RECURRENT VESICULAR ERUPTION OF THE HANDS DUE TO FOOD ALLERGY*

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In a previous communication (1) we reported a number of cases of eczematoid dermatitis in which it was thought that a sensitivity to certain foods played a definite role. This report embraced a variety of morphological types of dermatitis, but a large percentage of our cases fell into the group of annoying and resistant recurrent vesicular dermatitis of the hands. Since our return to civil practice we have continued to encounter a considerable number of patients with dermatitis of the hands in which food allergy apparently plays a predominant role. Such cases have been observed with equal frequency in Southeastern United States, India and Philadelphia. The clinical picture as seen in these patients is the usual one of recalcitrant vesicular eruption of the hands, with deep vesicles, patches of eczematous dermatitis, and varying degrees of secondary pyogenic infection. Pruritus is an outstanding feature.

The number of papers on the problem of recurrent vesicular dermatitis of the hands is large and the theories as to the etiology of such eruptions are numerous, and sometimes confusing. Space will permit citation only of those papers which deal in some respect with the relation of food allergy to the problem.

In 1912 Buckely (2) in a general article on the role of diet and skin disease discussed his own case of recurrent vesicular eruption of the hands. He reported that the dermatitis cleared when he restricted his diet to boiled rice, butter and water for five days and on resumption of his regular diet the eruption recurred.

In a discussion of a paper presented by Lehman (3), Wise mentioned two patients in whom a vesicular eruption of the hands resulted from eating oranges, and in 1936 he (4) again reported two patients in whom orange juice provoked vesicular lesions resembling sago grains on the palms and fingers. In the discussion of the paper by Andrews (5) on recalcitrant pustular eruption of the palms and soles, Engman Jr., remarked that in similar cases he was unable to produce any lasting improvement with the usual topical applications and roentgen therapy. However, he stated, he was able to control some of them with a diet eliminating entirely all "animal food." In the same discussion Lane cited the case of a young physician with a vesicular eruption of the hands who volunteered the information that eggs had some effect in his particular case.

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Lane followed this suggestion in two other patients and felt that ingestion of eggs, had something to do with the disorder.

Stokes et al. (6) mentioned the importance of food allergies in dermatitis of the hands suggesting "proceeding promptly, when signs of extension ("id") or sudden acuteness develop, to clear the intestinal tract of allergens and infection with one or two ounces of castor oil (anti-allergenic action of ricinoleates) and then after a day on water and a day on milk to add one simple food each day, which if no reaction in hand or food ensues, will with successive additions form collectively in a reasonable time a basal non-allergic diet." He further points out "if important or even merely suspected food allergens are identified they should be excluded six months to two years, regardless of the allergist's disposition to minimize weak positives".

In other papers (7) on vesicular eruptions of the hands, food allergy is listed as one of the many causative agents. Rowe (8) mentioned dermatitis of the hands (eczema) due to food allergy, but to date this paper has not been published.

The methods we used in determining food allergies are discussed in detail in a previous article (1). Except for case #30[1] (chocolate found to be the offending food after keeping a food diary for ten days) all these cases were tested by the strict trial diet. The following is essentially the program that was followed and is in principle similar to that proposed by Brown (9) in the management of asthma.

1. The purpose of the experiment, the method of application of the diet, and the evaluation of reactions are explained to the patient; the responsibility of adhering to the diet is transferred to him.

2. The patient is allowed nothing by mouth for 24 hours except water to which a little sugar may be added. Castor oil, 45 cc. is given if there has been a recent flare-up as evidenced by new vesicles.

3. After the first 24 hours there is usually improvement in the dermatitis, less itching, and few or no new vesicles. The patient is then allowed to have his first food. In this series of cases potato was used as the first food, but recent experience indicates that potato is a frequent cause of reaction. Milk was formerly used as the first food but likewise produced too many reactions to warrant its use early in the diet. At the present time beef is allowed as the initial food. On this day the patient receives only the selected food and water.

4. On the third day the hands are inspected for evidence of a flare-up. This will be indicated by: (a) increase in itching coming on two to eight hours after the ingestion of the food; (b) erythema at the sites of dermatitis; (c) new vesicle formation and (d) oozing if the reaction is severe. It is important to be able to identify new vesicles from old ones, and after a little practice this is easily done. The new vesicles are in various stages of development especially in regard to size; the vesicle wall is usually taut and translucent, and the fluid is clear. New vesicles have a zone of erythema which fades in 12 to 36 hours; then the tops become brown or yellow in color and the tenseness of the vesicle is lost. They usually appear at or adjacent to the site of involvement but new patches may

[1] Listed in Table 1.

develop at any time, especially with a severe reaction. Oozing usually occurs only with severe reactions. If none of these signs appear it is safe to assume that the patient has had no reaction and that an additional food may be allowed.

5. The hands are inspected daily and as long as no flare-up occurs, a new food is added each day. When a reaction does occur the time of onset and severity are noted and the last added food is discontinued. Our experience thus far in patients in the hospital indicates that it is best to add the food at the noon day meal and repeat it for the evening meal. The hands are then inspected between 10 and 11 A.M. on the following day and, if no reaction is present, a new food is ordered to be given at the noon day meal. The patients are instructed that if they have had a reaction during the night, they should not eat the last added food again even though it appears on the breakfast tray. The patient keeps an accurate list of the foods of each meal and the new food for the day is indicated by underlining.

6. When there is a questionable reaction, the food is either continued for one more day without the addition of a new food, or discontinued, at least temporarily. If this occurs early in the testing, the food is usually discontinued, but if the patient has already been tested to 15–20 foods, and the diet is quite adequate, the questionable food is allowed for one more day; if it is an offender, evidence of a reaction will usually be present the following day.

7. After the ingestion of some foods the reaction will be severe and will require two to four days for the flare-up to subside. During this period of reaction no new foods should be added. It is unfortunate if such reactions occur early in the testing, but such adversity is usually overcome, and the patient is willing to continue on the few foods that have shown no reaction after ingestion, until the flare subsides and he is again ready for testing.

8. After the testing has progressed for several weeks a persistent but mild flare-up may appear almost daily. This usually means that one or more foods are being taken to which he is mildly sensitive but which were overlooked during the testing period. In such cases the diet is reviewed and a list of foods is suggested as a basic diet. This list should contain only foods which the physician and the patient feel have been non-offenders on previous testing by ingestion. The basic diet is continued for four to six days and after there is sufficient improvement in the condition of the hands new foods are added, or questionable foods are retested.

