bipolar disorder is difficult not only for primary care providers but also for psychiatrists. Only a controlled random-assignment study can determine which specialty accomplishes diagnosis and management better. I also agree that competent clinicians should always practice within the boundaries of "training, experience, and proven ability."

Parenthetically, what data on "proven ability" is Dr. Manning referring to?

Finally, I applaud the sentiment that he welcomes a time when "psychiatry and primary care integrate into a seamless delivery system." In fact, in my opinion, psychiatrists are going through a major shift in their roles from a core identity as "psychodynamic psychotherapist" in the 1960s to "biological psychopharmacologist" in the 1990s to "primary care plus psychiatric caregivers" in the new millennium.

*Dr. Glick has been a consultant for, received grant/research support from, and participated in speakers/advisory boards for Bristol-Myers Squibb, Eli Lilly, Pfizer, AstraZeneca, and Janssen and is a major stock shareholder in Johnson & Johnson and Forest.*

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