

An Epidemic of an Obscure Disease at West Point, New York - Part IIGeneral Information

The characteristic clinical feature of the disease was jaundice. Thus it was possible readily to identify the many ambulatory cases during the survey. The illness began insidiously with anorexia, abdominal discomfort, and malaise. Fever was slight or absent; jaundice appeared within a few days, along with darkening of the urine. The course of the disease in different patients varied from a mild illness with minimal symptoms and slight icterus to a severe prostrating illness with deep jaundice, prolonged course, and loss in weight of 20 to 40 pounds.

During the spring of 1942, outbreaks of this disease occurred in many army camps throughout the country and overseas. The exact diagnosis was not readily apparent. The clinical features of the disease resembled acute infectious hepatitis or acute catarrhal jaundice. Weil's disease or leptospirosis could be ruled out by both clinical and laboratory studies. Acute poisonings due to chemicals were excluded by the absence of any exposure to them on the part of the many thousands of troops affected.

At some army camps, epidemiological evidence pointed to an association between these outbreaks and yellow fever immunization given two to three months previously. The possibility was considered that the disease might be a mild form of yellow fever due to the attenuated strain of the virus used in the vaccine. The picture was confused, however, by the fact that many troops had received yellow fever vaccine without developing jaundice.

Extensive epidemiological studies of other and larger army posts during April and May, 1942, pointed strongly to the hypothesis that the epidemic was caused by a certain few lots of yellow fever vaccine. An incubation period of two to three months was indicated. In only a few of these early investigations was it feasible to get fully adequate or sufficiently detailed data regarding strengths of inoculated units and dates and lot numbers of the yellow fever vaccine used. The rapid expansion of the Army at that time and the frequent movements of troops posed difficult problems to the field epidemiologist seeking quantitative data. When the epidemic occurred at West Point, a special inquiry was undertaken because the relative stability of this population offered good prospects for securing more accurate data.

Epidemiology Branch, CDC
ADLangmuir 7/1/64

Immunization Procedures

Accordingly, special attention was directed at West Point to the immunization which the patients with jaundice had received. The enlisted men among whom the cases were largely concentrated were predominantly seasoned troops. All had received vaccinations against typhoid fever, smallpox and tetanus subsequent to their entry into the Army. A check of the first 68 hospitalized cases revealed that in 63 of them these inoculations had been given prior to January 1, 1942. In only five cases had inoculations been given after that date.

In contrast, all of the 68 cases without exception had received yellow fever vaccine in February or March, 1942. These inoculations were administered by detachments on certain dates. A schedule of the dates and lot numbers of the vaccine used is presented in Table 4.

Analysis

By checking the data regarding lot numbers of yellow fever vaccine with the data regarding cases and organization (Table 4), it is immediately apparent that cases occurred only among units receiving lot number 368. It should be noted that there is an amazing uniformity of attack rates among the units which received lot number 368. A Chi square test for significance indicated that there are at least 76 chances out of 100 that the variation in attack rates which was observed is due only to sampling variation and not to significant differences among the units.

Furthermore, by grouping the units receiving the yellow fever vaccine according to dates of inoculation (Table 5), it is apparent that three distinct epidemic curves result, each having similar mean, median and modal intervals following inoculation and similar spreads of incubation periods.

Table 4

Summary Table

Cases of Obscure Illness by Organization
and Record of Yellow Fever Immunization

Code	Name of Unit	Y.F. Immunization		Approx. Strength (May)	No. of Cases	Attack Rates (%)
		Date	Lot No.			
Cav.	Cavalry Squadron	2/18	368	245	34	13.9
Ordn.	11th Ordnance	2/18	368	52	3	5.8
M.D.	Medical Detachment	2/18	368	118	17	14.4
Serv.	Service Detachment	2/19	368	209	20	9.6
Sig.	Signal Detachment	2/19	368	35	4	11.4
Vet.	Med. Detach. (Veterinary)	2/19	368	17	3	17.6
C.A.	Coast Artillery	2/25	368	75	7	9.3
Inf.	Infantry Detachment	2/25	368	65	9	14.8
Eng.	Engineers	2/26	368	73	11	15.1
F.A.	Field Artillery	2/26	368	187	31	16.6
M.P.	Military Police	2/26	368	89	15	16.9
B. & F.M.	Band and Field Music	3/4	368	97	15	15.5
Q.M.C.	Quartermaster Corps	3/4	368	113	14	12.4
O.	Commissioned Officers	3/4	368	165	25	15.2
N.	Nurses	3/5	368	13	2	15.4
Total: All Units which Received Lot No. 368				1553	210	13.5
A.C.	Air Corps	3/3&3/5	371, 374	223	0	0
O(Casual)	Comm. Officers (Casual)	3/5	371, 372, 374	0	0	0
Cad. 1st	Cadets - 1st Class	3/3	372, 373	373	0	0
Total: All Units which Received Vaccine Other than Lot No. 368				596	0	0
Cad. 2,3,4	Cadets 2nd, 3rd, 4th Class	None		1450	0	0
Civ.	Civilian Employees	None		1500	0	0
Dep.-F	Dependents - Female	None		611	0	0
Dep.-C	Dependents - Children	None		823	0	0
Total: All Units which Received No Vaccine				4384	0	0

Table 5

Cases of Obscure Illness by Date of Yellow Fever Immunization,
Organization, and Week of Onset

Immuni- zation Date	Organi- zation Code	W e e k E n d i n g													Total			
		Mar.		A p r i l				M a y					J u n e			Unk.		
		28	4	11	18	25	2	9	16	23	30	6	13	20				
2/18 & 2/19	Cav. Ord. M.D. Serv. Sig. Vet.		1			2	4	9	9	6	2		1					34
						1	2	3	1	5	2	1					1	3
				3	1	2	2	2	3	4	1						2	17
							1		3								1	20
										1	1						1	4
	Total		1	3	1	8	8	16	16	16	6	1	1				4	81
2/25 & 2/26	C.A. Inf. Eng. F.A. M.P.						1	2		1	2		1					7
									3	2	2		2					9
				1	1	2		1	3	1		1					1	11
		1			1		3	4	5	8	4	4					1	31
						1		1	3	3	2	2	2				1	15
	Total	1		1	1	4	4	8	14	15	10	9	3				3	73
3/4 & 3/5	B.&F.M. Q.M.C. O. N.								2	3	5	2	2	1				15
							2	3	2	3	3	2	1				1	14
		1						3	3	5	7	2	2	1			1	25
								1									1	2
	Total	1					2	7	7	8	15	6	5	2			3	56

Imm. Date	Weeks between Immunization and Onset															Total	Incubation Pd. in Weeks			
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	?		Range	Mode	Median	Mean
2/18 & 2/19	-	-	-	1	3	1	8	8	16	16	16	6	1	1	4	81	6-16	12	12	11.4
2/25 & 2/26	-	1	-	1	1	4	4	8	14	15	10	9	3	-	3	73	4-15	12	12	11.4
3/4 & 3/5	1	-	-	-	-	2	7	7	8	15	6	5	2	-	3	56	3-15	12	12	11.3
Total	1	1	-	2	4	7	19	23	38	46	32	20	6	1	10	210	3-16	12	12	11.4