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ORIGINAL PAPER

Prevention of Lower-Extremity Amputation With EDTA Chelation

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ABSTRACT: This patient review was designed to compare the lower-extremity amputation rate of patients treated with traditional surgical interventions with those who received EDTA chelation for treatment of peripheral vascular insufficiency. The patient populations were similar and the follow-up period was comparable between chelation patients and those progressing to amputation after surgery. All amputations occurred within 1 year after surgery. The chelation-treated group was observed for 36 months. Eighty-nine patients were treated surgically with 8 failures leading to amputation (9% amputation rate). Rest pain was relieved in 9 of 14 patients after surgery. Therefore, 64% of the patients who presented with rest pain experienced improvement in quality of life with no rest pain after surgery. Five patients with continued rest pain after surgery required amputation. Seventy-six patients (87%) were able to walk without claudication after surgery. Twenty-two chelation patients received a combined total of 750 treatments. Four patients presented with rest pain and all but 1 patient received total relief after an average of 12 treatments; consequently, 75% of patients with rest pain were improved. The patient who experienced no improvement in rest pain stopped chelation after 12 treatments. Twenty-one patients completed 30 or more EDTA treatments; of these patients, 20 experienced an increase in walking distance without pain. The patient who did not experience an increase in walking distance without pain received complete relief from rest pain. None of the patients receiving chelation therapy progressed to amputation. Chelation-treated patients were found to have a lower amputation rate than surgically treated patients with comparable lower-extremity arterial disease. Symptom relief with chelation is excellent. Therefore, EDTA chelation can be considered an option to surgical intervention for the initial and complete treatment of patients with lower-extremity arterial occlusive disease. (*Clinical Practice of Alternative Medicine* 1(3):165-169, 2000)

Lower-extremity arterial atherosclerosis leading to amputation continues to be a major cause of morbidity and mortality. The introduction of angioplasty and stent technology has expanded surgical treatment for peripheral arterial occlusive disease. Medical management has not improved since the development of Trental, a medication that alters red-cell configuration, making it possible for oxygenated blood to travel through a smaller stenosed arterial channel. Medical and surgical treatments offer temporary relief of symptoms but do not alter the disease process.

Lifestyle changes are also beneficial in reversing the effects of atherosclerosis, including a vigorous exercise program, counteracting risk factors, and diet change with a vitamin and mineral program. To be effective, lifestyle changes must include cessation of smoking as well as control of high blood pressure, diabetes, and low-density lipoproteins. Vitamins and minerals are beneficial as catalysts in enzyme systems designed to counteract free radical production and tissue damage.[1] Also, certain vitamins and minerals contribute to a direct neutralization of free-radical activity. Most people are unable to manage a lifestyle change sufficient to alter the end result of this devastating disease.

Improvement in surgical technique, lifestyle changes, and conventional medical management have failed to offer patients with advanced distal arterial disease hope for limb salvage. In conjunction with vitamin and mineral supplementation, EDTA chelation is a unique well-tolerated treatment that offers the possibility of avoiding amputation because it stimulates regression of the disease process of atherosclerosis, improving arterial flow to oxygen-deprived tissue.

Materials and Methods

Initial evaluation included a search for symptoms consistent with claudication or lower-extremity rest pain. The peripheral pulses were evaluated by digital compression. Patients with positive symptoms or with decreased or absent pulses were selected for further evaluation to include either ankle brachial index evaluation or triplex angiodynography ultrasound. When a significant alteration in blood flow was found, patients were given the option of medical therapy or surgical intervention. Medical management included Trental, cessation of smoking, and lifestyle alterations including antioxidant vitamins and exercise. The option of arteriogram and surgery was given to those experiencing no benefit with this medical treatment plan, as well as to those presenting initially with limb-threatening disease. Surgical bypass or angioplasty and stent placement was performed when a surgically treatable lesion was found. Patients who demonstrated advanced distal disease not amenable to surgery were offered

pain control and amputation when appropriate. Failed revascularization led to amputation in the majority of cases.

