ISSN 0094-324X

JOURNAL of the International Academy of Preventive Medicine

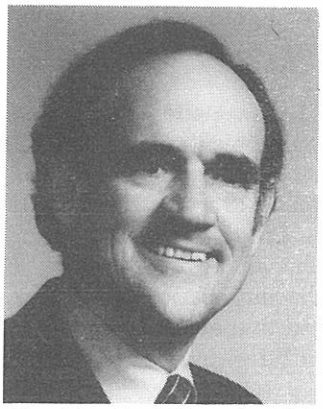
In This Issue . . .

The Effect of Intravenous Disodium Ethylenediaminetetraacetic Acid (EDTA) Upon Blood Cholesterol In A Private Practice Environment

E.W. McDonagh, D.O., F.A.C.G.P.; C.J. Rudolph, Ph.D., D.O., and E. Cheraskin, M.D., D.M.D.

The Effect of Intravenous Disodium Ethylenediaminetetraacetic Acid (EDTA) Upon Blood Cholesterol In A Private Practice Environment

E.W. McDonagh, D.O., F.A.C.G.P., C.J. Rudolph, PhD., D.O. and E. Cheraskin, M.D., D.M.D.



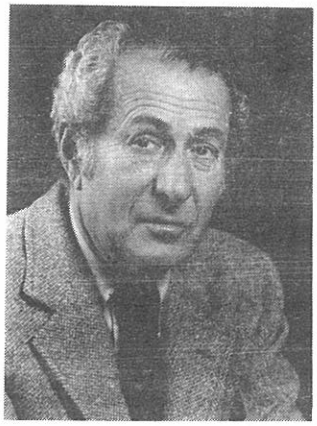
Edward W. McDonagh, D.O., F.A.C.G.P. attended La Salle College, Temple University and Kansas City College of Osteopathy & Surgery. He is a founding member of the International Academy of Preventive Medicine; Advisory Board Secretary of the American Academy of Medical Preventics; President of Board of Directors and Chief of Staff at Doctors Hopsital; Fellow in the American College of General Practitioners and a member of the Missouri State Association for Osteopathic Physicians and Surgeons, Western Missouri Association for Osteopathic Physicians, American Osteopathic Association, and the International Foundation for Preventive Medicine.

Dr. McDonagh has authored 9 papers on work at McDonagh Medical Center.

Charles J. Rudolph, Jr., Ph.D., D.O. is a Doctor of Philosophy and Doctor of Osteopathy. He specialized in laboratory medicine; trace mineral analysis and metabolism, allergies and ecological medicine; nutrition and metabolic medicine.

He has received the Campbell Soup Fellowship; American Oil Chemists Society Honored Student Award; Graduate excellence Award; Graduated Summa Cumlaude, Ph.D.,; Phi Lambda Upsilon, honorary chemical society; Phi Kappa Phi, honor society; Outstanding basic science teacher, Texas College of Osteopathic medicine; and Who's Who in American Colleges and Universities.

Dr. Rudolph has co-authored 9 papers on work at McDonagh Medical Center.



Emmanuel Cheraskin, M.D., D.M.D., Professor Emeritus, University of Alabama in Birmingham, published hundreds of articles and authored or contributed to fifteen books, including *Psychodietetics, Diet and Disease, Predictive Medicine;* Bibliography in *Two Thousand Men of Achievement.*

INTRODUCTION

There is a plethora of published papers showing possible parallelisms between blood cholesterol concentration and cardiovascular pathosis. Quite apart, there is a wealth of published paper purporting the possible effects of EDTA in cardiovascular syndromes. Surprisingly, there is only limited information in the scientific sphere concerning the possible role of EDTA in altering blood cholesterol.

This report is desiged to try to resolve the following five important questions:

1. What is the effect of EDTA upon blood cholesterol in private practice patients?
2. Is the cholesteremic action a function of age?
3. Is the cholesteremic effect different in the sexes?

4. Is the cholesteremic result related to the initial cholesterol concentration?
5. How quickly can one anticipate an alteration in blood cholesterol following the onset of EDTA?

REVIEW OF THE LITERATURE

As far as can be determined, a literature search disclosed only *four* reports designed to ascertain the effect of EDTA on blood cholesterol.

Perry and Schroeder[1], from the Hypertension Division of the Department of Internal Medicine at the Washington University School of Medicine and Barnes Hospital in Saint Louis, studied two groups of individuals treated, in one instance, with parenteral EDTA and, in the other case, with oral EDTA.

Twenty-two patients (ranging in age from 25 to 72 years and with a mean of 44 years) were administered 3 to 27 g of intravenous calcium disodium EDTA. The daily intake varied from 1 to 12 g and the total period of administration 1 to 11 days. In 15 of these subjects, the total fasting plasma cholesterol levels were determined before and after EDTA. Within one week of the last injection of EDTA, the mean cholesterol reduction was 75 mg% for those with the greater EDTA therapy; about 38mg% for those administered lesser amount of EDTA.

Kalz and his group[2], while studying lipoproteins and EDTA, tangentially reported the effect of 3 g of calcium disodium EDTA daily by mouth for 10 days to 5 psoriatic patients. The mean pre- and post-treatment cholesterol levels were 558 and 366 mg% respectively.

