

## ENTERIC FEVER

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**SUMMARY:** During 1967, there were 397 suspected cases of typhoid and paratyphoid fever seen at the British Military Hospital, Dharan, Nepal. One hundred and seventeen cases were confirmed and sixty-three cases were admitted.

The symptomatology, physical signs and complications are recorded and discussed.

### Introduction

In each of the previous four years (1963 to 1966) an average of 42 cases of suspected typhoid or paratyphoid fever were seen annually. There was an average confirmed case of about one per month. In 1967 the suspected and confirmed cases increased tenfold to 397 and 117 respectively (Table I).

Table I  
Incidence of typhoid or paratyphoid fever during 1963-1967

Year	Suspected cases	Possible cases	Confirmed cases
1963	45	5	18
1964	45	10	9
1965	37	8	8
1966	41	10	11
1967	397	137	117

### The 1967 epidemic

There was nothing to suggest an impending epidemic in the first five months of 1967, when the incidence was exactly the same as in the previous four years. It was the breaking of the monsoon on the 10th June that heralded the epidemic (Table II).

Table II  
Incidence of typhoid or paratyphoid fever during the 1967 epidemic

Month	Suspected Cases	Possible Cases	Confirmed Cases	Month	Suspected Cases	Possible Cases	Confirmed Cases
January	5	1	1	August	39	11	12
February	7	1	1	September	65	19	35
March	8	2	2	October	62	24	26
April	4	1	—	November	45	6	8
May	8	1	4	December	104	48	9
June	21	5	9	1968			
July	29	6	10	January	34	11	—
				February	8	1	—

\* Now at Chase Farm Hospital, Enfield, Middx.

On the 4th August, we lost our first patient—a female villager of thirty-one years of age. By the end of September the epidemic had reached its peak, though we were unaware that this was so at the time.

On the 10th November, typhoid was confirmed in both a nurse working in the Reception Department of the British Military Hospital and in a British warrant officer. In all, eleven members of the hospital staff or members of their families caught the disease.

On the 14th November, a Malayan Gurkha policeman, living in the camp, was admitted in extremis, also from a perforated ileum. He died on the operating table. As a result an immediate signal was sent to Singapore requesting help.

The Deputy Director of Army Health and the Deputy Director of Pathology flew over immediately, bringing with them further stocks of chloramphenicol and Widal reagent. However, the epidemic was by then practically over, the last case of typhoid fever being diagnosed on 21st December. No new cases were confirmed during the next three months, although one was suspected by the following March (1968).

### Aetiology

Infected village water supplies were responsible for the outbreak, the water being collected by a pipe from a river five miles north in the foothills. The British cantonment water supply came from the same source but was first filtered and then chlorinated and stayed pure throughout the epidemic.

Of those admitted to the British Military Hospital, 35 were males and 28 females. The majority of patients being in their thirties (Table III).

Table III  
Age incidence of 63 patients


Number of patients	Age (years)	Number of patients	Age (years)
2	0—9	2	40—49
17	10—19	1	50—59
17	20—29	1	60—69
21	30—39	2	70—79

The duration of symptoms on admission is classified in Table IV.


Table IV  
Duration of symptoms of 63 patients

Number of patients	Duration (days)	Number of patients	Duration (days)
4	1	3	11
5	2	3	12
2	3	1	14
6	4	5	15
2	5	2	16
1	6	1	17
6	7	1	18
7	8	1	20
2	9	4	28
2	10	5	29 plus


