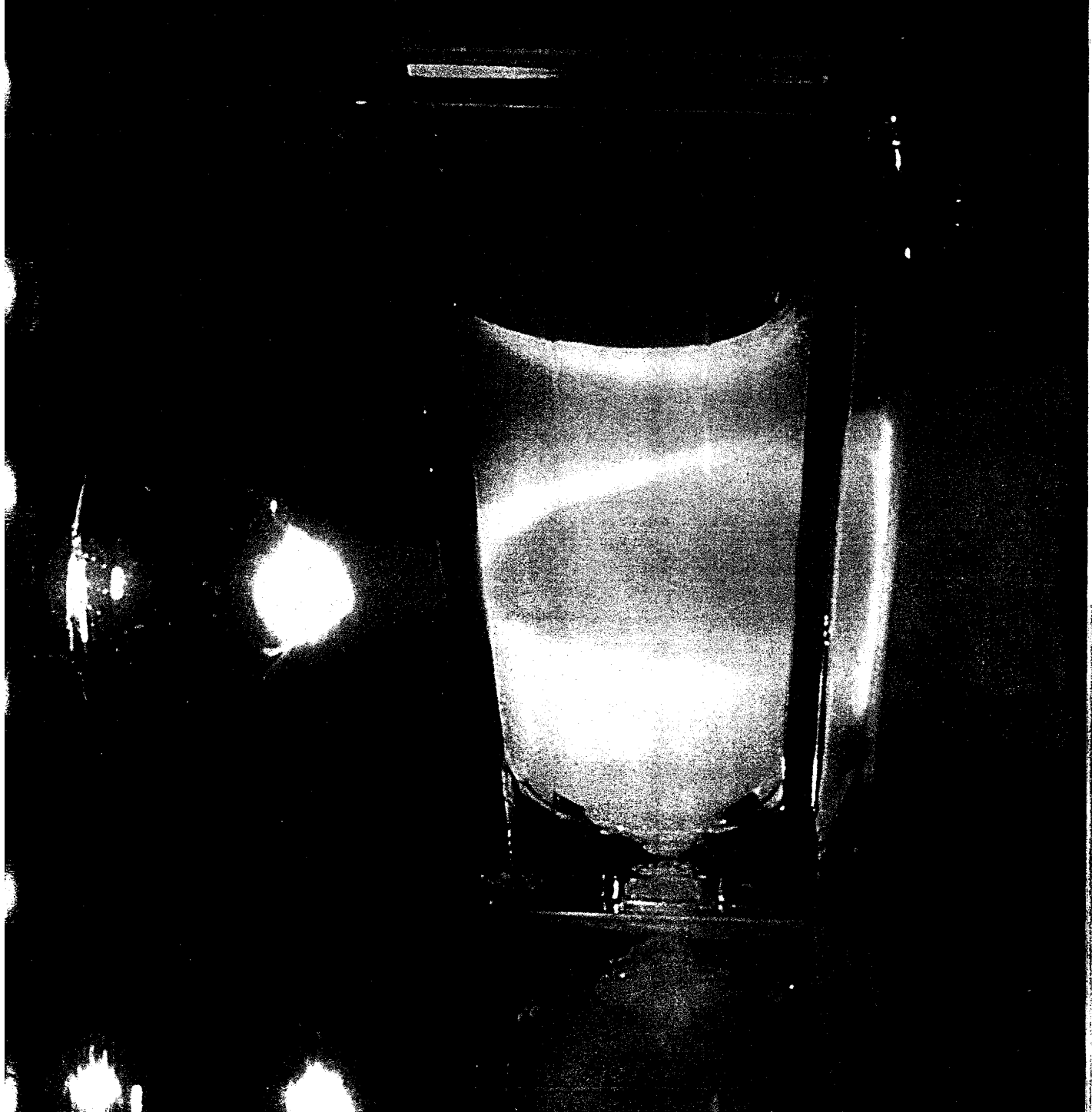


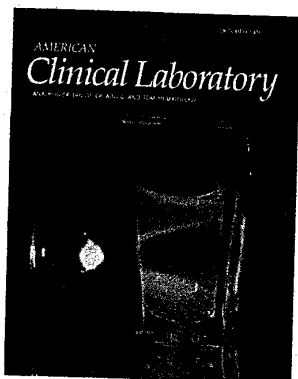
OCTOBER 1988

AMERICAN  
*Clinical Laboratory*

ANALYSIS OF DRUGS OF ABUSE AND TDM/HEMATOLOGY



# AMERICAN *Clinical Laboratory*



Cover: Photographed are components of the photo-optical clot detection system of a new coagulation instrument from Organon Teknika, the Coag-A-Mate™ XM. Courtesy of Organon Teknika, Durham, North Carolina.

