SCHAMBERG (J. F.)

A CLINICAL STUDY OF THE LYMPHATIC GLANDS IN ONE HUNDRED CASES OF SCARLET FEVER.

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A CLINICAL STUDY OF THE LYMPHATIC GLANDS IN ONE HUNDRED CASES OF SCARLET FEVER.*

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THERE is, perhaps, no acute eruptive disease which occasions more frequent errors of diagnosis than scarlet fever. The most experienced clinician will frequently find himself unable to pronounce a diagnosis in the presence of a scarlatiniform rash. There is no one symptom which is in itself at all characteristic of the disease. The coexistence of at least several symptoms is necessary to the establishment of a diagnosis.

The lymphatic glandular system is involved in a large number of acute and chronic infectious diseases. Among the acute eruptive fevers it has been particularly noted in Rötheln or German measles, in which disease it is invoked as a diagnostic feature. Its occurrence in scarlet fever is but casually, if at all, referred to in many text-books on the practice of medicine.

I herewith present the tabulated results of an examination of the superficial glands in 100 cases of this disease. In the appended table there are noted the day of the disease, and the respective sizes of the inguinal, epitrochlear, axillary, maxillary, lingual, submaxillary, anterior cervical and posterior cervical glands. These have been compared with well known objects, such as the pea, bean, lentil, almond, cherry, hickory nut, egg, orange, etc.

*Read before the Philadelphia Pediatric Society, October 10, 1899.

GLANDS IN SCARLET FEVER.

	Day.	Name.	Ing.	Epit.	Axil.	Sub. L.	Sub. M.	Max.	Ant C.	Post C.
1	3d	G. A.	bean	.....	bean	.....	bean	bean	.....	bean
2	5th	W. T.	bean	.....	bean	.....	.....	almond	.....	bean
3	2d	I. S.	bean	pea	bean	.....	bean	walnut	.....	bean
4	5th	J. D.	bean	pea	pea	.....	.....	walnut	.....	bean
5	5th	T. A.	bean	.....	bean	.....	.....	almond	.....	bean
6	5th	J. A.	pea	.....	bean	.....	.....	almond	.....	bean
7	4th	E. U.	bean	pea	bean	lentil	.....	almond	....	bean
8	3d	M. U.	bean	... .	bean	.....	.....	bean	.....	bean
9	5th	K. L.	bean	.....	bean	.....	.....	almond	.....	bean
10	5th	L. W.	bean	.....	pea	.....	.....	almond	.....	pea
11	3d	M. M.	bean	.....	bean	.....	.....	almond	.....	bean
12	3d	L. S.	bean	.....	.....	.....	.....	almond	.....	bean
13	4th	M. F.	bean	.....	bean	.....	.....	bean	.....	bean
14	3d	I. V.	bean	.....	bean	.....	.....	.....	bean	pea
15	9th	B. T.	bean	.....	.....	.....	.....	almond	pea	pea
16	3d	U. P.	bean	.....	pea	.....	.....	bean	pea	pea
17	5th	R. G.	bean	.....	pea	.....	.....	.....	bean	pea
18	4th	R. K.	pea	.....	bean	bean	bean	bean	bean	pea
19	4th	M. K.	pea	.....	almond	almond	almond	hickory	bean	.....
20	2d	T. C.	pea	. .....	pea	.....	... .	.....	pea	bean
21	3d	B. T.	pea	.....	pea	.....	.....	.....	pea	bean
22	7th	J. R.	bean	.....	bean	bean	.....	hickory	pea	bean
23	7th	H. L.	bean	.....	bean	.....	.....	hickory	pea	bean
24	3d	M. Mc.	bean	....	pea	bean	bean	almond	pea	pea
25	3d	R. F.	bean	.....	pea	pea	pea	almond	.....	bean
26	4th	C. J.	bean	.....	bean	.....	almond	almond	bean	pea
27	4th	L. B.	pea	.....	bean	.....	.....	almond	bean	pea
28	4th	N. Mc.	bean	.....	bean	.....	.....	hickory	bean	pea
29	8th	A. G.	bean	.....	.....	.....	.....	bean	pea	.....
30	6th	F. G.	bean	.....	l. pea	pea	pea	hickory	bean	bean
31	5th	B. G.	bean	.....	bean	.....	bean	almond	pea	pea
32	9th	H. F.	bean	.....	pea	.....	.....	hickory	pea	pea
33	4th	M. S.	bean	.....	pea	.....	.....	hickory	pea	pea
34	3d	F. S.	bean	.....	pea	.....	.....	hickory	bean	bean
35	7th	F. S.	bean	.....	pea	pea	bean	walnut	bean	bean
36	6th	W. F.	bean	.....	bean	.....	pea	bean	bean	.....
37	7th	H. I.	pea	.....	pea	pea	bean	almond	pea	pea
38	5th	H. R.	bean	.....	pea	pea	.....	hickory	pea	.....
39	13th	J. H.	pea	....	pea	.....	.....	bean	pea	.....
40	14th	J. B.	bean	.....	bean	.....	.....	bean	pea	bean
41	11th	L. F.	pea	.....	pea	.....	.....	bean	pea	bean
42	9th	C. U.	pea	.....	bean	pea	pea	almond	pea	pea
43	7th	C. U.	pea	.....	pea	.....	pea	cherry	pea	pea
44	4th	S. B.	bean	.....	bean	pea	bean	almond	pea	pea
45	3d	A. B.	pea	.....	pea	.....	bean	almond	pea	.....
46	2d	A. K.	bean	.....	bean	.....	....	cherry	pea	.....
47	4th	S. B.	pea	.....	pea	.....	.....	almond	pea	.....
48	8th	E. M.	pea	.....	pea	.....	.....	cherry	.....	pea
49	9th	B. B.	pea	.....	pea	lentil	.....	cherry	.....	pea
50	15th	E. E.	bean	.....	bean	pea	bean	cherry	bean	pea