9. In the beginning only simple foods such as potatoes, beef, pork, tea, various fruits and vegetables, milk, eggs and wheat are added. After the diet has progressed sufficiently, mixtures of foods may be used such as salads, bread, cake, etc.

10. The responsibility of adhering to the diet is placed entirely on the patient. In most cases cooperation is excellent even in individuals with lower than average intelligence. One or two definite flare-ups following a period of quiescence serve to convince even the most skeptical individual that recovery will follow strict adherence to the diet.

11. A good dietitian is of great value in helping the individual select foods,

in preparing a small group of foods in a variety of appetizing ways and in seeing that the patient gets enough to eat. It is important to keep up the caloric intake. The strict trial diet should not be used in under-nourished patients.

12. After the first few weeks the patient learns to recognize exacerbations and he can continue testing foods on his own initiative. He is taught the various ingredients of complex mixtures and is made to realize that if he is sensitive to eggs he cannot eat cake, custards, ice cream, etc., containing eggs. The strict trial diet is by far the most exact method of determining food allergy, in our experience. It is the most difficult to carry out, however, and usually requires hospitalization of the patient. Frequent assurance by the physician helps the patient over the most difficult periods. It is well to warn the patient that he may feel weak the first few days. Early, there is loss of weight but this is usually not serious in the well nourished. Supplementary vitamins are not necessary but if they are used they must be tested like other substances. This is particularly true of the B complex and the fat soluble vitamins derived from fish oils.

The following case reports are representative of the method employed, and emphasize the necessity of careful observation and careful attention to the details of management. The tabulation of cases briefly summarizes the outstanding features of the entire 30 cases observed. Table 1 summarizes the results of administration of various foods to these patients in terms of reactions apparently induced thereby.

Case 9

E. J. H. a 25 year old white soldier first noticed a patch of pruritic vesicular dermatitis in the second interdigital space of his right hand in July 1944, while in an army camp in Virginia. He was treated with local potassium permanganate soaks, a sulfonamide powder and gentian-violet. The itching was partially relieved and the area of dermatitis became dry and scaly. For the next two months it remained localized to its original site.

In September 1944 the patient was transferred to California and the dermatitis disappeared one week later. He left the United States in November 1944 and while enroute to India the dermatitis recurred. It slowly and progressively spread, with patchy involvement of the palms and fingers of both hands. Boric acid ointment and soaks was the only therapy used. On arrival of the patient in India the dermatitis continued to spread, and successively passed through periods of activity and quiescence. He frequently attended "sick-call" where potassium permanganate soaks, boric acid soaks, Whitfield's ointment and salicylic acid in alcohol were used. No lasting improvement was obtained and the patient was admitted to the 335th Station Hospital on June 1, 1945. Here sodium bicarbonate soaks, calamine lotion, mineral oil, salicylic acid ointment and crude coal tar were utilized, but the dermatitis was not relieved.

The patient was transferred to the 20th General Hospital June 22, 1945. The only additional facts elicited from his history were that his mother had hay fever and that in 1942 the patient had had a generalized urticaria presumably due to bananas, and lasting for one week.

Physical examination yielded negative findings except for the cutaneous lesions. There were varying sized and shaped acute and subacute eczematous plaques of dermatitis on the volar surface of wrist, first finger, dorsal surface of second, third and fifth fingers of his left hand and palmar surface, second and third web spaces and second and third fingers of his

TABLE 1

FOODS TESTED BY INGESTION	CASE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	NO. TESTED	NO. REACTED	% REACTION
Potatoes															x		x	x	x				x	x	x			x			29	8	28
Beef																				x			x			x					29	3	10
String beans														x					x		x				x		x				29	5	16
Coffee			x	x			x									x				x			x		x			x			29	8	28
*Milk	—	x		—		—	x		—	x		—		x	x		x	x	x					x			x				24	11	46
Butter	—	—	—	—	—	—	—	—	—	—	—	—	x	—	x		—	—			x										15	3	20
Bread, white	x		x				x		x	x			x		x				x		x	x				x	x	x	x		29	14	48
Corn				x					x											x		x			x		x				29	6	21
Peaches	x		x					x	x										x			x			x						29	7	24
Cream of Wheat	x		x				x		x	x			x		x				x		x	x				x	x	x	x		29	14	48
Tea									x										—	—	—	—				—					24	1	4
Chicken			x														x	x		x			x	x	x		x		x		29	9	31
Eggs	x				x					x			x	x	x		x	x					x			x		x			29	11	34
Spinach			x	x		x								x			—		—		—				x						26	5	19
Rice	x																x	x			x		—	x		x	x		—		27	7	26
Orange & Juice					x													x		x		x	x								29	5	16
Pineapple & Juice	x	x	x	x	x				x	x	x			x								x		—		x					28	11	39
Peas	x								x		x				x			x			x							x			29	7	24
Tuna Fish				x	x		x	x		x	x			x	x		—	—	—	—	—	—	—	—	—	—	—	—	—		16	8	50
Cabbage																	—							x	x						28	2	7
Oatmeal			x														x	x			x	x		—							28	5	18
Tomatoes & Juice		x	x	x	x	x		x	x					x			x	x				x		x							29	12	41
Beets	x										x			x	x		—	x	—					x			—		—		25	6	24
Cheese American	x	x			x		x	x		x			x	x			—	—	—		—			—			—				22	8	36
Cucumbers	—		—									x		x			—	—	—	—		—	—	—	—	—	—	—	—		16	2	12
Pork	x				x		x	x		x			x		x			x		x					x			x	x		29	12	41
Salmon	x																—	—	—	—	—	—	—	—	—	—	—	—	—		19	1	5
Peanuts					x			x				x		x			—	—	—	—	—	—	—	—	—	—	—	—	—		19	4	21
Apples	x						x	—				x		x						x			x			x					28	7	25
Grapefruit & Juice					x																						—				28	1	3
Prunes				x										x											x						29	3	10
Cherries	x			x			—											x	—		—			x					—		25	4	16
Asparagus		x			x						x	x		x	x		—	x				—	x				—				26	8	30
Onions	x				x	—		—		x	x							—	—	—		—	—	—	—				—		20	4	20
Carrots									x													—	x	x	x			x			28	5	18
Sauerkraut							x										—	—	—	—	—	—	—	—	—	—	—	—	—		16	1	6
Pears																															29	0	0
Chocolate			x					x	x	x			x	x			—	—	—	—		—	—	—	—		—			x	21	7	33
Raisins	x	x		x							x						—	—	—	—	—	—	—	—	—	—	—				20	4	20
Lemons																	—					—	—				—	—			24	0	0
Sweet Potatoes				x	x				x										—	—			—	x	x		—	—	—		23	5	22
Lettuce	—	—	x		—				—				—							—		—			x		x				20	3	15
Lime Jello	—	—	—	—	—	—	—	—	x	—				—			—	—	—	—	—	—	—	—	—	—	—	—	—		7	1	
Strawberry Jello						—		—		x	—		—				—	—	—	—	—	—	—	—	—	—	—	—	—		12	1	
Ice Cream	—	—		—	—	—	—	—			—		—				—	x	—	—		—		—	—	x	—				13	2	
Apricots				—	—	—	—	—	—	—	—		—				x		—		—		x	x					—		17	3	17
Lamb				—	—	—	—	—	—	—	—	—	—	—	—		x			x			x	x	x		x				18	6	33
Squash	—	—	—	—	—	—	—	—	—	—	—	—	—	—			x			x	—		—						—	—	8	2	
Cantaloupe	—	—	—	—	—	—	—	—	—	—	—	—	—	—			x	—	—	—	—	—	—					—	—	—	4	1	
Lima Beans	—	—	—	—	—	—	—	—	—	—	—	—	—	—			x			x	x	—	x						x		13	5	
Watermelon	—	—	—	—	—	—	—	—	—	—	—	—	—	—						x	—	—	—						—	—	6	1	
Oleomargarine	—	—	—	—	—	—	—	—	—	—	—	—	—	—			—		—	—	x								—	—	3	1	
Figs	—	—	—	—	—	—	—	—	—	—	—	—	—	—					—	—	—		—		x	—			—	—	6	1	
Broccoli	—	—	—	—	—	—	—	—	—	—	—	—	—	—					—	—	—		—		—		x				9	1	
Ry-Krisp	—	—	—	—	—	—	—	—	—	—	—	—	—	—					—	—	—			—	—		x				10	1	
Coca-cola	—	—	—	—	—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—			x	—	—	4	1	