Together with vitamin and mineral supplementation EDTA chelation has been added as a treatment option for patients choosing an alternative approach for therapy. Standard protocol of the American College for Advancement in Medicine was followed for the administration of EDTA, which was given intravenously over a 3-hour period.[2] The base solution was dextrose 5% in water for nondiabetic patients and a quarter normal saline for diabetic patients. Additions included magnesium 200 mg, heparin 1000 U, xylocaine 2% 10 mL, and sodium bicarbonate 10 mEq. Natural vitamins and minerals were given orally and included vitamin C 1 g, vitamin E 800 U, selenium 20 µg, betacarotene 20 000 U, folic acid 800 µg, thiamin 13.5 mg, riboflavin 15 mg, niacin 180 mg, pyrodoxine 18 mg, vitamin B_{12} 56 µg, biotin 600 µg, pantothenic acid 90 µg, and zinc 30 mg. These supplements were given daily and with each treatment. Therapy was performed on a weekly basis for 30 weeks and then continued once monthly as long as benefit was observed.

Pretreatment evaluation was accomplished using color flow ultrasound technology. The initial study was compared with those performed after the completion of 30 treatments. Normal studies show triphasic flow with blood-flow velocities of 50 cm/s to 60 cm/s or higher in the femoral and popliteal arteries. Triphasic flow and a velocity of 25 cm/s or higher are normal in the trifurcation vessels at the level of the ankle. Abnormal studies demonstrated biphasic or monophasic flow in the trifurcation vessels at the level of the ankle with a velocity lower than normally expected. Blood-flow velocity is abnormally elevated as the blood is forced through an area of significant stenosis. A significant stenosis is 70% to 75% or higher. The elevated velocity is present for a short distance just distal to the stenosis. The volume of blood passing beyond this point of obstruction is decreased. Reduction in volume of blood flow is detected by a lower velocity that can be measured distal to the poststenotic higher velocity. This explains the elevated velocity noted just distal to a significant blockage in the superficial femoral artery while recording a decrease in blood-flow velocity in the trifurcation vessels at the level of the ankle. The degree of elevation in velocity just below an obstruction compared to the velocity in the artery above the obstruction can be formulated into a ratio to estimate the percentage of stenosis. Reduction in blood-flow volume is detected in the artery more distal to the stenosis by a change in arterial wave form from triphasic to biphasic or monophasic, and by a reduction in blood-flow velocity.

Results

This report compares the results of surgical interventions with benefits experienced after taking EDTA for lower-extremity atherosclerotic vascular insufficiency. Eighty-nine patients with symptomatic lower-extremity arterial stenosis or occlusion were treated with bypass surgery or angioplasty and stent placement. Ultrasound and angiography were performed to confirm surgical candidates and to determine the procedure of choice. Graft failure leading to amputation occurred in 8 patients for an amputation rate of 9% (Table 1). Follow-up has been continued for 12 years. All amputations occurred within the first year after surgery. Fourteen patients in the surgical group presented with rest pain. Nine patients received relief of rest pain after surgery (Table 2). Five of the patients not receiving relief went on to amputation. Seventy-six patients were able to walk without claudication after surgery.

TABLE 1
Comparison of presenting symptoms and amputation rate

	Claudication	Rest pain	Amputation
Surgery	89 (100%)	14 (16%)	8 (9%)
Chelation	22 (100%)	4 (28%)	0

Twenty-two patients receiving 750 EDTA chelation treatments were selected for comparison with the surgically treated group. All patients were symptomatic, demonstrating either claudication or rest pain consistent with vascular insufficiency. Five patients were found to have significant iliac stenosis. The remaining studies showed significant unilateral or bilateral femoral or femoral-popliteal disease. The entire EDTA group was found to have poor distal runoff manifested by either abnormal biphasic or monophasic flow and reduced bloodflow velocities in all the trifurcation vessels at the level of the ankle. Eight patients had involvement of only 1 lower extremity, whereas 14 patients had significant bilateral disease. Therefore, 36 significant arterial stenoses were treated during the course of this study. The arterial flow deficits in the EDTA group were comparable to those in the surgically treated group. Every patient in both sections presented with claudication (Table 1).

