<table>
<thead>
<tr>
<th>Category</th>
<th>Author</th>
<th>Date</th>
<th>Title</th>
<th>Type of trial</th>
<th>Participants</th>
<th>Number of Tx</th>
<th>Compound</th>
<th>Method</th>
<th>Vitamins</th>
<th>Age</th>
<th>Medical Hx</th>
<th>Followup</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adverse effects</td>
<td>Baxter &amp; Krenzelok</td>
<td>2008</td>
<td>Pediatric fatality secondary to EDTA chelation</td>
<td>Case report</td>
<td>1</td>
<td>3</td>
<td>disodium EDTA</td>
<td>IV pushed over 5 to 10 minutes</td>
<td>not reported</td>
<td>5</td>
<td>autism</td>
<td>N/A</td>
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<td></td>
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<td></td>
<td></td>
<td>990 mg of Na2EDTA</td>
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<td></td>
<td>• A five-year-old autistic male was being chelated in a physician's office.</td>
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<td></td>
<td>It was not determined until after the child's death that he had been given edetate disodium rather than edetate calcium disodium.</td>
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<td></td>
<td></td>
<td>It caused profound hypocalcemia triggering the cardiac event that led to his death.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Adverse effects</td>
<td>Brown et al.</td>
<td>2006</td>
<td>Deaths Resulting From Hypocalcemia After Administration of Edetate Disodium: 2003-2005</td>
<td>Case reports</td>
<td>3</td>
<td></td>
<td>CaNa2EDTA + Na2EDTA</td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>case 1: 300 mg of CaNa2EDTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>case 2: lead case 2: 5</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>case 2: Na2EDTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>case 3: 53</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>case 3: EDTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>
case 1: A 2 yr old child was treated for lead poisoning, mistakenly administered disodium EDTA; suffered sudden cardiac arrest due to hypocalcemia.

case 2: A 5 yr old boy, 990 mg Na2EDTA IV pushed over 5-10 min; death due to acute cerebral hypoxic-ischemic injury secondary to diffuse subendocardial necrosis resulting from hypocalcemia.
case 3: 53 yr old woman, treated with 1.5 g EDTA IV pushed over 10-15 min, unconscious after 10-15 min; cause of death cardiac arrhythmia resulting from hypocalcemia and vacular cardiomyopathy.
| 3 | Adverse effects | Morgan et al. | 2002 | Adverse effects in 5 patients receiving EDTA at an outpatient chelation clinic (paper unavailable online) | Case series | 5 | ? | 3 g NaEDTA, 2 g MgCl₂, 100 mg B₁₂, 100 mg B₆, 1 ml B complex and 15 g Vit C. 1 patient also received 10 ml of 50% DMSO iv. | ? | ? | ? | • Five patients presented with symptoms that developed 30 min-2 h into chelation therapy at an outpatient clinic. • All patients were discharged without permanent sequelae. It is unclear if the effects were related to the dose or rate of administration. |
| 4 | Adverse effects | Grebe & Gregory | 2002 | Inhibition of Warfarin Anticoagulation Associated with Chelation Therapy | Case report | 1 | 1 | 3g EDTA | 1 time | MgCl₂, Procaine, heparin, vitamin V, KCl, B₆, B₁, NaHCO₃, trace elements | 64 | pulmonary embolism |
Based on our experience with this patient, we cannot determine with certainty whether chelation therapy decreases the effectiveness of warfarin anticoagulation.

In fact, this case seems to contradict previous findings. However, since chelation therapy can consist of numerous ingredients, different formulations may have various effects on warfarin.

Clinicians may see increases, decreases, or no change in the INR of warfarin-treated patients who receive chelation therapy.
<p>| Adverse effects | Magee | 1985 | Chelation treatment of atherosclerosis (paper unavailable online) | Retrospective analysis | 1 | Until more is known about how chelation therapy might affect warfarin, clinicians should consider increased INR monitoring in patients undergoing chelation treatment |
| Adverse effects | Wirebaugh | 1990 | Apparent Failure of Edetic Acid Chelation Therapy for the Treatment of Coronary Atherosclerosis | Retrospective analysis | 1 | 40-50 | 6 months | • treatment failure in peripheral vascular disease with need for surgery | • failed treatment • need for angioplasty • had reported improvement in anginal symptoms with treatment |</p>
<table>
<thead>
<tr>
<th>7</th>
<th>Arrhythmia</th>
<th>Soffer et al.</th>
<th>1961</th>
<th>Myocardial response to chelation</th>
<th>Case series</th>
<th>58</th>
<th>2</th>
<th>0.5 to 4 g Na2EDTA diluted in 500 or 1000 cc 5% glucose unless heart failure</th>
<th>from 30 min to 11 hours</th>
<th>28 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• arrhythmias present were premature ventricular contractions, atrial fibrillation, heart block, ventricular tachycardia, atrial flutter, AV dissociation</td>
</tr>
</tbody>
</table>
Bone density

1988

The Effect of Intravenous Disodium Ethylenediaminetetraacetic Acid Upon Bone Density Levels

Open-label

61

30

3 g EDTA

MVTMS

64.85

3 months

- total group bone density was 0.702 pretest and 0.706 post-test (no significant difference)
- the most interesting results were for the 25 participants that had lower than expected bone density measurements for their age
- they exhibited a statistically significant increase of 2% bone density at posttet
- authors conclude that EDTA does not lead to calcium depletion of the bone and even stimulates regeneration when a pathological state exists (osteoporosis)

BP

Li & Chen 2017

The changes of lead-exposed workers' ECG and blood pressure by testing the effect of

Case-control

147 lead-exposed + 104 controls

19.06
After the preliminary investigation, researchers selected 36 people from the lead poisoning group to be given a 20% intravenous injection of EDTA injection.

The abnormal ECG rate was significantly lower in controls (5.8%) than in exposed workers (35.37%) in 2008.

Repeated measurement of quantitative data analysis showed that the abnormal ECG rate (2008, 2009, 2010: 35.37%, 38.78%, 44.90%) of exposed workers increased consecutively from 2008 to 2010.

The level of blood lead (PbB) after treatment for 3 months was 494.7±28.77 μg/L and 382.8±46.61 μg/L (p<0.001) after 6 months.
The rate of abnormal ECG was 39.96% in the treatment group after 3 months of treatment and the rate was about 33.11% (p=0.003) after 6 months of treatment.

The percentage with abnormal blood pressure in the treatment group at the end of 3 months was 21.24% and 15.18% (p=0.006) after treatment for 6 months.

| 10 | BP | Riordan et al. | 1989 | EDTA Chelation Hypertension Study: Clinical Patterns as Judged by the Cornell Medical Index Questionnaire | Epidemiological | 28 | 20 | Hypertension | The group as a whole improved in all systems between the beginning of treatment and the tenth chelation |
Statistically significant single-scale improvement occurred in cardiovascular, digestive, and nervous systems. After 20 infusions, subjects continued to maintain their overall improvement when compared with pretreatment levels of symptomatology. 23% reduction in symptoms across categories, according to the Cornell Medical Index Scale (Resp 21, nervous 32, digestive 20, integumentary 28, cardiovascular 18, musculoskeletal 30, genitourinary 6).
<table>
<thead>
<tr>
<th>11</th>
<th>BP</th>
<th>Wussow et al.</th>
<th>??</th>
<th>Effect of EDTA Chelation and Supportive Multivitamin /Trace Mineral Supplementation With and Without Physical Activity Upon Systolic Blood Pressure</th>
<th>Open-label</th>
<th>50</th>
<th>34</th>
<th>as previously reported</th>
<th>MVTMS 5-10x RDA</th>
<th>61.4</th>
<th>CVS disease or high risk</th>
</tr>
</thead>
</table>

- At each stage tested the systolic blood pressure showed a statistically significant decline (8.7%, 6.7%, and 5.8%).
- In the chelation plus exercise group, the declines were -8.6, -7.4, and -6.2%.
- There was a trend to a greater decline but it did not reach significance.

<table>
<thead>
<tr>
<th>12</th>
<th>BP</th>
<th>Jackson &amp; Riordan</th>
<th>1995</th>
<th>Improvement of Essential Hypertension After EDTA Intravenous Infusion Treatment</th>
<th>Case report</th>
<th>1</th>
<th>30</th>
<th>3 g EDTA</th>
<th>3-5 hours infusion, weekly</th>
<th>51</th>
<th>Essential hypertension 180/100 without meds</th>
</tr>
</thead>
</table>

180/100 without meds 7 months
He was given an initial intravenous infusion of EDTA, which consisted of 3.0 g EDTA, 15.0 g ascorbic acid buffered in sodium ascorbate (Brinson Pharmaceuticals), 800 mg magnesium chloride, 40.0 mg procaine and 1000 units of heparin delivered in 500 mL of sterile, deionized water.

Pre- and post-chelation 24-hour urine samples were collected and aluminum, cadmium, lead, mercury, manganese, chromium, copper, iron, zinc, calcium, and magnesium levels measured.
The lead level was of particular interest as several published studies demonstrated a relationship of lead levels and hypertension.

His pre-chelation urine lead level was 14.0 mg/24 hours. The post-chelation urine lead level was 91 mg/24 hours. The Center considers a 5-fold increase in urine lead excretion after chelation an indication of increased body load of lead.

Other post-chelation urine studies were performed over a period of time and showed urine lead levels of 39, 40, and 50 mg/24 hours respectively.
The patient slowly decreased his medication during the EDTA treatment and stopped them completely at the last chelation (March 14, 1986).

His blood pressure at the last chelation was 124/84 mmHg.

| BP | Born et al. | 2012 | EDTA chelation reappraisal following new clinical trials and regular use in millions of patients: review of preliminary findings and risk/benefit assessment | Cohort study | 33 | 20 | 1.5 to 3 grams of disodium EDTA | • Magnesium chloride (1.2g) • Vitamin C (0.5g) • Smaller quantities of pyridoxine (B6) • Dextan heparin (B5) • B-complex • Sodium bicarbonate • Potassium chloride • Procaine • Sterile water to a total volume of 280mL | • Increased urinary levels of Pb have been identified in most of the cardiovascular cohort of patients. • There was an overall reduction of about 50% of urinary Pb levels comparing the first (mean 15.6 µg/g creatinine) with the twenty-fourth (mean 7.1 µg/g creatinine) treatment with EDTA. | CAD |
A corresponding general reduction in the systolic blood pressure was also observed in most patients, especially those with levels higher than normal for the age group (initial mean was 138 mmHg and the final mean 123 mmHg). Diastolic blood pressure was mostly unchanged.
<table>
<thead>
<tr>
<th>Case report</th>
<th>1</th>
<th>70</th>
<th>3 g EDTA</th>
<th>first 30 infusions every 3 days, then 10 twice per week, 10 once per week, and the remainder every 2nd week</th>
<th>MVTMS (ACAM protocol)</th>
<th>70</th>
<th>Secondary hypertension-renal artery stenosis</th>
<th>2 years</th>
</tr>
</thead>
</table>

- **Renal artery stenosis reversal in a hypertensive individual**, using a combination of EDTA chelation and multiple vitamin and trace mineral therapy (page 17)
- **BP**
- **Rudolph & McDonagh 1999**

### History of Hypertension
- Rhythm: Renal artery stenosis
- Blood pressure: Decreased over the treatment period (about 1200 mmHg)
<table>
<thead>
<tr>
<th>15</th>
<th>CAD</th>
<th>Clarke et al.</th>
<th>1956</th>
<th>Treatment of angina pectoris with disodium ethylene diamine tetraacetic acid Case series</th>
<th>20</th>
<th>15-60; average of 35</th>
<th>500 mL IV solution - 5 g disodium EDTA 5% glucose or normal saline</th>
<th>2.5-4 hours i.v.; 5 g per day for 5 days followed by a two day break</th>
<th>not reported</th>
<th>&gt; 46</th>
<th>Angina</th>
<th>up to two years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>• Of 20 reported patients with angina pectoris treated with EDTA, 18 survivors obtained unusual symptomatic relief. • Abnormal ECGs reverted to normal in 6 patients.</td>
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<td></td>
</tr>
</tbody>
</table>

| 16 | CAD | Van der Schaar | 2014 | The Effects of Magnesium-EDTA Chelation Therapy on Arterial Stiffness Case-control series | 43 (21 Dx CAD, 22 abnormal but no Dx), 18 controls | 25 infusions | 3 g of disodium-EDTA and 5 gr of magnesium sulfate were added to 500 ml of a 0.9% saline solution along with 1.49 gr potassium chloride, 20 mg thiamine, 100 mg pyridoxine, 0.5 mg hydrocobalamin and 5000 IU heparin. infused slowly over 3 hrs according to IBCMT Protocol; once per week | no | not reported | CAD or high risk for CAD | 25 weeks |
|    |     |              |      | • PWV (aortic stiffness) improved significantly after 25 treatments with Mg-EDTA chelation therapy in all (N =43) treated patients. • The initial PWV was 11.7 m/s; 9.0 m/s after treatment. |    |                 |                                                                                |                                               |                |          |           |                |
SBPao (central blood pressure) improved significantly after 25 Mg-EDTA chelation therapies in all (N = 43) treated patients from 148.3 mm Hg to 131.6 mm Hg.