* Cases 1–15 tested with dehydrated milk.

x reaction.

— not tested.

Tabulation of cases

CASE	CLINICAL PICTURE	CONTRIBUTING FACTORS	RESULTS OF TRIAL DIET
1.	Negro male age 39. Recurrent vesicular dermatitis of dorsum and sides of fingers and web spaces. 4 months duration.	Sensitive to gasoline (mechanic). Hemolytic Staph. Aur. cultured from hands	Tested to 41 foods. Reacted to 15. Hands completely well after avoiding these foods and contact with gasoline.
2.	Negro male age 23. Recurrent vesicular dermatitis of medial and lateral sides of hands, dorsum of fingers and web spaces. 9 months duration.	Chronic prostatitis treated with massage; no effect on dermatitis. Vesicle tops neg. for fungi on KOH examination. Hem. staph. aur. cultured from vesicles on hands	Tested to 43 foods. Reacted to 6. Hands cleared on avoiding these foods.
3.	White male age 21. Recurrent vesicular dermatitis of dorsum and web spaces of right hand. 10 months duration.	Severe hyperhidrosis. Culture—Hem. Staph. aur. Sensitive to Sulfadiazine	Tested to 44 foods. Sensitive to 11. On a retest to tomatoes had a severe vesicular flare with erythema multiforme lesions of iris type on wrists. Hands remained well when not eating the offending foods.
4.	White male age 32. Recurrent vesicular dermatitis of dorsum and sides of all fingers. 3½ months duration.	None	Tested to 41 foods. Reacted to 10. Hands clear with no recurrence while avoiding offending foods.
5.	White male age 27. Recurrent vesicular dermatitis of fingers, web spaces, dorsum and palms of hands. 7 months duration.	Moderate hyperhidrosis Culture staph. aur.	Tested to 41 foods. Reacted to 12. Hands cleared on avoiding these foods.
6.	White male age 39. Vesicular dermatitis of fingers. 7 weeks duration.	Worked as cook and used gasoline to which he was sensitive.	Tested to 39 foods. Sensitive only to tomatoes and spinach. Retested on several occasions with flare to these foods. Returned to duty and hands remained well if he avoided tomatoes, spinach and contact with gasoline.

Tabulation of cases—Continued

CASE	CLINICAL PICTURE	CONTRIBUTING FACTORS	RESULTS OF TRIAL DIET
7.	White male age 23. Recurrent vesicular dermatitis of fingers and palm of right hand. 5 months duration.	Culture—Hem. staph. aur.	Tested to 41 foods. Sensitive to 9. Hand cleared on avoiding these foods.
8.	White male age 29. Recurrent vesicular dermatitis of fingers. 15 months duration.	Father and mother had "eczema" of hands. Vesicular dermatitis of right sole cleared with "ringworm" treatment in 3 weeks. Chronic maxillary sinusitis	Tested to 39 foods. Reacted to 7. By avoiding these foods hands remained well.
9.	White male age 25. Recurrent vesicular dermatitis of the hands. 1 year duration.	None	Tested to 39 foods. Reacted to 12. Hands cleared on avoiding these foods.
10.	Negro male. Recurrent eczematous and vesicular dermatitis of hands. 4 months duration.	None	Tested to 43 foods. Reacted to 10. Hands remained well after eliminating offending foods.
11.	Negro male age 23. Vesicular dermatitis of dorsum of fingers, web spaces and palms. 7 months duration.	Severe hyperhidrosis. Severe secondary infection on admission. Beta Hem. Strep.	Tested to 42 foods. Sensitive to 7. Able to return to full duty and hands remained clear.
12.	White male age 20. Recurrent vesicular dermatitis of the dorsal surface of all fingers. 5 months duration.	Moderate hyperhidrosis	Tested to 44 foods. Reacted to 4. Hands clear and able to return to full duty.
13.	White male age 30. Recurrent vesicular dermatitis of the fingers and thenar eminences. 9 months duration.	Severe hyperhidrosis. Mild chronic pansinusitis. Culture from hands—Hem. Staph. Aur.	Tested to 42 foods. Sensitive to 7. Hands clear but unable to return to duty in India because the offending foods included eggs, wheat, pork, and cheese
14.	White male age 24. Vesicular dermatitis of fingers and medial border of right hand. 5 months duration.	Seborrheic dermatitis scalp, face, and chest	Tested to 44 foods. Reacted to 15. 95% cleared when returned to U. S.