TABLE 2
Comparison of theraputic results

	Rest pain relieved	Walking distance increased
Surgery	9 (64%)	76 (87%)
Chelation	3 (75%)	20 (95%)

TABLE 3
Comparison of walking distance before chelation and after 30 chelation treatments

WD	0-1 block	1-2 blocks	2-4 blocks	More than 4 blocks
PBC	16	5	0	0
PAC	1	3	12	5

PAC indicates number of patients after 30 chelation treatments; PBC, number of patients before chelation.

TABLE 4
Comparison of blood-flow velocity before chelation and after 30 chelation treatments

Blood-flow velocity	0-10 cm/s	10-15 cm/s	15-25 cm/s	More than 25 cm/s
PBC	7	11	3	0
PAC	0	3	10	8

PAC indicates number of patients after 30 treatments; PBC, number of patients before chelation.

Rest pain secondary to vascular insufficiency usually indicates multiple-level occlusions involving both proximal and distal lower-extremity arteries. Rest pain is a sign of more advanced occlusive disease that is often not benefited by surgical therapy. The percentage of patients presenting with rest pain was larger in the chelation group (Table 1). Three of the patients treated with EDTA had previous amputation and were experiencing limb-threatening blood-flow reduction in the remaining extremity. Four patients who chose EDTA presented with rest pain. All but one received relief of pain after an average of 12 treatments (Table 2); the patient who did not experience relief of pain stopped chelation after 12 treatments because he could tell no difference in his pain. All but one patient showed marked improvement in walking distance without pain after completing the base of 30 treatments (Table 3). The patient who did not improve in walking distance received complete relief of rest pain. All patients presenting with rest pain who finished the treatment course became completely asymptomatic. There have been no amputations in the EDTA-treated group after 33 months follow-up. Arterial studies after 30 treatments demonstrated an increase in blood-flow velocity ranging from 6 cm/s to 18 cm/s in one or more lower-extremity arteries in every patient (Table 4).

Discussion

A 1.4% amputation rate each year is associated with the natural history of patients with claudication. Vein bypass reduces this rate by 50%.[3] Reichle[4] reported an initial 1-year limb salvage of 61.2% after femoral to popliteal bypass grafting for severe ischemia in diabetics. The salvage rate for nondiabetics with severe ischemia was 74.4%. This value dropped to 0% after 14 years in diabetics and 50.8% for nondiabetic patients.[4] A study reported by Barnes[5] revealed a 5-year limb salvage of 82% after femoral to popliteal bypass procedures. Three-year limb salvage for patients undergoing popliteal to tibial bypass grafting for segmental distal popliteal occlusion or extensive disease of the tibial and peroneal arteries with recanalization near the ankle or foot has been reported as low as 57%.[6] Graft-patency rate remains in the range of 91% for 1 year and 74% after 4 years.[7] Lumbar sympathectomy in patients who are not good candidates for vascular reconstruction has been found to improve blood flow measured by noninvasive tests.[8] Limb salvage for the 89 patients in this report who were managed surgically was 91% with a 12-year follow-up, which compares favorably with other reported studies. Bypass procedures and angioplasty with stent placement do not treat the disease process of atherosclerosis. The progression of arterial plaque continues and eventually causes restenosis or tissue death leading to amputation.

