Clinical and other Notes.

A NOTE ON THE COLON BACILLUS IN ACUTE DIARRHŒA.

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Much has been written of the pathogenic faculties of the Bacillus coli family, and a causative rôle in neurasthenia constitutes the latest indictment. Amongst these observations the possibility of its being the cause of certain acute intestinal conditions does not appear to have received an undue share of attention. In view of the protean nature of the pathological lesions indisputably due to B. coli there appears reason for crediting it with the ability to excite an acute inflammation in its natural habitat, should the local resistance become lowered, or the normal virulence of the organism be enhanced.

In Mauritius acute diarrhœal disease occurs not uncommonly, and varies in intensity from a mild type with little general reaction to a severe infection of dysenteric nature with marked constitutional symptoms. Formerly, as a rule, the diagnosis "dysentery" was applied to these conditions, which designation, in many cases, defined the symptom complex rather than the ascertained cause.

The attempt to investigate the local diarrhœal infections was commenced by cultural examinations of the surface and intestinal organisms isolated from flies caught in various parts of the camp; at the same time efforts were made to ascertain the whereabouts of the flies' origin by means of coloured lycopodium. However, in view of the almost uniformly negative results of the concomitant fecal cultures, the fly examinations were not long continued. It is of interest, however, that the only organism of known or suspected pathogenicity isolated from any of the flies was B. proteus vulgaris, which organism was isolated from the feces of a severe case of diarrhœa some weeks later.

On the admission to hospital of any patient presenting diarrhœal symptoms, the following examinations are carried out at present as a routine procedure—and here one may state that obstinate constipation is the rule in the local enterica.

1. A stool is passed into a heated utensil and immediately examined microscopically on a warm stage.
2. Cultures are made on lactose and other media and incubated.
3. Mucus, if present, is stained by various methods and examined microscopically.

In addition, blood and urine cultures are taken if the patient shows any febrile reaction. These tests are repeated several times if a negative result is obtained.
Clinical and other Notes

During the past nine months the dejecta of seventeen patients suffering from diarrheal disease of unknown origin have been examined thoroughly by the foregoing methods with the following findings:

Specimens from one patient showed *E. histolytica*.

Two patients' fecal cultures showed non-lactose fermenting colonies, which on investigation proved to be *B. proteus vulgaris* in one instance, while from the other an organism corresponding with Bacillus "A," sub-group "a," in Graham-Smith's classification¹ was isolated.

In the fourteen remaining cases repeated investigations showed the presence of no abnormal organism.

The cases of two men whose symptoms had persisted without amelioration for twenty-one and fourteen days respectively first led to a consideration of "excretal" *B. coli* as a possible causative organism. Repeated fecal cultures had shown "excretal" *B. coli* colonies only, more particular examination of which proved *B. cloaca* to predominate. A series of serological examinations was then carried out, and these patients' serum was found to agglutinate *B. cloaca* in dilutions up to 1 in 50. Without loss of time a *B. cloaca* vaccine was made and injected, and the almost immediate relief and the speedy cessation of symptoms in both cases appeared more than a coincidence. In a third similar case no *B. coli* antibodies could be discovered, but the injection of a vaccine, made as in the foregoing instances, was attended with a like result. In the later cases no serological tests were performed owing to the vaccine therapy having been commenced before antibodies had been formed in an appreciable amount.

The following is the present procedure adopted in this hospital in every case of diarrheal disease. On admission the various investigations already noted are performed as thoroughly as possible, during which time the patient is treated by such methods as may appear indicated; if the symptoms show any sign of abating, no further therapeutic measures are employed. But if consecutive examinations show the presence of no abnormal organism, and if the symptoms still continue without abatement on the completion of these tests, injections of a *B. coli* vaccine are commenced. Failing the marked predominance of any one coliform organism a vaccine consisting of several strains of *B. coli communis, B. cloaca, B. lactis aerogenes*, &c., is employed; the usual initial dose being 50,000,000 organisms, increasing amounts being injected at intervals of about two days.

Of the fourteen cases in which no abnormal organisms could be detected, eight resisted ordinary therapeutic methods, and were treated with vaccines. Captain A. N. R. McNeill, in charge of the medical ward, states that, having employed the ordinary intestinal antiseptics and

¹ Report of the Local Government Board (Medical Officer's Supplement), 1911, Appendix B.
Clinical and other Notes

sedatives without evident effect in these cases, he found the results of vaccine therapy "most striking." Major V. J. Crawford, the officer commanding the hospital, who followed the cases closely and gave every assistance, concurs in this opinion.

The following are extracts from the medical case sheets of two patients treated on the lines advocated:

Case 2 (subacute).—Temperature about 99° F. Pain and tenderness in abdomen; bowels moved three to six times per day, little fecal matter with much blood-stained mucus being passed. Blood culture negative. Under ordinary treatment for fourteen days—ol. ric. c. tr. op.; later, ipecac. c. ac. tan.—without apparent benefit. Fecal examinations showed the presence of "excretal" B. coli only, among which colonies B. cloaca predominated. The blood serum was found to agglutinate B. cloaca in dilutions up to 1 in 50. Drug treatment stopped, and 75,000,000 organisms of an autogenous B. cloaca vaccine injected; two days later the patient is noted as "very comfortable and motions less fluid." An injection of 150,000,000 was then given. Five days after the first injection the motions are noted as "normal" in consistence and number. Two further doses were given before discharge.

Case 8 (acute).—Temperature 102° F. About a dozen motions per diem, consisting chiefly of mucus and blood; much pain and tenesmus. Patient "looked very ill." Blood culture negative; fecal examination showed "excretal" B. coli only. Treatment: Ol. ric. c. tr. op.; liq. hyd. perchlor.; later, ½ gr. morph. hypodermically. The patient showed no improvement; 75,000,000 organisms of a mixed vaccine were injected on the fifth day, followed by 150,000,000 two days later. After the first dose the patient was more comfortable, and forty-eight hours subsequent to the second injection the temperature fell to normal, but the same evening rose to 99°6 F. The following day a dose of 200,000,000 was given, and twelve hours later the temperature fell, and remained normal. During this time the intestinal condition and the patient's general state progressively improved, and on the sixth day after the first injection the bowels were moved only twice, and thereafter until the patient's discharge from hospital he had only one normal motion per diem. Two further injections were given before his discharge from hospital.

It may be urged that if vaccines had been withheld all these infections might have pursued a similar course. That the amelioration of symptoms should coincide with the employment of vaccines, since the commencement of this treatment in the different cases varied from the fifth day to the twenty-first, appears to be more than fortuitous. To attempt to formulate statistical data from the figures available would, of course, be absurd, therefore the clinical experience is the sole evidence adduced. The clinical results obtained in those remaining cases which previous to vaccine treatment showed no tendency to resolve appear to be remarkable.