

When the figures shown in Table II are compared with the corresponding figures recorded in Table I it is seen that the H titres of the sera from the contacts were 1,000 times lower and the O titres 500 times lower than the titres of the two therapeutic sera that had been used for the injections. If account is taken of the fact that the titre of the natural H antibody in normal human serum is extremely low, whereas the O titres for the sensitive typhoid strain 0901 often reach a dilution of 1 in 50 or 1 in 100, it may be concluded that the H titres give the correct measure of the degree of dilution of the passively transferred antibodies. Judging from the dilution factor, one could not expect to demonstrate the Vi antibody in the serum from the inoculated persons even in a dilution of 1 in 5, which, according to my experience, is the limit of the natural Vi agglutinin in human serum. Actually only two out of the nineteen sera tested produced marked Vi agglutination in a dilution of 1 in 5. One of the two persons who gave a positive Vi reaction was re-examined twelve days after the administration of the prophylactic dose. The Vi reaction was then negative in the dilution 1 in 5, and the H and O titres had fallen to less than half the values that had been established two days after the inoculation.

Comments

It is not suggested that these observations indicate that the prophylactic doses administered by Fenton and Hay were too small. The results of experiments in mice show clearly that the potency of the Vi antibody in protective action is very striking when contrasted with the comparatively low titre of its *in vitro* action in agglutination tests. It is quite conceivable that adequate protection may be afforded when the circulating Vi antibody is not demonstrable by agglutination even in the undiluted serum. However, in the absence of adequate data relating to the results of the prophylactic use of the serum in man it would appear to be inadvisable to reduce unduly the amount of the specific antibodies that are injected.

The titre of the Vi antibody in the concentrated anti-typhoid serum as issued at the present time is 1 in 3,000. Until serum with a considerably higher content of this antibody can be prepared the following recommendation seems to be justified: for prophylactic use one intramuscular dose should be given, and this should lie between the limits of one-sixth and one-third of the full curative dose, which is 99 c.cm. for an adult and proportionately less for a child. When deciding on the dose to be administered account should be taken of the degree of risk and of the length of exposure to the infection.

The Association of Special Libraries and Information Bureaux (31, Museum Street, London, W.C.1) held a luncheon at the Café Royal on April 27 at which over eighty people were present. The president, Sir Harry Lindsay, Director of the Imperial Institute, spoke of the three stages of science: first scholasticism, dominated by the great scientists; then the period of the authoritative textbooks; now the era of the individual specialist. The results of modern scholarship were scattered in innumerable technical journals, and in order to keep abreast search must be made over a very wide field. The same was no less true of other spheres of knowledge. "ASLIB" was therefore formed to act as a guide to specialist sources of information. Sir Clement Hindley said that members of the Association were eager to facilitate the dissemination of knowledge, and Sir Ian MacAlister spoke of "ASLIB" as a valuable and essential part of the great movement to make the instruments of civilization work.

OUTBREAK OF SONNE DYSENTERY DUE TO CONSUMPTION OF MILK

BY

G. K. BOWES, M.D., M.R.C.P.

Medical Officer of Health, Bedford

The following account of an outbreak of Sonne dysentery due to milk may be of interest.

Course of Outbreak

On January 5, 1938, information was received in the Public Health Department, Bedford, to the effect that five persons employed in a neighbouring office, all of whom had drunk raw milk there on the morning of Tuesday, January 4, had been taken ill with diarrhoea and vomiting on the evening of the same day or early the following morning. Since all members of the office staff came from different homes, the milk drunk appeared to be the only food common to the individuals concerned. Moreover, all those who partook of the milk were affected, and none of the office staff who had not drunk it had had similar symptoms. The milk was delivered daily by a retailer who obtained all his supplies from a farm about seven miles away, the retailer's dairy being the only one in Bedford to receive this milk. It arrives in churns, and is distributed raw to the consumers, some in bottles and some "loose." The bottling is done by the retailer. No other persons but the retailer and his wife, who is employed mainly in the shop connected with the dairy, lived on the premises or worked in the business. The retailer was interviewed by a member of the sanitary staff on the morning of Wednesday, January 5, and stated that he had had no complaints from his customers of any illness caused by the milk. This statement seemed at first to throw some doubt upon milk as the source of the illness.