Atherosclerosis is a condition due primarily to free-radical damage of the endothelial cell membrane. Various mechanisms are present to ensure a healthy flow of blood through the arterial system. One such mechanism involves the production of prostaglandins. The 2 most important prostaglandins in relation to blood flow and atherosclerosis are prostacyclin and thromboxane. Prostacyclin reduces the adhesive property of platelets, allowing free flow of blood cells. Prostacyclin also relaxes smooth muscle fibers in arterial walls, reducing spasm. Thromboxane causes an intense spasm in blood vessel walls and stimulates platelets to adhere.[9] Synthesis of prostacyclin is greatly inhibited by lipid peroxides and free radicals, which permit thromboxane to perform its negative effects unopposed. Without prostacyclin, thromboxane causes the free-radical injured arterial wall to become excessively attractive to platelets. Platelets deposit in an abnormally thick aggregation. A network of fibrin and microthrombi is formed. A number of leukocytes, which also produce free radicals, are caught in this aggregation of platelets. Erythrocytes hemolyze, causing iron and copper to be released, which leads to even greater free-radical formation. This formation expands and extends the area of endothelial injury, and eventually this sequence of events produces an atheroma. Calcium and cholesterol accumulate in the later stages of atheroma formation leading to a reduction in blood flow and eventual tissue loss secondary to decreased oxygen delivery.[10]

Several mechanisms of action make EDTA chelation a beneficial nonsurgical mode of therapy for atherosclerotic vascular disease. These mechanisms, unlike surgical intervention, work by directly altering or reversing the disease process leading to arterial stenosis or occlusion. Because EDTA is known to reduce the number of cross-linkages in connective tissue, the elasticity, including that of the smooth muscle in the arterial wall, is improved.[11] Consequently, the amended ability of the arteries to dilate increases the volume of blood flow. Magnesium, which is added to the EDTA solution, also has the effect of dilating the arterial system.

In addition, calcium is removed from the arterial plaque as the result of a direct and an indirect effect of EDTA. Bolick et al[12] demonstrated the effectiveness of EDTA for the removal of calcium from atheromatous arterial plaque in vitro. Kohn and colleagues[13] used subcutaneous injections of magnesium disodium EDTA in rabbits that were fed a high-cholesterol diet. This study showed diminished atheromata and a marked decrease in phospholipids. The researchers concluded that in addition to reducing calcium, EDTA also produced slower synthesis and more rapid destruction of phospholipids. A rapid phosphate turnover was also noted.[13] Walker[14] evaluated New Zealand albino rabbits, which exhibited calcified aortic plaques with marked elevation of serum cholesterol levels of 1200 µg/dL after 23 weeks of an atherosclerotic diet. The rabbits received 20 treatments of EDTA 50 mg/kg. The animals were evaluated 6 weeks after treatment and were found to have significantly less aorta calcium (300 µg/g of tissue) compared with animals that did not receive EDTA infusion (778 µg/g of tissue).[14] Brief pulsatile increases in parathormone levels, which occur during intravenous EDTA, resulted in an increase in new bone formation.[15] Cranton et al[10] argue that pathologic calcium deposits may be removed from arteries and other soft tissues for utilization in new bone formation. Whether by a direct removal of calcium from the arterial plaque or by the pulsatile effect of parathormone in transporting the calcium out of the atherosclerotic lesions, EDTA appears to decrease plaque by removing calcium. This beneficial effect is most likely the result of the combination of these 2 mechanisms. The result of this action should be a decrease in the degree of arterial stenosis and an increase in blood flow. The arterial flow channel is further increased by dilation of the artery secondary to decreased cross-linkages, magnesium, and enhanced prostacyclin effect, which also occur with EDTA. Reduction of arterial stenosis by 10% can double the blood flow through an artery.[16]

It has also been shown that EDTA chelation therapy is capable of exerting a beneficial effect by improving mitochondrial oxidative phosphorylation, enhancing the efficiency of cell respiration even in the presence of compromised blood flow and diminished oxygen.[17] One of the most important actions of EDTA is its ability to directly interfere with free-radical production. This mechanism of action prevents damage to the arterial cell membrane, which initiates the production of an atheroma. One EDTA treatment can reduce the production of free radicals a millionfold,[18] by removing heavy metals and abnormally located iron and copper that act as strong catalysts in the production of free radicals.

The benefit of EDTA chelation in the treatment of atherosclerotic arterial disease involving the lower extremities has been experienced clinically by numerous patients and reported by several physicians. In a study of the results of EDTA chelation used to treat various forms of advanced occlusive arterial disease, Clarke[19] found that the best results were in patients with intermittent claudication of the legs and in occlusive disease affecting circulation of the brain. Studies in the Russian literature reported by Nikitina[20] and in the Czechloslavakian literature by Brucknerova et al,[21] as well as reports by Casdorph and Farr[22] in the United States, have concluded that chelation is a treatment of choice for occlusive peripheral arterial disease.