Perry and Camel[3], in a presentation at a conference on metal-binding agents sponsored by the Hahnemann Medical College and Hospital in Philadelphia, discussed 12 female patients with initial plasma cholesterol levels of over 300 mg%. Group I included 5 hospitalized patients receiving 13 to 22 g of intravenous $CaNa_2EDTA$ over a 5 to 8 day period. Group II consisted of 5 outpatients who received 42 g each of oral calcium disodium EDTA over a 2-week period. Group III included 2 subjects given 0.8 and 1.2 g oral $CaNa_2EDTA$ over a period of 1 to 3 years.

In Group I, the initial cholesterol, prior to chelate administration, ranged from 312 to 466 with a mean of 388 mg%. Following $CaNa_2EDTA$ therapy, the mean cholesterol dropped about 100 mg%. While the reduction in cholesterol began right after the first dose of the chelate, it reached its maximum after 3 days. Plasma cholesterol then remained constant until 2 days after the last chelate injection, when it began to rise slowly.

In Group II, the initial plasma cholesterol scores resembled those in Group I. In this group, there was no change in the total cholesterol level.

In Group III, one of the two patients with xanthomatosis (with an initial plasma cholesterol over 500 mg%) who was administered oral $CaNa_2EDTA$ had several successive reductions in total cholesterol. The other patient (with an initial plasma cholesterol of almost 700 mg%), showed a persistent reduction in circulating cholesterol and a decrease in palmar xanthomatosis.

Olwin and Koppel[4], from the Coagulation Research Laboratory of the Division of Surgery at the Presbyterian-Saint Luke's Hospital and the Department of Surgery at the University of Illinois College of Medicine in Chicago, examined the effect of EDTA therapy upon elevated plasma lipid levels.

The patients were selected from the private practice of one of the investigators. The group consisted of 22 males and 12 females ranging in age from 42 to 67 (average 56 years) and 43 to 76 (mean 57 years) respectively.

The chelating agent (Na_2EDTA) was administered intravenously. The total plasma cholesterol ranged from 240 to 490 mg% initially. The values decreased from 3 to 57 mg% with a mean of 23 mg%. In most instances the reductions were produced with infusions of 12 to 15 g EDTA. The cholesterol levels again rose after EDTA was discontinued and once again were found to be lowered to a similar degree following reinstitution of chelate treatment.

MATERIALS AND METHODS

One hundred and forty-two patients participated in this study. The age and sex distribution is summarized (Table 1). Five points are worthy of special mention. First, the mean age and standard deviation for the entire sample is 62.2 and 12.2 years. Second, the age range extended from the third to the ninth decade (23 to 84 years with a spread of 61 years). Third, the male and female sample sizes are near-equal (76 and 66 respectively). Fourth, the means and standard deviations for the male and female groups separately are very similar (61.4 ± 12.0 versus 63.1 ± 12.5 years). Fifth and lastly, there is no statistically significant differences of the means ($P > 0.4000$) between the sexes.

On the basis of their diagnoses, all of these subjects were selected for chelation therapy, dietary recommendations and supportive multivitamin-trace mineral supplementation.

Initially, a battery of biochemical tests was performed including serum cholesterol[5,6]. The distribution of serum cholesterol for the entire group and for the sexes separately is summarized (Table 2). It will be noted that, for the entire sample, the mean and the standard deviation is 245 ± 58 mg%. Second, the range is considerable (from a low of 122 to a high of 374 with a spread of 252 mg%). Third, the means

and standard deviations for the male and female subsets separately are very similar (242 ± 55 and 249 ± 61 mg%). Lastly, there is no statistically significant difference of the means (P> 0.4000).

TABLE 1
Age Distribution

Age Groups (years)	Male Group	Female Group	Total Group
20-29	0 (0.0%)	1 (1.5%)	1 (0.7%)
30-39	4 (5.3%)	1 (1.5%)	5 (3.5%)
40-49	8 (10.5%)	10 (15.2%)	18 (12.7%)
50-59	19 (25.0%)	13 (19.7%)	32 (22.5%)
60-69	25 (32.9%)	13 (19.7%)	38 (26.8%)
70-79	15 (19.7%)	25 (37.9%)	40 (28.2%)
80-89	5 (6.6%)	3 (4.5%)	8 (5.6%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	33	23	23
Maximum	84	84	84
Range	51	61	61
Mean	61.4	63.1	62.2
S.D.	12.0	12.5	12.2
Significance of the difference of the means	t = 0.8304 P>0.4000		

TABLE 2
Serum Cholesterol Distribution (initial examination)

Cholesterol Groups (mg%)	Male Group	Female Group	Total Group
100-149	0 (0.0%)	2 (3.0%)	2 (1.4%)
150-199	18 (23.7%)	11 (16.7%)	29 (20.5%)
200-249	29 (38.2%)	22 (33.3%)	51 (35.9%)
250-299	14 (18.4%)	18 (27.3%)	32 (22.5%)
300-349	13 (17.1%)	8 (12.1%)	21 (14.8%)
350-399	2 (2.6%)	5 (7.6%)	7 (4.9%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	152	122	122
Maximum	358	374	374
Range	206	252	252
Mean	242	249	245
S.D.	55	61	58
Significance of the difference of the means	t = 0.7096 P>0.4000		

Each subject was then subjected to approximately 10 EDTA infusions along with a supportive multivitamin-trace mineral supportive regimen. The biochemical battery of tests, including serum cholesterol was then repeated. Table 3 outlines the time distribution between the first and second serum cholesterol determinations. It is clear, for the entire group and for the sexes separately, the time range is considerable (actually from 2 to 60 days). Also, the means and the standard deviations for the sexes are very much alike (23 ± 12 versus 25 ± 13 days). Finally, the scores are not statistically significantly different in terms of means (P > 0.4000).