From an examination of the above tables it will be seen that the various lymphatic glands are enlarged in the following proportion of cases:

Inguinal glands.....100 per cent.
(*a*) pea-sized.....23 per cent.
(*b*) bean-sized.....77 per cent.
Axillary .....96 per cent.
Maxillary .....95 per cent.
Posterior cervical.....77 per cent.
Anterior cervical.....44 per cent.
Sub-maxillary .....36 per cent.
Epitrochlear .....26 per cent.
Sub-lingual .....25 per cent.

The inguinal glands were in the main enlarged to the size of a

GLANDS IN SCARLET FEVER—*Continued.*

	Day.	*Name.*	*Ing.*	*Epit.*	*Axil.*	*Sub. L.*	*Sub. M.*	*Max.*	*Ant. C.*	*Post C.*
51	7th	M. W.	bean	pea	.....	.....	bean	almond	bean	bean
52	6th	D. W.	bean	lentil	pea	.....	.....	almond	.....	bean
53	5th	J. D.	pea	.....	pea	.....	almond	walnut	.....	pea
54	4th	A. V.	pea	.....	bean	.....	.....	walnut	.....	.....
55	7th	L. M.	bean	pea	bean	.....	pea	almond	bean	.....
56	5th	K. K.	bean	pea	.....	.....	pea	almond	pea	.....
57	6th	N. B.	bean	pea	bean	.....	bean	hickory	bean	pea
58	6th	M. P.	pea	pea	pea	.....	.....	almond	.....	pea
59	5th	M. M.	bean	.....	bean	pea	bean	bean	.....	pea
60	6th	E. S.	bean	pea	bean	pea	bean	almond	.....	bean
61	2d	F. D.	bean	pea	bean	pea	bean	almond	.....	bean
62	11th	M. B.	pea	lentil	bean	.....	.....	bean	.....	bean
63	5th	C. O.	bean	.....	pea	.....	bean	hickory	.....	pea
64	4th	J. B.	bean	.....	bean	.....	.....	almond	.....	pea
65	6th	J. B.	pea	.....	pea	.....	almond	hickory	.....	.....
66	4th	A. M.	bean	.....	bean	.....	.....	almond	.....	bean
67	3d	H. M.	bean	.....	bean	.....	.....	almond	.....	bean
68	4th	K. E.	bean	lentil	bean	.....	almond	almond	.....	.....
69	5th	E. F.	bean	.....	bean	.....	.....	egg	.....	bean
70	6th	M. G.	bean	.....	.....	.....	.....	almond	.....	bean
71	3d	E. E.	bean	.....	bean	.....	.....	almond	.....	bean
72	5th	W. C.	bean	pea	bean	... ...	.....	almond	pea	pea
73	5th	J. L.	bean	.....	almond	.....	.....	bean	....	bean
74	4th	A. T.	bean	pea	bean	....	....	walnut	.....	bean
75	6th	J. T.	bean	pea	almond	.....	.....	walnut	.....	bean
76	6th	H. S.	bean	pea	bean	.....	.....	almond	.....	pea
77	7th	M. Mc.	bean	.....	pea	.....	pea	walnut	.....	bean
78	6th	A. Mc.	bean	.....	bean	.....	.....	egg	.....	bean
79	3d	A. G.	bean	.. ..	bean	.....	bean	bean	.....	bean
80	3d	S. M.	pea	.....	pea	.....	.....	bean	.....	pea
81	4th	Y. S.	bean	lentil	bean	.....	pea	egg	.....	pea
82	4th	E. Mc.	almond	.....	bean	.....	bean	almond	bean	bean
83	8th	B. K.	bean	pea	bean	.....	bean	almond	bean	bean
84	12th	A. Mc.	bean	pea	bean	.....	.....	almond	.....	bean
85	5th	M. Mc.	almond	.....	bean	.....	.....	walnut	.....	bean
86	5th	Y. F.	bean	.....	bean	pea	bean	.....	.....	bean
87	5th	Y. B.	bean	.....	bean	.....	bean	walnut	.....	bean
88	8th	R. L.	bean	.....	bean	pea	bean	almond	.....	pea
89	7th	B. P.	bean	.....	bean	pea	.....	bean	.....	bean
90	11th	J. E.	pea	.....	bean	.....	orange	orange	pea	pea
91	6th	S. W.	pea	pea	pea	pea	bean	hickory	.....	pea
92	5th	D. L.	bean	.....	pea	.....	.....	bean	.....	pea
93	3d	G. A.	bean	.....	bean	.....	bean	bean	.....	bean
94	5th	W. T.	bean	.....	bean	.....	.....	walnut	.....	bean
95	2d	I. S.	bean	pea	bean	.....	bean	almond	.....	bean
96	5th	J. D.	bean	pea	pea	.....	.....	walnut	.....	bean
97	3d	P. F.	bean	pea	bean	pea	bean	almond	.....	bean
98	3d	M. G.	bean	.....	pea	.....	.....	hickory	bean	bean
99	6th	H. M.	bean	lentil	pea	.....	.....	almond	bean	pea
100	6th	E. S.	bean	pea	bean	bean	.....	almond	.....	pea