Conclusion

Traditionally, patients with lower-extremity vascular insufficiency have been treated surgically, bypassing the occluded or stenosed segment. Most recently, angioplasty, a less-invasive procedure, has been used to open stenosed vessels. Although this procedure is beneficial in many circumstances, it is costly and it does not treat the disease process, and there is a failure rate often leading to amputation. The surgical amputation rate in this series was lower than generally reported.

Many traditional physicians have not accepted chelation therapy. The benefit of EDTA for treatment of lower-extremity vascular insufficiency has previously been reported. Mechanisms of action have been outlined and are reviewed in this article. A growing number of highly specialized physicians are becoming more comfortable with the results of the chelation treatment option. Many patients are demanding this approach to treatment. They are doing their own research and have chosen the chelation alternative. Many have actually experienced the benefit of EDTA and are enjoying a higher level of health and comfort.

This report compares a group of patients treated conventionally with a group of similar patients treated with chelation. The chelation group demonstrated the best results with zero amputations compared to 9% for the surgically treated patients. In addition to the patient populations being similar, the follow-up period was also comparable. Based on these results and a literature review, EDTA chelation should be included as an initial option in the treatment of symptomatic and advanced limb-threatening lower-extremity vascular insufficiency.

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EDTA: A Life-Changing Experience

Editor: My skepticism was exceeded only by a lack of knowledge regarding the use of EDTA chelation. As a conventionally trained cardiovascular surgeon, the concept of free-radical pathology causing atherosclerotic vascular disease was not included in the curriculum. EDTA chelation was not a treatment option for our patients. Vitamins and minerals were not considered a valuable adjuvant to the advanced technology of angioplasty and bypass surgery. My dream of being a heart surgeon was becoming reality. However, I discovered a real problem. We were delivering symptomatic therapy and ignoring the disease process. The patients were encouraged to stop smoking, change their diet, exercise, and alter their lifestyle. Most patients were unsuccessful and were sent home for the untreated disease to continue its progression against health and life.

Because of my wife and her knowledge of vitamins, I was encouraged to learn about the possible benefit of vitamin E for cardiac patients. Research led me to believe there was in fact enough evidence to substantiate the inclusion of vitamin E in my treatment protocol. There was still more I needed to learn, and I continued my quest for additional knowledge. The concept of free-radical damage to the vascular endothelial cell membrane leading to plaque formation and stenosis was discovered during these studies. This information expanded the therapeutic options for my vascular patients and led to my eventual attendance at a chelation workshop sponsored by ACAM. Information received at the workshop made it possible for me to formulate a treatment plan that attacked the disease process rather than just the symptoms. My skepticism was changed to belief and excitement. The addition of EDTA and a more intense vitamin regimen has provided many of my patients with the opportunity to experience improvement and healing even without surgery. The case history of one of these patients serves as an example of this truth.

A 72-year-old man presented to Athens Surgery Clinic and Vascular Treatment Center for continuation of chelation therapy because of atherosclerotic coronary artery disease. The first coronary artery bypass surgery performed after a myocardial infarction was unsuccessful.

A second coronary artery bypass also ended in breakthrough angina that severely limited the level of activity and threatened to decrease his life expectancy. Post-surgical medical management failed to alter his condition. He was sent home with no hope for improvement or additional options.

Determined to find help for his failing heart, research led him to consider chelation therapy. Not only was he encouraged, there was immediate improvement with reduction of anginal episodes and an increase in work capacity. EDTA chelation was given twice weekly and then reduced to monthly therapy after 30 treatments. Over 200 chelation treatments have been given since the initial medical and surgical therapy failure 22 years ago. For longer than 2 decades he has enjoyed complete symptomatic relief with no activity restriction. He was faced with the reality of an early death after his bypass surgeries failed, and was instructed to go home and enjoy the little time left to him. Chelation has truly been a gift of extended life for this gentleman.

