

Dietary Calcium: a low priority in treatment of essential hypertension by Toronto family practitioners

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A sample of Toronto family practitioners was surveyed in order to ascertain whether increased dietary calcium was recommended in the treatment of essential hypertension. It was found that in excess of four-fifths of the same make no dietary calcium recommendations. It was concluded that this was the result of one or more of the following: 1. the low priority granted to nutrition in medical schools and continuing education courses contributes to a lack of awareness of nutritional therapies; 2. the relatively small body of literature pertaining to calcium and hypertension in contrast to the large volume of publications concerning drug therapies may contribute to a lack of familiarity with the research into calcium and hypertension; 3. the fact that the data to date have not established a definite causal relationship between low dietary calcium and hypertension may contribute to a lack of conviction as to the efficacy of increased dietary calcium as a treatment.

KEY WORDS: calcium, hypertension, chiropractic

Une étude a été faite sur un échantillon de médecins de famille de Toronto, afin de s'assurer si l'absorption de calcium diététique supplémentaire était recommandée dans le traitement de l'hypertension essentielle. On a pu constater que plus que quatre-cinquièmes des médecins consultés, ne recommandent pas de calcium diététique supplémentaire. On en a conclu que cela est le résultat de l'un ou plusieurs des facteurs suivants: 1. La faible priorité accordée envers la nutrition dans les écoles médicales et l'enseignement complémentaire, contribue au manque d'information sur les thérapies par nutrition. 2. La quantité restreinte de documentation concernant le calcium et l'hypertension par rapport à la quantité de publications traitant sur la thérapie par l'usage de produits pharmaceutiques, pourrait contribuer au manque de familiarisation dans la recherche du calcium et l'hypertension. 3. Du fait que les données jusqu'à présent n'ont pas établis de relations de cause à effet entre un faible taux de calcium diététique et l'hypertension, peut entraîner un manque de conviction en ce qui concerne l'efficacité du calcium diététique supplémentaire comme traitement.

MOTS CLÉS: calcium, hypertension, chiropractique

Introduction

Recently a small body of evidence has been accumulating which suggests that dietary calcium may, by some unknown mechanism(s), play an important role in preventing and possibly reducing essential hypertension. Various epidemiological studies have observed an inverse relationship between dietary calcium ingestion and blood pressure levels. McCarron et al (1984)¹, through extensive analyses of the Health and Nutrition Examination Survey I (Hanes I), and McCarron et al (1982)² in a pilot case-control study, have demonstrated a lower dietary intake of calcium in persons with high blood pressure. Ackley et al (1983)³ concluded from a survey analysis that calcium seemed the most likely component of dairy products which provided a protective effect against hypertension amongst males in an adult, predominately white, upper middle class community in southern California. Langford and Watson (1973)⁴ noted that, in a study of one hundred black females, those whose systolic pressure exceeds 125mm Hg ingested less calcium than those whose systolic pressure was 105mm Hg or less. Langford et al (1968)⁵ and McCarron et al (1982)² have suggested that a lower level of dietary calcium exposure may even be a predictor of the development of essential hypertension.

Laboratory and limited human experiments would seem to support these epidemiological data. In laboratory experiments, McCarron states that modification of calcium intake in several species of rats has been reported to alter blood pressure. McCarron

(1983)⁶, Ayachi (1979)⁷ and McCarron et al (1982)² demonstrated that decreasing the calcium intake could increase the blood pressure of the spontaneously hypertensive rat (SHR). McCarron (1982)⁸ repeated this demonstration on the Wistar-Kyoto rat (WKY), the normotensive genetic control for the SHR, suggesting that the state of calcium balance in these experimental models is a possibly important determinant of blood pressure regulation. Belizan et al (1983)⁹ established a correlation between a lowered diastolic blood pressure and calcium supplementation in two randomized clinical trials involving normal pregnant women and in a group of young people.

Although no definitive causal relationship is established by these data, there is a strong suggestion that "adequate" dietary calcium may prevent and possibly reduce hypertension. Allen (1982)¹⁰ raises doubt as to what the recommended calcium intake should be, dismissing the assumption that calcium absorption will adjust to lowered calcium intake. McCarron (1983)⁶ states that there is less than 1% prevalence of hypertension associated with calcium ingestion in excess of one gram per day. Since, according to the Dairy Council Digest (1984)¹¹, a large portion of the U.S. population falls far short of the RDA for calcium, the question arises as to what recommendations physicians are making to their hypertensive patients with regard to calcium ingestion.

