

Typhoid Carriers in Mental Hospitals. By P. K. McCOWAN, M.D.,
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THE following paper presents the results obtained from the investigation of enteric fever at Cane Hill Mental Hospital. For some time past there has been a persistent incidence of enteric fever on the female side of this institution. The cases have been sporadic, and as all circumstances pointed to the existence of "carriers" as the cause, it was deemed advisable to conduct an extensive bacteriological examination on all possible sources of infection.

For this purpose the case-records of all the female patients were examined, and a list compiled of all cases that had previously suffered with enteric fever or any illness suggesting enteric fever, or in the course of previous examinations had given a doubtful Widal reaction without clinical symptoms. All available evidence was made use of to make this list as complete as possible, and finally it was found to include 98 patients still resident in the mental hospital.

Specimens of the urine and fæces were sent by special messenger to the laboratory on four different occasions at periods of about a week.

At the laboratory they were immediately plated on MacConkey media, and all suspicious organisms investigated by sugar reactions and agglutination tests with the Oxford standard agglutinating sera, and in the large amount of work necessitated by this investigation we would acknowledge the valuable assistance rendered by Mr. F. Partner.

Repeated examination of these cases revealed eight instances in which *B. typhosus* was found in the excretions. These patients were placed together in one ward, and it was hoped that with suitable precautions the danger to the other patients in the ward would be reduced to a minimum, but six fresh cases of enteric fever occurred in this ward within six months. As a further precaution, all the patients were inoculated with T.A.B. vaccine, and only one further case has arisen.

Since the segregation of the "carriers" only one case of enteric fever has occurred outside this ward. Examination of the fæces and urine of all the patients in this other ward led to the detection of another fæcal "carrier." Thus in the course of this investigation nine "carriers" have been detected, three whose attack of typhoid was of comparatively recent date, and the remaining six of periods up to nineteen years. Their particulars are as follows :

(1) F. D—, admitted May 7, 1918. Mental condition: Dementia præcox. August 30, 1920: Attack of typhoid of three weeks' type. Agglutination to *B. typhosus* positive. Para A and B negative. Between September 11 and December 28, 1922, urine and fæces examined on nine occasions. Urine negative, but *B. typhosus* isolated once from fæces.

(2) S. H—, admitted January 14, 1897. Mental condition: Manic-depressive insanity. March 29, 1923: Attack of typhoid of three weeks' type. Agglutination to *B. typhosus* positive. Between April 11 and June 18, 1923, urine and fæces examined on six occasions. *B. typhosus* isolated once from the urine, and from the fæces on three occasions.

(3) E. B—, admitted December 7, 1908. Mental condition: Dementia præcox. October 9, 1922: Attack of typhoid of three weeks' type with pneumonia in convalescence. Agglutination to *B. typhosus* positive up to 3,000 Dreyer units. Para A and B negative. Between October 16, 1922, and March 5, 1923, urine and fæces examined on eight occasions. Urine negative, but *B. typhosus* isolated on last occasion from fæces.

(4) J. W. B—, admitted March 14, 1884. Mental condition: Dementia præcox. Typhoid fever of three weeks' type in 1904. February 24, 1917, clinical typhoid with negative Widal. Fæces negative, but urine examined four times between March 27 and September 11, 1922, showed the presence of *B. typhosus* on three occasions.

(5) E. L—, admitted March 15, 1892. Mental condition: Dementia præcox. March 2, 1917: Attack resembling enteric fever of three weeks' type, but with negative Widal. Between November 4, 1922, and February 24, 1923, urine and fæces examined on six occasions. Urine negative, but *B. typhosus* isolated three times from fæces.

(6) C. M—, admitted January 13, 1897. Mental condition: Dementia præcox. September 16, 1917: Note says, "She has run a temperature for ten days. No special symptoms. September 19, 1917: She is getting up and has quite recovered." Owing to the occurrence of a case of typhoid in the ward, the urine and fæces of all the patients were investigated. All were negative with the exception of the above case, from whose fæces *B. typhosus* was isolated.