TABLE 3
Time (between first and second cholesterol scores) Distribution

Time Groups (Days)	Male Group	Female Group	Total Group
0-9	6 (7.9%)	5 (7.6%)	11 (7.7%)
10-19	26 (34.2%)	22 (33.3%)	48 (33.8%)
20-29	22 (28.9%)	16 (24.3%)	38 (26.8%)
30-39	16 (21.1%)	13 (19.7%)	29 (20.4%)
40-49	4 (5.3%)	8 (12.1%)	12 (8.5%)
50-59	2 (2.6%)	1 (1.5%)	3 (2.1%)
60-69	0 (0.0%)	1 (1.5%)	1 (0.7%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	2	6	2
Maximum	59	60	60
Range	57	54	58
Mean	23	25	24
S.D.	12	13	12
Significance of the difference of the means	t = 0.7199 P>0.4000		

The serum cholesterol distribution for the second time is also outlined (Table 4). Table 5 summarizes the distribution of the number of days which intervened between the second and third biochemical measurement. Finally, Table 6 provides the serum cholesterol values established at the third measurement period.

RESULTS

QUESTION ONE: Table 2 outlines the initial serum cholesterol scores for the entire group and the sexes separately. There are several points which should be underlined. First, the overall spread of serum cholesterol values is considerable

(from a low of 122 to a high of 374 with a range of 252 mg%). Next, the ranges in the two sexes are very similar. Third, the means and standard deviations for the total sample and the sexes separately are very similar. Finally, there are no statistically significant differences of the means and the variances between the men and the women.

It will be noted (Table 3) that, on the average, 24 days transpired between the first and the second serum cholesterol determinations. Once again, it should be emphasized that the time was essentially the same in the two sexes.

TABLE 4
Serum Cholesterol Distribution (second examination)

Cholesterol Groups (mg%)	Male Group	Female Group	Total Group
100-149	8 (10.5%)	3 (4.5%)	11 (7.8%)
150-199	26 (34.2%)	30 (45.5%)	56 (39.4%)
200-249	27 (35.5%)	17 (25.8%)	44 (31.0%)
250-299	12 (15.8%)	11 (16.7%)	23 (16.2%)
300-349	3 (4.0%)	4 (6.0%)	7 (4.9%)
350-399	0 (0.0%)	1 (1.5%)	1 (0.7%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	101	135	101
Maximum	347	373	373
Range	246	238	272
Mean	210	213	211
S.D.	49	50	59
Significance of the difference of the means	t = 0.4115 P > 0.5000		

Table 4 summarizes the serum cholesterol findings for the two sexes separately and the total group following EDTA therapy plus supportive care for approximately 24 days. Once again, it is important to underline that there are no significant sex differences with regard to the followup serum cholesterol findings.

The distribution of the time periods between the second and third cholesterol determinations (Table 5) and the third and final serum cholesterol measurements (Table 6) are also outlined.

Under the conditions of this experiment, the mean age and standard deviation were 62.2 ± 12.2 years (Table 7). The *initial* serum cholesterol values were 245 ± 58 mg%. After an average of 24 days, the average cholesterol score dropped to 211 ± 49 mg%.

TABLE 5
Time (between second and third cholesterol scores) Distribution

Time Groups (Days)	Male Group	Female Group	Total Group
0-9	3 (3.9%)	2 (3.0%)	5 (3.5%)
10-19	16 (21.1%)	9 (13.7%)	25 (17.6%)
20-29	27 (35.5%)	20 (30.3%)	47 (33.1%)
30-39	14 (18.4%)	15 (22.7%)	29 (20.4%)
40-49	10 (13.2%)	12 (18.2%)	22 (15.5%)
50-59	6 (7.9%)	8 (12.1%)	14 (9.9%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	6	5	5
Maximum	56	57	57
Range	50	52	52
Mean	28	32	30
S.D.	13	13	13
Significance of the difference of the means	t = 1.6278 P > 0.1000		

TABLE 6
Serum Cholesterol Distribution (third examination)

Cholesterol Groups (mg%)	Male Group	Female Group	Total Group
100-149	5 (6.6%)	5 (7.6%)	10 (7.1%)
150-199	32 (42.1%)	17 (25.8%)	49 (34.5%)
200-249	24 (31.6%)	29 (43.9%)	53 (37.3%)
250-299	10 (13.2%)	13 (19.7%)	23 (16.2%)
300-349	3 (3.9%)	1 (1.5%)	4 (2.8%)
350-399	1 (1.3%)	1 (1.5%)	2 (1.4%)
400-449	1 (1.3%)	0 (0.0%)	1 (1.7%)
totals	76 (100.0%)	66 (100.0%)	142 (100.0%)
Minimum	102	123	102
Maximum	435	349	435
Range	333	236	333
Mean	211	216	213
S.D.	54	47	51
Significance of the difference of the means	t = 0.5420 P > 0.5000		