Materials and Methods

The 82 physicians listed in the yellow pages of the Toronto telephone book, who specifically designate themselves as being in general or family practice were mailed a brief letter and survey. They were asked to indicate whether they treated es-

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sential hypertension and what their ranges of systolic and diastolic readings were in defining the three categories – normotensive, borderline hypertensive and hypertensive. Although only data on calcium were required, the questionnaire asked for dietary recommendations on sodium, potassium and phosphorous as well. This was partly to disguise the specific interest in calcium and partly to determine whether recommendations concerning these minerals were being made, since all – especially sodium – have appeared in the recent literature as possibly being associated with hypertension.

Results

Forty surveys were returned representing a 48.8% response to the mailing and providing a sample of approximately 3.0% of all family physicians in Toronto.

Of the 40 surveys returned, two provided no information at all (one indicating that hypertension was not treated) and a third provided information only on the systolic and diastolic ranges defining the three categories – normotensive, borderline hypertensive and hypertensive. Table I summarizes the results of the remaining 37 surveys.

Discussion

From these data, it would appear that a minority of Toronto family practitioners include dietary calcium in their treatment of essential hypertension. Among those who do, their recommendations are about evenly divided between whether the increased calcium should come from dietary sources or supplement. Although it is not possible to know why so many do not include calcium in their treatment, it is tempting to speculate.

One possibility might stem from the historically low priority given nutrition in the medical school curriculae and postgraduate continuing education courses. Several authors have reported on the need for improvement in this area. A decade ago Flynn et al (1974)¹² recognized the importance of improving the physicians' knowledge on nutritional matters, but were

uncertain whether it should be undertaken at the medical school level or later during internship or residency training. In a symposium on teaching nutrition in medical schools chaired by Vitale and Hodges (1977)¹³, several authors reviewed the need for improved nutritional education at various levels in various specialties. Krause and Fox (1977)¹⁴ reported that only 22% of Nebraska Medical Association members indicated a willingness to participate in a survey on nutritional knowledge and attitudes. Interestingly, among the 22% who did participate, the poorest results were scored in questions relating to current concepts in diet therapy. From a survey among medical students, faculty, practicing physicians and nutritionists/dietitians, designed to rate nutritional concepts as to importance, Gautreau and Monsen (1979)¹⁵ made recommendations as to the design of medical school curricula for the inclusion of nutritional concepts. In spite of these and other earlier authors and their recommendations, Moore and Larsen (1983)¹⁶ were able to conclude from an extensive literature review that there are no well-established curricular guidelines for nutritional education in the residency programs for U.S. practitioners. However, they did report that a trend has developed to attempt to provide such education during residency training. And the trend continues. In Great Britain a task force has examined the status of nutrition in medical schools and post-graduate courses and has brought forth far-reaching recommendations in a report edited by Gray (1983)¹⁷.

Another possibility may well be the lack of awareness of the work that is being done with regard to calcium and hypertension. The data cited here represent a very small body of literature. When compared with the large volume of material being published under the headings, "hypertension" and "calcium", that pertaining to dietary calcium's role is miniscule. For example, in the Index Medicus (1983)¹⁸ there are 20 citations under the heading "Hypertension – Diet Therapy". None of these include the word calcium in the title. Those listed under "Hypertension – Drug Therapy" fill over 22 col-

Table I: CATION RECOMMENDATIONS MADE BY TORONTO FAMILY PRACTITIONERS IN TREATING HYPERTENSION

Cation	Recommendation and (number)	Mode of recommendation not indicated	Mode of recommendation by patient type								
			Diet				Supplement				
			H.T.	BdL.	H.T. & BdL.	N.I.	H.T.	BdL.	BdL.	N.I.	
Calcium	Increase (7)	1	2	0	1	0	0	1	0	0	2
Sodium	Decrease (37)	0	5	1	24	7	0	0	0	0	0
Magnesium	Increase (3)	0	1	0	1	0	0	0	0	0	1
Phosphorous	Increase (2)	0	0	1	0	1	0	0	0	0	0
Phosphorous	Decrease (1)	0	1	0	0	0	0	0	0	0	0