Samples were, however, obtained from milkings of the evening of January 5 and the morning of January 6 and sent to the County Medical Officer, Dr. C. G. Welch, in whose area the farm is situated, with a suggestion that a veterinary inspection of the cows might also be made. This veterinary inspection was undertaken, with negative results. At the same time a physical examination of samples showed that the milk was "clean." The County Medical Officer had meanwhile ascertained that another customer in the town had suffered from similar symptoms. On January 7 he obtained a sample of milk as delivered, and still sealed, at the house of this customer, and sent it to the Ministry of Health for examination.

On the same day, in a telephonic communication, Dr. Seymour of the Ministry of Health suggested that useful information might be obtained by house-to-house inquiries among the customers of the milkman. A list of these was accordingly secured. A preliminary inquiry in the evening of the same day showed that in two among the six houses then visited one or more members had suffered from similar symptoms. As in the original cases, the symptoms occurred on the evening of Tuesday, January 4, and the morning of Wednesday, January 5. In the original cases the milk supply had been stopped after the occurrence of symptoms, but in the households investigated no suspicion attached to milk, and members continued to drink it. It therefore appeared likely from this preliminary investigation that any infection of the milk had been limited to one day—namely, Tuesday, January 4. Though this presumption was subsequently found to be erroneous it was at the time decided, on the evidence available, not to take steps to stop the milk supply.

On Saturday, January 8, all households supplied with milk by the retailer were visited by the sanitary staff and inquiries made as to any illnesses with similar symptoms. In all, 106 households were visited, and it was found that in fifty-nine of them one or more members had suffered from the symptoms in question. The illness occurred alike among those who had had bottled and those who had had "loose" milk. The date of onset of the earliest symptoms in the households is given in the following table:

Monday, January 3	..	..	..	..	..	2
Tuesday, "	4	..	..	..	..	25
Wednesday, "	5	..	..	..	..	20
Thursday, "	6	..	..	..	..	7
Friday, "	7	..	..	..	..	5

Among an estimated number of 224 persons in the households investigated, ninety-six, or 43 per cent., suffered from symptoms. From the time distribution of the cases, the opinion, though erroneous, appeared to be confirmed that any infection of the milk was limited to one day. Hence it was still decided to take no action to stop the supply.

Specimens of faeces had been obtained from the original sufferers on January 7 and subsequent days, and sent to Dr. Scott, of the Ministry of Health pathological laboratory, for examination. On January 10 a report was received from Dr. Scott stating that two out of the five specimens showed the presence of dysentery bacilli of Sonne type, and that the same bacillus had been isolated from the sample of milk taken on January 7. It appeared quite clear, therefore, that the outbreak was one of Sonne dysentery and was due to the consumption of infected milk. It also appeared that this milk was still infectious at least as late as the time when the sample was taken (January 7).

In view of this additional and positive information it was decided to stop the milk supply under the power given by the Milk and Dairies Order, 1926, till an improvised pasteurizing plant could be installed. With the co-operation of the Bedford Gas Company, working in conjunction with the sanitary inspectors, such a plant was put into action on the evening of Monday, January 10, and it was possible to resume the ordinary milk supply after pasteurization on the following morning. Pasteurization was made a condition of permission to continue the supply of milk until it should have been proved that it no longer contained discoverable dysentery bacilli and that all those handling it at any stage were free from dysentery bacilli; and until the conditions at the farm were satisfactory from the point of view of possible milk infection.