Aix (endothelial function) improved significantly after 25 Mg-EDTA chelation therapies in all (N = 43) treated patients but was still abnormal. It decreased from 26.8 % to 11.5 %.

Of 15 diabetic patients suffering from severe vascular complications, all were relieved of their various degrees of peripheral vascular insufficiency.

| 17 | CAD | Lamar | 1964 | Chelation Therapy of Occlusive Arteriosclerosis in diabetic patients | Retrospective analysis | 15 | 30-40 plus maintenance | 3 g EDTA in normal saline or 10% levulose solution | pyridoxine 3 times/day plus additional B complex and other vitamins as indicated | diabetes with vascular complications |
• one infusion daily, 5 days each week (Monday through Friday).
• a rest period of up to 10 days is scheduled every third or fourth week.
• series usually consists of 30 to 40 infusions.
• first infusion given over 4 hours and gradually decreasing time to an average of 2.5 hours.

• Eight were restored to normal after suffering from strokes or advanced brain syndromes.
• Four with cardiac failure showed improvements in their clinical status and 3 patients with varying degrees of diabetic retinopathy obtained dramatic subjective and objective benefits, the latter illustrated by periodically taken retinal microphotographs.
• Seven of the 15 diabetics have shown persistent improvement with reductions of their insulin needs after EDTA.
• Patients who have evidence of progressive occlusive vascular disease seem to retain a great deal of calcium and excrete urinary amounts far below average.

• Single infusions once a month do not contribute further benefits while a minimum of 5 daily consecutively treated sets every 5-15 seeks are much more effective in maintenance follow-up.
<table>
<thead>
<tr>
<th>Page</th>
<th>CAD</th>
<th>Study Authors</th>
<th>Year</th>
<th>Study Design</th>
<th>Study Details</th>
<th>Treatment Duration</th>
<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>CAD</td>
<td>Guldager et al.</td>
<td>1993</td>
<td>DB-RCT</td>
<td>29 (14 EDTA, 15 placebo)</td>
<td>5-9 weeks to a total of 57 g EDTA</td>
<td>EDTA or placebo (isotonic saline) per infusion</td>
<td>No statistically significant difference in the plasma concentration of cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol or triglycerides between the 2 groups. Treatment with EDTA does not alter blood lipids in patients with intermittent claudication.</td>
</tr>
<tr>
<td>19</td>
<td>CAD</td>
<td>Casdorph</td>
<td>1981</td>
<td>Open-label</td>
<td>18</td>
<td>45-73</td>
<td>3 g disodium EDTA in 250 cc of Ringer's lactate solution, 200 mg of lidocaine was added to the solution in order to control local pain. Infusions were given once per week and were administered over a period of three hours in an office setting. Vitamin and mineral supplements were administered orally.</td>
<td>Intermittent claudication</td>
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</tbody>
</table>
The mean change in the ejection fraction was +5.77%, with a range of 2 to +16%. All patients improved clinically and in all but two there was complete subsidence of angina during the course of chelation therapy.

20 CAD Kitchell et al. 1963 The Treatment of Coronary Artery Disease: Disodium EDTA A Reappraisal

Retrospective analysis 10 + 28 + 9 20 3-4 g EDTA in 500 cc physiologic glucose or saline solutions 2.5-3 hour period, 3-4 times per week for 6-8 weeks severe angina unresponsive to all other treatments. 23 had MI rest periods of 12 weeks between series (2 or 3 courses)
We were convinced that the treatment was of no value since there was no subjective improvement in any patient, nor were there electrocardiographic findings to suggest a beneficial effect. Accordingly, the program was discontinued.

Surprisingly, however, about six to eight weeks after the treatment period ended, the patients began to describe an unusual improvement in the angina syndrome with a rather spectacular reduction in their use of nitroglycerine.
Each patient was then re-evaluated, and it was quite apparent that, concurrent with the subjective improvement, impressive beneficial changes were revealed in the electrocardiograms of 6 of the 10 subjects. The improved S-T segment and T wave changes had occurred specifically within the two month period after therapy since no such changes were evident with serial tracings taken during and immediately after the entire course of 20 infusions.
among 29 patients with angina, only 2 were immediately improved, but by 3 months, ECG was improved in 46.4% and exercise ability in 64.2%.

From these data, it is apparent that a course of 20 infusions of EDTA will produce a temporary pattern of improvement in about 60 percent of patients with the angina syndrome within three months of the period of therapy. It was not more beneficial than other commonly used methods.
<table>
<thead>
<tr>
<th>#</th>
<th>CAD</th>
<th>Author</th>
<th>Year</th>
<th>Description</th>
<th>Case report</th>
<th>EDTA dose</th>
<th>Frequency</th>
<th>Outcome</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>CAD</td>
<td>McGillem</td>
<td>1988</td>
<td>Inefficacy of EDTA Chelation Therapy for Coronary Atherosclerosis</td>
<td>Case report</td>
<td>1</td>
<td>&gt; 30 g</td>
<td>1.5 g EDTA because of renal failure</td>
<td>1-2 per week</td>
</tr>
</tbody>
</table>

- the mean percentage reduction in the cross sectional area increased from 67% before therapy to 78% afterward.
- the mean percentage of diameter stenosis increased from 47 to 56%.
- the mean lesion length increased from 10.0 to 10.7 mm.
- the mean minimum diameter decreased from 1.36 to 1.12.
- 100% occlusion of the distal RCA that had appeared in the pretreatment arteriogram remained unchanged.

| 22 | CAD | Morgan | 1991 | Myocardial ischemia treated with nutrients and intravenous EDTA chelation: A report of two cases | Case reports | 2 | | | | | |

2/2 patients improved.
23 CAD Boyle & Clarke 1961 Chelation therapy in circulatory and sclerosing diseases (paper unavailable online) Retrospective analysis 10

- 70% had improvements on EKG
- 90% improved clinically

24 CAD Knudtson et al. 2002 Chelation Therapy for Ischemic Heart Disease DB RCT 84 (41 treatment, 43 control) 33 40 mg/kg EDTA chelation therapy 3 hours per treatment, twice weekly for 15 weeks and once per month for an additional 3 months.
- 750 mg of magnesium sulfate
- 5 g of ascorbic acid
- 5 g of sodium bicarbonate (titrated to physiological pH) in the 5% dextrose.
- Lidocaine, 80 mg, was added to relieve pain at the administration site.
- Patients in both groups took oral multivitamin therapy as well

- The corresponding mean change in time to ischaemia at 27 weeks was 54 seconds (95% confidence interval [CI], 23-84 seconds; P < 0.001) and 63 seconds (95% CI, 29-95 seconds; P = 0.01), for a difference of 9 seconds (95% CI, 36 to 53 seconds; P < 0.001).
- Exercise capacity and quality of life scores improved by similar degree in both groups.
Based on exercise time to ischemia, exercise capacity, and quality of life measurements, there is no evidence to support a beneficial effect of chelation therapy in patients with ischemic heart disease, stable angina, and a positive treadmill test for ischemia.

- Negative conclusion: but 75% fewer chelation patients subsequently had bypass surgery, compared with the control group.

| 25 | CAD | Clarke et al. 1960 | Atherosclerosis, Occlusive Vascular Disease and EDTA | Retrospective analysis | several hundred | 90-150 g over several weeks | 3-5 g EDTA in 500 mL of diluent daily | advanced occlusive vascular disease |

- Best results in IC in who pain at rest has been invariably relieved.
• all gained greater ability to walk without pain, increased warmth and improved skin colour
• in the brain, there has been uniform relief of vertigo and tinnitus and apparent aid in recovery from acute paralysis and the signs of senility, even when advanced
• the results in angina, while good, have not equalled those in IC
• however, there has been symptomatic relief in 87% of a large series, few recurrences and a significant lowering of mortality rates
Elevated serum cholesterol levels in patients with vascular disease and/or familial hypercholesterolemia have been greatly reduced by therapy with EDTA and have remained at normal levels for as long as 3 years.

**Chelation of vascular atheromatous disease**

Retrospective analysis 3000

- 3 g EDTA
- 5000 units water-soluble heparin
- Procaine HCL 0.2% in saline
- 2-3 hours on a daily basis

Pyrozidine orally to help prevent nausea
- Multivitamins and trace minerals when indicated

- Various calcinoses

- Definite improvements of pedal artery pulsation, gain in colour, the return of normal temp and improvement in tissue quality of the feet
- 90% of problems in the lower extremities improve and increased ability to walk long distances comfortably
cerebrovascular system issues like amnesia, confusion, aphasia, motor coordination have improved in all cases of angina, characterized by the patient having no need for vasodilators after about the 5th infusion improved renal functions, reduction of prostatic obstruction by calculi, decrease in insulin requirement by diabetics, almost normal breathing in emphysematous patients, great improvement in arthritic patients and even in Parkinson's disease.
<table>
<thead>
<tr>
<th></th>
<th>CAD</th>
<th>Robinson</th>
<th>1982</th>
<th>Chelatio Therapy (paper unavailable online)</th>
<th>Retrospective analysis</th>
<th>248</th>
<th></th>
<th>Pain relieved \nBP and EKG’s better</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>CAD</td>
<td>Lamar</td>
<td>1966</td>
<td>Chelation Endarterectomy for Occlusive Atherosclerosis</td>
<td>Retrospective analysis</td>
<td>50 - 3 case reports</td>
<td>30-100</td>
<td>many patients showed a return to normal or near-normal cholesterol levels \nmajority increased blood flow and metabolic tissue affected by atherosclerotic ischemia \nimprovements in dyspnea, edema, leg pain at rest, hepatic omegaly, walking distance</td>
</tr>
</tbody>
</table>
### Table 1: Factorial analysis of TACT

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Years</th>
<th>Infusions</th>
<th>DB Type</th>
<th>DBs</th>
<th>Placebo</th>
<th>Vitamin</th>
<th>Mineral</th>
<th>Primary Outcome</th>
<th>Secondary Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lamas et al. 2013</strong></td>
<td>DB 2×2 factorial multicenter RCT</td>
<td>500 mL chelation solution (containing 3 grams of disodium EDTA, 7 grams of ascorbate, B-vitamins, electrolytes, procaine, and heparin) versus placebo, and to an oral vitamin and mineral regimen or an oral placebo. Infusions were administrated over at least 3 hours; weekly for 30 weeks, followed by 10 infusions 2 to 8 weeks apart. vitamin B6 25 mg, zinc 25 mg, copper 2 mg, manganese 15 mg, and chromium 50 mcg</td>
<td>&gt;50</td>
<td>Prior MI, median 55 months</td>
<td><strong>• primary end point was reached in 31.7% chelation + vitamin, 33.7% chelation + placebo, 40.2% placebo + vitamin, 40.2% placebo + placebo.</strong>&lt;br&gt;<strong>• comparison of active + active to placebo + placebo was significant HR 0.74.</strong>&lt;br&gt;<strong>• absolute difference was 8.3%, NNT 5 years = 12.</strong>&lt;br&gt;<strong>• NNT 5 in diabetics.</strong>&lt;br&gt;<strong>• secondary end point even greater (MI, death, or stroke).</strong></td>
<td></td>
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</tr>
</tbody>
</table>
no effect on total mortality (chelation: 87 deaths [10%] placebo 93 [11%])

