DYSENTERY PROPHYLAXIS BY ORAL BILIVACCIN AT POONA AND SECUNDERABAD.[1]

By Major W. WALKER, M.C.,
Royal Army Medical Corps,
AND
Captain R. C. WATS,
Indian Medical Service.

The exhaustive investigations by Major Manifold [1 and 2] into the prevalent types of dysentery encountered in Poona revealed the fact that the great majority were bacillary in origin. He further demonstrated that *B. flexner* was the most frequent infecting organism encountered.

Funds having been obtained from the Indian Research Fund Association, the task of preparing an efficient prophylactic Flexner vaccine was undertaken by the senior writer. Two strains of *B. flexner*, previously isolated by Major Manifold, were used for this purpose on account of their high antigenic properties. A vaccine containing a 1,000 million of each strain per cubic centimetre was prepared and preliminary animal tests having proved satisfactory as regards the production of agglutinins against the five standard strains of *B. flexner*, it was decided to test the vaccine on the laboratory staff. A serological examination of each individual, before the administration of the vaccine revealed the presence of agglutinins against *B. flexner* V, W, X, Z, and Y in all cases. The vaccine was administered in two doses, first dose $\frac{1}{2}$ cubic centimetre followed by 1 cubic centimetre after an interval of ten days. Serological tests were carried out on each individual at frequent intervals, and it was found that the existing agglutinins rapidly disappeared in all cases. Further, two individuals developed acute bacillary dysentery within twenty-one days of the second dose of the vaccine. It was decided not to proceed further with human tests until more exhaustive animal tests could be carried out.

Just when matters in this line of investigation had come to a standstill, a liberal supply of oral bilivaccin was put at our disposal by the Director of Medical Services in India with the request that its efficacy be tested as a prophylactic against bacillary dysentery amongst the troops in the district. This definitely determined our future line of investigation in local dysentery prophylaxis. The bilivaccin was tried out in Poona and Secunderabad and the results are recorded herewith.

---

[1] This research was financed by the Indian Research Fund Association. Reprinted by kind permission from the *Indian Journal of Medical Research*, vol. xvii, No. 1, July, 1929.

PRELIMINARY NOTES.

(1) It was decided to limit this investigation to British troops only, the arrangement being to protect a certain number of men in a few selected units, the unprotected, living under identical conditions, would thus act as controls. Special dysentery case sheets were distributed to the hospitals concerned for recording the clinical signs and symptoms of all cases of dysentery treated during the period of this investigation. The laboratory technique employed was that described by Major Manifold [1 and 2] in his Poona investigations.

(2) The form of the preparation.—The bilivaccin is prepared by the Biothérapie Company, Paris, according to the researches of Professor Besredka. It is presented in the form of dark brown tablets packed in small glass containers, three tablets per container. Three tablets represent the full prophylactic dose for an adult. Full directions are issued with each package. The following extracts are quoted:—

> "Take on empty stomach one tablet of vaccine on three successive mornings. Food can be taken one hour after the ingestion of the vaccine.
>
> "After the entire dose has been taken (three vaccine tablets in three days), complete immunity is secured.
>
> "The immunity acquired lasts for one year. In case of epidemics, it is advisable to repeat the vaccination in a few months.
>
> "No special diet is necessary."

(3) The distribution of the vaccine.—It was decided to protect one entire infantry unit and a portion of another at Poona and 300 troops at Secunderabad.

The final distribution of the vaccine was as follows:—

1st Bn. The Cheshire Regiment	856 doses.
2nd Bn. The Royal Irish Rifles	250 ,,
British Troops, Secunderabad	294 ,,

(4) The method of administering the vaccine.—The selected troops were paraded by companies, on three successive mornings, soon after *réveillé*, without having partaken of the usual "gun-fire" cup of tea. The men were arranged in line, three deep. The front man of each row was handed a container of three tablets and, having helped himself to one, passed the remaining ones to the men behind him. No food was taken before one hour had elapsed.

(5) The immediate effects.—The great majority experienced no after-effects on swallowing the tablets. A few complained of slight abdominal discomfort. No case developed dysentery during or immediately after the administration of the vaccine.

The findings at Poona and Secunderabad will be dealt with separately.

The Poona Investigations.

The vaccine was distributed to the troops during the third week of June, just prior to the expected "dysentery season." The material for this investigation was collected during the period July 1 to October 31, 1927. During the period forty-three cases of dysentery occurred amongst the British troops at Poona. Of these 36 or 83·7 per cent were bacillary in origin; 4 or 9·3 per cent were protozoal in origin; 3 or 7·0 per cent were unclassified.

The thirty-six cases of definite bacillary dysentery will first be considered in this report.

In twenty-four cases (66·7 per cent) the infecting organism was isolated, in the remaining twelve cases the typical bacillary exudate was demonstrated microscopically.

The distribution of these amongst the protected and the unprotected was as follows:—

	Shiga	Flexner	Bacillary exudate	Total
Protected	2	11	9	22
Unprotected	3	8	3	14
Totals	5	19	12	36

The Incidence of Cases in the Various Units, Poona.

	Strength of units	Number of cases	Ratio per 1,000
1st Cheshires.			
Protected	856	16	18·69
Unprotected	36	1	27·78
Total Regiment	892	17	19·06
2nd Ulsters.			
Protected	250	6	24·00
Unprotected	552	7	12·68
Total Regiment	802	13	16·21
Remaining British troops.			
Protected	Nil.	—	—
Unprotected	1,016	6	5·90
Total British troops, Poona.			
Protected	1,106	22	19·89
Unprotected	1,604	14	8·73
Total numbers British troops, Poona	2,710	36	13·21

Add to these figures the unclassified cases (exudate indefinite but suggestive of bacillary dysentery).