This decrement of approximately 14% is statistically significant (t = 10.8348, P < 0.0010). There is no statistically significant difference between the se-

TABLE 7:
Total Chelation Group
(n = 142)

Line		Mean & S.D.	Significance of the Difference of the Means
	Age Group	62.2 ± 12.2 yrs.	
1	1st cholesterol	245 ± 58 mg%	t = 10.8348 P<0.0010*
2	time between 1st & 2nd cholesterol	24 ± 12 days	
3	2nd cholesterol	211 ± 49 mg%	
4	time between 2nd & 3rd cholesterol	30 ± 13 days	t = 0.7819 P>0.4000
5	3rd cholesterol	213 ± 51 mg%	

*statistically significant difference of the means

cond and third cholesterol determinations which were spanned by about 30 days.

Hence, in answer to the first question, there appears to be a significant reduction in serum cholesterol within the first month or so of treatment with EDTA and supportive care in a private practice environment.

QUESTION TWO: In order to consider the age factor, the 142 individuals in this study were divided into two near-equal subgroups based upon age. Thus, there were 70 in the younger category (52.1 ± 8.2 years) and 72 in the older group (72.1 ± 5.6 years). Table 8 lists a comparison of all the items considered (age, initial cholesterol, time between first and second cholesterol measurements, second choleterol, time between second and third cholesterol evaluation, and the third cholesterol scores. The only significant difference of the means was the age factor, as one would expect since the participants were divided by age.

Table 9 provides a statistical analysis of the differences *within* the two age groups, as against the preceding chart (Table 8) which provided an *intergroup* comparison. There is a significant decline in the mean serum cholesterol scores in both the younger and older subsets and the difference is about the same. There are no cholesterol changes between the second and third determinations.

Hence, with regard to the second question, the observations reported in connection with the first question, are the same; namely, the age factor is unimportant.

TABLE 8:
Comparison of Changes in Serum Cholesterol Following EDTA Therapy in Terms of Age

Line		Older Age Group (n = 72)	Younger Age Group (n = 70)	Significance of the Differences of the Means
1	Age Groups	72.1 ± 5.6 yrs.	52.1 ± 8.2 yrs.	t = 16.8766 P<0.0010*
2	1st Cholesterol	243 ± 53 mg%	247 ± 63 mg%	t = 0.3925 P>0.5000
3	time between 1st & 2nd cholesterol	23 ± 12 days	24 ± 13 days	t = 0.3665 P>0.5000
4	2nd Cholesterol	212 ± 44 mg%	210 ± 55 mg%	t = 0.3030 P>0.5000
5	time between 2nd & 3rd cholesterol	29 ± 14 days	31 ± 13 days	t = 0.6800 P>0.4000
6	3rd cholesterol	211 ± 36 mg%	215 ± 62 mg%	t = 0.5401 P>0.5000

*Statistically significant difference of the means

TABLE 9:
Comparison of Changes in Serum Cholesterol Following EDTA Therapy in Terms of Age

Line		Older Age Group (n = 72)	Younger Age Group (n = 70)
1	1st Cholesterol	243 ± 53 mg%	247 ± 63 mg%
2	Significance of the Difference of the Means	t = 3.8055 P< 0.0010*	t = 3.6854 P< 0.0010*
3	2nd Cholesterol	212 ± 44 mg%	210 ± 55 mg%
4	Significance of the Difference of the Means	t = 0.2246 P>0.5000	t = 0.5698 P>0.5000
5	3rd Cholesterol	211 ± 36 mg%	215 ± 62 mg%

*Statistically significant difference of the Means

QUESTION THREE: Table 10 depicts all the data in terms of the two sexes. Within the limits of this study, there are no significant differences in the means or variances with regard to age, the first cholesterol, time between the first and second cholesterol measurements, the second cholesterol, time between the second and third cholesterol determinations, or the last cholesterol evaluation.

Table 11 tells us that there is only a significant reduction in serum cholesterol between the first

and second examinations and that there is no sexual difference.

Thus, a propos to the third question, the serum cholesterol alterations reported earlier for the entire sample and for the different age groups prevails. In short, the serum cholesterol values are not influenced by sex.

TABLE 10:
Male Versus Female Chelation Groups

Line		Male Group (n = 76)	Female Group (n = 66)	Significance of the Difference of the Means
1	Age	61.5 ± 12.0 yrs.	63.1 ± 12.5 yrs.	t = 0.8304 P>0.4000
2	1st Cholesterol	242 ± 55 mg%	249 ± 61 mg%	t = 0.7096 P>0.4000
3	time between 1st & 2nd cholesterol	23 ± 12 days	25 ± 13 days	t = 0.7199 P>0.4000
4	2nd Cholesterol	210 ± 49 mg%	213 ± 50 mg%	t = 0.4115 P>0.5000
5	time between 2nd & 3rd cholesterol	28 ± 13 days	32 ± 13 days	t = 1.6278 P>0.1000
6	3rd cholesterol	211 ± 54 mg%	216 ± 47 mg%	t = 0.5420 P>0.5000