Tabulation of cases—Continued

CASE	CLINICAL PICTURE	CONTRIBUTING FACTORS	RESULTS OF TRIAL DIET
15.	Negro male age 30. Recurrent vesicular dermatitis of dorsum and sides of fingers and web spaces of left hand. 7 months duration.	Moderate hyperhidrosis Sensitive to tincture of iodine	Tested to 46 foods. Reacted to 11. Hands completely clear on return to U. S. necessitated by multiple food sensitivities including potatoes, milk, wheat, pork and eggs.
16.	White female age 24. Recurrent deep vesicular eruption on dorsum and sides of fingers and web spaces. 1 year duration.	None	Tested to 10 foods on trial diet. Marked flareup following coffee. Returned to full diet with exception of coffee and hands remained well.
17.	White male age 34. Recurrent deep vesicular eruption on palms since age of 10 years. 24 years duration.	Moderate hyperhidrosis. Mild emotional factor	Tested to 34 foods. Reacted to 12. Hands remained well on avoiding the offending foods.
18.	White male age 29. Recurrent vesicular dermatitis of feet and later hands. 6 years duration.	Trichophytin test neg. Leather sensitivity (arch support) Chronic tonsillitis (tonsils removed) KOH examination of vesicle tops negative for fungi.	Hands and feet much better following tonsillectomy, recurrence of vesicles on return to full diet. Tested to 37 foods, reacted to 16. Separated from the service because of multiple food sensitivities. Hands and feet remained well when avoiding these foods.
19.	White male age 32. Recurrent deep vesicular dermatitis of palms. 1 year duration.	Moderate hyperhidrosis Two severe episodes of secondary infection	Tested to 34 foods. Reacted to 3; milk, wheat and potatoes. Hands cleared after excluding these foods.
20.	White male age 29. Deep vesicular eruption of fingers and palms. Lately lesions appeared on feet. 3 years duration.	Four severe attacks of secondary infection with lymphangitis. Patch tests to common contactants negative. Tricophytin test neg.	Tested to 38 foods. Reacted to 12. Hands cleared and remained well on exclusion of offending foods.

Tabulation of cases—Continued

CASE	CLINICAL PICTURE	CONTRIBUTING FACTORS	RESULTS OF TRIAL DIET
21.	White male age 39. Recurrent deep vesicular with eczematous patches on volar surfaces of wrists. 4 months duration.	Said to have fungus infection 10 years ago; none present at time of observation. Emotional factors 2 plus. One episode of secondary infection	Tested to 41 foods. Reacted to 8. Remained well after avoiding these foods.
22.	White male age 29. Recurrent vesicular dermatitis of palms and fingers of 11 months duration. Plantar dermatitis. 7 months duration.	Considerable acute infection about the nails. Became sensitive to sulfathiazole. Trichophytin test negative. Patch tests positive to OD wool, GI soap, and coconut oil	Tested to 32 foods. Sensitive to 8. Hands cleared on avoi g offending foods.
23.	White male age 26. Eczematous eruption of middle and index finger both hands. 10 months duration.	Trichophytin test neg. Scratch tests showed reaction to rice, rye, oats, wheat, oyster, shrimp, beef, chicken, lamb, pork, eggs, and milk.	Tested to 38 foods. Reacted to 4 of the first 5 foods tested Found sensitive to 13: beef, eggs, lamb, potatoes, coffee, apples, chicken, carrots, apricots, lima beans, asparagus and oranges.
24.	White male age 28. Eczematous eruption of fingers with patches on palms and dorsum of hands; marked nail changes. (Fig. 1) 9 months duration.	Severe secondary infection Sensitive to sulfadiazine	Tested to 37 foods. Reacted to 13. Gradual improvement and regrowth of normal nail while on diet excluding offending foods.
25.	White male age 23. Vesicular dermatitis of all fingers. 4 months duration.	Trichophytin test neg.	Tested to 44 foods. Reacted to 15. Dermatitis cleared on diet excluding offending foods.
26.	White male age 23. Vesicular and eczematous dermatitis of the hands and feet. 3½ years duration. Case reported in detail.	Sensitive to shoe leather	Tested to 46 foods. Reacted to 7. Hands and feet cleared after avoiding contact with shoe leather on restricting diet to non-offending foods.