Recently, this same patient was scheduled for coronary angiography in preparation for gallbladder surgery. His surgeon requested this study because of his cardiac history. The arteriogram showed no significant coronary artery disease. Twenty-two years earlier, there was documented coronary artery stenosis sufficient to warrant 2 bypass procedures. He tolerated the gallbladder surgery without incident. EDTA chelation therapy is being continued on a monthly basis. He remains active without symptoms or restriction of activity.

In conclusion, this history represents a patient with coronary artery atherosclerotic disease leading to myocardial infarction and myocardial revascularization on 2 different occasions. When the second surgery ended in failure, he was given no hope for recovery. After more than 200 chelation treatments, an arteriogram has demonstrated reversal of the atherosclerotic process suggesting healing of a disease that is the number one cause of mortality in America today. The inclusion of EDTA chelation as a treatment for atherosclerotic vascular disease has been the single best therapeutic addition to my practice of general and vascular surgery which began 19 years ago.

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Carotid Restenosis: A Case for EDTA Chelation

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ABSTRACT: Carotid restenosis has been found in up to 25% of patients after carotid endarterectomy. The most common cause of restenosis is continuation of the atherosclerotic process. Surgery can be beneficial in stroke prevention and should be considered in those patients at high risk for stroke. However, surgery does not arrest the disease of atherosclerosis. This report demonstrates a 10% reduction in the degree of stenosis in a patient treated with EDTA chelation for restenosis of a carotid artery after endarterectomy. EDTA chelation does arrest and reverse atherosclerosis and should be used in conjunction with surgery or as primary treatment for carotid restenosis as well as for vascular occlusive disease in any artery whether initial or recurrent.

Introduction

An exciting alternative for the treatment of vascular disease is now a reality. For over forty years many have implicated EDTA as a beneficial treatment for arterial occlusive disease. The chemistry and pharmacology of this synthetic amino acid have been more completely defined. The concept of free radical tissue damage has provided a better explanation of the pathophysiology of most if not all maladies. (1) These two areas of understanding can now be combined to explain abnormalities leading to disease and to design a treatment plan that actually attacks the disease process. This case is presented to illustrate the potential benefit of nonsurgical care of carotid restenosis using EDTA technology which offers a unique approach to reversing

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nal carotid artery. The systolic velocity was 220 cm/sec with a diastolic velocity of 58 cm/sec. The systolic velocity ratio was 2.2 with a diastolic velocity ratio of 4.8. The spectral broadening was recorded at 25 cm/sec. Color flow analysis revealed a 10% larger flow channel after EDTA chelation.

These data demonstrate a 10% reduction in the degree of stenosis of the right internal carotid artery with a decrease in both the systolic and diastolic velocities. The decrease in the systolic velocity ratio also demonstrates evidence of improvement regarding this patient's recurrent atherosclerotic carotid disease.

Discussion

Recurrent carotid stenosis following carotid endarterectomy has been reported as low as 3.8% in one series (3). Other authors have reported post-operative recurrent stenosis as high as 25% (4). My experience, after performing two hundred endarterectomies, includes nine restenoses for a recurrence rate of 4.5%. One patient required a second operation which was accomplished without complications. In the immediate post-operative period, carotid restenosis is most commonly caused by surgical technical error. Medial fibrodysplasia is associated with restenosis at one to two years after surgery. Restenosis after three to five years is most likely the result of progression of the atherosclerotic disease process. Conventional medical practice standards favor surgical treatment over medical management for significant carotid artery atherosclerotic disease (5). Surgical endarterectomy can be very effective in preventing stroke when performed in the right setting by a surgeon who can perform the surgery with a low morbidity and mortality rate. Carotid endarterectomy, however, does not treat the disease process as can be determined in part by incidence of recurrent stenosis. Conventional medical management offers nothing to reverse atherosclerosis. Disodium EDTA chelation represents a medical treatment modality that both arrests and reverses the atherosclerotic process. McDonagh, Rudolph and Cheraskin reported fifty-seven patients with cerebrovascular disease who were treated with EDTA chelation. They showed an 18% reduction in the degree of arterial stenosis and 88% of the patients showed objective improvement in cerebrovascular flow (6). Casdorph demonstrated significant improvement in cerebral blood flow studies after twenty intravenous infusions of EDTA (7). Rudolph and McDonagh reported