TABLE 11:
Chelation Groups

Line		Male Group	Female Group
1	1st Cholesterol	242 ± 55 mg%	249 ± 61 mg%
2	Significance of the Difference of the Means	t = 7.2834 P< 0.0010*	t = 8.1494 P< 0.0010*
3	2nd Cholesterol	210 ± 49 mg%	213 ± 50 mg%
4	Significance of the Difference of the Means	t = 0.7602 P>0.4000	t = 0.7321 P>0.4000
5	3rd Cholesterol	211 ± 54 mg%	216 ± 47 mg%

*Statistically significant difference of the Means

QUESTION FOUR: Table 12 sumarizes the subsets in terms of the initial serum cholesterol levels in two equal subgroups of 71 subjects each. As one might expect, there are significant differences in all three cholesterol measurements. As one might also anticipate, there are significant differences in the variances also.

TABLE 12:
Comparison of Changes in Serum Cholesterol Following EDTA Therapy in Terms of Initial Serum Cholesterol Level

Line		Initial Low Cholesterol (n = 71)	Initial High Cholesterol (n = 71)	Significance of the Difference of the Means
1	Age Group	62.6 ± 13.5 yrs.	61.8 ± 10.9 yrs.	t = 0.4175 P>0.5000
2	1st Cholesterol	198 ± 27 mg%	291 ± 40 mg%	t = 16.3122 P<0.0010*
3	time between 1st & 2nd Cholesterol	23 ± 12 days	25 ± 13 days	t = 0.7459 P>0.4000
4	2nd Cholesterol	180 ± 32 mg%	242 ± 44 mg%	t = 9.7179 P<0.0010 *
5	time between 2nd & 3rd Cholesterol	28 ± 14 days	32 ± 13 days	t = 1.5696 P>0.1000
6	3rd Cholesterol	182 ± 31 mg%	245 ± 47 mg%	t = 9.5367 P<0.0010 *

*Statistically significant difference of the means

TABLE 13:
Comparison of Changes in Serum Cholesterol Following EDTA Therapy in Terms of Initial Serum Cholesterol Level

Line		Initial Low Cholesterol (n = 71)	Initial High Cholesterol (n = 71)
1	1st Cholesterol	198 ± 27 mg%	291 ± 40 mg%
2	Significance of the Difference of the Means	t = 3.7263 P<0.0010*	t = 6.9562 P<0.0010*
3	2nd Cholesterol	180 ± 32 mg%	242 ± 44 mg%
4	Significance of the Difference of the Means	t = 0.3280 P>0.5000	t = 0.3072 P>0.5000
5	3rd Cholesterol	182 ± 31 mg%	245 ± 47 mg%

*Statistically significant difference of the Means

Table 13 underlines the fact that there are significant reductions in the means in both groups based on the initial values between the first and second determinations. However, in those with the lower initial score, the decrement was of an order of 9%; in the higher group 17%.

Thus, in connection with the fourth question, those with the higher initial cholesterol scores decreased

about twice as much as those with the lower first score.

QUESTION FIVE: Clearly, the time required to effect a change in the serum cholesterol is a function of a host of variables. Within the limits of this study, the time between the first and second cholesterol determined ranged from 2 to 60 days with a mean and standard deviation of 24 ± 12 days (Table 3). In general, the time between the second and third measurements was slightly longer (30 ± 13 days) as illustrated in Table 5. The time intervals were not significantly different in terms of the age of the subjects (Table 8), sex (Table 10), or in the light of the initial scores (Table 12).

Hence, with regard to the fifth and final question, it appears safe to say that, on the average, within about 12 to 36 days, one may expect a significant reduction in the serum cholesterol under this particular therapeutic regimen.

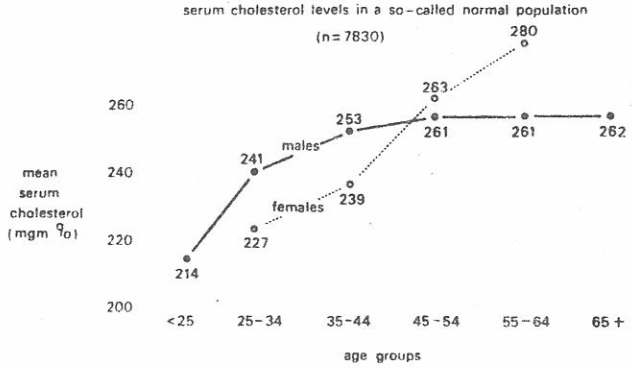
DISCUSSION

There are several items which warrant additional consideration. First and foremost, the point should be underlined that these observations were made in a private practice environment. The obvious advantage is that one is permitted to observe under the most common conditions. The obvious shortcoming is that it is impossible to conduct the highly-desired double-blind technique. And so, the questions still not resolved is what, in the therapeutic regime, is singularly responsible for the serum cholesterol changes. We had hoped to compare these results with a group of patients receiving the same therapy without the EDTA in the same private practice atmosphere. That would have shed some light on the relative influence of EDTA versus the multivitamin-trace supplementation. Unfortunately, the same size was too small. We plan to develop a larger sample of the latter type and pursue this matter at a later date.

