

From The Medical Clinic II (Allergy Department), S:t Görans Hospital,
Stockholm, Sweden. (Head: Helge Colldahl, M.D.).

ALLERGY AND CERTAIN DISEASES IN RELATION TO THE DIGESTIVE TRACT

Some Observations on the Effect of Elimination Diets

By

HELGE COLLAHL

In many allergic or possibly allergic diseases one does not know the offending antigen. In asthma, according to experience in our department, it is possible to show an allergen that can provoke asthma in only about 25 per cent of the cases (Colldahl 1952, 1959, Colldahl *et al.* 1964).

For several years I have tried elimination diets, along the lines laid down specially by Rowe, on patients where the presence of some undefined or unknown allergic factor was suspected.

This was done in order to investigate if food allergy could possibly be a factor of importance in such cases. Food allergy is one of the most controversial subjects in allergy. Most authors consider food allergy to be of minor importance.

Rowe (1944 and 1963) emphasizes that since skin tests are usually negative or slight in degree in chronic food allergy, trial diets must nearly always be used to study its possibility.

Tuft (1955) however, found that the incidence of positive skin test reactions to commonly eaten foods is definitely and significantly higher in an allergic than in a control group, whereas with foods not commonly eaten, the difference is not statistically significant.

Rinkel (1951) prescribes a very restricted diet consisting

of only a few foods to be followed for 4 days. Then, using special food tests, he proceeds with a careful study with the object of identifying the offending foods.

According to *Criep* (1962) the incidence of food allergy is probably greater than we realize. In some instances, allergy develops from over-indulgence in certain types of food. For this reason the most frequent causes of food allergy may be the common foods.

During the course of this investigation some observations have been made that indicate that an elimination diet can cause a change in the condition of the patient not only by taking away an offending antigen but possibly also by causing a change in the digestive tract.

A large number of patients have been studied. In this paper a detailed description is given of the way in which 4 patients of special interest responded to elimination diets, but the observations made in connection with other patients have also been referred to.

Elimination Diet.

This consisted of meat (beef) :

potatoes	salt
tapioca	sugar
green beans	tea
green peas	calcium salts
carrots	vitamins
soya oil	

Fruits, particularly blueberries, were added later. Milk, milk products and rye were added last.

Only one item of food was added at a time. If no improvement occurred with the original diet this was changed, in order to arrive at a diet that was the best possible one for the patient

CASE REPORTS

A. M. Housewife, born Sept. 21 1895. *Diagnosis:* Angio-oedema. She has 2 sisters who when they were young had urticaria after eating strawberries and shell-fish. The patient has two sons, one of them had prurigo Besnier as a child

1960.

Month	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
June	↓	↓		↓		↓		↓		↓		↓		↓		
	F.	L.N.G.				L.N.G.J.T.		G.J.						L.F.N.Lu.G.		
July		↓		↓		↓		↓		↓		↓		↓		
		L.G.J.N.		L.N.G.J.		L.F.N.G.J.		L.N.G.J.						F.G.J.		
Aug.	↓	↓		↓		↓		↓		↓		↓		↓		
	Lu.G.J.	L.F.N.G.J.		B(L)		L.Tr.N.G.J.		A.		G.J.				L.F.N.		
Sept.		↓		↓		↓		↓		↓		↓		↓		
		G.J.		F.Lu.G.J.		L.N.		G.J.								
Oct.														↓		
														L.G.J.N.F.		
Nov.				↓		↓		↓		↓		↓		↓		
				G.J.		G.J.		L.G.J.N.Lu		L.N.Lu				F.		
Dec.	↓		↓	↓		↓		↓		↓		↓		↓		
	L.N.Lu		L.N.Lu		L.N.F.			L.N.Ba.						G.J.		

F. = Face.
 N. = Neck.
 L. = Larynx.
 G.J. = Gastrointes-
 -tinal tract.
 T. = Thigh.
 Lu. = Lungs.
 B. = Breast.
 Tr. = Tongue.
 A. = Arm.
 Ba. = Back.
 Sh. = Shoulder.
 Tr. = Trunk.
 Tomy = Tracheo-
 -tomy.

A.M. ♀ 95.09.21.

Diagnosis. Urticaria and Angioedema

Fig. 1.