- five-year Kaplan-Meier estimates for the primary endpoint in the chelation
  - high-dose vitamin group was 31.9%, in the chelation
  - placebo vitamin group 33.7%, in the placebo
  - infusion + active vitamin group 36.6%, and in the placebo
  - infusions + placebo vitamin group 40.2%

- the reduction in primary endpoint by double active treatment compared with double placebo was significant (HR 0.74)
In stable, post-MI patients on evidence-based medical therapy, the combination of oral high-dose vitamins and chelation therapy compared with double placebo reduced clinically important cardiovascular events to an extent that was both statistically significant and of potential clinical relevance. In stable, predominantly asymptomatic coronary disease patients with a history of myocardial infarction, EDTA chelation therapy did not have a detectable effect on the quality of life over two years of follow-up.
<table>
<thead>
<tr>
<th>Time</th>
<th>Intervention Description</th>
<th>CAC Score Reduction</th>
<th>Example Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 days</td>
<td>EDTA 1500 mg taken in a rectal suppository base every evening + tetracycline</td>
<td>64.9</td>
<td>nanobacteria, CAD</td>
</tr>
<tr>
<td></td>
<td>Nutraceutical Powder (Vitamin C, Vitamin B6, Niacin, Folic Acid, Selenium, EDTA, L-Arginine, L-Lysine, L-Ornithine, Trypsin, CoQ10, Grapeseed Extract, Hawthorn Berry, Papain) 5 cm³ taken orally every evening; Tetracycline HCl 500 mg taken orally every evening.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Angina was decreased or ablated in 16 of 19 patients (84%).
- Lipid profiles improved to nonatherogenic direction significantly ($P < 0.001$), a remarkable finding in a patient group where 86% were on continuous statin medication already before the trial.
- All patients were positive for NB serology, antigen or both. Responders (n = 44, 57%) had significant decreases in total CAC scores, the average decrease being 14%. Non-responders (n = 33, 44%) had no change or had increases in CAC scores.

**Calci fication in coronary artery disease can be reversed by EDTA-tetracycline long-term chemotherapy**

- Open-label
- 100
- CAD
- Maniscalco & Taylor
- 2004
The results were promising as every second CAD patient showed objective improvement in their cardiovascular system. CAC scores reduced by an average of 14% in a 4-month therapy trial. This is striking because CAC scores are known to increase by more than 20% annually.

There are no previous reports showing a significant decrease in CAC scores with any regimen found in the literature. Thus, the novel therapy brought a unique, dramatic drop in a hallmark for coronary events.
<table>
<thead>
<tr>
<th>Case report</th>
<th>1</th>
<th>72</th>
<th>3 g EDTA in 500 cc 5% dextrose with 3 cc 50% magnesium sulfate, 20 meq potassium chloride, 1 cc B vitamins, 7.5 g sodium ascorbate iv infusion over 3 hours</th>
<th>MVTMS</th>
<th>59</th>
<th>Post MI</th>
<th>2 years</th>
</tr>
</thead>
</table>

- Coronary arteriogram showed a 100% occlusion of the LAD and 30% occlusion of the RCA.
- Following treatment the LAD showed residual stenosis of 65% and the 30% stenosis of the RCA was completely gone.
- The left ventricular contractility improved; initially the ejection fraction was 30% and this increased to 55% after therapy.
<table>
<thead>
<tr>
<th>No.</th>
<th>CAD</th>
<th>Goonasakera et al.</th>
<th>2010</th>
<th>The Effect of EDTA Chelation Therapy in Symptomatic Coronary Heart Disease: An Observational Study</th>
<th>Observational study</th>
<th>13</th>
<th>30 + 12 boosters</th>
<th>ACAM protocol</th>
<th>57</th>
</tr>
</thead>
</table>

- of the 13, 9 had been recommended to have CABG
- 11 / 13 patients improved in angina grading
- reductions were significant after 6 months
- mean serum creatinine showed a trend towards reduction
- no signs of hepatocellular damage
- systolic blood pressure decreased significantly during the 3, 4, 5, 6 months
- number of steps they could walk (250 to 1700) and climb (10 to 43) improved
The Effect of an EDTA-based Chelation Regimen on Patients with Diabetes and Prior Myocardial Infarction in TACT DB 2X2 factorial trial 633 (322 EDTA; 311 placebo) 40

- 500 mL IV solution
- 3 g disodium EDTA
- 7 g ascorbic acid
- 2 g of magnesium chloride
- B vitamins, and other components
- 3 hours iv.
- Weekly for 30 weeks
- Then biweekly to monthly to complete 40 infusions
- Vitamin B6 25 mg
- Zinc 25 mg
- Copper 2 mg
- Manganese 15 mg
- Chromium 50 mcg
- > 50
- Prior MI + diabetes
- No change in diabetic medications in either treatment group
- 15% absolute decrease in 5-year primary event rate (death, reinfarction, stroke)
- Relative reduction of 41% of a combined cardiovascular endpoint
- NNT 6.5 over 5 years to prevent a single event
- Reduction in death from any case of 43%
- 52% reduction in recurrent myocardial infarction

- Elevated lead
- Progressive reduction in QRS interval from 0.700 to 0.650 to 0.640 seconds respectively

- CAD with optimal treatment 6 months

Electrocardiographic Changes Associated with EDTA Chelation Therapy Open-label 28 20

- 3 g EDTA
- 15 g ascorbic acid buffered in sodium bicarbonate
- 800 mg MgCl2
- 40 mg procaine
- 1000 units heparin
- 500 cc water
- 3.5 hours
- 3 multivitamin and mineral supplement tablets per day
- Elevated lead
- Progressive reduction in QRS interval from 0.700 to 0.650 to 0.640 seconds respectively

Effect of chelation therapy on endothelial function in patients with coronary artery disease: PATCH substudy DB RCT 47 33

- 500 ml infusion solution of 5% dextrose in water
- Two tablets three times daily as tolerated, except on treatment days
- Average 64
- CAD with optimal treatment 6 months
Disodium EDTA was weight-adjusted (40 mg/kg), with a maximum total dose for each treatment of 3 g. Each treatment solution also contained:

- 750 mg of magnesium sulfate
- 5 g of citric acid (MgC5)
- 5 g of sodium bicarbonate
- Lidocaine (Xylocaine) 80 mg as added to relieve pain at the injection site
- dl-adrenaline as needed

Each solution was administered 0.1 mL in A, 1.0 mL in B, 1.5 mL in C, 2.0 mL in D, 2.0 mL in E, and 2.0 mL in F repeatedly at three monthly intervals. At the baseline, the study population had mild impairment of flow-mediated vaso-dilation (FMD) (7.2%).

The first chelation treatment did not change FMD as compared with placebo (chelation 6.5% vs. placebo 7.4%). The brachial artery studies at six months did not demonstrate significant differences in FMD between study groups (placebo 7.3% vs. chelation 7.3%).
Results suggest that EDTA chelation therapy in combination with vitamins and minerals does not provide additional benefits on abnormal vaso-motor responses in patients with CAD optimally treated with proven therapies for atherosclerotic risk factors.

Open-label 8 10 g EDTA over 6 weeks; further series of 10 infusions was administered over a period of 34–73 days.

- Magnesium 20 mg
- Nicotinamide 100 mg
- Decapranol 20 mg
- Thiamin (vitamin B1) 10 mg
- Riboflavin (vitamin B2) 5 mg
- Pyridoxine (vitamin B6) 50 mg
- Cyanocobalamin (vitamin B12) 1 mg
Forearm blood flow (FBF) was assessed by plethysmography and graded intrabronchial infusions of the endotethelium-dependent vasoconstrictor acetylcholine (ACh) and the endothelium-independent dilator sodium nitroprusside (SNP). There was no difference in vasoconstriction to either drug after EDTA alone compared with the control periods, but the response to ACh was augmented after combined therapy. The latter was accompanied by a small but consistent mean fall in plasma homocysteine of 1.660 ± 0.5 mmol/L.
The selective increase in the vasodilator response to ACh after therapy with EDTA and several B group vitamins indicates that NO-related endothelial function was improved. The absence of response to EDTA alone suggests that the supplementary vitamins were necessary for this benefit, which may have been related to the accompanying decrease in plasma homocysteine.
The results, along with the current interest in the possible cardioprotective effects of vitamins and the increasing administration of 'chelation therapy', call for more definitive studies on these aspects of 'alternative medicine'.

| 38 | CAD | Quan et al. 2001 | Use of chelation therapy after coronary angiography | Epidemiological | 5854 |

Reported current use of chelation therapy and 252 reported past use. Current use was associated with extensive coronary artery disease and the absence of diabetes.
Current users were less likely to have undergone percutaneous transluminal coronary angioplasty (OR 0.7; 95% CI 0.5 to 0.9) and coronary artery bypass graft surgery (CABG) (OR 0.3; 95% CI 0.2 to 0.5) in the first year after angio graphy, but were as likely as nonusers of chelation therapy to have undergone CABG surgery in the subsequent 3- to 5- year period (adjusted hazard ratio [HR] 1.1; 95% CI 0.7 to 1.9).
Past use of chelation therapy was associated with a history of CABG surgery before coronary angiography (OR 1.6; 95% CI: 1.1 to 2.3) and extensive coronary artery disease. Past users were also more likely to have undergone CABG surgery in the follow-up period (HR 1.7; 95% CI: 1.1 to 2.6).

About 8% of patients who underwent cardiac catheterization for coronary artery disease were using or had previously tried chelation therapy.
Users may have foregone revascularization in favor of this less invasive yet unproven treatment, with some users subsequently undergoing conventional treatment after chelation.

Alternatively, some patients may have turned to chelation as a “last resort” after having been judged unsuitable for revascularization.

| 39 | CAD | Cheraskin et al. | 1984 | Effect of EDTA Chelation and Supportive Multivitamin/Trace Mineral Supplementation with and without Physical Activity on the Heart Rate | Open-label | 50 | EDTA infusion patients received weekly, 2-hour intravenous infusions oral: Multivitamins/trace mineral supplementation approx 5-10 times the RDA | 58.6 - 61.4 | CAD or risks for it |

- HR decreased by 8.7 - 9.2%
- HR decreased significantly in both EDTA alone and EDTA + exercise groups
- Slight greater effect with physical activity in addition to EDTA but not statistically significant
<table>
<thead>
<tr>
<th>CAD</th>
<th>Open-label</th>
<th>26</th>
<th>1</th>
<th>(\leq 50) post MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arenas et al.</td>
<td>Enhanced vasculectoxic metal excretion in post-myocardial infarction patients following a single edetate disodium-based infusion</td>
<td>EDTA chelation treatment for vascular disease: a meta-analysis using unpublished data</td>
<td>1241</td>
<td></td>
</tr>
</tbody>
</table>

• up to 3 g of Na\textsubscript{2}EDTA
• 2 g of magnesium chloride
• 100 mg of procaine HCL
• 2500 U of unfractionated heparin
• 7 g of ascorbate
• 2 mEq KCl
• 840 mg sodium bicarbonate
• 250 mg of pantothenic acid
• 100 mg of thiamine
• 100 mg of pyridoxine

iv infusion administered over 3 h

After EDTA infusion, there was a 72% increase in total urinary metal levels compared to baseline (post EDTA vs. baseline urine: 2580 vs. 1500 µg/g creatinine).
Levels of aluminum, cadmium, gadolinium, lead, nickel, and thallium increased. Thorium became detectable in the urine of two patients.

The increase in urinary excretion in response to EDTA was particularly large for lead (3835 % increase) and cadmium (633 % increase).