Editor's Page ..... 6

## Features

- Laboratory testing in forensic postmortem cases  
BY Y.H. CAPLAN AND B. LEVINE ..... 8
- Performing cost-effective drugs of abuse testing on a random access analyzer  
BY S.N.S. HANJAN AND M. MULLINS ..... 21
- A latex agglutination immunoassay for the determination of cross-linked FbDP  
BY P.J. BRAUN ..... 26
- An innovative lymphocyte preparation system for flow cytometry  
BY J.W. BARKER ..... 32
- The anatomy of drug abuse testing  
BY S. JOSEPH MULE ..... 38
- The effects of intravenous EDTA infusion on the multichemical profile  
BY H.D. RIORDAN, J.A. JACKSON, E. CHERASKIN, AND M. DIRKS .. 42

## Product Reviews

- Highlights of the Month* ..... 44
- Serum/Urine HCG Test, Strep B Test, Sweat Testing System, Tumor Marker Control  
*Reagents* ..... 46
- Cholesterol Reagent, Cotinine Screen, ISE Control, LH IRMA and FSH IRMA, Specimen Identification
- Laboratory Supplies* ..... 47
- Centrifuge Tubes, Cryopreserved Cells, HPLC Columns, Mounting Medium, Specimen Collection Brush

Literature Reviews ..... 48

Advertising Index ..... 48

*American Clinical Laboratory* (ISSN 8750-9490)  
Volume 7, Number 7, USPS No. 740-310

Published monthly by International Scientific Communications, Inc., 30 Controls Drive, P.O. Box 870, Shelton, Connecticut 06484-0870 USA. Phone 203/926-9300, Telex 964-292, Fax 203/926-9310. Second-class postage paid at Shelton, CT and additional mailing offices.

International Scientific Communications, Inc. assumes no responsibility for the statements and opinions advanced by the contributors.

Subscriptions available: \$170.00 per year (\$210.00 outside continental USA).

Change of address: Provide old mailing label and new address, or new address and the 2-letter, 7-digit subscriber code in upper left-hand corner of your mailing label. Include zip code or postal code. Allow 4 to 6 weeks for changes to be made. Postmaster: Send address changes to *American Clinical Laboratory*, P.O. Box 4049, Woburn, MA 01888-9939.

©1988 by International Scientific Communications, Inc. All rights reserved. Reproduction in whole or in part without written permission from International Scientific Communications, Inc. is prohibited.



## The effects of intravenous EDTA infusion on the multichemical profile

THE INTRAVENOUS infusion of EDTA (ethylene diamine tetraacetic acid) is a therapeutic option sometimes used for the treatment of toxicological conditions (e.g., lead intoxication)<sup>1,2</sup> and other, somewhat controversial, treatments (e.g., occlusive vascular disease).

There are certain concerns about the potential health hazards of intravenous EDTA treatment.<sup>3</sup> Some suggest that intravenous EDTA treatment invites a "nonspecific metabolic upheaval," while others believe that the EDTA treatment may cause iatrogenic renal problems. Another concern deals with the potential demineralization of bone as a result of intravenous EDTA treatment.

Several of these concerns have been investigated previously. When used properly, EDTA treatment does not appear to compromise renal function. As a matter of fact, renal function appears to improve in some patients after the EDTA treatment.<sup>4-8</sup> In addition, preliminary evidence suggests that demineralization is not evident in patients after EDTA treatment.<sup>9</sup>

This paper deals with the more general question of a nonspecific metabolic upheaval as the result of intravenous EDTA treatment as monitored by a multichemical profile of 23 tests.

### Method

Twenty-eight people were randomly drawn from 127 volunteers who responded to an advertisement requesting the participation of

*Dr. Riordan is President, Dr. Cheraskin is Clinical Research Director, and Dr. Dirks is Administrative Director of Research, at The Olive W. Garvey Center, Wichita, Kansas. Dr. Jackson is Associate Professor and Chairman, Department of Clinical Sciences, College of Health Professions, The Wichita State University, Wichita, Kansas.*

people in the experiment and who fit the following criteria: 1) Are over the age of 40; 2) are ambulatory; 3) demonstrate a five-fold increase in the urinary lead as a result of a 3-g EDTA challenge; 4) have a fasting serum creatinine level of less than 1.5 mg/dL; and 5) have completed an extensive history and screening workup by a physician. All participants signed an informed consent form.