On the other hand, it must be underscored that we have here an unusual opportunity to witness what can be accomplished in a private practice setting. Under these conditions, it is evident that one can significantly reduce hypercholesterolemia in about 24 days in an order of about 13%. It is also clear that, while age and sex do not seem to influence the results, the initial serum cholesterol expectedly does; those with the initial higher serum cholesterol decreased about twice that in those with the lower initial values.

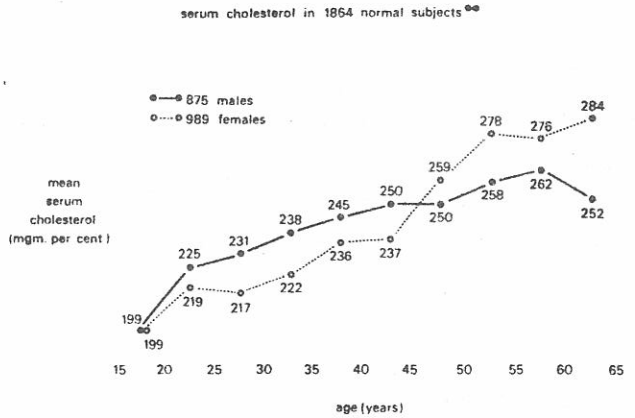
It is especially noteworthy that the posttherapy scores tend to settle in the neighborhood of approximately 210 mg%. This is clear in Table 7 for the total sample after treatment for about 24 days. This is also the case in the two different age groups (Tables 8 and 9). This is the status in both sexes (Tables 10 and 11).

This observation is especially interesting in the light of attempts to establish the "ideal" serum cholesterol. Cheraskin and Ringsdorf[7] propose, from a study of presumably healthy doctors and their spouses that the ideal nonfasting serum cholesterol approaches 200 mg% plus/minus the experimental error inherent in performing any biochemical test.



from: Pincherle, G. Factors affecting the mean serum cholesterol. J. Chron. Dis. 24: #5, 289-297, August 1971.

FIGURE 1. The serum cholesterol patterns in a presumably healthy population of 7830 individuals. The conclusion drawn is that it is a physiologic fact that, with advancing age, the mean serum cholesterol level rises in both sexes.



Schilling, F.J., Christakis, G., Orbach, A. and Becker, W.H. Serum cholesterol and triglyceride: An epidemiological and pathogenetic interpretation. Amer. J. Clin. Nutr. 22: #2, 133-138, February 1969.

FIGURE 2. The serum cholesterol patterns in a presumably healthy population of 1864 subjects. The conclusion drawn from these observations is that it is a physiologic fact that, with advancing age, the mean serum cholesterol scores rise in both sexes.

Finally, notwithstanding the general traditional consensus that serum cholesterol is physiologically different at different ages (Figures 1[8] and 2[9]), the observations reported here are consistent with those shown by McDonagh et al[10] that, following EDTA plus supportive therapy, the serum cholesterol approaches about 200 mg% in all age groups.

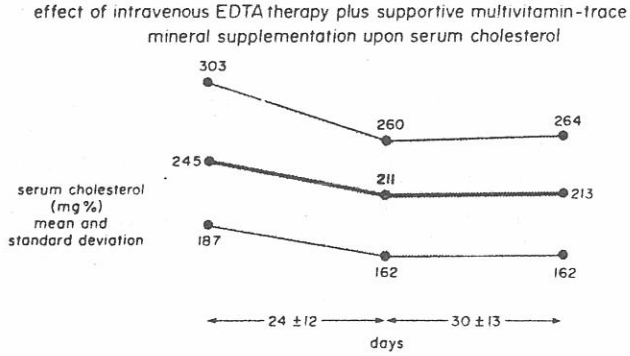


FIGURE 3. The effect of EDTA plus supportive multivitamin-trace mineral supplementation upon serum cholesterol. It will be noted that, within 24 ± 12 days, the values significantly decline from 245 ± 58 mg% to 211 ± 49 mg%. Within the next 30 ± 13 days there is no significant change in serum cholesterol.

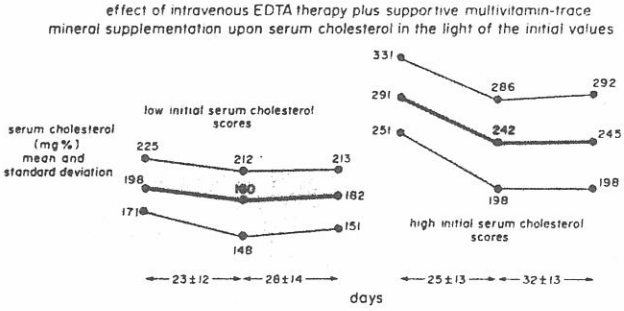


FIGURE 4. A pictorial representation of the changes in serum cholesterol following EDTA therapy plus supportive multivitamin-trace mineral supplementation in terms of the initial serum cholesterol levels. In those with a relatively low initial score (198 ± 27 mg%) there is, within a period of 23 ± 12 days, a significant decline in serum cholesterol to 180 ± 32 mg%. Following another 28 ± 14 days, there is no significant change. In contrast, in those with the initially high serum cholesterol values (291 ± 40 mg%), there is a significant reduction within 25 ± 13 days to 242 ± 44 mg%. Within the next 32 ± 13 days, there is no significant change.

SUMMARY

A literature search disclosed only four published reports with a total of 73 patients describing the effect of EDTA upon serum cholesterol.