for Advancement in Medicine protocol (2). This report is only a single case study, but does demonstrate significant improvement in both hemodynamics of flow and reduction in degree of stenosis of the right internal carotid artery with EDTA chelation therapy.

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LETTERS TO THE EDITOR

The Best of Two Worlds

Editor: A house divided cannot provide the best medical care for patients. The controversy regarding EDTA represents one of the many issues leading to a divided opinion concerning therapeutic design among physicians. Conventional thought considers EDTA for the treatment of vascular disease useless and of no value. Many doctors refuse to see patients who have received integrative therapies. The recorded literature in support of edetate and the antioxidant approach is dismissed as nonscientific and anecdotal. Lugo-Miro and associates[1] have suggested that the best way to evaluate a controversial issue is by meta-analysis. Chappell and Stahl[2] have published a meta-analysis of recorded reports regarding the use of EDTA in patients with coronary artery disease. Both negative and positive results were included in this study of 22,756 patients. Eighty-seven percent of these patients had favorable outcomes with improvements measurable by an objective test.

Chelation opponents say there is nothing recorded in the National Library of Medicine to support the efficacy of EDTA as a therapeutic option for atherosclerotic vascular disease. To the contrary, a careful review of literature contained in the National Library of Medicine reveals several very good articles indicating the benefit of EDTA and the antioxidant alternative. There are 3 double-blind, placebo-controlled studies regarding EDTA and peripheral vascular disease of the lower extremities. The first study, by Olszewer and Sabbag,[3] showed a strong positive response in 1 group that prompted un-blinding after 10 chelation treatments. In this group, the participants received EDTA. The study was completed with all patients receiving edetate, and all showed the same objective and subjective improvement.

The Danish trial[4] was the second to be performed. The blind was broken for undisclosed reasons. The authors concluded that EDTA is not beneficial for the treatment of lower extremity atherosclerosis. However, the authors' data showed that the mean actual claudication distance increased by 51% in the EDTA group and only 23% in the placebo group. This result is actually in favor of the EDTA group. The number of patients studied was too small for statistical significance.

A third double-blind study, from New Zealand,[5] also had a negative conclusion with results favoring chelation. In this report, the mean absolute claudication distance was not statistically significant, but the EDTA patients improved by 30%, compared to 14% for the placebo group. The mean resting ankle-brachial index improved significantly in favor of the EDTA group. The edetate group also experienced a significant improvement in performing mild to moderate activity, compared to the placebo group. The mean femoral artery pulsatility index improved significantly in favor of EDTA.

These double-blind studies all indicate the potential for improvement in exercise tolerance and objective peripheral vascular testing after EDTA therapy.

The National Library of Medicine contains other indexed articles indicating benefit from EDTA and antioxidant therapy. Ethylene diamine tetra-acetic acid is a strong antioxidant. A single intravenous treatment can decrease the free-radical load a millionfold.[6] Diaz and associates[7] report that epidemiological studies have provided evidence of an inverse relationship between coronary artery disease and antioxidant intake. The oxidative-modification hypothesis implies that reduced atherosclerosis is a result of low-density lipoprotein (LDL) that is resistant to oxidation. There is evidence that plaque stability, vasomotor function, and the tendency for thrombosis are subject to modification by antioxidants. Cellular antioxidants inhibit monocyte adhesion, protect against the cytotoxic effects of oxidized low-density lipoprotein, and inhibit platelet activation. In addition, antioxidants protect against endothelial dysfunction associated with atherosclerosis by preserving endothelial-derived nitric oxide.[7] Steinberg[8] concluded from strong evidence that LDL does become oxidized, forming a toxic radical. Use of antioxidants can slow the progression of the initial atherogenic fatty streak under conditions that do not lower plasma cholesterol levels. It may therefore be possible to obtain protection beyond that obtained by lowering plasma LDL levels. Morel[9] reported that free radicals such as superoxide and peroxide are involved in the formation of toxic LDL. EDTA was found to be very effective in preventing the formation of cytotoxic oxidized LDL. Peng and associates[10] found that phosphorylation of ADP by mitochondria from ischemic and ischemic reperfused myocardium is inhibited by endogenous ionic calcium. This inhibition can be reversed by the use of the calcium-chelating

