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CASE OF CHOLERA TREATED BY SALINE INJECTIONS.

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OCTOBER 16. G. R., aged 22, a shoemaker, of temperate habits and feeble health, has suffered mental distress from family events these two days. He had no alvine evacuation yesterday, ate beef and bread at dinner, toast and tea at supper, and was at work in his ordinary state of health. He is habitually costive. At 5, A. M., to-day, he had a copious dejection; seven smaller discharges occurred in the course of two hours. At 11, A. M., he was visited by a physician; he had just come in from the privy with cold skin, feeble pulse, anxious look, and nausea following profuse vomiting. A small dose of rhubarb with camphor was administered, and hot applications were made to the surface.

1, P. M. Lies in bed, making no complaint but of cramps, which are almost entirely confined to the left gastrocnemius; they are rare and slight in the right. No abdominal soreness. Countenance haggard, purplish; dark areolæ round sunken eyes; skin deadly cold; hands of a dirty blue color; skin of the fingers corrugated. The mind is tranquil, or indifferent; the senses perfect; no ringing in the ears. The voice is husky. Respiration is quick, somewhat laborious. Pulse 120, imperceptible in the left wrist, very feeble in the right, not tumultuous in the carotids. Tongue yellowish on surface, dotted red at tip and edges, dry, rough, cold. Thirst not very urgent. Vomiting of a thin fluid of the color of rhubarb. No dejections since 11 o'clock; their color is not known. No urine since 6, A. M.

R. Hydr. Submur. gr. i.  
Tinct. Opii gtt. ii. to iv.

To be repeated every ten minutes. If the vomiting ceases, continue the calomel and omit the laudanum. Give drinks sparingly. Apply hot sand to the epigastrium, and hot fomentations to the legs.

3, P. M. Has had one dejection of a half pint of clear, colorless liquid, containing three or four flakes, and looking like pure water into which one may have spit a little phlegm. Has vomited a little yellowish, turbid fluid. Says that he feels quite well, were it not for the cramps. The skin is warm and wet; the face darker; eyes more sunk; fingers more blue and wrinkled; the voice more husky. Buzzing in the ears.

Pulse is imperceptible in both wrists; 120 in carotids. Continue the treatment.

5, P. M. Has taken twenty grains of calomel, most of which, or all, has been rejected. Dejections of colorless fluid, with cream-like mucus. Pulse still imperceptible; voice entirely extinct; respiration high, laborious; skin cold and wet; and all unfavorable appearances are increased. The cramp has extended to the thighs.

Drs. Jackson, Bigelow, Channing and Ware, agreed in the opinion that no hope of recovery remained unless by venous injection. At 6 o'clock a vein was opened in the bend of the left arm, and three pints of the following solution were slowly injected.

Sodæ Muriat.  $\text{ʒi}$ .

Sodæ Carbonat. gr. vij.

Aquæ, Oi. ; 108 deg. to 115 deg. Fahr.

An amendment soon took place in the color and expression of the face, and the pulse returned at the wrists. Towards the close of the operation the patient complained of distress at the præcordia, and the respiration became laborious and irregular. A half pint of blood was allowed to flow from the orifice already made in the vein, and these difficulties subsided. Let a little brandy and water be given occasionally.

10, P. M. The good effects of the injection ceased about 9 o'clock. The skin is now cold; the voice, a whisper; the pulse, gone. The patient says that he feels better, and only needs strength; but all appearances are as adverse as before the operation. The blood drawn at the last visit has not formed any coagulum; the serum has separated, and is coagulated by heat like healthy serum.

A vein was opened above the inner ankle of the left leg, and eight pints were injected by the assistance of Drs. Channing and Ware. The heat of the solution, which was of the same strength as the one used before, was maintained quite steadily at 114 deg. Fahr. The patient did not show any sense of the incisions made now, nor before. During the operation the countenance gradually improved, the surface became warm, the pulse returned, and the breathing was more easy and regular. Towards the close of it the patient, unquestioned, said in a good voice, 'It is astonishing how much better I feel.' He was allowed to take  $\text{ʒss}$ . of tea frequently; and was left at 1-2 past 12 with warm skin, good complexion and countenance, hands less corrugated, mind occupied about his affairs and relations, and good pulse.

October 17. 8, A. M. Continued warm and comfortable all night; has been free from cramp and vomiting since the first injection. Dejections are frequent, small, thin, colorless, under his control, and preceded by a little griping. No other pain. Skin is warm, soft, elastic; face of good color and expression. Respiration 36, costal, regular. Voice distinct, modulated, a little husky. Pulse 136, regular, more strong in left arm. Tongue is yellowish, dry, dotted red at tip and edges. Apply a blister six by five to abdomen. Coffee and tea in small quantities.