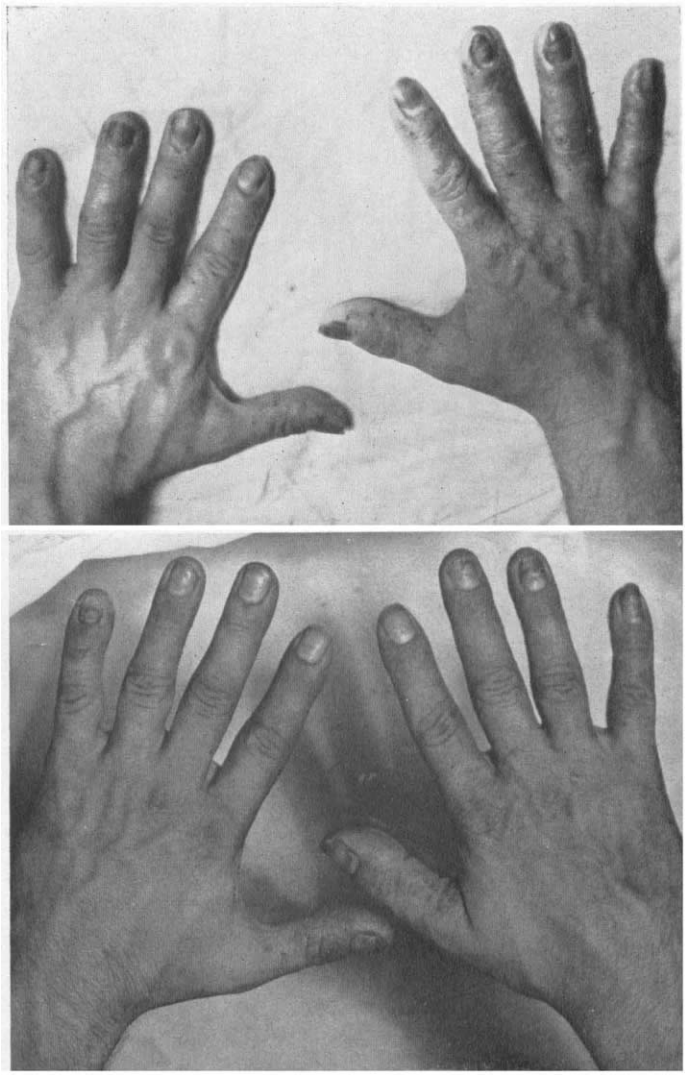
Tabulation of cases—Continued

CASE	CLINICAL PICTURE	CONTRIBUTING FACTORS	RESULTS OF TRIAL DIET
27.	White male age 30. Severe eczematous dermatitis of hands with secondary infection. 8 months duration.	Severe secondary infection cleared with sulfathiazole but vesicles continued to appear. No fungi demonstrated on repeated examination	Tested to 38 foods. Reacted to 12. Completely well on avoid-these foods.
28.	White male age 33. Dry scaling dermatitis with deep vesicles on palms and soles with eczematous dermatitis of left wrist and hat band area of forehead. Continued to get deep vesicles on palms and soles after removing leather as a contactant factor Recurrent "athlete's foot" of hands and feet. 20 years duration.	KOH examination of vesicle tops negative. Trichophytin test negative. Patch tests to leather and sodium dichromate positive	Tested to 39 foods. Reacted to 7. Hands and feet cleared completely when patient avoided offending foods and removed leather as a contactant factor
29.	White male age 38. Deep vesicular dermatitis of fingers mainly lateral aspect. 3 years duration.	Patient was a surgeon Gave up scrubbing for 2 years without improvement. Emotional factors 2 plus. No reaction to common contactants	Tested to 38 foods. Reacted to 7. Hands cleared and patient able to return to limited duty (necessitated by diet excluding potatoes, coffee, milk, wheat, pork, bread, and chicken)
30.	White female age 26. Deep vesicular dermatitis on 2nd, 3rd, and 4th fingers of right hand.	None	Chocolate found to be the offending food after patient kept food diary for 10 days. Hands completely well on avoiding chocolate.

left hand. In addition there were some vesico-pustular lesions on the periphery of some of the patches of dermatitis as well as scattered discrete vesicles on the dorsal surface and sides of all fingers of both hands. Some vesicles were tense and surrounded by a thin collar of erythema, others were dry and had a light brown appearance. There were a few purulent crusts, but the pyogenic element in the eruption was minimal.

Mild local therapy was instituted, consisting of aluminum acetate soaks one-half hour three times daily, and cold cream applied at night. The patient's symptoms were relieved moderately under this regime, but showers of fresh vesicles were frequently noted. Consequently a presumptive diagnosis of food allergy was made and strict trial diet was initiated on July 2, 1945.

On the first day the patient received no food and was given one tablespoonful of castor oil. The next day he had no pruritus and no new vesicles were noted. White potatoes,



1a

1b

FIG. 1. CASE 24

a. Appearance of hands after secondary pyogenic infection has been cleared and before patient was started on trial diet.

b. Appearance of hands after being on trial diet for eight weeks. Note regrowth of nail and general improvement of the dermatitis of the fingers.

beef, and string beans were successively added at daily intervals. During this period there was an absence of pruritus, and no new vesicles were seen. The old vesicles disappeared, and the eczematous plaques became dry and scaling. On July 6 tea was added to the diet. One cup of tea was drunk at the noon and evening meals, and six and one half hours after

the first cup, the patient noticed itching of his hands. Two hours later he noticed several deep vesicles on the second and third fingers of his right hand. That night the pruritus was

