

for areas of *old* calcification in the pancreas unaccompanied by acute inflammation. In view of the absence of abdominal pain during the period of intravenous injection and during the subsequent 12-month survival there is no basis for assumption that such changes were due to pancreatitis incident to these injections.

That the injected nutriment was actually utilized is strongly suggested by (1) the positive nitrogen balance and (2) the maintenance in weight. The latter could not be accounted for on the basis of hydration because the patient frequently experienced thirst and the daily urine output was 1000 cc or more on a fluid intake of 2000 to 3000 cc.

Summary. Parenteral nutrition was carried out over a 17-day period in an adult male by means of intravenous injection of dextrose, casein digest (amino acids) and emulsified fat. It is believed that this is the first recorded instance of nutrition in man by the simultaneous administration of the 3 primary types of foodstuff.

13555 P

Potassium Chloride Therapy and Serum Potassium in Infantile Eczema.*

A. V. STOESSERT.

From the Department of Pediatrics, University of Minnesota.

The observation has been made that the administration of potassium chloride to young children with bronchial asthma has given relief in some instances, especially when the intake of sodium chloride has been held at a low level. The ingestion of the potassium salt causes a cessation of the milder attacks of asthma, but in the more severe cases the asthma continues while the potassium chloride is being taken but ceases almost at once when the salt is discontinued.¹ Some of these subjects have had eczema during infancy and up to the time of the onset of the asthma. They appeared to respond best to the potassium chloride therapy.

Recent writings on eczema have emphasized the nonspecific factors as a cause of the disease. The skin of the infant especially the horny

* This work was supported by a grant from the Medical Research Fund of the University of Minnesota.

¹ Stoesser, A. V., and Cook, M. M., *Am. J. Dis. Child.*, 1940, **60**, 1252.

layer is thinner than that of the older child and the terminal capillaries show differences of configuration. The infant's skin has a higher content of water and of sodium chloride and a lower potassium/sodium ratio.² These features tend to disappear with growth but in the child with eczema they may remain or change slowly. The administration of potassium to increase the potassium/sodium ratio has been recommended. No careful studies have been made to determine the value of this nonspecific form of therapy in infantile eczema.

Six infants with eczema ranging in age from 7 to 16 months were chosen and placed under constant environmental conditions in the hospital. Nurses carefully instructed in the care of these little patients, bathed them with mineral oil, and applied only *unquentum acidi borici*. To prevent scratching it was necessary to use sedatives such as chloral hydrate. The infants were given an evaporated milk formula consisting of equal parts of irradiated unsweetened evaporated milk and distilled water. The younger children had 7% dextrimaltose added to the formula. The older subjects were offered a variety of the precooked cereals together with plenty of vegetables and fruits. Eggs were not permitted in any of the diets.

The type of eczema was practically the same in each case. There was a moist, red surface exuding serum. The disease was chiefly confined to the face and upper trunk, and to a lesser extent to the extremities. Three of the patients received potassium chloride orally, starting with 5 grains 3 times a day and increasing gradually over a period of one week to 15 grains 4 times a day. Then the salt was discontinued. The remaining 3 cases were observed as controls.

Samples of blood for the determination of the serum potassium, sodium and chloride were obtained shortly after admission during the acute stages of the disease, 2 weeks later when the condition of the skin had improved and again 4 weeks later when weeping had ceased entirely. The chemical methods used for the analyses of the blood were as follows: Potassium, Shohl and Bennett³; sodium, Butler and Tuthill⁴; and chloride, Wilson and Ball.⁵

The results are summarized in Table I.

The ingestion of potassium chloride does not improve the eczema, but instead causes a slight aggravation of the condition of the skin. The serum potassium is above the normal range during the more

² Holt, L. Emmett, Jr., and McIntosh, Rustin, *Holt's Diseases of Infancy and Childhood*, New York, D. Appleton-Century Company, 1940, Edition 11, 899.

³ Shohl, A. T., and Bennett, H. B., *J. Biol. Chem.*, 1928, **78**, 643.