(7) S. T—, admitted March 24, 1890. Mental condition: Dementia præcox. October 28, 1918: Typhoid fever of three weeks' type. Agglutination positive. Urine and fæces examined thrice from March 25, 1922, to January 8, 1923. Urine negative, but *B. typhosus* isolated from fæces on last occasion.

(8) M. A. D—, admitted January 30, 1919. Mental condition: Dementia præcox; wet and dirty. May 27, 1919: Typhoid fever of three weeks' type. Agglutination positive. Urine and fæces examined four times between October 3, 1922, and February 19, 1923. Urine negative, but *B. typhosus* isolated from fæces on one occasion.

(9) E. T—, admitted September 14, 1916. Mental condition: Secondary dementia. August 4, 1920: Typhoid fever of three weeks' type while suffering from pulmonary T.B. Urine and fæces examined four times between June 29, 1922, and February 12, 1923. Urine negative, but *B. typhosus* isolated on two occasions from fæces.

It will be observed that the above cases include one urine carrier and eight fæcal carriers. The urinary case is noted to have had an attack of typhoid nineteen years ago, and the other cases have probably been intermittent "carriers" for periods up to seven years. In one case there was no definite previous history of typhoid, but a suspicious note renders it probable that the case has been a carrier for over six years.

This investigation agrees with others of a similar nature in suggesting a higher incidence of "chronic carriers" following typhoid infection in mental hospitals than the 3 *per cent.* found in similar investigations elsewhere. It has been suggested that a psychosis

is a predisposing factor to a carrying state, but there is no evidence to support this view. A much more probable explanation of the large number of "carriers" found is the exceptional facilities for thoroughly carrying out bacteriological investigations on a large scale in the institutions concerned, with a corresponding increase in the probability of detecting the presence of "carriers." Also, as Eccard suggests, an insane typhoid convalescent of filthy habits is probably always reinfesting himself, and so develops into the chronic type.

As regards the pathogenesis of the typhoid-carrying state, though none of the "carriers" in the present series have symptoms, quite a large number of "carriers" suffer from cholelithiasis, while in others, though symptoms may have been absent, gall-stones have been almost invariably found at autopsy. The condition is probably due to focal deposits of *B. typhosus* in the gall-bladder in intestinal "carriers," and in the pelvis or tubules of the kidney in urinary "carriers." These deposits are doubtless determined by pre-existing lesions, which would account for the striking preponderance of female over male "carriers," in accordance with the relative gall-stone incidence in the two sexes.⁽¹⁾ In the majority of autopsies on intestinal "carriers" the bacillus has also been recovered from the liver, intestinal walls and spleen.

As regards the physical disabilities of the "carrier" state, it may be said in general that the "carrier" who has no definite gall-bladder symptoms is little, if at all, inconvenienced in bodily health. Certain "carriers" of intermittent type, however, have been observed to suffer from periodic disturbances of their general health.

Various methods of treatment have been tried in the endeavour to clear up the infection in this condition. Cholecystotomy and cholecystectomy have been tried, but the results have been far from encouraging. This is only to be expected when it is remembered that in long-standing cases the bacilli are lodged, not only in the gall-bladder, but also in the biliary tracts and duodenal recesses. Vaccines, both stock and autogenous, have been unsuccessful, and X-ray treatment in the region of the gall-bladder has proved equally disappointing. The drug treatment of both urinary and intestinal "carriers" has been entirely ineffective, a temporary improvement being the very best that has been obtained. It must indeed be admitted, on considering the pathology of the condition, that the problem of effecting a cure in these "carriers" is an extremely difficult one. In the case of "carriers" who are in an early stage of this condition, there may be some hope of effecting a permanent cure by one or more of the above methods, but in

long-standing chronic cases the chances of success would seem to be extremely remote.

