

CALCIUM CEVITAMATE IN THE TREATMENT OF
ACUTE RHINITIS

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NEW YORK

The discovery and synthesis of vitamin C has made possible a significant advance in calcium therapy sufficient to warrant re-examination of the value of calcium therapy in otolaryngology.

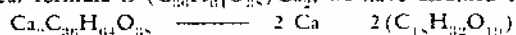
Vitamin C possesses the unique property of solubilizing and ionizing calcium to a degree not previously attainable by oral or intramuscular administration. In calcium cevitamate, the calcium salt of vitamin C, there is available a more effective approach to calcium therapy than that of the previously used gluconate.

A comparison of the two products showed the following:

TABLE I

Salt	Per Cent Solution by Weight	Concentration Moles / Liter	Temp. Drop °C	Per Cent Ionization	Yield Ca Ion Per Gram Salt	Yield Ca Ion Per cc. Solution
Cal. Cevitamate	5%	.123	.577	74.6	.0700	.0037
Cal. Cevitamate	10%	.261	1.085	60.0	.0563	.0065
Cal. Cevitamate	20%	.589	2.362	58.1	.0545	.0137
Cal. Cevitamate	30%	1.008	3.940	55.3	.0528	.0226
Neo-Gluconate	10%	.125	.565	*47.8	.0323	.0048
Neo-Gluconate	20%	.273	1.120	*40.3	.0273	.0088
Calglucon	3%	.072	.263	48.6	.0452	.0014

*Since the structure of the neo-calgluconate is not known, and since its empirical formula is $(C_{30}H_{51}O_{13})Ca_2$, we have assumed that it ionizes as follows:



An analysis of these findings would tend to indicate the calcium cevitamate in 5 per cent solution was approximately equivalent to the neogluconate in 10 per cent solution and that the 10 per cent calcium cevitamate was approximately equivalent to the 20 per cent neogluconate.

The comparative series was run only to 30 per cent calcium cevitamate because the neogluconate solutions do not exceed 20 per cent. In considering the calglucon tablet which is only 3 per cent soluble the yield of calcium ions per cc. of solution was .0014,

whereas that of the calcium cevitamate in only 30 per cent solution was .0226, or about twenty times greater. If calculated on the basis of 100 per cent it would be in the vicinity of sixty times greater in calcium ion content per cc. solution. How important this factor can be in the question of calcium absorbability becomes apparent from the volume of solute necessary to obtain an equal amount of available calcium. For every 100 cc. of solute required for the absorption of calcium cevitamate, it would require 6,000 cc. of solute for an equal availability of calcium in calcium gluconate. Since the total fluid content of the gastro-intestinal canal is about 5,000 cc. and absorption of calcium occurs only in the upper intestine, the difference in absorbability between calcium cevitamate and calcium gluconate becomes apparent.

The action of cevitamic acid on the ionization of calcium opens up a field both of theory and practice. A comparison of the physiologic action of cevitamic acid and calcium shows an almost completely parallel action in bone metabolism, hemorrhagic diathesis, cell membrane permeability and detoxicating action. So close is this resemblance that one can interchange their functions. It is this element which suggests that cevitamic acid may be the factor which acts as the vehicle for the diffusible fraction of the serum calcium. There is a strong probability that the parathyroid hormone and cevitamic acid jointly balance the small fraction of ionized diffusible calcium. Greenwald is quoted by Cantarow as suggesting that some of the calcium is bound to an organic substance in a citrate-like combination, the compound being intimately connected with the parathyroid hormone, probably diffusible and slightly ionized. Belief in the existence of such a compound is also shared by Klinke and by Sendray and Hastings. The latter drew attention to the similarity of action of the parathyroid hormone and citrate solutions in holding calcium in solution. In view of the fact that calcium citrate is only 0.8 per cent soluble, it is difficult to conceive of citrate as a calcium solubilizing agent. Cevitamic acid, however, has precisely the desired action in the ionization of calcium and its distribution in the intestinal canal, pituitary and adrenal makes it a much better hypothetical agent than citrate.

From the practical aspect, it is important to note that the injection of calcium cevitamate is nonirritating and better tolerated than gluconate.

In considering the action of calcium cevitamate in the series of cases here reported, one must take cognizance of the vitamin C action and its time-honored use as citric drinks in the treatment of the com-

mon cold. However, if my theory as to the function of cevitamic acid is correct, one must attribute the ultimate benefit to calcium action.

A series of clinical trials were undertaken. All acute upper respiratory tract infections that applied for treatment in the ambulatory state and were free from fever, were considered in the group of the common cold.

