**Habitual Constipation as a Sign of Infantile Preberiberi[§] and the
Effect of Vitamin B.* A Clinical Experiment and Study
on a Group of Apparently Healthy Infants Nursed
with Arakawa-negative** Human Milk.**

66th Report of the Peroxidase Reaction.

By

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In breast-fed infants defaecation^{1, 2)} is more frequent than in bottle-fed ones; in the former it occurs generally from once to three times a day, except in the first month of birth, when it occurs generally 5 or 6 times a day. In infantile pathology, constipation is not so frequent as diarrhoea, but not so infrequent as it appears, because a diarrhoea case generally will not fail to consult a doctor, while constipation will not necessarily be complained of. The latter is made light of not only in the circle of laymen, but also in the medical circle. In the present paper I desire to point out that constipation in breast-

§ This paper formed a part of a special lecture delivered by Prof. A. Sato in the 18th General Meeting of the Tohoku Medical Society, Sendai, 29th October, 1933.

* Vitamin B₁ is meant throughout the paper.

** Arakawa-positive may be used in two different senses. One of these is: Arakawa-positive in a biochemical sense. A sample of human milk is said to have become Arakawa-positive, when it becomes blue on the addition of Arakawa's reagent. There it means that the sample is not negative to Arakawa's reaction. Arakawa-positive in a clinical sense: A sample of human milk is clinically Arakawa-positive only when it shows such a reaction as ++ or +++ in one minute of the addition of Arakawa's reagent. Another sample of human milk may be Arakawa-positive in the first described sense, but yet clinically negative.

1) M. V. Pfaundler u. A. Schlossmann, Handbuch der Kinderheilkunde, Leipzig 1923, Vol. I, 35, Vol. III, 229.

2) E. Feer, Lehrbuch der Kinderheilkunde, Jena 1922, 8 a. 226.

fed infants, which may pass for "habitual constipation," is already a symptom of an infantile disease.

Etiology of Infantile Constipation.

Causes^{3,4,5)} of constipation in breast-fed infants are stenosis or occlusion of the digestive canal in a part, intestinal invagination, incarcerated hernia, abdominal tumors, megacolon etc. The anatomical intestinal conditions in infancy, that is comparative longness and abnormal bend of sigmoid flexure and its mesentery, hinder the passage of the intestinal contents and mechanically cause constipation. According to Marfan,⁶⁾ the constipation of infants occurs frequently from this cause. Besides these organic lesions, constipation forms a symptom in feverish diseases, rickets, cerebral lesions, including idiocy, myxoedema, tetanus and anal fissures etc. Besides these causes, there is a group of apparently habitual constipation.

In most frequent cases of habitual constipation in breast-fed infants there is a so-called pseudo-constipation^{6,7,8)} due either to hypogalactia on the part of lactants or to deficient ability of sucking on the part of infants. Infants in either case are mostly under-nourished and show scanty urine. A sufficient supply of milk will cure the constipation. Again, there⁷⁾ are breast-fed infants of good nutrition with a sufficient milk supply, who complain of constipation, due to a good resorption of milk in the upper part of the intestinal tractus and to a resulting lack of acid^{7,8,9)} residues which might otherwise irritate the colon to cause a more active peristalsis. In such cases, an ad-

3) M. Fukushima, *Oriental Journ. of Diseases of Children*, 1925, 7, 38.

4) A. B. Marfan, *Affections des voies digestives dans la première enfance*, Paris 1923, 472.

5) J. L. Morse and F. B. Talbot, *Diseases of nutrition and infant feeding*, New York 1920, 321.

§§ Marfan's classification of infantile constipation will be shown below for convenience sake:

1) transitory constipation.

2) habitual constipation. i) alimentary constipation. ii) neuro-muscular constipation. iii) constipation by mechanical stenosis (narrowness of intestine; complexity and exaggeration of sigmoid flexure).

6) E. Freudenberg, *Physiologie u. Pathologie der Verdauung im Säuglingsalter*, Berlin 1929, 49.

7) H. Finkelstein, *Lehrbuch der Säuglingskrankheiten*, Berlin 1924, 721.

8) F. Lehnerdt, *Kinderaerztliche Praxis*, 1932, 4, 145.