1, P. M. Dejections are frequent, occurring every half hour, thin; the four last are of fæcal color, and somewhat fæcal smell. Says that he has just passed a very little urine. Other symptoms as at last visit. Arrowroot.

3, P. M. Has had three dejections, thin, more fæcal. The countenance is not so easy, the eyes are more sunken. Respiration less regular. Pulse 136, not so firm. Thirst great, but not urgent.

5, P. M. No pain but from the blister, which has drawn well. No dejection. Has vomited, the first time since the first injection, a gill of thin, colorless, inodorous fluid; he says it is the arrowroot. Countenance less natural; voice more husky. Right hand very cool, and the pulse less strong than in the left. Respiration 36, irregular, occasionally a deep inspiration. Pulse 136, feeble. Great desire of cold drink. Omit the arrowroot. Let him have a fluid-ounce of porter every half hour.

10, P. M. Surface warm; circulation active in capillaries of the skin, and veins of the extremities. No pain; no headach. Countenance better. Eyes patient of strong light. Says that he had a buzzing in his ears all day yesterday, but not any to-day: remembers the first injection, but not the second. The mind is collected, active. No dejection. Urgent thirst. Tongue more moist, edges less red. Respiration regular. Pulse 128, full and firm.

R. Pil. Hydrarg. gr. ij.

Saponis gr. ij.

M. ft. pil. sumend. horis singulis.

If the bowels are moved, substitute the following:—Pil. Hydr. gr. ij. Opii. gr. 1-5. Dress blister with Ung. Hydrarg. Porter 3ss. every hour; if any headach, omit it. Cold water frequently. Perfect quiet.

October 18. 5, A. M. One thin, fæcal dejection. The skin, particularly of the extremities, of a pink color. Conjunctivæ injected; pupils contracted. Has had some quiet sleep. Pulse 120, regular. Thirst urgent. Pergat.

9, A. M. Two thin dejections of natural color and smell. No pain. No corrugation of the skin. Dark areolæ continue around the eyes. Fur on the tongue is looser. Pulse 116, firm. Continue Pil. Hydrarg. cum Sapon. Omit the porter.

1, P. M. No dejection. Countenance very good, but for the areolæ round the eyes. Pink color of hands and feet continues. Pulse 116. Pergat.

5, P. M. Two small, thin, fæcal dejections. Has vomited, once, some of the liquid taken; says that it was caused by wind. No headach. No abdominal soreness. Areolæ less dark. Respiration 20. Pulse 112, regular. Edge of tongue less red. Pergat.

8, P. M. No change. Gets some quiet sleep. Contin. Pil. horis secundis. Soda water, ʒj. horis sing. Let not the sleep be broken on any account.

October 19. 3, A. M. At 9, P. M. discharged urine, and had a large dejection; and again both excretions at 2, A. M. Is sleeping. Respiration 20, quite natural; but with some force and sound in expiration. Pulse 104. Pergat.

9, A. M. Three thin, bilious dejections. Has vomited thrice, about three gills of bile. Has discharged a pint and half of clear urine. No pain. Countenance good; areolæ much less marked; con-

conjunctivæ less injected ; pupils of natural size. Skin of proper temperature. Yawns at times. Respiration natural. Pulse 96, firm, compressible, of good volume. Tongue soft, dryish, cleaning. Less thirst. Omit. pil. Continue soda. Beef-tea ʒ ij.

12, M. Rejected the beef-tea 15 minutes after taking it. Discharged a pint of urine at once. Vomited a pint and half of bile at four times. Two bilious dejections. Countenance less bright. Feet not warm. Pulse unchanged. Omit beef-tea and soda water. Cider ʒ iss. every hour.

5, P. M. Has taken six ounces of cider. Has passed a half pint of urine, a little cloudy. Has vomited six times, a pint of bile with a little mucus. Five bilious dejections, measuring a quart. Has hiccoughed a little. Complains of distress at epigastrium. Nausea for a short time before vomiting. Countenance haggard ; large areolæ about the eyes. Skin of just comfortable heat. Speaks in a whisper ; can produce voice by an effort. Tongue warm, dryish. Pulse 132, feeble. ʒ ss. of punch every half hour.

R. Sodæ Supercarb. gr. xij. Aquæ ʒ ij.

Give ʒ ss. of the solution every fifteen minutes.

9 1-2, P. M. Is still more sunken ; extremities are cold, and fingers bluish. Has vomited three times, a small quantity of bile. Six scanty, bilious dejections. Respiration laborious. Pulse 140, small, weak. He is hiccoughing.