Certain measures can be carried out for the diminution of spread of infection by "carriers." The first step is the adoption of some form of routine bacteriological examination during convalescence, and as the cases examined in this investigation show, allowance must here be made for intermittency. Undoubtedly much harm can be prevented by the early recognition of "carriers," and the longer the duration of bacteriological supervision the less is the risk of overlooking the intermittent "carrier." Monthly examination of the excreta of all convalescents for a period of twelve months would probably suffice, and in mental hospitals with their own laboratories this can very easily be carried out. Similarly it would be easy to examine the excreta of every new admission. It is a very good rule, and one that is observed in many institutions, that no patient who has suffered from typhoid fever should be allowed to have anything to do with the food of other patients. Infection occurs most frequently by the hands, which are readily contaminated with typhoid bacilli during defæcation and urination. It has been found that washing the hands with soap and water alone may fail to remove *B. typhosus* present, whereas this with thorough drying after removal of soap with running water is very efficient. The chief protective measure in mental hospitals is isolation. To be successful this means an isolation block with special nurses, which may well be impracticable in many institutions. Owing to administrative difficulties, it has certainly been impossible so far at Cane Hill Mental Hospital. Here all that has been practicable has been the collection of all the "carriers" in one ward, but the attempted isolation under these circumstances has not proved very successful.

The present investigation, together with a similar one at Long Grove Mental Hospital indicates that the condition of mental hospitals as regards typhoid fever is more serious than is generally accepted, and suggests the possibility of a number of "carriers" being present in similar institutions.⁽²⁾ In the London County Council mental hospitals it might be easier to deal with these patients as a whole than at each hospital separately, though in other respects there would be many difficulties.

Summary.—The investigation of 98 cases whose history indicated any suspicion of previous enteric fever has led to the discovery of one urinary and seven fæcal "carriers," also one fæcal "carrier" was discovered amongst the contacts of a case of enteric fever occurring in a ward, after segregation of the above "carriers." One "carrier" had no definite previous history of enteric fever, but a suspicious note suggests the possibility that the case has been

a "carrier" for six years. The other cases have probably been "carriers" for periods up to nineteen years.

The importance of periodic and persistent bacteriological examinations of the excreta of suspected cases is shown by the fact that the "carriers" were mainly of the intermittent type, and typhoid bacilli were only isolated after repeated examinations. The recent equipment of laboratories in the London County Mental Hospitals will help in this respect, not only in giving facilities for more work to be carried out, but also enabling examinations to be made on absolutely fresh material.

The treatment of these cases presents a very difficult problem, the only prophylactic measures possible being general inoculation and segregation of "carrier" cases. The latter measure confers some hardships on the patient if varying mental types have to be warded together; it also presents administrative difficulties.

In conclusion we would express our thanks to Dr. F. Golla, Director of the Pathological Laboratory at the Maudsley Hospital, and Lt.-Col. S. Elgee, Medical Superintendent of Cane Hill Mental Hospital, for their interest and facilities given to carry out this work.

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(¹) During the years 1907 to 1913 at Claybury Mental Hospital, 539 male and 587 female autopsies were made under the direction of Sir Frederick W. Mott. The incidence of gall-stones was 52, or 9·6 *per cent.*, males, and 95, or 16·2 *per cent.*, females.—(?) Similar investigations at Horton Mental Hospital show there to be several carriers, in addition to one already known and isolated. Cases of typhoid have been comparatively few, but have recently tended to increase. No epidemics have occurred.—Eps.

The Unconscious: A Suggestion.⁽¹⁾ By WILLIAM CALWELL, M.D., Physician, Royal Victoria Hospital, Belfast,

THE word "unconscious" is used in Freud's sense; the word "suggestion" is used more in the general sense of the presentation of an idea to the mind than perhaps in the more technical sense of McDougall.

(¹) A paper presented at the Annual Meeting held at Belfast, July 2, 1924.