Some were associated with acute exacerbations of chronic previously treated sinusitis, frequently of influenzal character; others were of the simple infectious type associated with obvious exposure to persons suffering from cold.

The character of the response to treatment with calcium cevitamate is strikingly shown in the accompanying chart. The cases relieved by one injection were considered well in 24 hours or given a second injection on the second or third day. Cases associated with sinusitis received a continuation of the injections for one or two weeks because of the marked beneficial effects of the calcium cevitamate. Patients were advised to appear for treatment as close to the onset of the cold as possible, and were instructed to be mindful of the beginning dryness and discomfort of the nasopharynx and a fresh post-nasal discharge. These symptoms were observed to precede the coryza by about 12 to 24 hours. In a series of over two thousand injections, there were no complications incident to the injection. With but few exceptions there was no pain or reaction. There were, however, some instances of pain such as are incident to the injection of 3 cc. of any fluid, and soreness on pressure for a few days. This latter condition varied with the location of the injection, being absent if placed deep, slightly above the upper outer quadrant of the gluteus. Although a much larger series of injections was given than are here recorded, only cases of upper respiratory conditions affecting the nose and ear are presented. The period of study covered two years and included a hundred cases. Some of the patients returned promptly for injections at the onset of or during a cold, several times during the year. In the acute cold, the injections were given daily in alternating sides, or every other day for one to four injections. In cases associated with sinusitis, two injections were given for the period of the treatment. Allergic patients were given two injections weekly, supplemented by 10 to 15 grains of nucleic acid three times daily. Improvement was noted as moderate, marked or complete. It would seem an extravagant statement to say that all cases showed improvement, yet with but a few isolated exceptions, all benefited by the reduction in nasal congestion and discharge and

rapidity of recovery. The usual period of exhaustion following a cold was remarkably shortened.

The accompanying list of case reports represents 100 cases in continuous series treated with calcium cevitamate. In no case was there any complication associated with the injection. There were no sloughs, and only one case showed, on repeated injection, a tendency to lumpiness which gradually disappeared, thus establishing the non-irritating character of the solution and its ready absorption. Although in this series of cases 296 injections were administered intramuscularly, over 2,000 injections of the calcium cevitamate have been administered without any complications.

The cases reported comprise those of upper respiratory tract infection, of which 48 were the common cold, 38 were combined acute rhinitis and sinusitis and two acute laryngitis, 12 cases had nasal allergy. The tabulation of results showed 42 per cent completely relieved, as a rule after the first or second injection, comprising chiefly the cases of acute cold, 35 per cent of which were markedly improved comprised chiefly the cases of acute cold combined with sinusitis, and 3 per cent but moderately improved comprised the more or less chronic types. The allergic cases responded remarkably well.

In presenting this work on clinical material, one is mindful of the fact that animal experimentation would be valuable. However, since the etiologic agent of the common cold has not yet been isolated, there remains no other control than clinical application which in this study gave conclusive and gratifying results.

SUMMARY

1. The value of calcium therapy in otolaryngology has been enhanced through the use of the calcium salt of vitamin C, the calcium cevitamate.
2. A comparative test of the physical properties of calcium cevitamate and calcium gluconate shows a marked difference in solubility and ionization.
3. Since an ampule of 3 cc. of a 15 per cent solution of calcium cevitamate was injected, each dose represented about 450 mgs. of vitamin C. The calcium content is about 11 per cent when calculated as calcium oxide.
4. Calcium cevitamate would appear to be practically an abortive in the treatment of the common cold.

