

A FOOD-BORNE OUTBREAK OF STREPTOCOCCAL INFECTION

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(With 2 Figures in the Text)

INTRODUCTION

Milk-borne epidemics of scarlet fever, usually associated with streptococcal sore throat, have frequently been reported (Camps & Miller Wood, 1936; Watson, 1937; Douglas, Smith, Sutherland & Watson, 1941; Henningson & Ernst, 1939). Food-borne outbreaks of streptococcal tonsillitis have also occurred in which milk did not appear to be responsible (Commission on acute respiratory diseases, 1945; Rantz, Spink & Boisvert, 1945), and in one of these (Bloomfield & Rantz, 1943) 25% of the cases developed scarlatiniform rashes. A similar outbreak, involving sixty-four men of a cavalry unit stationed in Italy, is reported here.

EPIDEMIOLOGY

The primary attack rate was 16%, and the cases were fairly evenly distributed among four squadrons, each of which had separate billeting arrangements. The junior N.C.O.'s and privates of all the squadrons used the same dining-hall, but the officers and sergeants, among whom there were no cases, had separate messing arrangements.

The outbreak was of the explosive type characteristic of food-borne epidemics, and the dates of onset of symptoms among the cases admitted to hospital were as follows: fourteen cases on the first day, twenty-four on the second, eleven on the third, and none on the fourth. Two further cases of tonsillitis from the same unit were admitted to hospital 10 days later, but otherwise there were no secondary cases. The low secondary attack rate is remarkable, as close personal contact was inevitable among men living in barrack rooms on active service.

It is unlikely that the infection was milk-borne as only tinned condensed milk was used in the dining-hall. A civilian labourer with a septic finger was thought to be a possible source of infection, but confirmation was not possible owing to limited bacteriological facilities.

CLINICAL FINDINGS

Forty-nine cases were admitted to hospital showing the usual features of streptococcal tonsillitis. The appearance of the throat varied from redness and oedema only to confluent bilateral exudate. A B-

haemolytic streptococcus was grown from all but six of the throat swabs, often in pure culture, but there were no facilities for typing the organism. Typical scarlatiniform rashes were seen 2-4 days after the onset of symptoms in ten cases, all of whom subsequently showed some degree of desquamation. Several other cases showed flushing of the face and a transient erythema, particularly in the flanks, and there was no clear-cut dividing line between cases with rashes and those without. Any subdivision of patients into 'tonsillitis' and 'scarlet fever' would have been artificial, although the average duration of pyrexia and toxæmia was definitely greater among those cases developing typical scarlatiniform rashes.

TREATMENT

Published reports on the treatment of scarlet fever and streptococcal sore throat are conflicting, and, although the total number was small in this group, it was felt that the simultaneous infection of men of the same age and medical category with the same organism justified a therapeutic experiment. Accordingly, the cases were divided at random into the following groups:

Group A (14 cases): treated with intramuscular penicillin—20,000-40,000 units 3-hourly for 3-4 days.

Group B (16 cases): treated with sulphadiazine gm. 2 statim and gm. 1 4-hourly up to a total of 25 gm.

Group C (19 cases): received symptomatic treatment only.

Group X (14 cases): was selected at random to include just under one-third of each of the above groups. These patients were given a single injection of 6000 units of refined haemolytic streptococcus antitoxin within 24 hr. of admission.

Group Y (35 cases): consisted of the patients receiving no antitoxin.

Table 1. *Distribution of cases*

	Group X (anti-toxin)	Group Y (no anti-toxin)	Total
Group A (penicillin)	4	10	14
Group B (sulphadiazine)	5	11	16
Group C (controls)	5	14	19
Total	14	35	

In assessing the results of therapy, it was decided to accept as the criterion of cure the number of days taken for the temperature to return to normal, the end-point being defined as the first day on which the temperature did not rise above 99° throughout the 24 hr. In effect, the fall of temperature seemed to reflect clinical improvement as assessed by the disappearance of signs and symptoms.

The results are recorded in Figs. 1 and 2, and they confirm the clinical impression that the group treated with penicillin recovered most quickly. The group treated with sulphadiazine occupy an intermediate position, but clearly improved more rapidly than those given symptomatic treatment only.