There was also a moderate increase in nickel (373 % increase) and aluminum (275 % increase).
<table>
<thead>
<tr>
<th>Page</th>
<th>CAD, PAD</th>
<th>Authors</th>
<th>Year</th>
<th>Study Design</th>
<th>Number of Patients</th>
<th>Treatment Details</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>CAD, PAD</td>
<td>Clarke et al.</td>
<td>1955</td>
<td>Retrospective analysis</td>
<td>22</td>
<td>EDTA infusion (10 with undetectable levels)</td>
<td>Gdinium appeared in the urine of 14 patients after EDTA treatment. The four patients with detectable levels demonstrated a marked increase (8662%) in gadininium urinary levels following EDTA infusion.</td>
</tr>
<tr>
<td>43</td>
<td>CAD, PAD</td>
<td>Hancke &amp; Flytlie</td>
<td>1993</td>
<td>Retrospective analysis</td>
<td>470</td>
<td>I.V. infusions of 500 ml sterile water with Na2EDTA, 50 mg/Kg (Maximum 3 g) and the infusion included vitamin C, sodium bicarbonate and magnesium</td>
<td>Of 65 patients who were referred for coronary bypass surgery, 58 did not require it after chelation therapy.</td>
</tr>
</tbody>
</table>
Of 27 patients awaiting amputation as the only surgical offer of treatment, 24 avoided surgery.

• 101 over the age of 69 were improved, 6 were the same and one was worse. Of those between 60 and 69 years, 93 were better, 9 unchanged and 1 was worse. Below the age of 60, 47 were better, 7 unchanged and none were worse.

• In the group with claudication (n=262), we found an improvement in 82%.

• Ankle/arm ratios were improved in 82%.
Walking distance, which included both claudication and myocardial ischemia patients, was improved in 87% of the patients.

Several of the patients in the claudication group started treatment very late in the course of the illness.

Of 44 who had problems with wound healing, 31 improved, 11 were unchanged, and 2 became worse.
Of 137 who complained of cold feet, 110 improved, 27 were unchanged and none became worse; many were so severely disabled that they had been refused bypass surgery, and no other medical treatment was offered.

- 253 patients with electrocardiographic ST depression, 175 showed improvement.
  74 were unchanged and 4 had increased ST depression.

The average blood pressure decreased in 109 patients, 37 were unchanged and one had higher blood pressure.
Working capacity was assessed in both myocardial ischaemia and claudication patients. Of 318 patients undergoing this study, 271 showed improvement (85%).

Of 207 patients using nitroglycerine, 189 reduced their consumption. Most of them were able to discontinue its use altogether. However, 16 continued with the same dose as before and 2 had to increase their dose.
Subjective improvement in the coldness of feet, increased energy and work capacity, together with striking improvement in general condition were noted by most patients.

Several of the male patients reported improved sexual potency, improved sight and hearing, and symptoms like migraine and tinnitus disappeared as an unexpected bonus for many patients.
| ID | CAD, PAD, CVA | Clarke et al. | 1960 | Treatment of occlusive vascular disease with disodium ethylene diamine tetraacetate acid | Retrospective analysis | 76 + 31 + 25 | 15 | 3 g in 500 ml of 5% glucose or normal saline | 2-3 hours on 5 consecutive days, two days off, rest period of one week between series | pyridoxine, 25 mg, 3 times per day during period of infusions | angina: 61 CVA: 66.9 IC: not reported | Angina pectoris, IC, CV accident continuing short booster series of 5 daily infusions at 9-12 months | • 90-100% symptom relief experienced by 87% of patients | • 31 patients treated for IC; 23 had 90-100% relief | • good results on acute paralytic syndromes and vertigo | • slight effects on long-term paralytic syndromes | • reducing the dose from 5 to 3 g largely eliminated side effects |
|----|----------------|----------------|------|-----------------------------------------------|------------------------|-----------|----|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| 45 | CAD, PAD, CVA | Cheraskin | 1991 | Cardiovacular Dynamic s and EDTA Chelatio n with Multivita min /Trace Mineral Supplemen tation | Case series | 77 + 57 + 28 | 26 | 3 g EDTA | MVTMS-tailored to each patient's needs, based on biochemical and clinical evaluation; vit B and c approx 10x the RDA while other vitamins were approx RDA | CAD, PAD, cerebral vascular occlusion | average of 60 days | • the ankle/brachial index increased an average of 22%, indicating improvement in arterial blood flow | • of the 117 limbs studied, 95 (81%) improved, 22 (19%) worsened.
Phras ed another way, 95 limbs improved an average of 29% and 22 limbs worsened for a mean of 10%.

- The mean value of arterial stenosis was 28% prior to treatment.
- Following therapy, the average score decreased to 10%.
- There was an overall statistically significant reduction in arterial occlusion of 18%.

When the initial QRS durations are compared to those after 10 and 20 infusions, there are statistically significant improvements between the initial scores and the latter two points.
<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Year</th>
<th>Study Type</th>
<th>Sample Size</th>
<th>Intervention</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD/CVD PAD Van der Schaar 1989</td>
<td>Exercise tolerance in chelation therapy (paper unavailable online)</td>
<td>Open-label</td>
<td>111</td>
<td>1</td>
<td>Single needle mesotherapy: 1 ml of disodium EDTA, 1 ml of 1% procaine, and 3 ml of injectable water • 15 minutes of pulsed-mode ultrasound administered using a 15% solution of disodium EDTA gel</td>
<td>In all patients improved in exercise tolerance</td>
<td></td>
</tr>
<tr>
<td>Calcific shoulder tendinitis Cacchio et al. 2009</td>
<td>Effective ness of Treatment of Calcific Tendinitis of the Shoulder by Disodium EDTA</td>
<td>DB-RCT</td>
<td>80 (40 active, 40 control)</td>
<td>1</td>
<td>Single needle mesotherapy: 1 ml of disodium EDTA, 1 ml of 1% procaine, and 3 ml of injectable water • 15 minutes of pulsed-mode ultrasound administered using a 15% solution of disodium EDTA gel</td>
<td>• 1 administration per week for 3 weeks, of single needle mesotherapy • ultrasound 5 times per week for 3 weeks.</td>
<td>40-52 shoulder calcifications</td>
</tr>
<tr>
<td>Cancer Blumer &amp; Cranton 1989</td>
<td>Ninety Percent Reduction in Cancer Mortality after Chelation Therapy With EDTA</td>
<td>Cohort</td>
<td>59</td>
<td>1.9 g CaEDTA injections plus vitamin C and B1</td>
<td>18 yr follow up</td>
<td>None</td>
<td>Mortality from cancer was reduced 90% during an 18-year follow-up of 59 patients treated with CaEDTA.</td>
</tr>
</tbody>
</table>

Only one of 59 treated patients (1.7%) died of cancer while 30 of 172 non-treated control subjects (17.6%) died of cancer.

Death from other osteosarcoma was also reduced.

Control and treated patients lived in the same neighborhood, adjacent to a heavily traveled highway in a small Swiss city. Both groups were exposed to the same amount of lead from automobile exhaust, industrial pollution and other carcinogens.
Exposure to carcinogens was no greater for the studied population than exists in most other metropolitan areas throughout the world.

Statistical analysis showed EDTA chelation therapy to be the only significant difference between controls and treated patients to explain the marked reduction in cancer mortality.

<p>| 49 | Cardiovascular adverse events | Chappell et al. | 2005 | Subsequent Cardiac and Stroke Events in Patients with Known Vascular Disease Treated with EDTA Chelation Therapy: A Retrospective Study |</p>
<table>
<thead>
<tr>
<th>Page</th>
<th>Carotid</th>
<th>Author(s)</th>
<th>Year</th>
<th>Summary</th>
<th>Treatment Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Carotid</td>
<td>Rudolph &amp; McDonagh</td>
<td>1990</td>
<td>Effect of EDTA Chelation and Supportive Multivitamin Trace Mineral Supplementation on Carotid Circulation: Case Report</td>
<td>30 infusions approx. every second day</td>
</tr>
<tr>
<td>51</td>
<td>Carotid</td>
<td>Holliday</td>
<td>1996</td>
<td>Carotid Restenosis: A Case for EDTA Chelation</td>
<td>20 + monthly maintenance treatments</td>
</tr>
<tr>
<td>Carotid</td>
<td>Rudolph et al.</td>
<td>1991</td>
<td>A Nonsurgical Approach to Obstructive Carotid Stenosis Using EDTA Chelation</td>
<td>Open-label</td>
<td>30</td>
</tr>
<tr>
<td>Page</td>
<td>Chronic disease</td>
<td>McDonagh et al. 1985</td>
<td>The “Clinical Change” in Patients Treated with EDTA Chelation Plus Multivitamin /Trace Mineral Supplementation</td>
<td>Open-label</td>
<td>139</td>
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</tbody>
</table>

| 54 Chronic disease | Olszewer & Carter 1988 | EDTA Chelation Therapy in Chronic Degenerative Disease | Retrospective analysis | 2870 | 20-40 | 50 mg/kg disodium magnesium EDTA over 3-3.5 hours; Treatments were given 2-3 times weekly | vitamins C, B complex, and magnesium in infusion patients were also given orally combined multivitamin, mineral, and trace element preparations |      |      |
Using qualitative but nevertheless standardized criteria for improvement, our analysis shows that EDTA Chelation Therapy resulted in "marked" improvement in 76.89% and "good" improvement in 16.56% of patients with ischemic heart disease - marked meaning change in stress test to negative and asymptomatic while off all medication.
improvement in 91% and "good improvement in 7.6% of patients with peripheral vascular disease and intermittent claudication. "marked meaning an increase of 5x baseline in walking distance."

In a group of patients with cerebrovascular and other degenerative cerebral diseases, 24% had "marked improvement, and 30% had "good improvement."

Of four patients with scleroderma, three had "marked improvement and one had "good improvement."

"marked" improvement is 91% and "good improvement is 7.6% of patients with peripheral vascular disease and intermittent claudication. "marked meaning an increase of 5x baseline in walking distance."
Seventy-five percent of all the patients had “marked” improvement in “gastrointestinal symptomatology of vascular origin”.

<table>
<thead>
<tr>
<th>Study</th>
<th>Disease</th>
<th>Year</th>
<th>Study Title</th>
<th>Design</th>
<th>Patients</th>
<th>Intervention</th>
<th>Follow-up</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>Chronic disease</td>
<td>1984</td>
<td>The Effect of EDTA Chelation Therapy With Multivitamin/Trace Mineral Supplementation Upon Reported Fatigue</td>
<td>Open-label</td>
<td>139</td>
<td>3 g EDTA</td>
<td>63</td>
<td>61 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>multivitamin/trace mineral supplementation</td>
<td></td>
<td>Improve nt of 39% in mean fatigue score</td>
</tr>
<tr>
<td>56</td>
<td>Chronic disease</td>
<td>1965</td>
<td>The Treatment of Progressive Systemic Sclerosis with Disodium Edetate</td>
<td>Case reports</td>
<td>4</td>
<td>3 g Na2EDTA dissolved in 500 ml. of a 5% solution of dextrose water by intravenous injection</td>
<td>6 mo follow up</td>
<td>Systemic sclerosis</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>over a 3 hour period, given each day for ten days. The patients were then given a weekly infusion of the same amount in the Out Patient Department for six months. Each patient received over 100 grams of EDTA</td>
<td></td>
<td>None of the four patients treated showed any significant clinical improvement after six months of EDTA treatment. Three of the four patients had a progression of their disease while on the drug.</td>
</tr>
</tbody>
</table>
These results confirm the findings that the clinical course of patients with scleroderma treated with EDTA was not significantly different from that of patients not so treated.

- Administering the drug for a six-month period and following the patients closely with the most objective tests presently available did not reveal any evidence of improvement.

| 57 | Chronic disease | Hansotia et al. | 1969 | Chelation Therapy in Wegener’s Granulomatosis Treatment with EDTA | Case report | 2 g Na₂EDTA in 1000 cc 5% glucose infused daily for 10 days |

- A 23-year-old woman with Wegener’s granulomatosis continued to deteriorate for 20 months on antibiotic and steroid therapy.
Addition of intravenous Na, EDTA to her regimen brought about prompt improvement with normalization of neurological findings, loss of pain and clearing of pulmonary involvement.