The therapeutic treatment consisted of a series of 20 EDTA intravenous infusions administered at approximately weekly intervals (where possible) over a period of 20 weeks. The maximum time span for a few subjects extended to 38 weeks. The EDTA infusion consisted of 3.0 g EDTA (Keylate®, Editate sodium, The Key Co.), 15.0 g ascorbic acid buffered in sodium bicarbonate (Bronson Pharmaceuticals), 800 mg magnesium chloride, 40.0 mg procaine, and 1000 units of heparin delivered in 500 mL of sterile, deionized water. The solution was intravenously infused over a period of 3-5 hours. Additionally, each subject was given three Insurance Formula™ (Bronson Pharmaceuticals) vitamin and mineral supplement tablets per day.

The multichemical profile was drawn while fasting, before treatment, after 10 infusion treatments, and after 20 infusion treatments. The serum was separated immediately and sent to a local private reference laboratory for processing.

### Results

Table 1 lists the parameters and results of the multichemical profile before treatment, after 10 treatments, and after 20 weekly treatments. Also included are the suggested reference ranges for each parameter as established by the reference laboratory performing the

tests. All the parameters measured before treatment were within the reference values established for each procedure. Also, as shown, there were no clinically significant changes in any parameter after 10 or 20 treatments. Statistical treatment of the data revealed significant changes ( $p < 0.01$ ) in calcium, sodium, chloride, total protein, globulin, albumin/globulin ratio, total bilirubin, and cholesterol in the 20 treatment data as compared to the pretreatment data. However, all parameters remained within the normal accepted ranges; therefore, these changes were probably not of clinical importance.

### Discussion

There appears to be no evidence of a nonspecific metabolic upheaval after 20 EDTA intravenous infusions. Creatinine and blood urea nitrogen levels were not significantly changed. This is similar to previous work that showed EDTA treatment does not compromise renal function.<sup>6-8</sup> Calcium and phosphorus levels did not significantly change over the period of 20 treatments. Although there were no radiographic studies of bones performed in this study, it would appear from the calcium and phosphorus results that there was no excessive mobilization of these compounds from the bone. However, the patients in this treatment group were on supplemental vitamin and mineral therapy. Total iron levels were not significantly changed. All liver function tests (ALT, AST, LDH, T. bilirubin, GGT, alkaline phosphatase) were normal. Cholesterol was reduced by 10.7 mg/dL after 20 treatments. McDonagh et al., showed similar results with cholesterol and HDL.<sup>9-13</sup>

The results of the 23-multichemical tests after 20 treatments of intra-

Table 1

Test	Multichemical profile results			Reference values <sup>+</sup>
	Pretreatment	10 Treat- ments	20 Treat- ments*	
Glucose	102.9	104.3	105.0	60-125 mg/dL
Calcium	9.9	9.6	9.7	8.5-10.5 mg/dL <sup>o</sup>
Phosphorus	3.5	3.5	3.5	2.5-4.5 mg/dL
Alkaline phosphatase	84.6	78.8	81.7	20-150 $\mu$ L
Sodium	139.9	140.1	141.1	135-148 mEq/L <sup>o</sup>
Potassium	4.2	4.2	4.0	3.5-5.5 mEq/L
Chloride	100.1	101.7	102.1	94-109 mEq/L <sup>o</sup>
Total protein	7.1	6.9	6.9	6.0-8.5 g/dL <sup>o</sup>
Albumin	4.2	4.1	4.3	3.5-5.5 g/dL
Globulin	2.8	2.7	2.6	1.5-4.5 g/dL <sup>o</sup>
Albumin/globulin ratio	1.5	1.5	1.6	1.1-2.5 <sup>o</sup>
Uric acid	6.4	6.2	6.0	2.2-7.7 mg/dL
BUN	15.3	15.7	15.7	7-26 mg/dL
Creatinine	1.1	1.1	1.1	0.5-1.5 mg/dL
BUN/Creatinine ratio	14.5	15.0	15.1	5-50
Iron	96.1	82.5	87.8	40-180 $\mu$ g/dL
Total bilirubin	0.6	0.5	0.5	0.1-1.2 mg/dL <sup>o</sup>
Triglyceride	167.9	168.3	165.1	10-190 mg/dL
Cholesterol	202	191.2	191.3	115-240 mg/dL <sup>o</sup>
LDH	192	181	184.3	100-250 $\mu$ L
AST(SGOT)	26	22.2	23.4	0-50 $\mu$ L
GGT	24.1	19.3	24.5	0-45 $\mu$ L
ALT(SGPT)	32.2	22.9	23.7	0-50 $\mu$ L <sup>o</sup>

\*=X treatment time was 30.7 weeks.

