

Metabolic Acidosis as a Marker for Laxative Abuse in Patients with Bulimia

James E. Mitchell, M.D.
Dorothy Hatsukami, Ph.D.
Richard L. Pyle, M.D.
Elke D. Eckert, M.D.
Lana I. Boutacoff, M.A.

Patients with bulimia who abuse laxatives as a manifestation of their eating disorder may demonstrate a low serum bicarbonate on routine laboratory screening, suggesting diarrhea-induced metabolic acidosis. The utility of this finding as a diagnostic marker is discussed.

Laxative abuse is now recognized as an important problem among patients with eating disorders, in particular patients with the bulimia syndrome. Various authors have reported that between 38 and 75% of patients with bulimia abuse laxatives at some point during the course of their illness (Russell, 1979; Pyle et al., 1981; Abraham & Beumont, 1982; Mitchell et al., 1983; Mitchell et al., 1985). In this patient population laxatives are usually employed in an attempt to rid the body of food prior to its digestion in an attempt to prevent weight gain. These patients tend to use stimulant-type laxatives, usually in amounts many times greater than those recommended by manufacturers (Mitchell & Boutacoff, 1986). What little literature is available suggests that laxative abuse is relatively ineffective as a means of preventing the absorption of calories (Bo-linn et al., 1983), that patients who abuse laxatives rather than vomit after binge eating tend to consume less food while binge eating yet weigh more than patients who do not abuse laxatives (Lacey & Gibson, 1985), and that the weight loss that follows laxative abuse is attributable to dehydration (Bo-linn et al., 1983; Mitchell & Boutacoff, 1986).

James Mitchell, M.D., and **Elke Eckert, M.D.**, are Associate Professors, Department of Psychiatry, University of Minnesota, Minneapolis. **Dorothy Hatsukami, Ph.D.**, and **Richard Pyle, M.D.**, are Assistant Professors, Department of Psychiatry, University of Minnesota, Minneapolis. Address reprint requests to Dr. Mitchell, Box 393 Mayo, University Hospitals, 420 Delaware St. S.E., Minneapolis, Minnesota 55455.

International Journal of Eating Disorders, Vol. 6, No. 4, 557-560 (1987)

© 1987 by John Wiley & Sons, Inc.

CCC 0276-3478/87/040557-04\$04.00

Although laxative abuse is a common problem among bulimic patients, these patients are often reluctant to discuss this issue, even under direct questioning. Because laxative abuse has significant implications for the medical evaluation, medical management, and treatment of bulimic patients, it would be useful to have a biological indicator that would aid in identifying patients who engage in this behavior.

We report here data related to electrolyte patterns in two groups of bulimic patients, one group being composed of those individuals who admitted to abusing laxatives at the time of evaluation and the other group composed of those who denied abusing laxatives, and discuss the utility of serum bicarbonate determinations as a method of screening for laxative abuse.

METHODS

Data were obtained by chart review of the records of patients who were evaluated in the outpatient Eating Disorders Clinic at the University of Minnesota following routine referral. To be included in the study, patients had to be female, between the ages of 18 and 40, and had to have met DSM-III criteria for bulimia when evaluated. Consecutive records were reviewed until a series of 40 patients who had admitted at the time of evaluation to at least weekly abuse of laxatives for weight control purposes were obtained. A comparison sample of 40 patients who denied the use of laxatives for at least 6 months prior to evaluation was also obtained. Sources of information included the psychiatric data base, which contained detailed information on psychiatric and medical history (completed by each patient at the time of evaluation), the diagnostic summary sheet, which included assessment of the prevalences and frequencies of various bulimic behaviors including laxative abuse (completed by the evaluating physician or psychologist at the time of evaluation), and the results of laboratory determinations obtained the day of evaluation. Data were analyzed using the corrected Chi-square test.

RESULTS

The laxative abuser group did not differ significantly from the comparison group in terms of age at evaluation (25.4 ± 7.5 versus 24.3 ± 5.8 years) or duration of bulimia (6.4 ± 5.9 versus 6.1 ± 5.1 years).

Significantly fewer patients in the laxative group (27, 67.5%) relative to the comparison group (37, 92.5%) reported current vomiting at the time of evaluation ($\chi^2 = 6.33$, $df = 1$, $p = .012$). Of those patients who reported vomiting, fewer patients in the laxative group (17, 63.0%) relative to the comparison group (33, 89.2%) reported vomiting at a minimum frequency of once a day ($\chi^2 = 4.84$, $df = 1$, $p = .028$).

The extent of laxative abuse in the laxative abuser group varied considerably. All patients were using at least one stimulant-type laxative, the two most common agents being Exlax and Correctol. The mean reported dosage was 13 (range 1–75, expressed as multiples of the recommended package labeling). There were 15 (37.5%) patients who reported using laxatives once or several

times a week, and 25 (62.5%) who reported using laxatives at least once a day.

Evaluation of the serum electrolyte determinations revealed that in the laxative abuse group, 6 patients (15%) were alkalotic (as indicated by elevated bicarbonate), 6 (15%) were hypochloremic, and 7 (17.5%) were hypokalemic. None of the laxative abusers who denied vomiting were alkalotic. In the comparison group, 12 patients (30%) were alkalotic (all also admitted vomiting), 4 (10%) were hypochloremic, and 8 (20%) were hypokalemic.