Only 63 of the 117 confirmed cases could be admitted as there were simply not




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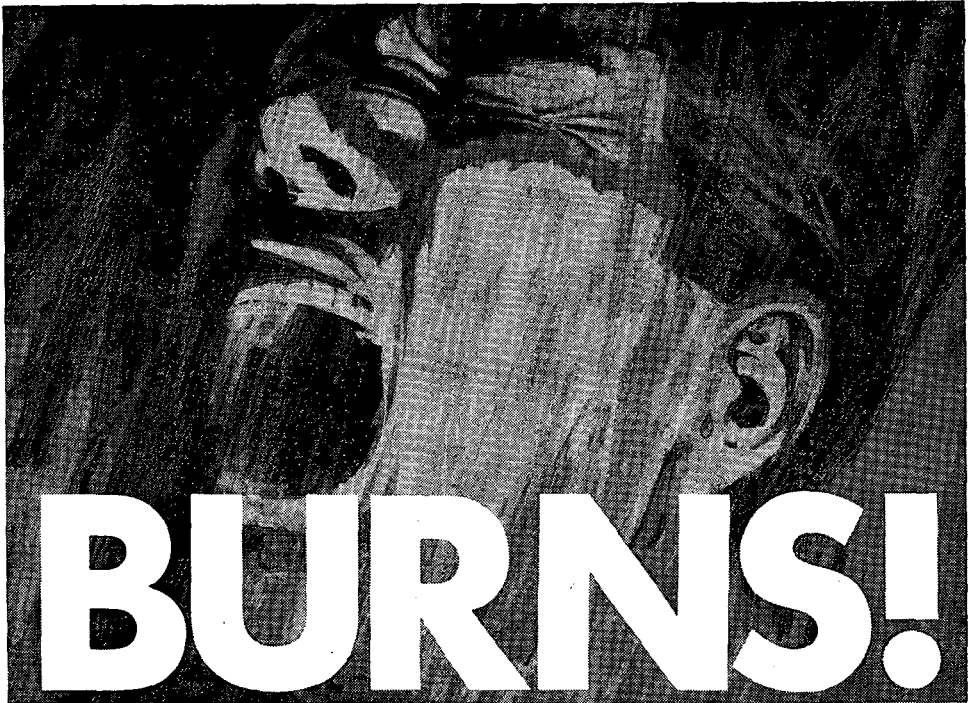
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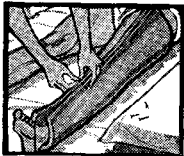
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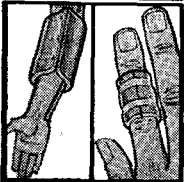
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sufficient beds, there being only 17 male medical beds and a family ward containing a total of 8 beds for all conditions.

### Symptomatology

In the majority, the disease started with vague malaise and a mild fever which increased in severity each evening until, usually after about a week, the patient presented himself or herself when really ill. Other patients presented the first day, with a sudden onset of the disease. Many presented, after suffering over a month (Table IV), with only mild symptoms. These, however, would only clear up with chloramphenicol, even though these patients were often apyrexial.

The symptoms, on admission, of the 63 cases of typhoid and paratyphoid that were actually admitted, together with the physical signs and complications are shown in Table V.

Table V  
Symptoms, physical signs and complications of 63 patients

Symptoms	Cases	Percentage	Symptoms	Cases	Percentage
Abdominal pain	32	51	Burning hands/feet	12	19
Headache	30	48	Frequency	11	18
Backache	19	30	Dry mouth	11	18
Dysuria	19	30	Inability to move right leg	8	13
Joint pain	11	18	Deafness	8	13
Bodily pain	8	13	Insomnia	7	11
Shoulder pain	5	8	Constipation	7	11
Fever	61	97	Loss of taste	7	11
Sore throat and cough	33	53	Rigor	6	10
Nausea/vomiting	25	40	Soreness of eyes	5	8
Diarrhoea	25	40	Epistaxis	2	3
Giddiness	24	38	Flatulence	2	3
Weakness and lethargy	18	29	Soreness of the lips	2	3
Anorexia	13	21	Mental confusion	2	3
Physical signs	Cases	Percentage	Physical signs	Cases	Percentage
Left hypochondrial tenderness	19	30	Slow pulse in relation to high fever	6	10
Right iliac fossa tenderness	15	24	Ptosis	6	10
Abdominal distension	15	24	Enlarged liver	5	8
Splenic enlargement	12	19	Rash	2	3
Right hypochondrial tenderness	12	19	Neck stiffness	1	2
Complications	Cases	Percentage	Complications	Cases	Percentage
Pneumonia (right lower lobe 2, left lower lobe 3)	5	8	Haematemesis	3	5
Hepatitis	5	8	Relapse	2	3
Death	4	6	Cholecystitis	1	2
Appendicitis	4	6	Osteitis	1	2
Rectal haemorrhage	3	5	Stillbirth	1	2
Abortion	3	5	Abscess formation	1	2
Perforated ileum	3	5	Bed-sores	1	2
			Premature labour	1	2

### Investigations

Typhoid and paratyphoid fever were usually diagnosed when paired or more sera rose to a minimum of 1/60 with the Widal test. Later, at the height of the epidemic, when supplies of the Widal reagent became short, a single 1/60 titre was accepted as

diagnostic. Using this criteria, 117 cases were diagnosed in the epidemic, 77 being typhoid and 40 paratyphoid—mostly paratyphoid C. Of the 63 cases that were admitted, 48 had typhoid and 15 paratyphoid. Blood, urine and stool culture were only occasionally successful; there was only one trained laboratory technician.