In the endeavour to trace the source of the now definitely known infection inquiries were made as to the health of all those who came in contact with the milk. In the course of the preliminary inquiry on January 7 it had already been ascertained that neither the retailer nor his wife, the only two persons concerned in handling the milk after delivery to the dairy in the borough, had at that time had symptoms. Specimens of faeces were now obtained from both these individuals and sent to the Ministry of Health. At the same time Dr. W. K. Parbury, medical officer of health for the Bedford Rural District, in which area the farm is situated, made inquiries as to the health of those persons handling the milk in the course of its production and transit, and obtained specimens of faeces. He also made inquiries at some forty houses to which milk from the farm is delivered by the farm milk lorries before they come into the borough, and found that no household had been affected with dysenteric symptoms (with the exception of one patient who had had diarrhoea accom-

panying a definite attack of pneumonia obviously unconnected with the milk). This distribution of cases seemed to make it reasonably clear that the milk had been infected in the town and not on the farm or in the course of conveyance to the town. Reports received from the Ministry of Health showed that the faeces were negative in the case of all persons handling the milk, with one exception—namely, that of the retailer. This fact, however, for reasons to be stated, cannot be taken as confirming the view, formed on other grounds, that the milk was infected in the borough.

It has been mentioned that on Friday, January 7, the retailer stated that he had not had the symptoms in question. After the receipt of the report on his faeces he was again interviewed, and he then said that on January 9 he had suffered from toothache and had drunk milk largely in place of his ordinary food. On the same day he had an attack of diarrhoea. This fact renders it rather more probable that he was himself infected by drinking the milk than that he was the original source of the infection. In consequence of the report received the retailer was on January 13, the date of the receipt of the report, prohibited under the provisions of the Milk and Dairies Order, 1926, from handling milk or milk vessels till he should be proved free from dysentery bacilli.

The medical officer of health of the rural district carried out at the farm investigations into the water supply from which the cows drank and to which they had access. Normally the cows drank from a trough fed by rain-water from the roof of the farm buildings, but when this was exhausted they drank from a pond into which they were able actually to enter, with the possibility of contamination of their udders. Samples for bacteriological examination were taken both from the trough and from the pond. The first reports on these samples stated: "This water is very badly contaminated with intestinal organisms; the *Bacillus coli* are of the faecal type. Organisms of the dysentery group are present, but I have been unable to determine which variety without agglutination tests employing specific sera for each form." Subsequent tests of samples of the water with a view to determining the nature of the dysentery bacilli failed to reveal their continued presence. Steps were taken to have the pond fenced off so as to prevent the cows from entering the water, though they were allowed to drink from this when the rain-water trough was exhausted.

Subsequent specimens of faeces from the retailer proved negative, and after the third negative report on January 27 he was permitted to resume handling of milk and vessels. On the receipt of a report from the medical officer of the rural district to the effect that the suspected pond had been fenced off and other minor requirements carried out, the retailer was released from the obligation to pasteurize.

No further cases of illness came to light among the customers of the retailer after the systematic inquiries on Saturday, January 8. It will be seen that the source of infection of the milk remains obscure.

Symptoms

The symptoms in most cases were mild, and consisted of abdominal pain, vomiting, and diarrhoea for twelve to thirty-six hours. In only a very small proportion of cases was medical advice sought, and in only a few cases was passage of blood and mucus in the faeces mentioned. In a few instances the diarrhoea persisted for some days and was accompanied and succeeded by a period of weak-

ness. The period between consumption of milk and onset of symptoms was twelve to twenty-four hours in those cases where this could be determined.

Additional Inquiries

On January 11, when the cause of the outbreak first became clear, all the medical practitioners in the town were informed of the facts and were asked for information as to any further cases which might come to their knowledge. Inquiries were also addressed to the larger local works.

Investigations as to the food and milk supply were undertaken in all cases reported—a comparatively small number—but it was not possible to determine that any further supply of milk or other article of food had been infected.

Precautionary Measures

In view of general statements from medical practitioners to the effect that a large number of sporadic cases with similar symptoms had occurred recently in the town, it was at first considered a possibility that other milk supplies might have become infected, and therefore consumers were advised through the Press to boil all their milk. When further investigation failed to reveal any common source of cases other than the one already known it was decided that this precaution might be discontinued.