9) L. Langstein and L. F. Meyer, *Säuglingsernährung u. Säuglingsstoffwechsel*, Wiesbaden 1914, 104.

dition of carbohydrates which will produce acids,—cereals, sugar, malt soup etc—will cure the constipation. In the case of older sucklings, a supply of diet rich in fat will, though not always, answer the purpose.

Then there^{8 9)} are infants prone to constipation who are accustomed to “habitual” enemata performed for fear of coming fits or fever, and who have thus come to develop chronic constipation. A change in diet should be tried first of all in these cases. According to a statistical study of Fukushima,³⁾ a very frequent cause of habitual constipation in breast-fed infants seems to be a too frequent feeding, an over-feeding, and an irregular feeding. But it is questionable whether a correction of the feeding would bring successful results frequently in these cases.

In the present paper I desire to add one habitual constipation in breast-fed infants. This kind of constipation does not differ apparently from the usual habitual constipation in breast-fed infants which will not be deleterious to health, but in reality it is to be considered as the harbinger of serious infantile disorder, or as a symptom of infantile preberiberi¹⁰⁾ (of Prof. A. Sato).

Case Report.

There were 16 cases of infantile preberiberi who visited our Department from January to September in the year 1932, and they were under my direct observation. All these cases were recorded and are tabulated in the accompanying Table (Cf. Table).

Discussion of Result.

As is shown in the table, it was in some cases (Cases 1, 2, 4, 5, 7, 10 and 16) mothers alone that received a medication of vitamin B; in other cases (Cases 3, 12, 13, 14 and 15) it was infants alone, and in the remaining cases (Cases 6, 8, 9 and 11) it was both lactants and infants. But the important thing is that vitamin B was the only remedy given. Not only were no other remedies given, but also not a single suggestion about changing methods of feeding was made. Thus the simple fact was: they—lactants or infants—came to our Department to receive vitamin B. The result was the disappearance

10) A. Sato, *Paediatrica concrete* (Jap.), Vol. I, 3rd edition, Tokyo 1932, 253.

[illegible]

13 ♂ 85 d.	Con- stipa- tion and her- nia	Defaecation once in every 3 days	"	Suffi- cient	(-)(-)(-)	Her- nia infa- nalis	Infant	Frequency of defaecation Arakawa's reaction	0 1 1 1 1 5th
14 ♂ 6 m.	Cough and constipa- tion	Since birth prone to constipa- tion; since 10 days cough- ingspell	Chronic peri- tonitis	"	(-)(-)(-)	Per- tussis	Infant	Frequency of defaecation Arakawa's reaction	0 1 1 3rd + + + + + + + + +
15 ♀ 42 d.	Con- stipa- tion and vomi- ting	Since 12 days con- stipation	Paraes- thesia and pain of legs	Defi- cient	(-)(-)(+)		Infant	Frequency of defaecation Vomiting Arakawa's reaction	0 0 1 1 2 0 occasional 3rd 5th
16 ♀ 10 m.	Con- stipa- tion	Since 3 months constipa- tion and occasio- nal enema	Healthy	Suffi- cient	(-)(+)(+)		Mother	Frequency of defaecation	0 0 0 1 0 1 0 1

* 11th } shows the Arakawa's Reaction was on the 11th day of treatment { on the right breast (-)0' (±)1' (±)3'
| | + } on the left breast (-)0' (-)1' (-)3'

or improvement of the symptom—constipation—in 13 cases, or in about 80% of all cases. But a remarkable effect was not seen in two cases (Cases 5 and 9) and in the remaining case (Case 2) the effect of vitamin B remained unknown.