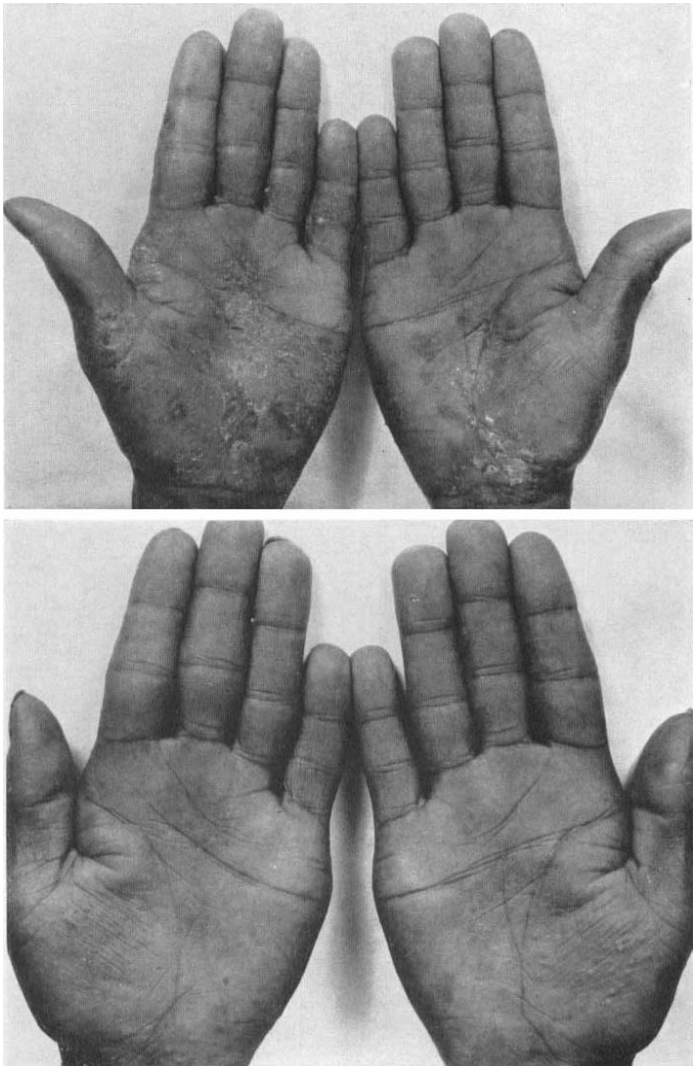


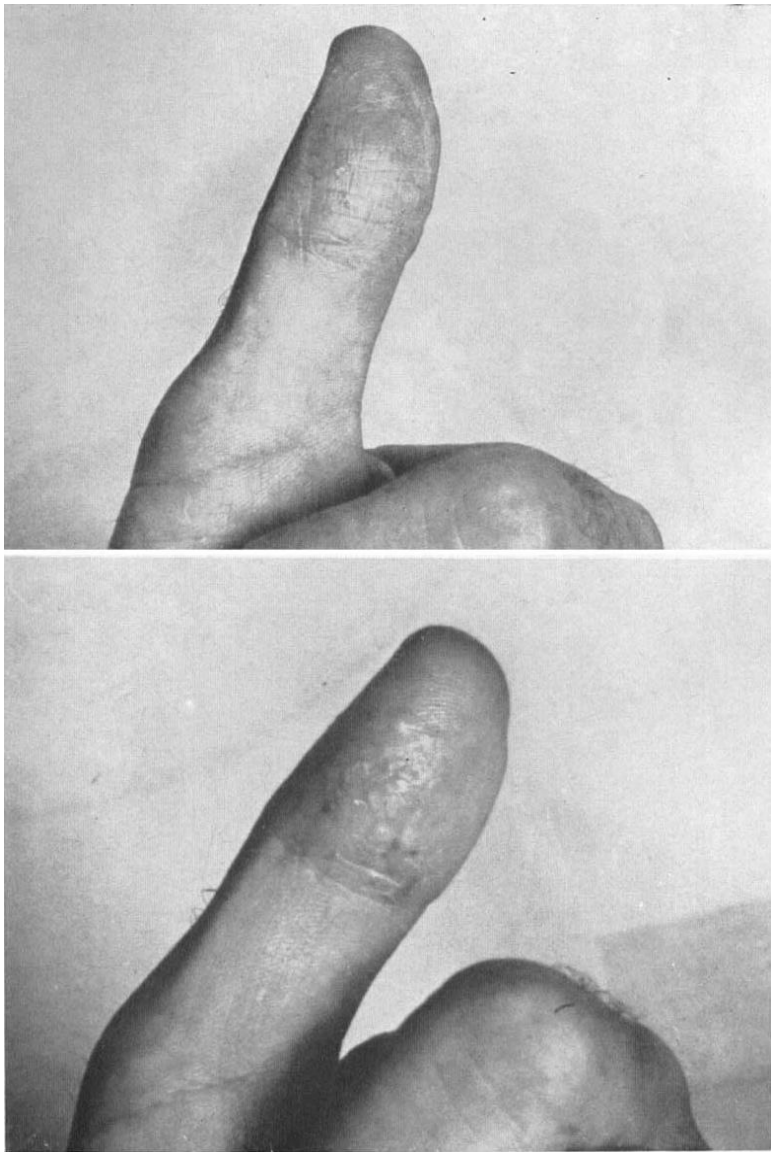
FIG. 2. CASE 10

a. Eczematous dermatitis of palms as seen on admission.

b. Appearance of palms seven weeks after being on trial diet. The eczematous process has disappeared and the palms are clear except for deep seated vesicles. These vesicles are the result of a retest with cheese. The photograph was taken twenty-four hours after ingesting cheese.

quite severe, and the patient spent a restless night. The following morning many new vesicles had appeared. The eczematous plaques were diffusely erythematous, denuded and oozing. Tea was eliminated from the diet. The next day, no new vesicles were seen and the old ones began to dry. The erythematous collar disappeared. This reaction com-

pletely subsided in sixty hours, during which time no new foods were added. On July 9 rice was added to the diet, followed by oatmeal the next day. No reactions occurred. On



3a

3b

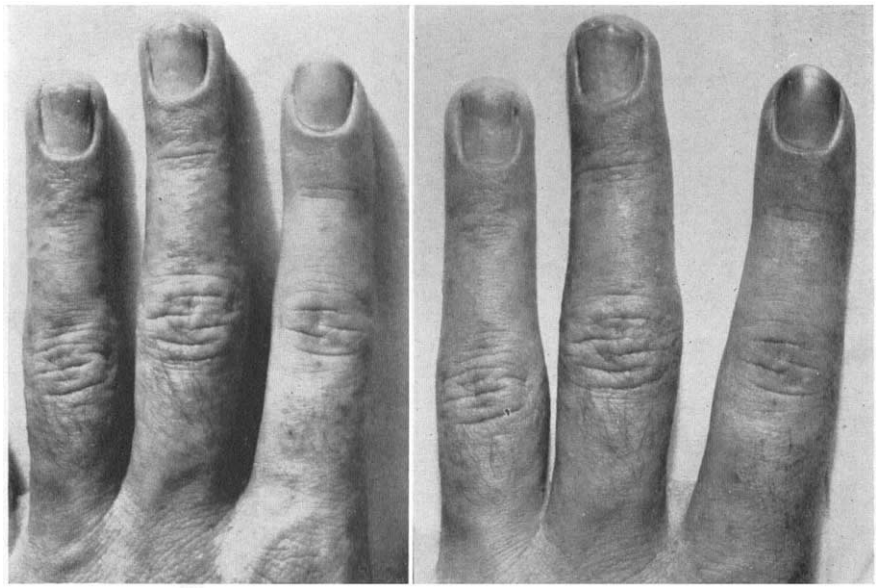
FIG. 3. CASE 18

a. Appearance of thumb in quiescent stage.
b. Appearance of deep vesicles on thumb twenty-four hours after ingesting rice.

July 11 corn was added at the evening meal. Ten hours later a moderate exacerbation began, and lasted thirty-six hours. Similarly he had flares after eating peaches and pineapple but no reaction followed the ingestion of chicken, pears, lamb, pork, butter and milk.

At this time the dermatitis had regressed markedly and the previously eczematous plaques were less infiltrated, dry and scaling. There was no pruritus except after eating foods to which the patient was apparently sensitive.