Comments

Dysentery, as is well known, has been widely prevalent throughout the country in recent months, and this has generally been due to the Sonne bacillus. During the weeks ending January 8, 15, 22, and 29 the number of cases notified in England and Wales was 256, 256, 291, and 250, respectively. Dr. A. A. Jubb of the Ministry of Health in a communication states as follows:

"It is a reasonable conclusion that this outbreak was milk-borne, although the mode of infection of the milk has eluded investigation. The detection of the Sonne bacillus in milk has not previously been reported, and the occurrence is therefore of importance for our records.

"You will be interested to know that we have received several reports of very full and even laborious inquiries made by medical officers of health into the origins of outbreaks of dysentery during the recent prevalence, but so far nothing tangible has resulted, except that in two instances an article of food was found to be infected with Sonne bacilli. In a few institutional outbreaks, however, it has been possible, owing to the circumstances of a closed community, to trace with a fair degree of certainty the course of a Sonne infection through an article of food, but bacteriological confirmation has been lacking."

In reviewing the course of the outbreak it is easy to see that several mistakes were made. Some of these were perhaps inevitable at the early part of the investigations, when knowledge was incomplete, and some, with the experience gained, might be avoided in a future outbreak. In the first place, at the outset it would have been wiser to suspect an illness of human origin rather than some toxic condition of the milk as the result of possible illness of the cows, which was at the first in my mind. There was at the time, however, nothing to point specially to dysentery, nor did I realize that this illness had so short an incubation period. Secondly, the fact that nearly all the cases would have remained undiscovered if a house-to-house inquiry among all consumers had not been made shows that it is useless to rely upon a statement from the milkman as to any illness among his customers, even if

this had been widespread. In fact, had it not been for the chance information received from a neighbouring office the outbreak might have been undetected, though probably this would have made no difference to its course. Again, it is difficult to say whether it was sound judgment to determine not to stop the milk supply on the evidence available at the time and before definite infection of the milk was known. I should always hesitate to take this action unless there was good evidence that milk had caused, and was continuing to cause or to be likely to cause, serious illness among consumers. As it still appears probable that the retailer himself became infected after the onset of the outbreak, I am of the opinion that there was no reason to prohibit him from taking part in handling milk or vessels at an earlier stage than was in fact done.

Summary

1. An outbreak of Sonne dysentery due to drinking milk is described.
2. Fifty-nine out of 106 households, or ninety-six among 224 individuals (estimated), were affected.
3. The incubation period was usually twelve to twenty-four hours.
4. Symptoms as a rule lasted twelve to thirty-six hours.
5. Sonne dysentery bacilli were isolated from faeces of some of the patients and from the milk itself.
6. The actual source of infection of the milk remains untraced.

THE GONADOTROPIC ACTIVITY OF THE ANTERIOR PITUITARY GLAND IN RELATION TO INCREASED INTRACRANIAL PRESSURE

BY

W. R. HENDERSON, F.R.C.S.

Neurological Surgeon, General Infirmary at Leeds

AND

I. W. ROWLANDS, Ph.D.

National Institute for Medical Research, Hampstead

It is known clinically that a considerable increase in the intracranial pressure, in cases of cerebral tumour, may lead to irregular and even complete cessation of menstruation. This effect is presumed to be due to mechanical compression of the pituitary gland. An investigation of a single case of increased intracranial pressure during pregnancy showed that there was a notable decrease in the hormone content of the placenta and urine (Henderson and Robson, 1936). This result led us to investigate the effect of increased pressure on the amount of gonadotropic hormone in the pituitary of men and non-pregnant women. The results obtained relative to increased pressure are inconclusive, but interesting observations have been made on the pituitaries from cases with normal intracranial pressure, which served as controls to the above series.

Material and Methods

In all, 109 human pituitary glands were assayed for gonadotropic activity. Fifty-seven of the glands were from patients (twenty-eight men and twenty-nine women) with normal intracranial pressure who died at the National Hospital, Queen Square, from a variety of general and neurological diseases other than acute infections. The