Among the sixteen cases there were 5 mothers with beriberi symptoms. Four infants had a history of icterus neonatorum of a long duration. This is interesting if we consider Aritomi's¹¹⁾ assumption that jaundice of the newborn could possibly come as a symptom of infantile beriberi. Two mothers (Cases 7 and 10) had themselves obstinate constipation. It seems to be considered as heredity⁵⁾ in these cases. The presence of constipation in mothers whose infants complain of constipation also was reported by Fukushima³⁾ and by others.⁶⁾ In my two cases a medication of vitamin B was able to improve the constipation of the mothers. Of my 16 cases, 5 mothers (or 31% of all the 16 cases) showed a hypogalactia. Was then the infantile constipation due to this hypogalactia in these cases? Before answering the question, the following opinions must be taken into consideration. Ohta¹²⁾ states that in a case of hypogalactia, one might be led to think of infantile beriberi, and that an administration of vitamin B (oryzanin) causes a increase of lactation. T. Chiba¹³⁾ noticed that the amount of milk of the cows fed on B-avitaminotic food shows gradually a decrease, and that at last the lactation stops. All this may be taken to mean that B-deficit may result in an insufficient secretion of mother's milk. On the other side, our daily experience shows that Arakawa-negative cases, or mothers whose milk is negative or weakly positive to Arakawa's reaction, are more prone to hypogalactia than Arakawa-positive cases. This will naturally lead to the conclusion that constipation will be frequent in infants fed on Arakawa-negative milk.

Indeed, we may think in Case 5 that a medication of vitamin B caused a primary increase of milk secretion and only secondarily an improvement of the complaint—constipation, but then how is Case I to be explained in which the constipation was cured in spite of the fact that milk secretion did not increase? Besides, in a number of my cases hypogalactia was not seen, whereas their infants complained of constipation. Before giving the answer to the question, we must consider the effect of vitamin B.

11) S. Aritomi, *Jika Zasshi*, 1931, **370**, 110.

12) K. Ohta, *Jika Zasshi*, 1931, **369**, 134.

13) T. Chiba, *Rinsho Igaku*, 1928, **16**, 1451.

It has¹⁴⁾ been noticed that in beriberi cases of adults, constipation and other gastro-intestinal disturbances are the most frequent symptoms. According to F. Widenbauer,¹⁵⁾ obstinate constipation occurs frequently in case of avitaminosis B and he states a case of it was cured by medication of yeast. Also from a roentgenological point of view T. Urano,¹⁶⁾ S. Koike¹⁷⁾ and K. Ohmori state that the movement of intestines in this disease is very slow, and a contrast material stagnates in them for a longer time. They state also that the medication of vitamin-B will cure first of all these gastro-intestinal disturbances. According to J. L. Rosedale¹⁸⁾ there are two factors in the ordinary role of the vitamin B prepared from rice polishings, one of which—his lead acetate precipitate portion—has to do with digestive processes and cures the symptom of stoppage of B-avitaminotic pigeons, while it will not, he states, cure typical acute polyneuritis.

Fr. Uhlmann¹⁹⁾ investigated the pharmacological action of orypan (extract of rice polishings) upon intestinal movements and found the action is similar to that of pilocarpine. R. Ito²⁰⁾ investigated the action of various vitamin-B preparations in the market for intestinal movements in rabbits and pointed out the following results; that an administration of small amounts results in moderate peristalsis of the intestines, that large amounts, after a momentary stoppage, cause a very marked peristalsis and that still larger amounts cause a complete stoppage of the peristalsis, though this effect is, he states, still observed after the destruction of the vitamin (B_1 and B_2) in the preparations by exposure to a high temperature ($175^{\circ}\text{C}.$) under a high pressure (100 Lbs.) for 4 hours. In consideration of the views of these authors, we can with good reason conclude that in the case of infantile preberiberi which is an early state of infantile B-avitaminosis, constipation is a natural symptom which may occur frequently. This should prompt us to think of infantile preberiberi in the case of an apparently healthy infant who complains of constipation.

14) J. Shimazono, Kakke, Tokyo 1929, 148.

15) F. Widenbauer, M. med. W., 1935, 27, 1071.

16) T. Urano, Igaku Chuwo Zasshi, 1917, 17, 571.

17) S. Koike and K. Ohmori, Igaku Chuwo Zasshi., 1926, 23, 1363.

18) J. L. Rosedale, Biochem. Z., 1927, 21, 1266.

19) Fr. Uhlmann, Z. f. Biolog., 1918, 68, 452.

20) R. Ito, Journ. of Oriental Medicine, 1931, 15, 729.

Conclusions.

Habitual constipation comes frequently as a symptom of infantile preberiberi. A medication of vitamin B will cure or improve it.