After five months steroids were discontinued. Since April, 1967, eight exacerbations in 18 months of cellulitis of the right eye with otitis media and facial pain were treated with antibiotics and EDTA with alleviation of symptoms except for ophthalmoplegia, total deafness and saddle nose deformity.
• Complete control of symptoms occurred only after the addition of EDT A.
• Abnormal tryptophan tolerance studies and increased urine porphyrins and zinc and copper excretion were noted.
<table>
<thead>
<tr>
<th>Study ID</th>
<th>Disease</th>
<th>Authors</th>
<th>Year</th>
<th>Study Type</th>
<th>Treatment</th>
<th>Target</th>
<th>Duration</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>Chronic pelvic pain syndrome</td>
<td>Shoskes et al.</td>
<td>2005</td>
<td>Open-label</td>
<td>EDTA 1500 mg suppository daily</td>
<td>nanobacOTC supplement (vitamin C, selenium, EDTA, coenzyme q10, bromelain, grapeseed extract, hawthorn berry, quercetin, L-arginine, vitamins B3, B6, and B9, L-lysine, L-ornithine, tryptophan, and papain) tetracycline 500 mg per day orally</td>
<td>44.6 chronic prostatitis/pelvic pain syndrome</td>
<td>3-4 months</td>
</tr>
<tr>
<td>59</td>
<td>CKD</td>
<td>Lin et al.</td>
<td>2003</td>
<td>RCT</td>
<td>1 g of calcium disodium EDTA</td>
<td>Lead exposure</td>
<td>27 months</td>
<td></td>
</tr>
</tbody>
</table>

- 4 patients had between 25-49% improvement and 8 had greater than 50% improvement in the NIH-CPSI scores.
- 10 patients underwent transrectal ultrasound to measure stone size.
- Stones were unchanged in 4, decreased in number and/or size in 5 and resolved in 1.
- Upon stopping therapy, 2 patients had symptom recurrence which was resolved after restarting therapy.
- 7 patients who were reexamined at least 3 months after stopping therapy had no recurrence or worsening of symptoms.
mixed with 200 ml of normal saline

- over a period of two hours weakly until the body lead burden fell below 60 g
- for three months and treatment was continued for 24 months if the body lead level was high normal

- the serum creatinine levels and body lead burden at baseline were the most important risk factors
- the glomerular filtration rate improved significantly by the end of the 27-month intervention period in patients receiving chelation therapy
- the mean (±SD) change in the glomerular filtration rate in the patients in the chelation group was 2.1 ml per minute per 1.73 m² of body surface area, as compared with −6.0 ml per minute per 1.73 m² of body surface area in the controls.
The rate of decline in the glomerular filtration rate in the chelation group was also lower than that in the control during the 24-month period of repeated chelation therapy or placebo.

| 60 | CKD | Lin-Tan et al. | 2007 | Long-term outcome of repeated lead chelation therapy in progressive non-diabetic chronic kidney diseases | SB-RCT | 116 (58 chelation, 58 control) | 1 g of calcium disodium EDTA mixed with 200 ml of normal saline over a 2-h period weekly followed by weekly maintenance chelation therapy over 48 months until, on repeated testing, BLB was <60 mg | Mean change in the glomerular filtration rate (GFR) in the chelation group was -1.8 ± 8.8 ml/min/1.73 m², as compared with -12.7 ± 8.4 ml/min/1.73 m² in the control group |

| 61 | CKD | Lin et al. | 2006 | Low-level Environmental Exposure to Lead and Progressive Chronic Kidney Diseases | RCT | 32 | 1 g of calcium disodium EDTA mixed with 200 ml normal saline, 3 months over 2 hours | Baseline BLB was an important risk factor in determining progressive renal insufficiency. |
The mean glomerular filtration rate (GFR change) in the chelation group patients was 6.6 mL/min/1.73m² compared with 4.6 mL/min/1.73m² in the control group patients at the end of the intervention period.

The mean decrease in GFR per year of chelation group patients was lower than that of control group patients during the repeated chelation period.

Environmental exposure to lead, even at low levels, may accelerate progressive renal insufficiency of nondiabetic patients with CKD.
<table>
<thead>
<tr>
<th></th>
<th>CKD</th>
<th>Lin et al.</th>
<th>2001</th>
<th>Environmental lead exposure and progressive renal insufficiency</th>
<th>Longitudinal study and controlled clinical trial</th>
<th>110</th>
<th>1 g calcium disodium EDTA</th>
<th>2 hours</th>
<th>lead exposure</th>
<th>2 year follow up</th>
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</table>

After EDTA chelation therapy, the amount of BLB in the study group decreased from 198 to 39.2 ug, and their renal function increased 8%. Three months later, renal function had increased by 12.8%. Twelve months later, the gain of renal function remained at 10.2%. The effect of improving renal function lasted for at least one year.
<table>
<thead>
<tr>
<th>Study ID</th>
<th>Disease</th>
<th>Authors</th>
<th>Year</th>
<th>Study Design</th>
<th>Case-Control Series</th>
<th>Intervention Details</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>CKD</td>
<td>Wu et al.</td>
<td>2004</td>
<td>Case-control series</td>
<td>Lack of reversal effect of EDTA treatment on cadmium-induced renal dysfunction: a fourteen-year follow-up</td>
<td>Intravenous EDTA treatment (0.5 g EDTA/day for three days) 11 times from 1986 to 1999</td>
<td>Although EDTA enhanced the excretion of cadmium, repeated periodic administration of EDTA did not ameliorate Cd-induced renal dysfunction in the present study. Our results suggest that reversibility of renal dysfunction caused by Cd is related to the level of Cd exposure at the time of removal from exposure. Renal dysfunction could be reversed if initial U Cd &lt; 10 µg/g Cr, but was irreversible when U Cd &gt; 10 µg/g Cr.</td>
</tr>
<tr>
<td>64</td>
<td>CKD</td>
<td>Chan et al.</td>
<td>2012</td>
<td>SB-RCT</td>
<td>Effect of Chelation Therapy on Progressive Diabetic Nephropathy in Patients With Type 2 Diabetes and High-Normal Body</td>
<td>50 (25 treatment, 25 placebo)</td>
<td>2 yr; 27 month intervention period</td>
</tr>
</tbody>
</table>
1 g of calcium disodium EDTA mixed with 200 mL of normal saline solution until body lead burden was less than 60 μg (0.29 umol).

Durin the first 3 mont h's, tr eatmen t group patie nts recei ved weakly 2-hour iv infusi ons.

After the initial chela tion thera py, an impro vemen t in kidne y functi on of treat ment- group patie nts was obser ved.

1.0 mL/min/1.73 m2 in the treat ment group vs -1.5 mL/min/1.73 m2 in the contr ol group.

At the end of this study, blood lead level (3.8 g/dL) and body lead burde n (46.0 g) of treat ment- group patie nts were lower than blood lead level (6.8 g/dL) and body lead burde n (151.3 g) of contr ol patie nts.
At this stage, the eGF R of treatment group patients (17.4 mL/min/1.73 m²) was higher than that of the control group (9.7 mL/min/1.73 m²).

The yearly rate of decrease in eGF R of the treatment group during this period was 5.6 mL/min/1.73 m², which was less than that of the control group (9.2 mL/min/1.73 m²).

Twenty-six patients, including 17 (68%) control-group patients and 9 (36%) treatment-group patients, reached 2-fold increase in baseline serum creatinine.
Of these, 26 patients who showed a 2-fold increase in baseline serum levels, 11 (44%) control-group patients and 4 (16%) treatment-group patients received renal replacement therapy.
| CKD   | Lin et al. | 2006    | SB-RCT | 87 (30 intervention, 15 control) | iv infusions 1 g of calcium disodium EDTA mixed with 200 ml of normal saline until the body lead burden was 60 mg (0.29 mmol). | 2-h weekly for 3 mos | 30–80 | • The therapeutic dosage of calcium disodium EDTA averaged 7 g.  
• After chelation therapy, the change in the glomerular filtration rate in the chelation group was 0.675 ± 0.2 ml/min/1.73 m² of body surface area, compared with -1.47 ± 4.6 ml/min/1.73 m² of body surface area in the control group.  
• Progression of renal insufficiency (5.07 ± 5.7 ml/min/year) following initial chelation therapy in the chelation group was slower than that (11.8 ± 77.0 ml/min/year; P = 0.0084) of the control group at 12 mos. |
<table>
<thead>
<tr>
<th></th>
<th>CKD</th>
<th>Lin et al.</th>
<th>1999</th>
<th>Chelation Therapy for Patients with Elevated Body Lead Burden and Progressive Renal Insufficiency</th>
<th>RCT</th>
<th>32</th>
<th>8</th>
<th>1 g of calcium disodium EDTA mixed with 200 mL of 5% dextrose in water weekly intravenous infusion, over 2 hours</th>
<th>2 months</th>
<th>chronic renal insufficiency</th>
</tr>
</thead>
</table>

- Rates of progression of renal insufficiency were similar in the treatment group and the control group during a 12-month baseline observation period.
- After the 2-month treatment period, improvement in renal function was greater in the treatment group than in the control group.
- In the 12 months after the treatment period, renal insufficiency progressed more slowly in the treatment group than in the control group.
| 67 | CKD and gout | Lin et al. 2001 | Lead chelation therapy and urate excretion in patients with chronic renal diseases and gout | Cross-sectional and RCT | 101 and 30 in the clinical trial | 30 (20 study, 10 control) | weekly iv infusion of 1g of CaNa2 EDTA mixed with 200 mL normal saline for two hours | 4 weeks | • Serum urate levels and BLS of CRI patients with gout were significantly higher than those of the CRI group. • Daily urate excretion, clearance were significantly lower than those of the CRI group. • Chronic low-level lead exposure may interfere with urate excretion of CRI patients. |

| 68 | CNS | Hernandez et al. 2006 | Follow-up of patients affected by manganese-induced Parkinsonism after treatment with CaNa2EDTA | Case series | 7 | 5-26 | 2 g CaNa2EDTA in 500 ml of physiologic solution followed by an additional 500 ml of physiologic solution between 10 and 52 g total, infused in 4 h, | 25-68 | Parkinsonism induced by manganese poisoning. • In four patients, a marked regression of the disease occurred after chelation with CaNa2EDTA. • Another patient experienced a mild improvement of tremor. • Two patients did not show significant changes. |
| 69 | CNS | Fulgenzi et al. | 2015 | Efficacy of chelation therapy to remove aluminum intoxication | Open-label | 211 | 22 or 34 | 2 g EDTA diluted in 500 mL physiological saline, over two hours, once a week for ten weeks, then once every two weeks for a further six to twelve months | Cell food: 78 ionic/colloidal trace elements and minerals combined with 34 enzymes and 17 amino acids suspended in a solution of deuterium sulphate | Neurodegenerative diseases | • Our results showed that Al intoxication reduced significantly following EDTA and Cellfood treatment, and clinical symptoms improved. • After treatment, ROS, oxLDL, and homocysteine decreased significantly whereas vitamin B12, folate and TAC improved significantly. |

<p>| 70 | CNS | Fulgenzi et al. | 2012 | A case of multiple sclerosis improvement following removal of heavy metal intoxication | Case report | 50 | 1 | 2 g EDTA infusion over 90 min | Glutathione Cellfood | Multiple Sclerosis | 5 years | • Improved symptoms suggestive of MS remission. • The clinical data correlated with the reduction of heavy metal levels in the urine to normal range values. |</p>
<table>
<thead>
<tr>
<th>Page</th>
<th>CVA</th>
<th>Casdorph</th>
<th>1981</th>
<th>EDTA chelation therapy II, efficacy in brain disorders (not the original paper)</th>
<th>Open-label</th>
<th>15</th>
<th>20</th>
<th>cerebral blockage</th>
</tr>
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<tbody>
<tr>
<td>71</td>
<td></td>
<td></td>
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<td>• 14 demonstrated improved cerebral blood flow via radiotopic measurements.</td>
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<td>• All 15 improved clinically despite one not having demonstrated blood flow improvement.</td>
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<td>• Dramatic improvements in cognitive and orientation abilities were observed.</td>
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</table>

<table>
<thead>
<tr>
<th>Page</th>
<th>Eyes</th>
<th>Al-Hity et al.</th>
<th>2018</th>
<th>EDTA chelation for symptomatic band keratopathy: results and recurrence</th>
<th>Retrospective analysis</th>
<th>89</th>
<th>1</th>
<th>Band keratopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td></td>
<td></td>
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<td>disodium edetate 0.37% eye drops topically, 3 min intervals and calcifications removed</td>
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<td>581 days</td>
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<td></td>
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<td>• Median preoperative visual acuity was 6/18 (range 6/6-NPL) with the visual axis affected in 97.8% of cases</td>
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<td>• The mean initial follow-up time was 40 days, and the visual axis was clear in 97.8%</td>
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</table>
Visual acuity was maintained or improved in 79.8%, with 13.5% improving by two lines or more.