On July 29, carrots were added to the diet and eaten at the noon meal. One-half hour later, itching of the hands was noted, and fifteen minutes later generalized pruritus. Thirty minutes later he noted hives on his trunk. He was seen by one of us (DP) six hours after eating carrots, and presented giant urticarial lesions on the entire trunk and lower extremities. At that time his hands showed erythema and weeping of the eczematous plaques, and groups of new vesicles on the second, third and fourth fingers of his left hand. Adrenalin was given intramuscularly (0.5 cc. of 1/1000 solution) three times during that night. The patient denied having eaten bananas (Rf. antecedent history of urticaria in this patient)



4a 4b

FIG. 4. CASE 5

A flare-up following ingestion of pork and its subsidence in seventy-two hours.

a. Twenty-four hours after ingestion of pork. Height of the exacerbation.

b. Seventy-two hours after ingestion of pork showing a subsiding in the flare.

or any food other than given him in his diet. He was placed on a basic diet consisting of white potatoes, beef, string beans, pork and lamb. The next day his hands demonstrated further evidence of exacerbation. The urticaria involved the upper arms in addition to the previous sites. This exacerbation of the dermatitis lasted ninty-six hours and the urticaria for five days.

On August 5, new foods were again added to the diet and exacerbations were subsequently noted from peas, white bread, tomatoes, sweet potatoes, lime jello and cream of wheat. No further urticaria occurred.

The patient was retested to wheat, peaches and tomatoes, and following the ingestion of each food a flare resulted. He was not retested to carrots because of the severity of the first reaction.

On September 8, the patient was placed on a diet eliminating corn, lime jello, pineapple, peaches, carrots, tomatoes, wheat, peas, chocolate, tea and sweet potatoes. He was last

seen September 18 at which time his hands were entirely clear except for slight residual lichenification at the sites of previous involvement. He was returned to the United States because his multiple food sensitivities prohibited him from obtaining an adequate diet in India.

This patient with a chronic recurrent vesicular dermatitis of the hands of one year duration was treated by use of a strict trial diet. He reacted to corn, lime jello, pineapple, peaches, carrots, tomatoes, wheat, peas, chocolate, tea and sweet potatoes. This patient had a generalized urticaria as well as a local reaction following the ingestion of carrots. His hands remained completely well when he eliminated the aforementioned foods.

Case 10

T. N. a thirty-one year old negro male soldier, had been in the China-Burma-India Theater fifteen months before he noted the onset of pruritic dermatitis of the thenar eminence of his right hand. This occurred in October 1944. The dermatitis rapidly spread within one week to involve the volar surface of the wrist, thenar eminence, first web space and first and second fingers of the left hand, and the second finger of the right hand. The patient was treated with local measures for three weeks at the 25th Field Hospital, and improved somewhat.

One month later the dermatitis became worse, and involved the aforementioned areas of both hands, and in addition, the medial border of his right hand. Again local therapy was utilized with some benefit. Ten days later an exacerbation again occurred. Local measures at the 48th Evacuation Hospital produced no improvement. He was admitted to the 20th General Hospital in February 1945.

At the time of admission the patient presented acute, denuded, oozing, crusted plaques of eczematous dermatitis involving the dorsal surface and sides of all fingers, all web spaces, the medial and lateral borders and the palmar surface of both hands. In addition there were some vesico-pustules in the periphery of the plaques as well as many tense vesicles scattered throughout the plaques of dermatitis. His hands were severely pruritic.

In the next two weeks local bichloride of mercury (1–3000) soaks were used for one-half hour three times daily and two and one-half per cent ammoniated mercury ointment was applied at bedtime. The dermatitis improved somewhat under this regimen. During this period, however, crops of new vesicles were noted in the old dermatitic plaques as well as in previously uninvolved skin of the hands.

A strict trial diet was started on March 14, 1945. Exacerbations of the dermatitis occurred after the ingestion of pork, pineapple juice, milk, eggs, cheese, onions, chocolate, cream of wheat, strawberry jam, tuna fish and vanilla ice cream. The patient was retested to pork, pineapple juice, milk, cheese and wheat by ingestion with a repetition of the first noted reaction. After three months of observation and testing, the patient was placed on a diet excluding all of the aforementioned foods. Under this regimen his dermatitis completely disappeared. Later he had one exacerbation following the ingestion of pancakes which contained eggs and wheat.

Case 26

J. B. a 23 year old white soldier first had difficulty with his skin in December 1940. At that time he noted a few small vesicles on the radial side of the right third finger near the base of the finger. He did not recall any dermatitis of his feet previous to this, but shortly after he developed vesicles on the medial side of the great toes. Gradually the condition became worse on the hands and feet, and by the end of six weeks, the process had extended pretty well over both hands and both feet. At that time he was working at a candy factory. He failed to get relief from treatment that was prescribed by his local doctors and his com-

pany referred him to a dermatologist. Treatment was continued, and the hands eventually cleared up in August 1941. He returned to work in the candy factory. Several weeks later he developed a few vesicles on the right third finger. At times the dermatitis improved but it did not clear completely. A persistent patch remained on the third finger of the right hand.

The patient was inducted into the Army June 15, 1943 and since that date the condition of his feet had become worse, but the hands remained about the same. The patient felt that his work as a shoe repairer aggravated the condition on his hands. Further questioning revealed that prior to his induction he had occasionally repaired shoes, although his main occupation was a candy maker.

Local treatment for "fungous infection" of the hands and feet was given from November 1943 to April 1944 with no improvement. The patient was admitted to Oliver General Hospital on April 22, 1944. At that time he presented erythematous scaly crusted patches of dermatitis over the dorsum and sides of the middle and index fingers of the right hand. There were a few scattered vesicles on the fingers of the left hand, and similar lesions on the soles and medial aspects of the feet. The remainder of his physical examination was negative and there was no indication that emotional disturbance was playing a part in the dermatitis.

Patch tests to shoe leather, 2% sodium dichromate solution and G. I. soap 10% were positive. An intradermal test with 1:30 dilution of trichophytin was reported as 1 plus. The hands and feet showed considerable improvement after avoiding leather contact for three weeks. He had a definite flare-up of his feet when he was allowed to wear his shoes for six hours. However, even after avoiding contact with shoe leather, vesicles continued to appear on the sides of his fingers. Because of the possibility of a food allergy the patient was started on a trial diet on May 29, 1944. He showed marked improvement after one day of starvation and had no reaction after eating potatoes as his first food. He had a reaction after eating beef but was able to eat peas, pork and oranges without reaction. On June 4, for noon day meal he ate broccoli and at 9 P.M. noted itching of the ulnar side of the left index finger; the following morning he had a crop of new vesicles at this site. This reaction continued over several days and it could not be determined if he was reacting to the foods (apples and coffee) added the following 2 days. He was then allowed a basic diet of white potatoes, pork, peas, and oranges for 3 days. At the end of this time his hands had improved sufficiently for further testing. Coffee and apples were retested and he had no reaction. The diet was continued through June and July and patient was found sensitive to pineapple, wheat, rice, tomatoes, Ry-Krisp, veal. From time to time he was retested to the offending foods and it was finally determined that he was sensitive to: beef and veal, broccoli, pineapple, wheat, rice, tomatoes, and Ry-Krisp.