⁴ Butler, A. M., and Tuthill, E., *J. Biol. Chem.*, 1931, **93**, 171.

⁵ Wilson, D. W., and Ball, E. G., *J. Biol. Chem.*, 1928, **79**, 221.

TABLE I.
Serum Electrolytes During Acute Phase and Various Stages of Healing in Infantile Eczema.

Case No.	Shortly after admission			End of 2nd hospital wk			End of 1st hospital mo.		
	K	Na	Cl	K	Na	Cl	K	Na	Cl
Mg per 100 cc serum									
Cases receiving potassium chloride orally									
1	25	289	366	24	320	378	16	298	354
2	25	336	369	27	318	365	20	297	319
3	24	314	366	21	303	344	14	305	360
Avg	24	313	367	24	313	362	16	300	344
Controls receiving no potassium chloride									
4	27	335	399	24	302	348	19	298	366
5	23	312	360	20	307	381	15	309	375
6	29	318	377	24	313	395	15	323	374
Avg	26	321	378	23	307	374	16	310	371

severe phases of the disease. This elevation is present in infants receiving the potassium chloride as well as in the controls. With improvement in the eczema, the potassium of the blood begins to fall and when all oozing has disappeared leaving the skin dry, the values are normal. The serum sodium and chloride are normal during the acute stages of the eczema, and do not undergo any significant change as healing takes place. The administration of potassium chloride causes no change in the sodium and chloride of the blood. That the levels of these electrolytes are normal was established by examining 24 samples of blood from 12 children ranging in age from 4 months

TABLE II.
Serum Electrolytes in a Group of Infants and Young Children Who Have Never Had Eczema.

Case No.	Admission to hospital			Shortly before discharge		
	K	Na	Cl	K	Na	Cl
Mg per 100 cc serum						
1	18	323	380	14	317	362
2	17	313	357	18	—	368
3	16	317	371	17	312	352
4	18	315	365	18	313	348
5	16	320	370	17	320	357
6	16	315	381	16	315	376
7	17	318	356	15	319	351
8	18	300	341	19	298	364
9	17	332	382	18	342	387
10	16	340	392	16	326	398
11	16	333	400	15	315	351
12	11	322	369	17	323	380
Avg	16	320	372	16	318	366

to 2 years. None of these subjects had any skin or allergic disease. The results are shown in Table II.

The elevation of the serum potassium when the eczema has progressed to the point where the papules of the disease coalesce and produce a moist red surface exuding fluid is a most interesting observation. These little patients certainly must have at this stage a marked disarrangement of the normal electrolyte balance. The threshold for the excretion of potassium is raised subjecting the tissue cells including those of the skin to a high potassium content. Water must be drawn into the cells. Swelling takes place with some cell disruption. This may cause the extreme irritability of the skin which is present at the height of the disease. It is in line with the studies of Klauder and Brown,⁶ who noted that in an examination of the content of calcium, potassium, magnesium and sodium in rabbit skin in relation to cutaneous irritability as judged by the applications of croton oil, there was an inverse relation between irritability of the skin and calcium content and a direct relation in regard to potassium. The greater the irritability of the skin the greater the likelihood of a low calcium and a high potassium content. Potassium chloride therapy, therefore, does not appear to be indicated in infantile eczema.

13556

Infection of Horses with St. Louis Encephalitis Virus, Experimental and Natural.*

W. McD. HAMMON, B. N. CARLE AND E. M. IZUMI. (Introduced by K. F. Meyer.)

From the George Williams Hooper Foundation and Division of Veterinary Science, University of California, San Francisco and Berkeley, California.

Within the last year evidence has been obtained indicating a close epidemiological parallel between the viruses of the "equine" encephalitides and that of St. Louis encephalitis. Howitt¹ first called attention to antibodies to both Western equine and St. Louis viruses in the blood of certain patients in California. More recently, Ham-

⁶ Klauder, J. V., and Brown, H., *Arch. Dermat. and Syph.*, 1927, **15**, 1.

* Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

¹ Howitt, B. F., *Am. J. Pub. Health*, 1939, **29**, 1083.