1961

Jan.	F.	L.GJ.Sh(U).N.	GJ.Tr.	GJ.	GJ.
Feb.	GJ.	GJ.	L.F.To.N.	L.N.	GJ.
June	GJ.			L.N.	L.F.N.
July	GJ.F.	GJ.	GJ.	GJ.	GJ.L.To.N.
Aug.	GJ.F.	GJ.	GJ.		
Sept.					
Oct.					
Nov.	L.F.N.T-omy.				
Dec.					

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Diagnosis: Urticaria and Angioedema

Fig. 2.

and has now pollen rhinitis and pollen asthma. The other son has headaches of the migraine type.

Since 1951 the patient has been on a special diet consisting of milk and vegetables.

Menopause at 54 years of age.

In February 1960 the patient had oedema Quincke round the waist for the first time, together with stomach pains and vomiting. Subsequently attacks of urticaria occurred in feet, arm, neck and face almost weekly. Sometimes there were no attacks for 3 weeks. Fig. 1 and 2 show the times for and localizations of the attacks. The day before the attack only a very small quantity of urine was passed.

The patient often had "cystitis" in connection with attacks of Quincke oedema.

Tooth infection 1960. One tooth was extracted in July 1960. This did not change the course of the disease.

Previous treatment: At the beginning of each attack the patient had to take steroid preparations i.m.

Provoking agents observed by the patient: Only bee stings.

The patient had to be tracheotomized in November 1961. In December 1961 she was admitted to our department for allergological examination.

General condition good. Bloodpressure 160/100. Heart and lungs: Normal auscultation findings. Ecg was generally normal but showed on some occasions auricular fibrillation. BSR: 21/1 hour. HB: 77 per cent. RBC: 3.8 millions. WBC: 4.600. Diff. count N: 55, E: 4, L: 36, M: 5.

Intradermal test for allergy: Small positive reactions to cereals, molds and dust.

X-ray teeth: No apical change. X-ray nose sinuses, lungs, gallbladder and stomach: Normal findings.

Gynecological examination: Normal findings.

The following elimination diet was given on 5/12 1961: Meat, potatoes, green beans, peas and carrots. One item of food was then added at a time at intervals of 1-2 weeks.

Between January-June 1962 the patient was put on full diet and no development of any urticaria or any Quincke oedema was observed. The elimination diet has caused a change in the patient's condition. We still do not know the reason for this.

H. O. male, school master, born Apr. 26, 1900. *Diagnosis:* Bronchial asthma. Bronchial asthma since 1958. 1960 Hyperthyreoiditis. Treated with I¹³¹. 1961 Glaucoma (Medical therapy successful).

Treated at Medical Clinic II, S:t Görans Hospital, several times since 1961 for bronchial asthma, and 1962 also for heart failure and in 1963 for intestinal hemorrhage.

General condition: (28.12.1961) Dyspnoic, but only slight breathing difficulties. Blood pressure 160/90. By auscultation ronchi. Ecg normal. BSR 3mm/1

hour. HB 90. RBC 4.2 millions. WBC 5000. Diff. count. N: 59. E: 4. B-: Ly: 32. M: 4.

X-ray chest: Normal. Vital capacity 2.0-2.5 l.

Intradermal and epidermal tests for allergy: Negative.

Elimination diet was started on 23/1 1962: Meat, potatoes, vegetables, soya oil, vitamins, calcium. On the following days the following foods were added:

9/2 1962	rice, buillon
21/2 1962	cabbage
7/3 1962	blueberries
28/3 1962	milk. After 10 minutes asthma for $\frac{1}{2}$ hour. Milk was not given in the diet following this.
17/4 1962	wheat
27/4 1962	rye, Vitaquel (vegetable butter)
22/5 1962	chicken

During the Autumn of 1962 the asthma became worse owing to heart failure.

X-ray heart 19/11 1962: Total volume 1400 ml

X-ray heart 29/11 1962: Total volume 1260 ml

X-ray heart 10/12 1962: Total volume 1140 ml

30/11 1962 venous pressure 15 cm H₂O

10/12 1962 venous pressure 6 cm H₂O

23/11 1963 in the morning the patient had melaena. The stool was black and also contained some red blood. *X-ray*: The gastric mucosa was swollen. No ulcer or infiltration in the wall. Diverticula in colon. *Proctoscopy*: Normal findings.