H.T. – Hypertension

BdL – Borderline

N.I. – Not Indicated as to patient type

umns of listings which would number close to 700 articles. In an off-line bibliographic citation list generated by MEDLARS II on the key words "calcium" and "hypertension" for the years 1982 and 1983, 149 articles are given. Of these, 76 pertain specifically to calcium blocking drugs, while 21 do pursue the relationship of serum calcium to hypertension. Most of the latter discuss experimental findings in the SHR. With such a sparsity of clinically significant findings on the role of dietary calcium and such an abundance of literature available on drug research, plus the heavy advertising and promotion by the pharmaceutical manufacturers, it is not unreasonable to assume that lack of awareness is a contributing factor. Interestingly, two comments were added to separate surveys which confirm some truth to this assumption: "I am not aware from my readings that these elements (Ca, Mg, Pi) have been linked to hypertension"; and, "No known relevance".

Also, among those who may be aware, it is possible that there is a lack of conviction as to the efficacy of dietary calcium therapy. As has been indicated, most data, however convincing, neither prove a causal relationship nor present more than theories as to the possible mechanism of action. In this regard the 1984 Report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure¹⁹ makes no specific therapeutic recommendations regarding calcium, potassium and magnesium because, in their view, the evidence of a relationship between these cations and hypertension is not convincing. Thus, it may well be that the more conservative practitioner who is aware of the work being done in this field is proceeding cautiously. Three comments added to separate surveys would support this hypothesis: "Although I have seen articles on the relationship of Ca to BP, I have not yet put these theories into practice"; and, "No recommendations at present"; and, "Inconclusive evidence. Do not recommend".

With regard to the seven respondents who do advocate increased dietary calcium, it is interesting to note that four of these included the dietary recommendations for magnesium and phosphorous. It is possible that these might represent the small group of nutritionally aware physicians one might expect to find in any sample. Certainly one would expect nutritionally aware physicians to recommend calcium even though the evidence may be only suggestive, on the basis of the more favourable benefit-to-risk ratio vis à vis drug therapy.

Two interesting incidental observations were made by this survey: the almost universal recommendation to reduce salt intake and the wide disparity in systolic/diastolic readings which define hypertension.

All 37 of the respondents who made dietary recommendations indicated that they counselled a reduction of sodium in hypertensives while 25 of these extended this to borderline hypertensives. This would agree with Engstrom (1983)²⁰ who found that the first nutrient many physicians limit when treating their patients' hypertension is sodium. He proceeds to caution, as does McCarron (1983)⁶, that diets restricting sodium may inadvertently reduce calcium as well because many of the foods

which are high in sodium are high sources of calcium as well. Thus, in accordance with the dietary calcium hypothesis, such restriction would have unintended negative effects on the hypertensive patient. The JNC Report(1984)¹⁹ which acknowledges that only certain patients may respond, recommends restriction to approximately two grams of sodium per day, and advises that there is no hazard involved in such moderate restriction of sodium. This would appear to be the philosophy of Toronto family practitioners. However, one respondent, who indicated that sodium was restricted in both the borderline and hypertensive patient, commented: "Recently shown to be ineffective".

As shown in Table II, the BP readings used to define hypertension show a wide variation. The number of responses was higher for diastolic readings because four physicians indicated that they used only diastolic pressure in diagnosis. Also, four respondents stated that their readings varied with age. These findings are in agreement with Dunn et al (1984)²¹ who concluded that there is no general agreement among Toronto family practitioners on the systolic and diastolic pressures at which hypertension should be diagnosed and treated.

Table II: AVERAGE BLOOD PRESSURES AT WHICH TORONTO FAMILY PRACTITIONERS DIAGNOSED HYPERTENSION

Blood pressure (mm Hg)			
Systolic			
No. of Responses	Mode	Mean	Extremes
33	150	154	130; 165
Diastolic			
38	95	95	85; 105

Summary

In summary, this manuscript has examined the relationship between dietary calcium and essential hypertension and has reported on a survey of a sample of Toronto family practitioners with regard to whether increased dietary calcium was recommended in the treatment of essential hypertension. It has also suggested three possible theories as to why less than 20% of the survey respondents made any dietary calcium recommendations to patients being treated by them for essential hypertension.

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