The haemoglobin levels, total white cell counts and Erythrocyte sedimentation rates on admission, are recorded in Tables VI to VIII respectively.

**Table VI**  
Percentage haemoglobin levels of 63 patients

Number of patients	Percentages	Number of patients	Percentages
2	20—29	18	70—79
1	40—49	13	80—89
10	50—59	9	90—99
7	60—69	3	100 plus

**Table VII**  
Total white cell count of 63 patients

Number of patients	count	Number of patients	count
2	1—2000	4	9—1000
4	2—3000	3	10—11000
11	3—4000	2	11—12000
11	4—5000	1	12—13000
5	5—6000	1	15—16000
13	6—7000	2	16—17000
1	7—8000		
2	8—9000	1	23—24000

**Table VIII**  
Erythrocyte sedimentation rate of 63 patients in millimetres per hour

Number of patients	Millimetres	Number of patients	Millimetres
7	0—9	2	70—79
4	10—19	2	80—89
3	20—29	10	90—99
8	30—39	5	100—109
4	40—49	4	110—119
6	50—59	3	120—129
4	60—69	1	130 plus

### Treatment

Chloramphenicol, 500 mg six hourly for seven days, and 250 mg six hourly for fourteen days, was the treatment adopted for the majority of the cases.

Of the 59 in-patients who survived—7 were given a one week course: 8 a two week course: 37 a three week course: 5 a four week course and 2 a five week course. No special diet was ordered, though 6 of the patients required intra-venous fluids.

### Differential diagnosis

The conditions that were commonly considered in the differential diagnosis of the

disease during the epidemic were—Brucellosis fever: Amoebic and bacillary dysentery: Appendicitis and its complications including paralytic ileus: Cystitis and pyelitis: Influenza: Kala-Azar: Malaria: Perforated or bleeding duodenal ulcer: Rheumatism: Tonsillitis and Tuberculosis, wherever it might be.

### Comment

The mortality of typhoid fever abroad is double that at home. The Gurkhas seem specially liable to typhoid infection (Morrison, 1960), in spite of being repeatedly infected throughout their lives.

Sore throat and cough, just as in the Harlow outbreak, were the presenting symptoms in over half the cases in this epidemic. Faintness and vertigo was a major symptom (37 per cent) in contrast to the 10 per cent in Morrison's series. Likewise nausea and vomiting (40 per cent) were double Morrison's incidence of less than 20 per cent. Again diarrhoea (40 per cent) was four times as common—reminiscent of the days when pea-soup stools were the most characteristic complaint. In contrast only 11 per cent to Morrison's 50 per cent complained of constipation.

Deafness was much commoner (13 per cent to 1 per cent). Nose bleeding was only 3 per cent in contrast to Morrison's 15 per cent and the Aberdeen outbreak but in common with the Harlow cases.

The fact that the spleen was enlarged in only 19 per cent can be partially explained by these being purely the signs found on admission. The fact that a rash was so rarely found (3 per cent) can similarly be explained. In addition it is difficult to find a scanty faint rash in a pigmented person.

The incidence of rectal haemorrhage—including both melaena and fresh haemorrhage—was 10 per cent which compares interestingly with the 12 per cent in Gadeholt and Madsen's (1963) analysis of over 1000 untreated cases and Morrison's 10 to 20 per cent.

I cannot explain why the relapse rate was so low; we had only 3 per cent compared with Morrison's 23 per cent.

Our mortality rate of 6 per cent is very similar to Lantin, Geronimo and Calilong's (1963) report of 8 per cent in 251 treated cases.

Acute appendicitis was the presenting yet virtually the only feature in 4 cases. This has not been commonly described before.

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