only in chronic cases that will not yield to ordinary treatment; 4. To use it only with the consent of the patient's friends; the nature of the treatment, and the effect of the croton-oil on the skin, being first fully explained. If the last rule be not carried out, parents are apt to think that their children are being over-treated.

MENINGITIS IN TYPHOID FEVER.

By H. TOMKINS, M.D.,

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To those familiar with the morbid processes associated with typhoid fever, it is well known that, of all the anatomical lesions found in that protean disease, acute meningitis is the most rare. Cerebral congestion, with marked oedema of the brain-substance, together with serous effusion into the ventricles and arachnoid space, are common, but the signs of true meningeal inflammation are but seldom seen. The delirium, however violent and prominent as a clinical factor, is no evidence of encephalic inflammation; and the *post mortem* appearances found in the brain in cases characterised during life by the most active delirium are not uncommonly of an entirely negative character. The statistical researches of Louis on this subject confirm these statements; and Hoffman found only four cases of acute meningitis in 250 *post mortem* examinations.

That the most violent psychical disturbances are unattended with any demonstrable anatomical alteration in the brain, is doubtless due simply to the fact that the changes which have occurred in the nervous substance are of that fine and more delicate histological nature, that it is most difficult, with our present knowledge and methods of examination, to demonstrate the existence of definite parenchymatous changes. As an example of the coarser and more rare lesion of meningitis, the following may be of some interest.

Thomas P., aged 47, a milkman of corpulent habit, was admitted into this hospital on October 1st, 1880, suffering from an apparently mild attack of typhoid fever. He had been ailing about two weeks, commencing with vague and indefinite feelings of *malaise*. He lay heavy and disinclined to any exertion, but when spoken to, was perfectly intelligent, and free from any rambling. Pulse 96; respirations 24. The tongue was moist, furred; the urine free from albumen, 1020. There was a scanty eruption. Temperature 102°. The bowels were costive. For the next fourteen days, his general condition remained almost unchanged, with the exception that he became somewhat more prostrate. His temperature remained steady, from 102° to 103°; he took all that was given him without trouble; complained absolutely of nothing but being tired; lay heavy and lethargic, without purging the whole time. On the 15th, he appeared less intelligent, and complained of headache and intolerance of light. On the following day, there was not much change, and the temperature being 103° in the morning, it was resolved to reduce it, as it had shown no signs of remission. For this purpose, he was given 15 grains of sodium salicylate every three hours; this, in twenty-four hours, reduced it to 99°, and, on the evening of the 19th, it was normal. The salicylate of soda was then given in 7½-grain doses only, with the result of the temperature rapidly rising again to 104.4° on the morning of the 20th.

The soda produced the usual physiological effect of that drug, and, until the morning of the 21st, little change was observed, except increasing hebetude and lethargy. It now became apparent that we had to deal with some cerebral complication; he was with difficulty roused or made to comprehend anything, his urine was passed involuntarily, the bowels were not open. The salicylate was increased again to 15 grains, but failed to reduce the temperature below 101.4°, and was discontinued on the evening of the 22nd.

On the morning of the 23rd, he had internal strabismus of the right eye, pupils both dilated, and sluggish in action; semicomatose, and, during the day, became completely so, with apparently right hemiplegia, and died the following day.

The *post mortem* examination revealed a few small ulcers in the lower part of the ileum, none in the cæcum; mesenteric glands enlarged; spleen dark, soft, 11½ ounces in weight. On removing the dura mater from the brain, the latter was found covered with a sero-purulent exudation, especially on the left vertex. On removing it from the skull, the base was covered with a thick layer of purulent exudation, extending over all the under surface of the pons and medulla, and across the fissure of Sylvius on each side. A considerable quantity of sero-purulent fluid was in the base of the skull, whilst both ventricles were distended with a clear serous fluid, free from any lymph or pus.

Out of a total of forty cases of typhoid in which I have had opportunities of *post mortem* examination, this is the only one in which I

have found evidence of a true meningitis. It also illustrates how liable is even the mildest case of enteric fever to some serious complication, for the greater part of the progress of this case presented only the features of an ordinary mild attack of the disease.

INTRAVENOUS INJECTION OF MILK.

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At the last meeting of this Association I read a paper on the "Intravenous Injection of Milk." At that time my experience was derived from five cases; and there were only twenty-two cases on record. Since then, however, I have performed the operation twenty times. And my object in again bringing forward this subject is to give briefly the results of those cases. Twelve of them were performed in cases of phthisis, in all of which the patients had reached an almost moribund condition, with the result that, in every instance, without exception, life has been prolonged. In one, the patient had apparently only a few hours to live, yet, after the operation, he rallied so much that for some months he was able to follow his usual avocations. At the end of that time, when he was rapidly getting worse, I repeated the operation, with the result of improving his condition, although only for a still shorter time. He has since succumbed. In another case, that of a lady, the subject of well marked phthisis, who came from India for the purpose of having the operation performed, I injected four ounces of goat's milk. From the date of the operation she commenced rapidly to improve, and within a fortnight all her worst symptoms were relieved. Three months later, however, they returned; she has since died. A third case was similar to this in all particulars. In all the other cases the patients are still alive. In one of them there was dyspnoea, which was not, however, increased by the operation. Diarrhoea, where it existed, was invariably checked; in fact, it was difficult to free the bowels for a few days after the operation. Perspiration was at first increased, afterwards lessened; cough was always relieved. The general feeling left on my mind was one of disappointment at the very temporary improvement which followed in all these cases; and I fear that in cases of phthisis much benefit cannot be hoped for beyond lengthening life for a few months.

I have operated on four cases of pernicious anæmia, all of which were cured by the injection. In one, the transfusion was performed twice, in the others but once. Two were cases of exhaustion from hæmorrhage, both of which recovered. One was from uterine hæmorrhage, which recovered very rapidly. The second was from recurring hæmorrhage from a wound of the palmar arch which had bled at intervals for four weeks. The patient was so exhausted that he was quite unable to walk across the room, I injected six ounces, and repeated the same quantity on the following day. In three weeks this patient was as strong as before the accident. The last two were cases of exhaustion after typhoid fever. Both were benefited by the operation, one recovered and the other has since died.

Such has been my experience of the intravenous injection of milk. I look upon it as a much better and safer operation than transfusion of blood.

The difficulty in obtaining and defibrinating the blood, and the danger of coagulation in injecting it, in my opinion account for the reason that the operation has not come into general use in cases of emergency. It is quite different with milk. In any place, whether it be town or country, it is easily procured within a few minutes, and with proper precautions the operation is devoid of danger. Some deaths have occurred during or immediately after the operation, but in these cases the milk was either acid or kept for too long a time, or too large a quantity had been injected. The milk of any animal kept in confinement is slightly acid even when it leaves the udder, and as the blood will not tolerate the presence of an acid, it is not to be wondered at that very unpleasant symptoms often develop when milk in that state has been injected. To prevent the possibility of this, I always add ten grains of carbonate of ammonia to each injection. This, besides rendering it certain that the milk is alkaline, prevents that depression which so frequently follows the operation. I invariably use goats' milk, as it is much more easy to bring that animal in close proximity to the patient, thus avoiding any unnecessary delay between milking and the injection. I never use more than six ounces of milk. When time will not allow fresh milk to be obtained, that at hand may be boiled and strained.

This was done in two of the successful cases. In conclusion, I have only to hope that in suitable cases a fair trial may be given to this operation, which seems already to have fallen into unmerited disrepute both here and in America.