In contrast, this report summarizes the observations of 142 private practice patients treated with EDTA and supportive multivitamin-trace mineral supplementation and the effect on serum cholesterol.

The evidence indicates that, in a matter of approximately two to four weeks it is readily possible to reduce hypercholesterolemia on the average about 14% (Figure 3). When the serum cholesterol change is viewed in terms of the initial cholesterol score, those with the higher levels decrease about twice as much (17%) versus those with the lower initial values (9%) as shown in Figure 4.

REFERENCES

1 Perry, H.M., Jr. and Schroeder. H.A. *Depression of Cholesterol levels in human plasma following ethylenediaminetetraacetate and by hydralazine.* J. Chron. Dis. 2: #5, 520-533, November 1955.

2 Kalz, F., Quastel, J.H., Telner, P., Schafer, A. and MacIntyre, W. *Changes of the electrophoretic patterns of the sera of psoriatics under various forms of therapy.* J. Invest. Dermat. 31: #3, 161-166, September 1958.

3 Perry, H.M., Jr. and Camel, G.H. *Some effects of $CaNa_2EDTA$ on plasma cholesterol and urinary zinc in man.* In Seven, M.J. and Johnson, L.A. *Metal-binding in medicine.* 1960. Philadelphia, J.B. Lippincott Company. pp. 209-215.

4 Olwin, J.H. and Koppel, J.L. *Reduction of elevated plasma lipid levels in atherosclerosis following EDTA therapy.* Proc. Soc. Exper. Biol. Med. 128: #3-4, 1137-1140, 1968.

5 Allain, C.C., Poon, L.S., Chan, C.S.G., Richard, W., and Fu, P.C. *Enzymatic determination of total serum cholesterol.* Clin. Chem. 20: #4, 470-475, April 1974.

6 Henry, R.J., Cannon, D.C., and Winkelman, J.W. *Clinical chemistry: principles and techniques.* Second Edition. 1974. Hagerstown, Maryland, Harper and Row. p. 1436.

7 Cheraskin, E. and Ringsdorf, W.M., Jr. *Another look at the 'ideal' serum cholesterol level?* Arch. Intern. Med. 140: #4, 580-581, April 1980.

8 Pincherle, G. *Factors affecting the mean serum cholesterol.* J. Chron. Dis. 24: #5, 289-297, August 1971.

9 Schilling, F.J., Christakis, G., Orbach, A., and Becker, W.H. *Serum cholesterol and triglyceride: An epidemiological and pathogenetic interpretation.* Amer. J. Clin. Nutr. 22: #2, 133-138, February 1969.

10 McDonagh, E.W., Rudolph, C.J., and Cheraskin, E. *Serum cholesterol and the aging process.* Published in Medical Hypotheses, Vol. VII, pp. 685-694, 1981.

AN OCULOCEREBROVASCULOMETRIC ANALYSIS OF THE IMPROVEMENT IN ARTERIAL STENOSIS FOLLOWING EDTA CHELATION THERAPY

E.W. McDonagh, DO, FACGP
C.J. Rudolph, DO, PhD
E. Cheraskin, MD, DMD

ABSTRACT: Fifty-seven patients were evaluated objectively for cerebral vascular arterial occlusion before and after an average of 28 intravenous infusions of disodium ethylene diamine tetraacetic acid. Measurements of arterial occlusion were made with the relatively simple, noninvasive oculocerebrovasculometric analysis. Cerebrovascular arterial occlusion diminished by an average of 18% (from a mean of 28% to a mean of 10%) following therapy ($P<0.001$). Eighty-eight percent of patients treated with EDTA chelation therapy showed objective improvements in cerebrovascular blood flow.

Since C. Miller spelled out the clinical syndrome of carotid occlusive disease in 1951,[1] there have been increasing efforts to develop non-invasive tests for diagnosis of common and internal carotid lesions. The plethora of diagnostic procedures testifies to the difficulty in arriving at a fully satisfactory single technique.[2]

It is noteworthy that while there are several hundred published documents on non-invasive instrumentation and technique, there is practically nothing written on the results of non-surgical therapy for stenosis utilizing any of the current, common non-invasive treatments.

This report, as far as we can ascertain, is the first attempt to examine the effect of intravenous disodium ethylene tetraacetic acid (EDTA) therapy plus multivitamin-trace mineral support upon arterial insufficiency (stenosis) utilizing one of the popular non-invasive techniques, namely oculocerebrovasculometry (OCVM).