351 WEST 86TH STREET.

TABLE II

Case #	Patient	Sex	Date	Diagnosis	Comment
1	B. B.	M	3 24, 1937	Acute cold	Marked improvement
2	C. G.	F	4 5, 1937	Acute cold	Complete relief
3	E. K.	F	4 5, 1937	Acute cold	Complete relief
4	J. G.	F	4 5, 1937	Acute cold	Complete relief
5	I. G.	F	4 5, 1937	Acute cold Rt. ethmoiditis	Marked improvement
6	H. S.	F	4 1, 2, 5, 7, 1937	Grippe, left Sphenoiditis	Marked improvement
7	P. D.	M	4 6, 1937	Aphthous stom- atitis. Acute cold	Complete relief Stomatitis disap- peared after one injection
8	G. B.	M	4 7, 1937	Acute laryngitis	Marked improve- ment
9	L. G.	F	4 7, 12, 1937	Acute cold	Complete relief
10	D. S.	F	Bilateral maxil- lary and eth- moidal sinusitis	Improvement noted with each injection
11	L. K.	M	11 9, 11, 1936	Acute rhinitis Bilateral eth- moiditis	Marked improve- ment
12	P. S.	F	11 10, 15, 12 7, 1936 3 31, 1937	Bilateral eth- moiditis	Marked improve- ment
13	W. H.	M	4 20, 1937	Acute cold	Complete relief
14	R. R.	F	4 27, 1937	Bilateral eth- moiditis	Moderate im- provement
15	F. G.	F	4 27, 1937	Bilateral eth- moiditis	Marked improve- ment
16	D. D. D.	M	4 28, 1937	Acute rhinitis	Marked improve- ment
17	M. B.	F	5 3, 7, 1937	Bilateral eth- moiditis	Marked improve- ment
18	L. L. M.	M	5 10, 1937	Acute rhinitis	Complete relief
19	G. B.	F	3 1, 16, 4 6, 1937	Acute cold	Complete relief
20	H. C.	F	3 20, 21, 1937	Bilateral maxillary sinusitis	Marked improve- ment
21	R. M.	F	3 21, 1937	Acute cold	Complete relief

TABLE II—(Continued)

Case #	Patient	Sex	Date	Diagnosis	Comment
22	J. O'D.	M	3 20, 1937	Acute cold	Complete relief
23	J. N.	M	3 23, 24, 31, 1937	Bilateral maxillary sinusitis	Marked improvement
24	E. S.	F	3 25, 1937	Acute cold	Complete relief
25	R. G.	F	3 28, 1937	Acute cold	Complete relief
26	A. S.	M	10 21, 25, 11 13, 12 21, 1936; 1/15, 29, 2 24, 25, 1937	Acute rhinitis; deflected septum, ethmoid, polypoid	Marked improvement
27	C. R.	F	10 22, 11 12, 1936	Acute rhinitis	Completely relieved
28	H. R.	M	10 23, 26, 11 27, 30, 1936; 1/8, 18, 22, 29, 2 24, 1937	Acute rhinitis Bilateral maxillary ethmoidal sinusitis	Acute symptoms relieved; sinusitis improved
29	N. K.	F	10 30, 11 2, 4, 6, 11, 12 19, 1936	Vasomotor rhinitis, severe	Marked improvement
30	E. J.	F	11 2, 9, 13, 17, 1936	Bilateral ethmoiditis	Marked improvement
31	S. W.	F	11 2, 1936	Acute cold	Complete relief
32	W. J. R.	M	11 3, 9, 23, 1936	Acute rhinitis Bilateral ethmoiditis	Marked improvement
33	A. S.	F	11 3, 9, 11, 14, 1936	Deflected septum Bilateral ethmoiditis	Marked improvement
34	S. T.	F	10 29, 11 3, 10, 25, 1936	Bilateral ethmoiditis; sphenopalatine ganglion neuralgia	Marked improvement
35	G. F.	M	11 4, 1936	Acute cold	Complete relief
36	A. G.	M	11 4, 1936	Acute rhinitis	Complete relief
37	S. R.	M	10 16, 1936	Acute rhinitis	Relieved completely
38	S. H.	M	10 15, 23, 26, 1936; 1 8, 3 10, 12, 1937	Acute rhinitis Bilateral ethmoiditis	Relieved completely

TABLE II—(Continued)

Case #	Patient	Sex	Date	Diagnosis	Comment
39	E. L.	M	10 20, 1936	Acute rhinitis Left ethmoiditis	Marked improvement
40	T. C.	F	10 20, 23, 27, 11/9, 17, 12 9, 14, 21, 1936; 1 5, 8, 1937	Bilateral ethmoiditis	Marked improvement
41	L. A.	F	10 20, 23, 26, 11/7, 12 11, 1936; 2/27, 1937	Acute rhinitis, deviated septum, bilateral ethmoiditis	Relieved of acute attacks. Sinusitis improved
42	F. R.	F	10 10, 21, 1936	Acute rhinitis	Relieved completely
43	A. C.	M	10 21, 24, 26, 11/6, 9, 11, 12, 1936	Acute rhinitis Bilateral ethmoiditis	Marked improvement
44	F. S.	M	10/21, 25, 28, 12/14, 1936; 1/27, 3/10, 12, 4 7, 1937	Acute rhinitis, left pan-sinusitis; left radical pansinus operation 4 yrs. ago	Marked improvement
45	J. E.	M	10 21, 1936	Acute rhinitis	Relieved completely
46	E. E.	F	10 21, 28, 11 4, 1936	Acute rhinitis Bilateral ethmoiditis	Completely relieved
47	L. C.	F	10 22, 26, 29, 11 23, 27, 1936	Acute rhinitis Bilateral ethmoiditis	Relieved completely
48	J. W.	M	11 9, 12, 1936	Acute rhinitis	Marked improvement
49	A. F.	F	10 23, 26, 11 17, 23, 1936	Acute rhinitis; nasal allergy	Marked improvement
50	A. K.	F	10 26, 1936	Acute rhinitis Bilateral ethmoiditis; left sphenoiditis	Marked relief
51	B. S.	F	10 26, 1936	Acute rhinitis	Completely relieved
52	L. S.	F	10 26, 1936	Acute rhinitis; right maxillary sinusitis, old radical operation	Marked improvement