Because of the sensitivity to shoe leather and to several foods, he was separated from the service.

DISCUSSION

It is not desired to give the impression that all cases of recurrent vesicular dermatitis of the hands are due to food allergy, or even have a partial etiologic basis in food sensitivity. We have observed many patients in whom the dermatitis was proven to be due to contact allergens, and others which were caused by fungi. In some cases the eruption apparently was due to psychosomatic factors. The cases presented in this paper belong to the large group in which the dermatitis presisted after other causal factors were removed and in which prolonged local therapy had been ineffective.

Except for Cases #16 and #30, all the patients were studied while in a hos-

pital. For the majority of cases hospitalization is necessary if a strict trial diet is to be carried out adequately. However, a physician experienced in the method can test some cooperative patients on an out-patient status. The development of more practical methods for working out these problems in the office and clinic is necessary. At the present time a method using infrequently reacting foods (derived from Chart I) along with history, scratch tests and food diary is being used with some success. However, better results are obtained by initial hospitalization for ten days to two weeks, during which time a fairly adequate basal non-allergic diet is worked out and the patient becomes familiar with flare-ups and learns to recognize them. Further testing then can be done at home, with one or two visits to the physician's office each week.

Next to adhering strictly to the diet as outlined, the most important factor in the successful use of the method is the ability of the physician and patient to recognize a reaction following the ingestion of the test food. The important features of a reaction are as follows:

1. Increase in pruritus. It may be present in one or all of the patches of dermatitis. Often the patient has a feeling of "something under the skin."
2. Erythema of the patches.
3. Development of new vesicles. They have a zone of erythema about them: they are translucent and the vesicle wall is taut. As the vesicle becomes older there is loss of the erythema, it becomes less tense, and the top becomes yellowish-brown in color.
4. Oozing may occur in severe reactions. In 95% of the cases the reaction appeared within the first 24 hours. The earliest reaction in our cases occurred within two hours. In the majority of patients the average time of onset of the itching was eight hours and vesicles usually appeared about twelve hours after the ingestion of the responsible food. By twenty-four hours the reaction was quite pronounced. We have seen no patients in whom a reaction has been delayed for three to four days.

It was not practical to retest every reaction-producing food in every case, but in many of the patients the same reaction recurred on repeated ingestion of the suspected food. In testing and retesting these patients, one must constantly keep in mind fluctuations of the allergic state. Factors of fatigue, infection, emotional stress, and the effect of other allergens must be considered. It is conceivable that after several major allergens have been removed from the diet, the patient will show no reaction on the retesting of a minor allergen.

Chart I shows a tabulation of the cases and the foods to which each patient was tested by ingestion. It is important to note that there are only two foods to which no reaction appeared, and more recently studied patients have shown reactions to these foods. The number of cases is too small to determine a definitive "reaction incidence" for each food, but the following gives some idea as to the frequency of reactions following the ingestion of various foods (only foods tested in 15 or more patients are listed).

No single food produced reactions in more than 50% of the patients studied.

41–50%	%	31–40%	%	21–30%	%	11–20%	%	10% or less	%
Tuna fish	50	pineapple	39	asparagus	30	butter	20	prunes	10
wheat	48	American cheese	36	white potato	28	raisin	20	beef	10
bread, white	48	eggs	34	coffee	28	onions	20	cabbage	7
milk	46	lamb	33	rice	26	spinach	19	sauerkraut	6
tomato	41	chocolate	33	apple	25	oatmeal	18	salmon	5
pork	41	chicken	31	peas	24	carrots	18	tea	4
				beets	24	apricots	17	pears	0
				peaches	24	oranges	16	lemon	0
				sweet potato	22	cherries	16		
				corn	21	lettuce	15		
				peanuts	21	cucumbers	12		

It is obvious that such a list is only tentative and will be changed as more patients are tested. Some apparent discrepancies will be settled only after many patients are studied by this method.

Since these patients were studied in the military service it was not practical to follow them to determine spontaneous desensitization. Many patients were separated from the service because of multiple food sensitivities which made it difficult for them to subsist on army rations.

Observations thus far indicate that failure of the method in the diagnosis and treatment of dermatitis due to food allergy is mainly due to the following:

1. Improper selection of cases. Pustular psoriasis and hyperkeratotic dermatitis of the hands does not show improvement when on a trial diet.

2. Failure to evaluate the case completely and remove the contributing causes such as secondary infection, fungous infection and contact irritants.

3. Inability of the physician to recognize a reaction. It is important to examine the case daily and search carefully for new vesicles. Early it may be well to clip the top of the vesicles as they appear, the new ones can thus be easily recognized. After some experience this is not necessary.

4. An uncooperative patient—one who does not adhere to the outlined diet. The responsibility should be placed solely on the patient. No liberties in eating can be granted, because as soon as there is one deviation from the strict routine, others will be taken by the patient. Once a definite flare can be demonstrated as due to a food there is usually no subsequent difficulty in keeping the patient on the diet. The patient should be impressed with the fact that this is not only a method of diagnosis but also a method of treatment.

It is hoped that with further study we shall be able to evaluate more clearly diets made up of low allergenic foods, skin tests, spontaneous desensitization after avoiding the offending food for various periods of time, desensitization and treatment with propeptans, and thus arrive at a more practical out-patient approach to the problem.

SUMMARY

1. Thirty cases of vesicular dermatitis of the hands are presented.

2. Food allergens were detected by ingestion while patients were on a strict trial diet in twenty-nine of the cases. In one case the allergen was detected by having the patient keep a food diary.

3. Prompt improvement appeared as soon as the offending foods were withheld and definite reaction occurred on ingesting an offending food.

4. The foods most likely to give a reaction are tuna fish, wheat, milk, tomato, pork, pineapple, American cheese, eggs, lamb, chocolate, and chicken.

5. The foods less likely to give a reaction are prunes, beef, cabbage, salmon, tea, pears and lemons.

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