This patient had asthma 10-30 minutes after drinking milk. After taking 3 glasses of milk the asthma was so severe that aminophylline had to be given. He also had asthma from yoghurt, whey, whey-cheese but not from cream.

During the test meals (Table 1) the patient had in an almost symptom free state to take 100-500 grams of different milk fractions. Casein and milk fat did not provoke any symptoms. Other milk proteins than casein seem the most likely antigens responsible for the symptoms. This is in agreement with results published by *Ratner & Gruehl*. According to these authors the albumin fraction of milk seems to be most important antigenically. Cheese, prepared from casein, the principal protein of milk, may contain small quantities of albumin.

Milk (as seen from Table 1) with an exceptionally low bacteria content (produced in a farm of specially high standard) also caused asthma in this patient. The symptoms caused by this milk were less severe than those provoked by ordinary milk. Further studies will show if the bacteria in the milk can be of some importance for provoking asthma symptoms.

TABLE 1

	<i>Asthma</i>	<i>Date</i>
Ordinary milk	++	10. 4. 1962
Whey-cheese	++	20. 5. 1962
Whey-cheese	+	22. 5. 1962
Milk with specially low bacteria content	+	29. 5. 1962
Cream	—	30. 5. 1962
Casein fraction	+	1. 6. 1962
Whey-proteins	+	4. 6. 1962
Ordinary milk	++	5. 6. 1962
Curdled milk	+	8. 6. 1962
Yoghourt	++	12. 6. 1962
Keso (cottage cheese, containing mainly casein)	—	13. 6. 1962

An elimination diet and provocation tests show that whole milk and certain milk products cause asthma.

The patient has been on a milk free and egg free diet since 1962. His condition has improved and he is able to carry most of his half-time work at school. Neither ACTH nor steroids were necessary. During 1960-1961 his asthma prevented him from working at all.

I. B. Female. Office clerk, born Aug. 8, 1909. *Diagnosis:* Hypertension + Migraine. Grandmother had migraine. Some relatives have had eczema. 1948 the patient had hypertension, adiposity, oligomenorrhea and hirsutism. She was treated by pituitary irradiation with good results.

Nephropathia in connection with scarlet fever 1950.

In 1960 the patient had headaches, dizziness and fatigue.

Blood-pressure 230/160. Sometimes difficulty to move her right hand and leg. She was treated with Reserpine alkaloids and diuretics without much effect.

In the end of 1961 more headaches. The headaches could be provoked by chocolate. Sometimes the patient had a visual form of aura, numbness and tingling in her right arm and leg. At the end of the attack the patient often had vomiting.

Readmitted in December 1961.

General condition: Tolerably good (13/12 1961).

Heart and lungs: Normal auscultation findings. Blood pressure changed from day to day between 210/130-150/90 and was 155/120 (14/12 1961), 210/130 (21/12 1961) and 175/100 (29/12 1961). HB 97. RBC 4.3 millions. WBC 5,900. Diff. count N: 56, E: 2, L: 34, M: 3. BSR 15. Ecg normal. Bodyweight 75,5 kgs (28/12 1961) and 71,5 kgs (7/3 1962).

Endocrinological examination gave the following results:

Thyroid and Adrenal function normal.

Epinephrine and Norepinephrine in urine normal.

Renal function normal. Retinal changes present (Fundus hypertonicus I-II).

Intradermal testing for allergy showed positive reactions to rape pollen, dusts and cow epithelium.

An elimination diet was started on December 29th 1961. It consisted of meat potatoes, tapioca and vegetables. Fruits were added later. After about 14 days the headaches had almost disappeared but the blood pressure was still elevated. Since March 1962 she has been taking Ismelin (Guanethidin bisulfas), 10 mgs $\times$ 3 and since June 1962 Flutra (Trichlormethiazid), 2 mgs $\times$ 1.

Her blood pressure is now about normal (150/100).

Since starting the diet the headaches, the numbness and cramp in the right side of the body have disappeared. She can work full time, is very satisfied and never complains about having to follow the diet strictly. No attempt has therefore been made to return her to full diet.

E. S. Housewife, born Jan. 4, 1925. 4 children. *Diagnosis:* Ulcerative Colitis. All the children have had Prurigo Besnier. One son has pollinosis.