<sup>+</sup>=As established by the local reference laboratory.

<sup>o</sup>=20 week treatment compared to pretreatment, p=<0.01.

venous infusion with EDTA in this experiment would tend to show that there is no nonspecific metabolic upheaval. It would also appear that there is no renal compromise based on the BUN and creatinine results.

## References

1. WYNGAARDEN, J.B., *Cecil's Textbook of Medicine* (W.B. Saunders Co., Philadelphia, PA, 1985) pp. 598-599, 2307-2309.
2. ISSELBACHER, K.J. et al., *Harrison's Principles of Internal Medicine* (McGraw-Hill, New York, NY, 1980), p. 967.
3. JONES, R.J., "Chelation therapy," *JAMA* 250 (5), 672 (1983).
4. CRANTON, E.M. and FRACKELTON, J.P., "Current status of EDTA chelation therapy in occlusive arterial disease," *J. Holistic Med.* 4 (1), 24-33 (1982).
5. RIORDAN, H.D. et al., "Another look at renal function and the EDTA treatment process," *Orthomol Med.* 2 (3), 185-188 (1987).
6. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "The effect of EDTA chelation therapy plus multivitamin-trace mineral supplementation upon renal function: A study in serum creatinine," *J. Holistic Med.* 4 (2), 146-151 (1982).
7. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "The effect of EDTA chelation therapy plus supportive multi-

vitamin-trace mineral supplementation upon renal function: A study in blood urea nitrogen, *J. Holistic Med.* 5 (2), 163-171 (1983).

8. SEHNERT, K., CLAGUE, A.F., and CHERASKIN, E., "The improvement in renal function following EDTA chelation and multivitamin-trace mineral therapy: A study in creatinine clearance," *Med. Hypotheses* 15 (11), 301-304 (1984).
9. RIORDAN, H.D. et al., "A safe treatment for demonstrated chronic lead burden" (submitted for publication).
10. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "Serum cholesterol and the aging process," *Med. Hypotheses*. 7 (6), 685-694 (1981).
11. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "Homeostatic effect of EDTA with supportive multivitamin-trace mineral supplementation upon High Density Lipoproteins (HDL)," *J. Osteopathic Phys. and Surg. Calif.* 8 (2) (1982).
12. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "The influence of EDTA salts plus multivitamin-trace mineral therapy upon total serum cholesterol/high-density lipoprotein cholesterol," *Med. Hypotheses* 9 (6), 643-646 (1982).
13. MCDONAGH, E.W., RUDOLPH, C.J., and CHERASKIN, E., "The effect of intravenous disodium ethylenediaminetetraacetic plus supportive multivitamin/trace-mineral supplementation upon fasting serum calcium," *Med. Hypotheses* 11 (4), 431-438 (1983).

# Take 5 minutes to read this. You may help save a life.

**An estimated 100,000 Americans have Tourette Syndrome. Although not fatal, it can be a living nightmare.**

**Tourette Syndrome is a physical disorder often mistaken for psychological illness. To be treated, it must be correctly diagnosed.**

Here are four essential characteristics of Tourette Syndrome:

■ Onset between 2 and 15. Tourette Syndrome *always* begins between these ages, with an average age of 7 years. It is chronic and lifelong.

■ Involuntary muscular movements. Fast eye blinking, head jerking, facial grimaces, knee jerks, other body movements.

■ Uncontrollable noises. Involuntary grunting, snorting, sniffing, throat clearing, barking, other odd noises. Also involuntary profanity in some patients.

■ Symptoms vary over time. Symptoms change, replacing one another, over time. They vary in frequency and severity, and *always* disappear during sleep.

Undiagnosed and untreated, Tourette Syndrome can have devastating effects on the patient and family. That's why correct diagnosis of Tourette Syndrome is the first and most important step to treating it. If you suspect that anyone in your family, or a friend, may have Tourette Syndrome, please mail the coupon below.

I would like more information.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Tourette Syndrome Association  
42-40 Bell Boulevard  
Bayside, New York 11361

This advertisement was prepared as a public service by  
Ogilvy & Mather.

ACI • 42