The mean length of follow-up was 581 days (median 374, maximum 2438).

Twenty-five eyes (28.1%) showed localized recurrence of calcium with a mean time of 546 days (median 374), but only four cases required repeat EDTA chelation.

The median time between operations was 430 days.
<table>
<thead>
<tr>
<th>Page</th>
<th>Eyes</th>
<th>Rudolph et al.</th>
<th>Visual Field Evidence of Macular Degeneration Reversal Using a Combination of EDTA Chelation and Multiple Vitamin and Trace Mineral Therapy</th>
<th>Case report</th>
<th>1</th>
<th>30</th>
<th>3 g EDTA</th>
<th>MVTMS ACAM protocol</th>
<th>59</th>
<th>age-related macular degeneration</th>
<th>1 yr</th>
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<tbody>
<tr>
<td>73</td>
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<tr>
<td>74</td>
<td>Lead poisoning</td>
<td>Markowitz et al.</td>
<td>1993 Effects of calcium disodium versenate (CaNa2EDTA) chelation in moderate childhood lead poisoning (paper unavailable online)</td>
<td>Open-label</td>
<td>201</td>
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</table>

- pre-treatment visual acuity was 20/60 in the right eye, 20/30 in the left eye
- post-treatment visual acuity improved to 20/25 in the right eye, 20/20 in the left eye
- past clinical experience showed much faster and better results than with nutritional supplementation alone

- Children with positive lead mobilization tests had on average higher initial BPb, bone lead, and erythrocyte protoporphyrin concentrations.
The chela
ted childr
en decre
ased appro
ximatel
y 4.7
micro gram
s/dL (0.23
mum
ol/L), 41
corrected
net count
s, and 24
micro gram
s/dL (0.46
mum
ol/L) more
than the unchela
d childr
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lead, and eryth
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Children with highe
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ased the most, whil
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levels show
ed the least
decline,
with or witho
ut treat
ment.
• When the initial values on the measures were controlled analytically, or when subgroups matched on initial levels were compared, there were no significant differences between the chelated and unchelated children.
  • The apparent effectiveness of CaNa₂EDTA at reducing lead burden and toxicity is no longer observed when the pretreatment levels are considered.
The findings suggest that sufficient doubt about CaNa2EDTA efficacy now exists to warrant a randomized controlled trial of chelation therapy in moderately lead-poisoned children. However, until such studies are performed, it would be premature to withhold chelation treatment on the basis of this study alone.

| Page | Mechanism of action | Guldager et al. 1996 | Metal excretion and magnesium retention in patients with intermittent claudication treated with intravenous disodium EDTA | DB-RCT | 60 | 20 | 3 g of Na EDTA and 8.4 g of sodium chloride in sterile water to 1000 mL (isotonic solution) | To avoid hypocalcemia, each treatment lasted 3-4 h; only minor symptoms were encountered, with no difference between the two groups; 20 infusions were given over 5-9 weeks, with no more than 4 treatments per week | Multi tabs with magnesium Ferrosan, 100 mg of magnesium, 15 mg of zinc, and 2.5 mg of copper. | After the first infusion, a statistically significant increase in the urinary excretion of lead, copper, zinc, and calcium was found in the group that received EDTA, compared with the placebo group. |
• In contrast, magnesium excretion showed a significant decrease.
• The serum calcium concentration decreased in the EDTA group from a mean (±SD) of 2.37 mmol/L to 2.26 mmol/L.
• The serum concentrations of copper remained statistically unchanged in the EDTA-treated group during the study. The same was true for serum magnesium, serum mercury concentrations didn't differ significantly after treatment.
In the EDTA-treated group, the serum concentration of parathyroid hormone (1-84) was increased by a factor of 2.5 at the completion of the treatment series, and serum alkaline phosphatase decreased by about 15%.

Mechanism of action
Waters et al. 2001

EDTA Chelation Effects on Urinary Losses of Cadmium, Calcium, Chromium, Cobalt, Copper, Lead, Magnesium, and Zinc
Open-label
16 (9 new, 7 prior EDTA)
3 g (2 patients received less because of renal insufficiency) EDTA mixed in sterile water
5 g of sodium ascorbate
2500 units of heparin
3 mL of 2% procaine
100 mg pyridoxine HCl
4 meq KCl
1 mL of 8.4% sodium bicarbonate
1000 µg hydroxycobalamin
1 mL vitamin B complex
7 mL magnesium sulphate equivalent to 686 mg of elemental magnesium
iv infusion arm vein over a 2.5- to 3-h period
51-77
verify results based on binding constant 4 days

- In the EDTA-treated group, the serum concentration of parathyroid hormone (1-84) was increased by a factor of 2.5 at the completion of the treatment series, and serum alkaline phosphatase decreased by about 15%.
- Large quantities of zinc are removed by EDTA during the chelation process.
- EDTA chelation therapy induces large losses of the toxic metals cadmium, lead, and zinc.

| 76 | Mechanism of action | Waters et al. 2001 | EDTA Chelation Effects on Urinary Losses of Cadmium, Calcium, Chromium, Cobalt, Copper, Lead, Magnesium, and Zinc | Open-label | 16 (9 new, 7 prior EDTA) | 3 g (2 patients received less because of renal insufficiency) EDTA mixed in sterile water | 5 g of sodium ascorbate | 2500 units of heparin | 3 mL of 2% procaine | 100 mg pyridoxine HCl | 4 meq KCl | 1 mL of 8.4% sodium bicarbonate | 1000 µg hydroxycobalamin | 1 mL vitamin B complex | 7 mL magnesium sulphate equivalent to 686 mg of elemental magnesium | iv infusion arm vein over a 2.5- to 3-h period | 51-77 | verify results based on binding constant | 4 days | • In the EDTA-treated group, the serum concentration of parathyroid hormone (1-84) was increased by a factor of 2.5 at the completion of the treatment series, and serum alkaline phosphatase decreased by about 15%. | • Large quantities of zinc are removed by EDTA during the chelation process. | • EDTA chelation therapy induces large losses of the toxic metals cadmium, lead, and zinc. |
Following chelation therapy, levels of cadmium in the urine averaged threefold over the pre-chelation baseline values. Lead was also found increased in every patient and averaged more than 35 times higher on the day of EDT A treatment. EDT A treatment produced an approximate doubling of calcium in the urine on the day of chelation copper excretion of the new patients was significantly higher on the day of chelation than that of the maintenance patients who had been chelated.
Mechanism of action

Kassner et al. 1990

Role of forced diuresis on urinary lead excretion after the ethylene diaminetetraacetic acid mobilization test.

Open-label

- Group 1 received 35 mg/kg CaNaEDTA mixed with 0.5% procaine by intramuscular injection and were encouraged to drink fluids throughout the collection CaNaEDTA period.
- Group 2 received 10 ml/kg of isotonic saline solution, followed by 35 mg/kg CaNa2EDTA diluted in a solution of 5% dextrose/0.2% NaCl, 150 ml infused for 45 minutes. After the infusion was complete, intravenous administration of fluids was continued at a rate one and one-half times the hourly maintenance fluid requirements.

32 months

- The mean total urine volume in group 2 was significantly greater than that of group 1, and urinary lead concentration was higher in group 1.
- However, there was no difference in total lead excretion between the groups; consequently, there was no difference in the mean mobilization ratio between them.
- Our data suggest that intravenous administration of CaNa2EDTA, followed by intravenous infusion of fluids during the lead mobilization test, ensures better diuresis, decreasing the rate of inadequate collections.
| 78 | Mechanism of action | Sata et al. 1998 | Behaviourof heavy metals in human urine and blood following calcium disodium ethylenediaminetetraacetate injection: observations in metal workers | 18 | 20 mg/kg CaEDTA in 250 ml of 5% glucose solution | 23-57 years | • CrU reached a maximal level within 1 h after the start of the injection.
• The highest urinary levels of MnU, PbU, and CrU occurred between 1 and 2 h, while CuU reached its maximum between 2 and 4 h.
• The urinary excretion of cadmium, mercury, and tin did not alter significantly following CaEDTA injection.
• PbP increased significantly following CaEDTA injection, with PbP concentrations being greatest at 1.5 h. In contrast, zinc levels fell to their greatest extent 1.5 h after CaEDTA administration. |
It is worth while to note that there were no marked changes in the plasma and erythrocyte concentrations of all other metals examined in this study.

| 79 | Mineral depletion | Riordan et al. 1990 | Mineral excretion associated with EDTA chelation therapy | Open-label | 25 | 20 | 3 g EDTA, 15 g ascorbate, 800 mg MgCl₂, 40 mg procaine, 1000 units heparin in 590 ml water | 1-2 weeks apart over 3-5 hours | MVTMS | >40 | hypertension |

- The 24-hr urine samples collected after the first treatment showed markedly higher amounts of beryllium than the pre-infusion samples.
- Mercury showed no significant increase.
- 7-fold increase for lead and cadmium.
- 2-fold for aluminum.
- Among essential minerals, manganese 50-fold, zinc 30-fold, iron 8-fold, calcium 2-fold.
these excretion levels were maintained for all minerals except lead which dropped by nearly 50% between the 1st and 10th infusion. Aluminum showed a rise between the 1st and 20th infusions as did mercury. Manganese and chromium also showed increased after many infusions. Supplements given were much larger than the induced excretions so the margins appear ample to compensate.
- mean 24-hr excretion of lead after the first EDTA infusion was 93 mcg, much less than the 1200 mcg/kg WDT. A currently considered to indicate increased lead burden and risk of lead nephropathy.
- initial blood lead level was 6.8 mcg/dL.
- following treatment, blood lead level declined 45% to 3.7 mcg/dL.
- mean initial cadmium excretion was 7 mcg and mean initial blood cadmium was 0.09 mcg/dL.
- following treatment, blood cadmium levels were insignificantly increased to 0.11 mcg/dL.
Blood pressure did not change, but nearly all subjects were already taking antihypertensive medication. The most significant loss is 1.8 mg zinc per day. More frequent infusions would increase the loss of essential minerals.

<table>
<thead>
<tr>
<th>Study</th>
<th>Authors</th>
<th>Year</th>
<th>Lesions or Deficiency</th>
<th>Case report series</th>
<th>Infusion Protocol</th>
<th>Treatment Duration</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Mucocutaneous Lesions Mineral Depletion/ Lipids</td>
<td>Perry &amp; Schroeder</td>
<td>Lesions Resembling Vitamin B Complex Deficiency and Urinary Loss of Zinc Produced by Ethylenediamine Tetraacetate*</td>
<td>Case report series</td>
<td>CaNa2EDTA 1-12 g infusions</td>
<td>daily</td>
<td>arthritis, CKD</td>
</tr>
<tr>
<td>81</td>
<td>Musculoskeletal system</td>
<td>Rudolph &amp; McDonagh</td>
<td>Magnetic Resonance</td>
<td>Case report</td>
<td>protocol of the AAAM</td>
<td>treatment over 12 months</td>
<td>recurrent disc herniation</td>
</tr>
<tr>
<td>61</td>
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</tbody>
</table>
imaging evidence of a reduction in disc herniation using a combination of EDTA chelation and joint reconstructive therapy

initially, the disc protrusion was 5 mm into the spinal canal. After treatment, it was shown by MRI to protrude only 2 mm, a decrease of 60%.