Healthy till 1948. Since then she has had intermittent colitis with diarrhea with blood and mucous in the stools. Sometimes several years between the bouts.

She relapsed in Autumn 1961, and was admitted in January 1962.

General condition tolerably good (17/1 1962). Very thin. Heart and lungs: Normal auscultation findings. Abdomen: Not very tender. Soft. Erythema nodosum on the legs.

18/1 1962 HB 62. RBC 3.5 millions. WBC 4.700. Diff. count. N 73, E 3, L 21, M 3. BSR 116/1 hour (18/1 1962), 33/1 hour (27/3 1962) Bodyweight 41.4 kgs (20/1 1962), 49.0 kgs (3/9 1964).

X-ray shows ulcerative colitis in the whole of colon.

Proctoscopy showed small ulcerations.

Intradermal test for allergy: Negative.

• Elimination diet was given 18/1 1962. (Meat, potatoes, tapioca, tea). The patient felt better by the end of January. Rice was tried on 6th of February, but had to be abandoned as the abdominal symptoms became worse.

Salazopyrin (Salazo-sulfapyridine) was given on the 9th of February but as the patient did not feel well it had to be discontinued on 13th February. Azudimidine (Salazo-sulfadimidine) was tried on 20th of February. In the beginning of March the number of stools diminished and the blood in them disappeared completely. In March the Erythema nodosum nodules also disappeared. Milk, wheat and fruits have been added to the diet. Rice and vegetables are excluded. Only a little bread has been given. She was symptom free till May 1964. At this time she cut down her azudimidine dose to 1 tablet a day and started, as she was travelling, to eat more bread than before. In July she had another bout of her disease. With a more restricted diet (no bread was given) and a higher dose of azudimidine (4 tablets a day) she became almost symptom free again.

This patient does not tolerate vegetables and rice. When on an elimination

diet she quickly became better. In order for her to become symptom free Azu-dimidine had also to be given. A combination of elimination diet and sulpha drugs has been of special value. No steroid hormones or ATCH have had to be given.

RESULTS AND DISCUSSION

A study of the effect of elimination diets has been performed. A description is given in the way in which 4 patients of special interest responded to these diets, though the observations made of the other patients have also been referred to.

An allergic condition can be stopped by an elimination diet. If items of food are added one by one a full diet can sometimes be given without the reappearance of any allergic symptoms. The possibility exists that in such cases it is not the food itself that contains the offending agent, but that some change provoked by the elimination diet has occurred in the intestinal tract and that this change remains even when full diet is resumed.

Certain foods or food substances may provoke symptoms every time they are given. In these cases an elimination diet must be given for a long time.

In ulcerative colitis a combination of elimination diet and a suitable sulpha preparation can give good clinical results. In many cases no steroids have to be given. The more suitable the diet the less need for ACTH and steroids. Where possible it is important that no steroids are given when the elimination diet is tested out.

Most patients that are on the strict elimination diet used here have a strong desire for bread, butter and milk. But there are some who feel so much better when eating a strict cereal and milk free elimination diet that they are quite satisfied.

From the investigations made it would seem that elimination diets ought to be given more importance than previously in the treatment of allergy and allied conditions.

It is not always clear how the elimination diets work. In some cases an allergenic food is evidently cut out of the pa-

tient's diet but in other cases the reason is not known with certainty. As is mentioned above the possibility exists that the changed diet brings about a change in the contents of the intestinal tract. In the first place one thinks of a change in the intestinal flora, with such a change persisting even when full diet is resumed.

Treatment by means of elimination diets seems to be sufficiently important to justify further investigation with a view to ascertaining all possible effects such diets may have.

SUMMARY

Some observations on the effect of elimination diets have been made in patients with diseases where allergy may be of importance. In this paper 4 patients are described in detail. These patients had angio-oedema, bronchial asthma, migraine and ulcerative colitis. The observations made in connection with other patients have also been referred to.

The observations made indicate that elimination diets can be of great value for such patients and that an elimination diet may bring about a change in the patients' conditions not only by the elimination of an offending antigen but probably also by causing a change in the digestive tract. This latter change may remain even after a full diet has been resumed. These problems will be further investigated.

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