However, metabolic acidosis as indicated by a low serum bicarbonate was confined almost exclusively to the laxative abuse group; 11 (27.5%) demonstrated a metabolic acidosis whereas 2 (5.0%) in the comparison group demonstrated this pattern ($\chi^2 = 5.88$, $df = 1$, $p = .015$). There was no apparent relationship between reported frequency of laxative abuse and vomiting behavior and evidence of acidosis or alkalosis.

DISCUSSION

The current data suggest that metabolic acidosis, as suggested by a decreased serum bicarbonate determination, in a patient with a known or suspected eating disorder, should suggest the possibility of laxative abuse. However, the results also show clearly that most patients who admit to laxative abuse do not demonstrate a metabolic acidosis on routine screening. Therefore a test result indicating acidosis provides useful information and is strongly suggestive of the diagnosis, whereas a test result indicating normal or elevated serum bicarbonate does not rule out the diagnosis.

The presumed mechanism of the acidosis seen in association with laxative abuse is loss of alkaline fluid from the bowel secondary to laxative-induced diarrhea (Rose, 1977). It is of note that this develops in some patients despite frequent vomiting, a behavior that tends to generate alkalosis through loss of H^+ and volume contraction (Kaehny, 1976; Rose, 1977).

In the current analysis we were unable to discern any discriminating variable (e.g., frequency of vomiting or laxative abuse, amount of laxative ingested), which might indicate why a given individual who abuses laxatives and vomits would be either acidotic or alkalotic. However, information was not available about the timing of the most recent episode of laxative abuse or vomiting prior to blood drawing, and it is likely that the acidosis following laxative use is transient. However, the practicing physician would be using electrolyte determination much as we did as a screening measure at evaluation. Therefore the current results are still of practical importance.

There are several important limitations to the current study. We assumed a diagnosis of metabolic acidosis on the basis of low serum bicarbonate determination. To accurately evaluate and quantify the acidosis, arterial blood gas determinations for pH and PCO_2 would be necessary (Rose, 1977). Further research is needed in this regard.

Our classification of patients as laxative abusers or nonabusers was based strictly on their self-report. Some patients may have been abusing laxatives and did not tell us, certainly a possibility in the two patients with acidosis who served as controls.

One may ask why evidence of metabolic acidosis should even be sought,

since patients can simply be asked about their abuse of laxatives, as we asked in this study. However, we would contend that for several reasons the process of evaluation in our clinic may foster a willingness to discuss laxative abuse that is uncommon in medical settings. Our patients are required to schedule their own evaluation appointments. They complete detailed eating history data base forms and self-monitor their eating and eating-related behaviors, including vomiting and use of laxatives, prior to being seen for evaluation. Implicit in the process is the notion that laxative abuse is a common problem in bulimia that we are open to discuss.

In conclusion, the best means currently available to determine the presence or absence of laxative abuse is through direct, nonjudgmental questioning of the patient. However, acidosis in a young woman, particularly a woman with bulimia, suggests the possibility of laxative abuse, just as alkalosis suggests the possibility of vomiting, and should alert the clinician to the need for further questioning.

REFERENCES

- Abraham, S. F., & Beumont, P. J. V. (1982). How patients describe bulimia or binge eating. *Psychological Medicine*, *12*, 625-635.
- Bo-linn, G. W., Santa Ana, C. A., & Morawski, S. G. (1983). Purging and calorie absorption in bulimic patients and normal women. *Annals of Internal Medicine*, *99*, 14-17.
- Kaehny, W. D. (1976). Pathogenesis of metabolic acidosis and alkalosis. In R. W. Schrier (Ed.), *Renal and Electrolyte Disorders*. Boston: Little Brown and Company.
- Lacey, J. H., & Gibson, E. (1985). Does laxative abuse control body weight? A comparative study of purging and vomiting bulimics. *Human Nutrition: Applied Nutrition*, *39A*, 36-42.
- Mitchell, J. E., & Boutacoff, L. I. (1986). Laxative abuse complicating bulimia: Medical and treatment implications. *International Journal of Eating Disorders*, *5*, 325-334.
- Mitchell, J. E., Hatsukami D., Eckert E. D., & Pyle R. L. (1985). Characteristics of 275 patients with bulimia. *American Journal of Psychiatry*, *142*, 482-485.
- Mitchell, J. E., Pyle, R. L., Eckert, E. D., Hatsukami, D., & Lentz, R. (1983). Electrolyte and other physiological abnormalities in patients with bulimia. *Psychological Medicine*, *13*, 273-278.
- Pyle, R. L., Mitchell, J. E., & Eckert, E. D. (1981). Bulimia: A report of 34 cases. *Journal of Clinical Psychiatry*, *42*, 60-64.
- Rose, A. D. (1977). *Clinical Physiology of Acid-Base and Electrolyte Disorders*. New York: McGraw-Hill.
- Russell, G. (1979). Bulimia nervosa: An ominous variant of anorexia nervosa. *Psychological Medicine*, *9*, 429-448.