In early studies, it was noted that patients receiving EDTA therapy reported improvements in various types of degenerative arthritis at about 1/3 of the time it took for improvements to occur in the vascular system. The improvements were temporary and required boosters because the underlying cause was not removed.
**Combination with prolact therapy is synergistic resulting in greater improvements than either therapy alone.**

<table>
<thead>
<tr>
<th>Study</th>
<th>Parameters</th>
<th>Duration</th>
<th>Treatment</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonagh &amp; Rudolph, 1981</td>
<td>Oxidative &amp; metabolic parameters</td>
<td>2 months</td>
<td>EDTA therapy</td>
<td>Hyperlipidemia decreased by about 30 points across all age groups following EDTA therapy</td>
</tr>
</tbody>
</table>

Serum cholesterol and the Aging Process: 221 EDTA therapy

Multivitamin and trace mineral supplements
The influence of EDTA salts plus multivitamin-trace mineral therapy upon total serum cholesterol and high-density lipoprotein cholesterol

Open-label 358 10 EDTA infusions multivitamin-trace mineral supplements 5-10x the RDA hyperlipidemia 50 days

Over all, there is a statistically insignificantly decline in CHOL/HDL ratio. However, a more careful analysis of the table indicates that relatively low ratios (under 4.0) tend to rise, relatively high ratios (5.0 and above) tend to decline, and those in a range of 4.0-4.9 (mean 4.4) tend to remain unchanged.

Hence, the ratio suggested by Castle II as the "ideal" seems possible, within the limits of this study, with EDTA and supportive therapy.
| 84 | Oxidative & metabolic parameters | Olwin & Koppel | 1968 | Reductio n of Elevated Plasma Lipid Levels in Atherosclerosis following EDTA Therapy | Retrospective analysis | 34 | 20 | 3 g added to 500 ml of 5% dextrose in water infused over a period of 3-5 hours; repeated daily for 5 days in most patients and again resumed after a 2-day rest period over 4 weeks | 56 | atherosclerosis, some diabetics |
| 85 | Oxidative & metabolic parameters | Fulgenzi et al. | 2014 | Improvement of Oxidative and Metabolic Parameters by Cellfood Administration in Patients Affected by Neurodegenerative Diseases on Chelation Treatment | Open-label | 50 | 2 g EDTA over two hours, weekly | Cellfood: 78 ionic/colloidal trace elements and minerals combined with 34 enzymes and 17 amino acids or other antioxidant | 43 | neurodegenerative diseases | 3 months |
After chelation + Cellfood treatment, low basal levels of active B12 improved significantly both in controls and in ND patients, moreover, a significant decrease in Hcy levels but no significant variations in s-Fol concentrations were observed.

Basal ROS levels were significantly higher and basal TAC levels were significantly lower in ND patients than in controls.

In both controls and ND patients, only chelation + Cellfood treatment improved TAC and ROS values significantly compared with chelation + other antioxidants.
cholesterol profile improved more in controls than in ND patients after both antioxidant treatment s, while chelation + Castor oil treatment was significantly effective on both groups.

- oxLDL levels decreased, even if not significantly so, in both groups.
- all ratios improved after both treatment s in ND patients and in controls.
- High ROS levels were associated with low GSH values. At baseline, no GSH levels were significantly higher in controls than in ND patients.
Chelation + Cellfood treatment significantly increased GSH levels in ND patients (Figure 6). On the whole, our findings showed that chelation + Cellfood treatment was much more efficient than other antioxidant treatments.
<p>| 86 | Oxidative &amp; metabolic parameters | Roussel et al. | 2009 | EDTA Chelation Therapy, without Added Vitamin C | Decreases Oxidative DNA Damage and Lipid Peroxidation | Open-label | 10 | 6 | 3 g EDTA | 2,500 units heparin, 3 mL 2% procaine, 100 mg pyridoxine HCL, 4 meq KCL, 7 mL Mg sulfate (equal to 686 mg elemental magnesium), 1 mL B-complex vitamins, and 1 mL sodium bicarbonate. | Chelation therapy for five weeks led to a 20 percent decrease in plasma MDA levels (p&lt;0.02). Fpg-sensitive sites in DNA decreased 22 percent in the treated patients, indicating a lower level of oxidized DNA bases (8-OHdG) after treatment. Improvements in other measures of antioxidant status were not statistically significant. | EDTA Chelation Therapy | 50-76 | • Chelation therapy for five weeks led to a 20 percent decrease in plasma MDA levels (p&lt;0.02). Fpg-sensitive sites in DNA decreased 22 percent in the treated patients, indicating a lower level of oxidized DNA bases (8-OHdG) after treatment. Improvements in other measures of antioxidant status were not statistically significant. |</p>
<table>
<thead>
<tr>
<th>#</th>
<th>Oxidative &amp; metabolic parameters</th>
<th>McDonagh et al.</th>
<th>1983</th>
<th>The Effect of Intravenous Disodium Ethylenediaminetetraacetic Acid (EDTA) Plus Supportive Multivitamin/Trace Mineral Supplementation Upon Fasting Serum Calcium</th>
<th>Open-label</th>
<th>80</th>
<th>30</th>
<th>3 g EDTA over 3 hours, 5 day intervals</th>
<th>MVTMS</th>
<th>63.8</th>
<th>none</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Over all, the fasting serum calcium level did not change significantly. EDTA therapy appeared to have a &quot;homeostatic&quot; effect on serum calcium levels in that low levels rose, medium levels remained unchanged and high levels declined.</td>
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</table>

<table>
<thead>
<tr>
<th>88</th>
<th>Oxidative &amp; metabolic parameters</th>
<th>Rudolph et al.</th>
<th>1991</th>
<th>Effect of EDTA Chelation on Serum Iron</th>
<th>Open-label</th>
<th>122</th>
<th>30</th>
<th>3 g EDTA</th>
<th>MVTMS</th>
<th>61.5 m</th>
<th>degenerative diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A decrease of 17.15 % in serum iron in the group as a whole. In patients with initially high iron levels, the decrease was 43.6%. In patients with initially low iron levels, the increase was 31.6 % in men and 10.4 % in women.</td>
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<tr>
<td>Page</td>
<td>Study Title</td>
<td>Authors</td>
<td>Year</td>
<td>Study Design</td>
<td>Study Duration</td>
<td>Intervention</td>
<td>Outcome Measures</td>
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<tr>
<td>89</td>
<td>Oxidative &amp; metabolic parameters</td>
<td>Lin et al.</td>
<td>2002</td>
<td>Environ mental lead exposure and urate excretion in the general population</td>
<td>RCT</td>
<td>24</td>
<td>1 g of calcium disodium ethylenediamine tetraacetic acid (EDTA) mixed with 200 mL of 5% dextrose in water</td>
<td>iv infusion over 2 hours</td>
<td>lead exposure</td>
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<tr>
<td>90</td>
<td>PAD</td>
<td>Arenas et al.</td>
<td>2017</td>
<td>Safety of Chelation Therapy</td>
<td>Open-label</td>
<td>3</td>
<td>40</td>
<td>EDTA</td>
<td>first 20 infusions administered bi-weekly</td>
<td>80</td>
<td>critical limb ischemia</td>
</tr>
</tbody>
</table>
With Edta in Patients With Critical Limb Ischemia: A Pilot Trial of Limb Preservation in Diabetic Patients

subsequent infusions administered weekly.

• All patients had detectable levels of toxic metals in urine.
• Lead was the most abundant toxic metal in the chelated urine.
• The lowest baseline tissue perfusion pressure in the affected limb was 22, 17 and 19 mmHg for each of the three patients, respectively.
• No patient has been amputated or developed an acute cardiac event.
• One patient had a PTC A of her affected leg and underwent diuretic therapy for a non-healing ulcer.
• No significant changes have been detected in skin perfusion pressures during follow-up.
Preliminary findings of this open-label trial suggest that EDTA treatment in CLI patients is safe. Moreover, after more than a year of follow-up, no patient has required any amputation or had any cardiovascular event.

| 91 | PAD | Guldager et al. | 1992 | EDTA treatment of intermittent claudication: a double-blind, placebo-controlled study | 159 (EDTA, 75 patients; placebo, 78 patients) | 20 | 3 g Na EDTA and 8.4 g NaCl in sterile water diluted to 1000 ml | duration of a single treatment was 3-4 h, given over a period of 5-9 weeks, 46 days average | > 40 stable IC 6 months |

- This study did not demonstrate any effect of EDTA chelation therapy in the treatment of intermittent claudication.
- The ankle-brachial index remained unchanged throughout the study period, and no difference was found in the patients' subjective impression of the therapeutic result.
Patients improved more than the placebo group, but the difference was not statistically significant (twice as much).

The change in BP from pre-treatment to post-treatment showed a significant effect of the treatment group.

The difference was estimated to be -8.82 mmHg.

The raw average of treatment group’s was -4.85 for the EDT A group and 3.41 for the placebo group.

Brachial pressure in the EDT A group was reduced by 8.82 mmHg more than that in the placebo group post-treatment.
<table>
<thead>
<tr>
<th>Patient ID</th>
<th>PAD</th>
<th>Study</th>
<th>Authors</th>
<th>Year</th>
<th>Study Design</th>
<th>Treatment</th>
<th>n</th>
<th>Duration</th>
<th>Outcome</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>92</td>
<td>PAD</td>
<td>Sloth-Nielsen et al.</td>
<td>1991</td>
<td>Arteriographic Findings in EDTA Chelation Therapy on Peripheral Arteriosclerosis</td>
<td>DB-RCT</td>
<td>153</td>
<td>20</td>
<td>3 g Na EDTA and NaCl 18.4 g in sterile water added to 1,000 mL of isotonic solution given over 3-4 hours over 6-10 weeks</td>
<td>not reported</td>
<td>&gt; 40 IC follow up after 3 months</td>
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<tr>
<td></td>
<td></td>
<td>van Rij et al.</td>
<td>1994</td>
<td>Chelation Therapy for Intermittent Claudication: A Double-Blind, Randomized Trial</td>
<td>DB-RCT</td>
<td>32 (15 treatment, 17 control)</td>
<td>20</td>
<td>500-mL infusion contained 3.0 g disodium EDTA, 0.76 g magnesium chloride, and 0.84 g sodium bicarbonate in normal saline, given over 3 to 3.5 hours, twice per week for 10 weeks</td>
<td>Both groups received Parentrovite as part of the infusion</td>
<td>67 IC</td>
</tr>
</tbody>
</table>
- thiamine hydrochloride 250 mg
- riboflavin phosphate [sodium salt] 5.5 mg
- pyridoxine hydrochloride 50 mg
- ascorbic acid [sodium salt] 500 mg
- nicotinamide 160 mg
- sodium pantothenate 5 mg
- glucose anhydrous 1000 mg
- sodium metabisulfite 4 mg