agent EDTA. Bolic[11] demonstrated 2 different forms of calcification in coronary atheromata. One type exhibits hematoxylin-ringed lacuna when calcium is removed. The calcium is present in discrete granules and is slowly extracted by EDTA. The second type shows no lacuna and is diffusely infiltrated by calcium. EDTA more rapidly extracts calcium from these atheromata. Bolic's study documented diminished atheromata and marked decrease in phospholipids with EDTA. The rationale for EDTA and antioxidant therapy is convincing based on these studies, which can be found in the universally accepted National Library of Medicine.

There are two different worlds of therapeutic design, conventional and integrative. The conventional attempt to counteract the symptoms of the disease process and the integrative emphasizes ablation of the disease itself. For some patients, a combination of these modalities leads to the best results. The following patient case history serves to demonstrate the potential benefit of EDTA given in conjunction with coronary artery bypass or angioplasty: A 62-year-old man presented for EDTA because of recurrent angina after 3 of 5 bypass grafts had occluded. His procedure was performed 5 years earlier. The status of the grafts was determined by an arteriogram that also showed a 99% blockage in the posterior descending branch of the right coronary artery. A second bypass was recommended for treatment of the right coronary artery stenosis. The lesion was judged to be contraindicated for angioplasty. The patient refused another bypass, choosing instead to proceed with EDTA. After 6 treatments, his angina subsided. He remained asymptomatic until his 22nd infusion. At that time, an episode of chest pain occurred while he was working on his boat. His cardiologist recommended an arteriogram, which revealed that the lesion that was 99% blocked had decreased to a 90% stenosis. A less invasive procedure using angioplasty technique was successfully performed. The patient made the decision to return to his cardiologist. It is possible that he may have improved sufficiently by continuing edetate. A positive aspect of his decision was the discovery of the 9% reduction in the degree of stenosis in the right coronary artery following chelation. By using a combination of EDTA, which reduced the degree of stenosis, and angioplasty, which increased immediate myocardial blood flow, the original more invasive recommendation for another bypass procedure was avoided.

This case report and review of literature contained in the National Library of Medicine present the scientific evidence and clinical example that support the use of EDTA in managing atherosclerotic vascular disease. This can be accomplished by single therapy or in combination with the conventional medical-surgical therapeutic option. The best of two worlds.

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Tympanostomy Tubes in Young Children

Editor: In the volume 2, no. 3, Fall 2001 edition of *Clinical Practice of Alternative Medicine*, someone who didn't have the courage to put his name to his reviews gave his opinion on various abstracts produced in other journals.

I have been a practicing otolaryngologist for over 30 years and have also been a great advocate of alternative therapy, particularly cutting-edge allergy treatments. I am a past president of the American Academy of Otolaryngic Allergy, the Pan American Allergy Association, and the American Academy of Environmental Medicine. I certainly appreciate the role of allergy and environment, and the various multisystem diseases.

The reviewer's comments, however, on page 212 concerning abstracts in the *New England Journal of Medicine* are totally wrong. Insertion of tympanostomy tubes for chronic serous otitis is very efficacious in children who are 1 and 2 years old. However, if recurrent tonsillitis occurs, there is definitely a place for adenotonsillectomy. This operation is currently not done enough, and I see children who have constant recurrent ear, nose, and throat infections who are cured by an adenotonsillectomy. If a child has a normal respiratory system, unobstructed by tonsils and adenoids, and only gets one