TABLE II—(Continued)

Case #	Patient	Sex	Date	Diagnosis	Comment
73	G. N.	M	4 24, 1937	Bilateral ethmoiditis	Complete relief
74	E. H.	F	4 26, 29, 1937	Acute cold	Complete relief
75	J. F.	M	8 18, 1937	Allergic rhinitis	Marked improvement
76	A. B.	F	8/18, 1937	Acute otitis, grippe type Acute rhinitis	Improved. No paracentesis
77	M. R.	F	6/25, 28, 1937	Acute rhinitis	Complete relief
78	J. B.	M	10 28, 1937	Acute cold	Complete relief
79	A. S.	M	7 8, 13, 8 16, 1937	Nasal allergy; Bilat. maxillary and ethmoidal sinusitis	Marked improvement
80	B. L.	F	7 12, 16, 1937	Acute rhinitis and bronchitis	Marked improvement
81	I. L.	F	7 17, 8 9, 25, 9 16, 20, 24, 27, 10 1, 3, 7, 15, 18, 19, 1937	Bilateral ethmoiditis	Moderately improved
82	L. S.	F	7 17, 23, 8 4, 6, 13, 20, 9 8, 12, 28, 1937	Bilateral ethmoiditis	Marked improvement
83	L. I.	M	4/9, 1937	Allergic rhinitis	Marked improvement
84	A. C.	F	4 10, 1937	Bilateral ethmoiditis	Marked improvement
85	S. F.	M	4 1, 19, 1937	Acute cold, post-nasal drip	Marked improvement
86	R. L.	F	4 5, 17, 1937	Bilateral ethmoiditis. Sinusitis	Moderately improved
87	F. W.	F	11 7, 1936	Acute cold	Complete relief
88	L. S.	M	11 7, 9, 1936	Acute cold	Complete relief
89	M. R.	M	11 7, 1936	Acute cold	Complete relief
90	O. F.	M	10 28, 1036	Acute rhinitis	Complete relief
91	I. B.	F	10 28, 11 6, 16, 1936	Deviated septum. Bilateral ethmoiditis; acute rhinitis	Marked improvement

TABLE II—(Continued)

Case #	Patient	Sex	Date	Diagnosis	Comment
92	R. T.	M	10 28, 11 2, 16, 1936	Sinusitis; bilateral maxillary sinusitis. Asthma	Marked improvement in asthma and sinusitis
93	C. N.	M	10 30, 1936	Acute rhinitis	Completely relieved
94	C. A.	M	10 30, 1936	Acute rhinitis	Completely relieved
95	A. M.	M	10 31, 11 7, 21, 1936	Allergic vasomotor rhinitis	Marked improvement
96	R. M.	F	11 1, 9, 19, 12 2, 20, 1936; 1 5, 10, 15, 2 19, 25, 3 16, 1937	Post-nasal drip Bilateral ethmoiditis	Marked improvement
97	D. K.	F	10 14, 20, 11/2, 9, 1936	Allergic rhinitis. Polypoid pansinusitis. Deflected septum	Allergy improved greatly. Sinusitis recurred. Radical operation
98	N. G.	F	7 16, 9 27, 10 25, 1937	Bilateral maxillary sinusitis. Severe asthma, nasal allergy	Asthma completely relieved. Sinusitis markedly improved
99	J. S.	F	6 28, 7 14, 10 20, 23, 1937	Bilateral maxillary ethmoid sinusitis. Severe asthma, nasal allergy	Asthma markedly improved. Sinusitis markedly improved
100	J. G.	M	8 1, 21, 24, 31, 9 1, 3, 16, 25, 10 2, 9, 16, 25, 30, 1937	Bilateral ethmoiditis. Nasal allergy. Asthma	Asthma completely relieved. Nasal allergy relieved. Sinusitis markedly improved.

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