**Controlled Trial**

- There was a significant improvement in walking distances in both groups at the end of the infusion program.
- However, the major endpoints of improved absolute and subjective walking distances as well as postexercise ABI were not significantly different in the two groups at any time during treatment or follow-up.
- At 3 months after treatment, resting ABI of both the better and worse legs showed some improvement in the chelation group.
- An equal proportion (13%) of each group thought that they had received the active agent.
The proportion of patients showing an improvement in walking distance was not significantly different between the chelation group (60%) and the control group (59%). Chelation patients improved 78% more than controls, with a statistically significant increase in pulsatility index.
| 94 | PAD | Casdorph | 1983 | EDTA chelation therapy II: Treatment of peripheral arterial occlusion, an alternative to amputation (chapter 11: Textbook of Chelation Therapy) | Case report series | 4 | 30-45 | 1.5-3 g in Ringer's or dextrose solution, some patients received 5000 units heparin, 2 g MgCl2 | 1-4 times per week, 3 hours | • some patients received additional vitamin/mineral supplements and hyperbaric oxygen therapy | end-stage PAD | • all 4 patients had failed all available medical treatment and had been referred for amputation of the lower extremity (rest pain, gangrene, ulcer(s)) | 4/4 subjects avoided lower extremity amputation • one patient lost the 2,3,4 right toes • patients ambulated normally at one-year follow up |
| 95 | PAD | Diehm | 1986 | Effects of EDTA-Chelation Therapy in Patients with Peripheral Vascular Disease: A Double-Blind Study. (unpublished but presented as a paper before the Internation Symposium on Atherosclerosis, Melbourne, Australia, October 14, 1985) | DB RCT | 24 | 20 | EDTA vs bencyclan | PAD | • the trial was funded by a pharmaceutical company and compared EDTA with a vasoactive drug • both groups improved 70-76% immediately after treatment |
results in the EDT. A group continued to improve and at 12 weeks post-treatment reached 182% negative conclusion, but chelation patients increased their walking distance 400% more than controls. Complete data showed that 4 patients in the EDT A group experienced more than a 1000 m increase in pain-free walking distance, but were excluded as outliers. A reanalysis of the data including those four patients shows that the EDT A group improved 400%
| 96 | PAD | Odzower et al. | 1990 | A pilot double-blind study of sodium-magnesium EDTA in peripheral vascular disease | DB RCT | 10 | 20 | Na2 EDTA was used in a dose of 1.5 g for each infusion | 41-53 | PVD (diabetes or arteriosclerosis) | 1.5 g for each infusion | vitamin C (2 grams) | B complex (2 mL) | vitamin B6 (300 mg) | heparin 500 IU | magnesium sulfate (1 g) |

- The EDT A group after 10 infusions doubled the distance walked before therapy (x 2.2), compared with essentially no change in the placebo group (x 1.04).
- After the 20th infusion, the EDT A group walked nearly three times (x 2.93) the distance and, in the placebo group, after we introduced EDT A, they improved approximately 100% (x 1.96).
- The improvement in the original EDT A group from the 10th to the 20th session was 31% (x 1.31).
<table>
<thead>
<tr>
<th>PAD</th>
<th>Ujueta et al.</th>
<th>2019</th>
<th>The effect of EDTA-based chelation on patients with diabetes and peripheral artery disease in the Trial to Assess Chelation Therapy (TACT)</th>
<th>Posthoc analysis of DB-RCT</th>
<th>162</th>
<th>combined diabetes, post MI, and PAD</th>
<th>66</th>
</tr>
</thead>
</table>

- Activated infusions significantly reduced the primary endpoint compared with placebo infusions (HR, 0.52; 95% CI, 0.30–0.92; \( P = 0.006 \)).
- There was a marked reduction in total mortality from 24% to 11%, although of borderline significance (\( P = 0.052 \)).


| PAD | Ujueta et al. | 2019 | Edetate Disodium -Based Treatment in a Patient With Diabetes and Critical Limb Ischemia After Unsuccesful Peripheral Arterial Revascular | Case report | 99 | combined diabetes, post MI, and PAD | 66 |

- 3 g Na2EDTA protocol of TACT twice weekly for 10, once weekly next 20, and then once per month for the final 10.
- MVMTS TACT

16 months?
A patient with CLI nonhealing ulcers and pain unimproved by medical or surgical therapy including hyperbaric oxygen.

- Total occlusions of left superficial femoral artery, distal right superficial femoral artery, and right popliteal artery.
- Dry gangrene on distal phalanges and was offered below the knee amputation.
- Urine measurements baseline and after 1st infusion: Al 816%, Cadmium 428%, Gadolinium 15,900%, Lead 2733%, Tin 1344%.
- QoL, pain, general health all improved.
- Gangrene and foot ulcers resolved.
| 100 | PAD | Escobar et al. | 1995 | Chelatio n in peripher al arterial insufficie ncy (paper unavailable online) | Observati onal | 80 | • no cardi ovasc ular event s durin g treat ment |
| 101 | PAD | Godfrey | 1990 | EDTA chelation as a treatmen t of arterioscl erosis (paper unavailable online) | Retrospec tive analysis | 27 | • mark ed improv ement in ankle /brac hial indice s in 76 /80 pa tie nts • pulse oscillo graph fs of the poste rior tibial and dorsa lis pedis arteri es impro ved • 28 had inope rable lesions |
| 102 | PAD | Arenas et al. | 2019 | Limb Preserva tion Using Edetate Disodium -based Chelatio n in Patients with Diabetes and Critical Limb Ischemia : An Open-label Pilot Study | Open-label | 10 | 50 | 500 ml chelate solution (3 g EDTA, 2 g MgCl2, 100 mg procaine HCL, 2500 U unfractionated haptan, 7 g ascorbate, 2 mEq of KCL, 840 mg of NaHCO3, 250 mg pantoth ic acid, 100 mg thiamine, 100 mg pyridoxine) twice per weak for 20 sessions, then once per week for 20 sessions, then once per month for 10 sessions | MVTMS | 75.3 | critical limb ischemia and diabetes | 1 year | • All pa tie nts had cadm ium and lead detec ted in their baseli ne, pre -infusi on urine • baseli ne levels of cadm ium incre ased by an avera ge of 250% after the initial infusi on |
baseline levels of lead increased by an average of 3733% after the initial infusion.

- Excretion of toxic metals was maintained throughout the 40 infusions.
- There was a reduction of pre-chelation urinary lead of 73% and post-chelation of 68% at baseline compared to infusion 40.
- GFR did not change over the 40 infusions.
- Amputation occurred only in the 3 subjects who were unable to complete the 40 planned infusions.
5 of 7 patients had ulcers or gangrene at baseline. In all those patients, wounds completely resolved and there were no new active wounds infections.

Quality of life measured by the SF-36 and PAD disease-specific instruments demonstrated improvements in all categories. There was a 76.5% median improvement in the pain score and a 56% median improvement in overall health. In the PAD questionnaires, QOL improved by a median of 351%.
<table>
<thead>
<tr>
<th>ID</th>
<th>Category</th>
<th>Reference</th>
<th>Year</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>PAD/CAD</td>
<td>Hoekstra et al.</td>
<td>1993</td>
<td>Serial infusions of magnesium disodium ethylene diamine tetraacetic acid enhance perfusion in human extremities (paper unavailable online) Retrospective analysis 19147</td>
</tr>
<tr>
<td>104</td>
<td>Pharmacokinetics</td>
<td>Rudolph &amp; McDonagh</td>
<td>1983</td>
<td>The Chelation Carrier Solution: An Analysis of Osmolarity and Sodium Content Review</td>
</tr>
<tr>
<td>105</td>
<td>Platelet volume</td>
<td>Rudolph et al.</td>
<td>1990</td>
<td>An observation of the effect of EDTA chelation and supportive multivitamin/mineral mineral supplementation on blood platelet volume: a brief communication Open-label 85 &gt; 30 3 g EDTA 32-84 chronic degenerative disorders over 13 months</td>
</tr>
<tr>
<td>Study ID</td>
<td>Country</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Controls</td>
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<tr>
<td>106</td>
<td>Psychiatric</td>
<td>McDonagh et al.</td>
<td>The Psychostimulatory Potential of EDTA Chelation</td>
<td>Open-label</td>
</tr>
</tbody>
</table>

Emotional symptoms were assessed using the Cornell Medical Index Health Questionnaire at baseline. Subjects scored an average of 6.1 (equivalent to 37% emotional complaints). Following EDTA chelation, the mean number of complaints dropped to 4.1 (27% improvement in feelings and mood).

- 105/139 subjects reported positive findings.
- Analysis of data subsets of patients initially reporting symptoms in each area showed that tension improved by 50%, depression by 49%, anger by 46%, inadequacy by 41%, sensitivity by 37%, and anxiety by 23%.
Effects of intravenous EDTA treatment on serum parathyroid hormone (1-84) and biochemical markers of bone turnover (paper unavailable online)

- Serum calcium and serum phosphate decreased following treatment and remained unchanged in the placebo group.
- PTH increased 2 1/2 fold following EDTA treatment.
- The change in serum PTH was inversely correlated with the change in serum calcium.
- In the EDTA group, urinary hydroxyproline/creatinine and calcium/creatinine increased after treatment.
Serum bone alkaline phosphatase decreased significantly in the EDT.
A group immediately after treatment and returned to baseline level at three months, while only an insignificant decrease in serum osteocalcin was seen following treatment.
EDTA treatment increases endogenous PTH secretion considerably and leads to increased bone resorption. However, no changes in osteoblastic markers indicating increased activation of bone remodeling could be demonstrated. Our findings suggest that chelation therapy with EDTA is accompanied by bone loss.
| Renal function McDonagh et al. | 1982 | The Effect of EDTA Chelation Therapy Plus Supportive Multivitamin Trace Mineral Supplementation upon Renal Function: A study in serum creatinine | Open-label | 383 | 10 infusions | 3 g EDTA in 1000 cc normal saline over 3 hours with an average interval of 5 days between infusions. | oral vitamin and trace mineral | 50 days |

|  |  |  |  |  |  |  |  |  |

- Over all, the fastin g serum creatinine levels declined.
- Specifically, those with relatively low initial serum creatinine levels increased those with relatively high levels, but generally fell to be within the physiologic range declin ed. and those in the area of approximat ely 1.0 mg/dl remained unchange d.
- It would appear ar within th e limits of this study, that th is thera peutic regim e is not nephr otoxic.
- There is even a sugges tio n that th is treat m ent proce dure may improve kidney function.
| Renal function McDonagh et al. | 1982 | The Effect of EDTA Chelation Therapy Plus Supportive Multivitamin/Trace Mineral Supplementation Upon Renal Function: A Study in Blood Urea Nitrogen | 80 | 30 | 3 g EDTA over 3 hours in 1000 ml various carrier solutions at an interval of 5 days | MVTMS | 64 | chronic degenerative disorders |

- range of BUN levels at baseline was considerable
- only 10/80 participants had baseline dysfunction
- there was no statistically significant change in BUN levels after 10 infusions
- statistically significant reductions after the 20th and 30th infusions (-7% and -6% respectively)
- EDTA appeared to affect BUN levels "homeostatically" where low levels rose and high levels fell
- no evidence of nephrotoxicity
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Year</th>
<th>Authors</th>
<th>Study Design</th>
<th>Intervention</th>
<th>Duration</th>
<th>MVTMS</th>
<th>Vitamins/Minerals</th>
<th>Diseases</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Effect of EDTA Chelation and Supportive Multivitamin/Trace Mineral Supplementation on Chronic Lung Disorders: A Study of FVC and FEV1</td>
<td>1989</td>
<td>Rudolph et al.</td>
<td>Open-label</td>
<td>3 g EDTA</td>
<td>9 months</td>
<td>65.5</td>
<td>chronic diseases</td>
<td></td>
<td>• Initially, 26% of participants demonstrated abnormal FVC and FEV1</td>
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<td>• After treatment, only 5% of subjects had abnormal FVCs and those subjects improved 16.5%</td>
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<td>• After EDTA iv infusion on the improvement in FVC and FEV1 was statistically significant (12.1% and 12.8% respectively)</td>
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<td></td>
<td>• The initial measurements were FVC 80% of expected value and rose to 92.5% following treatment</td>
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<td></td>
<td>• The initial measurements of FEV1 were 88% of predicted for age and increased to 96.3% following treatment</td>
</tr>
<tr>
<td>Safety</td>
<td>Wedeen et al.</td>
<td>1983</td>
<td>The Safety of the EDTA Lead-Mobilization Test</td>
<td>Open-label</td>
<td>122</td>
<td>2</td>
<td>Intramuscular injection of 1 g CaNa$_2$EDTA (with 1 ml 2% procaine)</td>
<td>8 to 12 hr apart</td>
<td>4 weeks</td>
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</table>

- The effect of the CaNa$_2$EDTA lead-mobilization test on renal function was determined in 122 patients.
- Three days, seven days, and four weeks after the test, the mean serum creatinine was not significantly increased.
- These data indicate that the EDTA test is not nephrotoxic even in patients with preexisting renal disease.