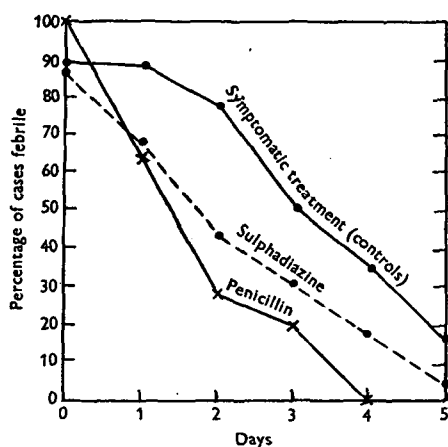


Fig. 1. Effect of chemotherapy.

case had a 'relapse' of tonsillitis in the third week, after he had been discharged from hospital.

A clinical experiment was undertaken to try to determine the influence of secondary infection on the incidence of septic complications. Eighteen patients receiving symptomatic treatment only were admitted to an emergency expansion ward (ward 4) to which no 'outside' cases were admitted and which closed down as these patients were discharged. The remaining patients were admitted to three different 'permanent' wards to which a few sporadic cases of tonsillitis from other units were admitted during the period under review. The incidence of septic complications is tabulated ward by ward in Table 2, which shows that the combined

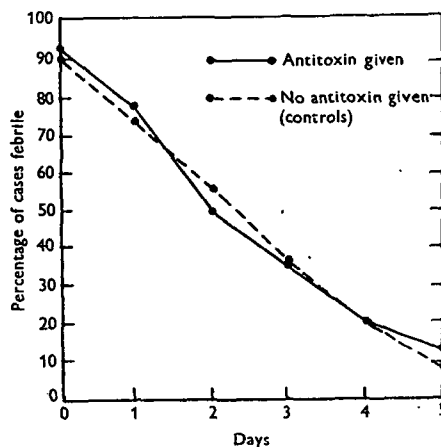


Fig. 2. Effect of antitoxin.

It was a little surprising that the group given antitoxin appeared to derive no benefit in respect of the duration of fever and toxæmia. The antitoxin did, nevertheless, appear to exert a definite effect in suppressing the appearance of a scarlatiniform rash. Seven cases developed rashes following admission to hospital, but these were all in group Y, and no case given antitoxin on admission subsequently developed a rash.

COMPLICATIONS

Upper respiratory complications. Ten cases developed upper respiratory complications. Symptoms were severe naso-pharyngitis with post-nasal discharge, tonsillitis with exudate, one case of bronchitis, and one of frontal sinusitis. No case was classed as 'complicated' unless the upper respiratory symptoms were accompanied by a definite relapse of fever. These complications supervened 6-12 days after the onset of the initial tonsillitis, rather earlier than those usually described in scarlet fever. One

complication rate in wards 1, 2 and 3 was 29 %, but there were no complications among the eighteen cases treated in ward 4.

Table 2. Incidence of upper respiratory complications

	Groups			Total	Complications
	A	B	C		
Ward 1	7	1	1	9	3
Ward 2	0	11	0	11	3
Ward 3	7	1	0	8	3
Ward 4	0	0	18	18	0

This result is consistent with the bacteriological findings of Allison & Brown (1937), who showed that the complications and relapses in patients with scarlet fever were usually attributable to reinfection by a streptococcus of a different serological type. The use of single-bed wards (Bergmann, 1944) or bed isolation technique (Stewart Stalker, Whatley & Wright, 1942) in the treatment of scarlet fever has

not been uniformly successful in reducing the complication rate, but in the present series the results were striking.

Evidence concerning the efficacy of various methods of treatment in reducing the complication rate in scarlet fever is conflicting, although some American workers have obtained good results from the use of courses of penicillin lasting 5 days or more (Epidemiology Unit No. 82, 1946; Ashley, 1946; Hirsch, Rotman-Kavka, Dowling & Sweet, 1947). There appears to be no corresponding literature in the case of streptococcal tonsillitis. In the present series there were insufficient data from which to draw conclusions, but exposure to the risk of cross-infection appeared to be a factor of far greater importance than was the type of treatment given initially.

Late complications. All the cases were reviewed 3–4 weeks after the onset of the outbreak, and subjected to an examination which included chemical

testing of the urine. Apart from two cases of rheumatic fever there were no late complications.

SUMMARY

1. A food-borne outbreak of streptococcal infection in a cavalry regiment is described.

2. A controlled therapeutic experiment was carried out on the forty-nine patients admitted to hospital. Those given chemotherapy recovered more quickly than the controls, recovery being most rapid in the group given intramuscular penicillin.

3. Typical scarlatiniform eruptions were seen in ten cases. Streptococcal antitoxin appeared to prevent the occurrence of rashes, but had no significant effect on the duration of fever and toxæmia.

4. Upper respiratory complications supervened in ten cases. Evidence is presented which suggests that they were due to cross-infection.

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