Fifty-seven routine patients suffering with chronic degenerative disorders participated in this experiment in a private practice environment. Included were 34 males, age range from 23 to 83 years old with a mean and S.D. of 61.4

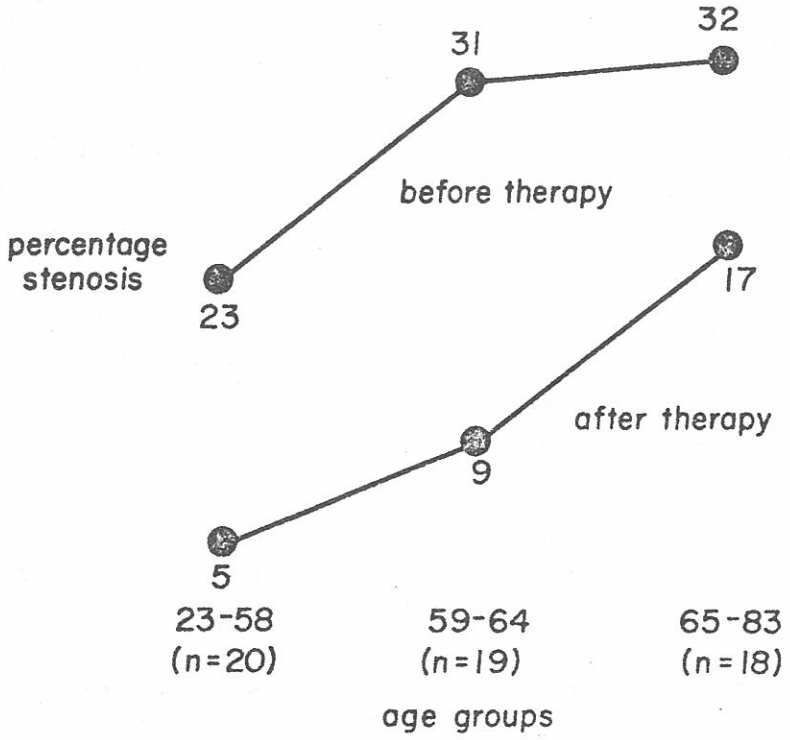
Dr. E.W. McDonagh, a member of the Board of Directors of the American Academy of Medical Preventics, founded the McDonagh Medical Center in Gladstone, Missouri, where he practices with Dr. C.J. Rudolph. Dr. E. Cheraskin is Professor Emeritus and former Chairman of the Department of Oral Medicine at the University of Alabama.

JOURNAL OF HOLISTIC MEDICINE, VOL. 4, NO. 1, SPRING/SUMMER 1982
0195-5977/82/1300-0021$02.75

± 11.2; and 23 females from 48 to 77 years old with a mean and S.D. of 60.2 ± 7.8.

At the initial examination, each patient underwent a detailed history, physical examination and comprehensive battery of biochemical tests. Each patient also underwent oculocerebrovasculometry (OCVM), a unique non-invasive tonometric system for the detection of arterial insufficiency (stenosis). This technique was developed in cooperation with Maurice Langham, Ph.D., of the Wilmer Institute at the Johns Hopkins University School of Medicine.[3,4] This non-invasive system simultaneously measures intraocular pressure and ocular pulse in both the undisturbed state and with the eye pressure increased to the ophthalmic arterial pressure. The procedure measures the ophthalmic arterial pressure which, when compared to the brachial blood pressure, provides a reasonably accurate method of assessing carotid artery occlusive disease, cerebrovascular occlusive disorders, and ocular vascular pathology.[5]

Following the initial studies, each subject received a series of intravenous disodium EDTA infusion with a mean and S.D. of 28.4 ± 7.7 (ranging from 10 to 46). Additionally, a multivitamin-trace mineral supplement (dosage approximately five to 10 times the RDA) was supplied. Upon completion of the EDTA and multivitamin-trace mineral series, each individual once again received a comprehensive history, physical examination, battery of biochemical tests, and oculocerebrovasculometry.



effect of EDTA + multivitamin-trace mineral therapy upon total (right + left) percentage stenosis

Five points deserve particular consideration. First, at the beginning, the mean percentage of arterial stenosis was 28% with a range from 3% to 74%. Following therapy, the average stenosis was 10% with a range from 0 to 54%. Hence, there was an overall statistically significant reduction in arterial occlusion of 18% ($t = 7.1931$, $P<0.001$). Second, as shown in Figure 1, with advancing age (on the horizontal axis), there is a progressive increase in vascular insufficiency at the initial examination from 23% in the youngest age group to 32% in the oldest. Third, following treatment, at every temporal point, there is a significant mean reduction in stenosis of an order of 18% ($t = 5.3516$, $P<0.001$), 22% ($t = 5.2566$, $P<0.001$), and 15% ($t = 2.6147$, $P<0.025$) respectively. Fourth, not shown in the figure of the total of 57 patients, 50 improved clinically and 7 worsened. Thus, approximately 88% of the patients improved. Finally, these observations were made possible with a relatively simple, non-invasive instrument and technique, oculocerebrovasculometry (OCVM).

REFERENCES

1. Fisher M: Occlusion of the internal carotid artery. *Arch Neurol Psychiatr* 1951;65:346-377.
2. Ackerman RH: *Cerebrovascular Survey Report. Non-invasive diagnosis of carotid disease.* Washington, Joint Council Subcommittee on Cerebrovascular Disease. National Institute of Neurological and Communicative Disorders and Stroke and National Heart and Lung Institute, 1980, pp. 190-210.
3. Langham ME: A new procedure for the analysis of intraocular dynamics in human subjects. *Exp Eye Res* 1963;2:314-324.
4. Langham ME, To'mey KF: A clinical procedure for the measurement of the ocular pulse-pressure relationship and the ophthalmic arterial pressure. *Exp Eye Res* 1978;27:17-25.
5. To'mey KF, Langham ME: in press.

McDonagh Medical Center
2800-A Kendallwood Parkway
Gladstone, MO 64119