Total British troops, Poona.			
Protected	1,106	24	20·79
Unprotected	1,604	15	9·35
Total numbers British troops, Poona	2,710	39	14·39

Clinical Aspects of the Disease, Poona.

The first set of figures refers to cases of definite bacillary dysentery, those within brackets refer to definite plus unclassified dysenteries.

Duration of symptoms in days	Protected cases	Unprotected cases
Abdominal pain	1·29 (1·27)	1·50 (1·46)
Persistence of blood and mucus ..	2·14 (2·04)	1·71 (1·67)
Persistence of mucus only	3·91 (3·75)	2·71 (2·80)
Duration of fever	1·00 (0·96)	1·57 (1·46)
Highest temperature recorded ..	101° F.	104° F.

The Secunderabad Investigations.

The material for this investigation was collected during the period July 1 to December 31, 1927. During this period fifty-seven cases of dysentery occurred amongst the British troops stationed at Secunderabad. These cases were classified as follows: 44 or 77·0 per cent were bacillary in origin; 2 or 3·5 per cent were protozoal in origin; 11 or 19·5 per cent were unclassified.

The report will first deal with the definite cases of bacillary dysentery.

The infecting organism was isolated in 26 (59·1 per cent) of the cases, the remainder showed the typical bacillary exudate. The distribution was as follows :—

	Shiga	Flexner	Bacillary exudate	Total
Protected	1	2	3	6
Unprotected	7	16	15	38
Totals	8	18	18	44

The Incidence of Cases in the Various Units, Secunderabad.

	Strength of units	Number of cases	Ratio per 1,000
1st Loyals.			
Protected	148	4	27·02
Unprotected	598	11	18·39
Total Regiment	746	15	20·10
1st Gordons.			
Protected	117	2	17·09
Unprotected	600	14	23·33
Total Regiment	717	16	22·31
Remaining British troops.			
Protected	29	Nil.	—
Unprotected	878	13	14·78
Total remaining British troops	907	13	14·33
Total British troops, Secunderabad.			
Protected	294	6	20·41
Unprotected	2,076	38	18·30
Total Number British troops, Secunderabad	2,370	44	18·50

Add to these figures the unclassified cases—their distribution was as follows: Among protected, 1; unprotected, 10.

Total British troops, Secunderabad.			
Protected	294	7	23·80
Unprotected	2,076	48	23·12
Total Number British troops, Secunderabad	2,370	55	23·21

Clinical Aspects of the Disease, Secunderabad.

Duration of symptoms in days	Protected cases	Unprotected cases
Abdominal pain	1·50 (1·83)	1·76 (1·73)
Persistence of blood and mucus ..	2·50 (2·43)	2·95 (2·59)
Persistence of mucus only	3·83 (4·16)	3·69 (3·67)
Duration of fever	1·00 (1·43)	1·23 (1·19)
Highest temperature recorded ..	103° F.	102·6° F.

POONA AND SECUNDERABAD FINDINGS COMBINED.

A. Definite bacillary dysentery cases only.

	Strength	Number of cases	Ratio per 1,000
Protected	1,400	28	20·00
Unprotected	3,680	52	14·10
Totals	5,080	80	15·75

B.—Definite bacillary dysentery cases plus unclassified cases.

Protected	1,400	31	22·14
Unprotected	3,680	63	17·12
Totals	5,080	94	18·50

CLINICAL FINDINGS, POONA AND SECUNDERABAD COMBINED.

Duration of symptoms in days	Protected cases	Unprotected cases
Abdominal pain	1·39 (1·55)	1·63 (1·59)
Persistence of blood and mucus ..	2·32 (2·23)	2·35 (2·13)
Persistence of mucus only	3·87 (3·95)	3·20 (3·23)
Duration of fever	1·00 (1·19)	1·44 (1·32)
Highest temperature recorded ..	103° F.	104° F.

SUMMARY.

(1) The efficacy of anti-dysenteric bilivaccin as a prophylactic against bacillary dysentery was tried out among the British troops stationed at Poona and Secunderbad. At Poona with a British garrison of 2,710 men, 1,106 (41·0 per cent) were protected, while at Secunderabad with a British garrison of 2,370 men, 294 (12·7 per cent) were protected. The total number protected was 1,400 out of a total of 5,080 (27·6 per cent).

(2) Alternative records are presented, the first dealing with definite cases of bacillary dysentery, the second including unclassified cases in addition to definite cases.

(3) A few records, showing the clinical aspect of the disease among the protected and the unprotected, are also presented.

CONCLUSIONS.

Oral bilivaccin failed as a prophylactic against bacillary dysentery during our investigations at Poona and Secunderabad.

The clinical course of the disease did not appear to be modified in individuals protected by the vaccine.

We have to thank Major Pottinger, M.C., R.A.M.C., and Major Stevenson, R.A.M.C., for supplying us with clinical records of all cases of dysentery treated by them during the period of this investigation, at Poona and Secunderabad respectively.

REFERENCES.

[1] MANIFOLD, J. A. (1926). "Important Features in the Correct Diagnosis of Dysentery in India," JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, February.

[2] *Idem.* with DEMONTE, A. J. (1928). "Report on an Investigation of Dysentery and Diarrhœa in Poona." *Ind. Journ. Med. Res.*, vol. xv, No. 3, January. Reprinted JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, June.