A grain and half of opium was given ; and with the assistance of Drs. Ware and Hale, arrangements were made to inject a saline fluid into the veins. Before proceeding to the operation, his pulse was found to have become larger and less frequent, his skin to be warmer, and his dejections to have ceased. He had now taken the opium forty minutes ; and it was determined to continue the opium and brandy so long as this amendment proceeded. Repeat the pill at 11, P. M. ; and if any hiccough, or vomiting, or purging, again at 12. Give a teaspoon of brandy in two teaspoons of cinnamon water, every fifteen minutes. External warmth.

2, A. M. Report by Dr. J. B. S. Jackson. Has slept, waking often to ask for drink. Hiccough has been frequent. Hands are warm ; the nose is cold. Sleeps, breathing as if fatigued. Pulse 110, fuller and stronger in both wrists ; very distinct in the left.

Soon after this report, he began to sink further ; and died at 7, A. M. The body was examined eight hours after death, in presence of Drs. J. Jackson, Channing, Homans, Ware, Hale, and J. B. S. Jackson. *Muscles* rigid. *Face* much sunken ; fuliginous ; very large and dark areolæ round the eyes. *Lungs* much collapsed, crepitant, contained much dark blood. Small old adhesions at apices. *Heart* of ordinary size ; the left side empty ; the right side filled with dark, liquid blood. *Aorta* and *vena cava* full of dark thin blood. *Peritoneum* dryish. *Stomach* thin, flabby, contains a gill of bile. The mucous membrane of natural thickness and firmness ; very red in checkered spots, which at first view represented ecchymosis ; but when the membrane was stretched, the redness was seen to be in the vessels. Mucous membrane of *duodenum* very red. In *jejunum* mucous membrane slightly injected, of natural firmness, in some parts covered with a custard-like or creamy lining.

*Stomach* contained a gill of thick fluid, like porridge, of light brown color. Its mucous membrane universally red, and at the upper part coated with mucus. At the lower part the membrane was soft, dark-red, clean; the congregate glands enlarged; the solitary glands were very red, greatly enlarged, rising above the level of the membrane like warts. The *large intestines* of ordinary thickness; the mucous membrane of a pale red color, clean as if washed, but not looking soaked. *Liver* mottled on the surface; natural within; gall bladder full of bile. *Spleen* small, firm. *Pelvis of kidney* contained a small quantity of creamy matter. *Bladder* of ordinary size.

*Observations.*—This patient lived nearly four days after asphyxy and other signs of collapse were so complete that the many physicians who saw him believed that he would die in three or four hours. From Tuesday night, the time of the second injection, to Friday forenoon, he grew steadily better; the natural secretions returned; and strong hope was had of his recovery. It is plain that this amendment is to be ascribed to the injection; and the history of the case is much in favor of the operation. For it roused him from the desperate state of collapse, and at least gave time for the return of the healthy functions. The man, however, was of delicate frame, feeble constitution from childhood, and with health impaired by sedentary habits. When the natural actions returned towards the close of the third day, they became excessive; the urine, which had been suppressed three days and a half, was secreted in the quantity of four pints and more, in 18 hours; discharges of unmixed bile by vomiting and purging occurred almost every half hour; and the patient died at length, exhausted, with bilious cholera. It is to be considered how far this excess of action was produced by the mercurial and the stimulants, the exhibition of which preceded it: probably the chance of complete recovery would have been greater, had the ingesta been limited to mucilages and diluents. The pink color of the skin, particularly in the extremities, was quite remarkable. If it arose from the brightness given to the color of the circulating mass by the admixture of the salts injected, it would show that too much was thrown in. If it is a sign of hyperœmia of the capillaries, or their inflammatory condition, produced by the presence of offensive foreign matters (in the language of the nascent pathology an error loci occurring, and the sharp spicula of the salts distending and abrading the small vessels), then we should keep in view the occurrence of the same state in the internal mucous membranes, and be ready to remove it by the abstraction of blood or other more proper means.

*Boston, October 22, 1832.*

*NOTE.*—The bright pink color of the extremities is very similar to that which attends the restoration of warmth to hands which have been very much chilled; and it has been suggested that the cause may be the same. Since the date of the communication, I have had an opportunity of seeing three cases of injection into the veins, in which warm water, without salt, was thrown in. The pink color did not show itself in any one of them. I have observed five cases of saline injection; the redness was more or less remarkable in four; its presence in the fifth case is not known, as the patient was not seen after the operation. In one of these cases, the first in which the remedy was employed in this city, the surface in the vicinity of the orifice in the vein became colored a bright crimson after a few strokes of the piston, and the redness was gradually diffused. These facts make it probable that the color is owing to the presence of the salts in the blood.

*October 29.*

J. G. S.