pea or bean, although occasionally they would reach the dimensions of an almond.

The epitrochlear glands varied from the size of a lentil to a pea. Not infrequently the enlargement occurred but upon one side. From an examination of a few dozen more cases not included in these tables, I have received the impression that the epitrochlear gland is enlarged in considerable more than 26 per cent of cases of scarlet fever. Occasionally there is a second enlarged gland just above the epitrochlear gland.

The axillary glands varied in size from a pea to an almond. They were usually enlarged in clusters rather than singly. The axillary glands are best felt by putting the fingers well into the axilla (the arm of the patient being held a little from the body);

the glands are found by making pressure either against the head of the humerus or against the upper ribs.

The sub-lingual gland was scarcely ever larger than the size of a lentil seed.

The sub-maxillary lymphatic glands varied in size from a pea to an almond. In one case a gland reached the size of an orange, broke down and suppurated.

The maxillary glands or those just behind the angle of the jaw, reached the largest size of any of the lymphatic glands and were the most frequent to undergo suppuration. In the above cases they varied from the size of a bean to that of an orange. The average was perhaps the size of an almond or hickory nut.

The anterior cervical glands, or those lying anterior to the sterno-cleido-mastoid muscle, were in the main pea or bean-sized, as were also those posterior to this muscle.

The enlargement of all the glands about the jaw and neck was more or less proportionate to the amount and intensity of the throat involvement.

The patients were examined at various stages of the disease, as early as the 2d, and as late as the 15th day. Unfortunately no cases were observed upon the first day of the disease, and consequently the date of commencing glandular tumefaction could not be accurately ascertained. In the cases observed upon the second and third day, however, the enlargement was well marked and it is quite probable that it was already present upon the first day. The duration of the enlargement doubtless varies in different cases. In several patients examined at intervals of a few days for three weeks, the glands were found to gradually diminish in size, but at the end of this time they were still slightly enlarged.

I had hoped that a study of the lymphatic glands might be of diagnostic aid in differentiating scarlet fever from the rashes occurring in the course of diphtheria. The occurrence of mild diffuse erythematous eruptions in diphtheritic patients is not uncommon. Some of these eruptions bear the distinctive ear-marks of scarlet fever, and are accompanied by more or less characteristic general symptoms. Many, however, are of an indefinite character and unattended with any more definite systemic manifestations. The question then arises—Is the eruption a toxic rash—the so-called "erythema diphtheriticum," or is it a mild scarlet fever? In order to compare the glands in diphtheria with those in scarlet fever, a control examination of some twenty-five

or more cases of diphtheria was made. This examination sufficed to demonstrate that there is a wide variation and lack of uniformity in the adenopathy of diphtheria. In general, the glands are much less markedly enlarged than in scarlatina, but in some cases the glandular intumescence may reach quite as intense a degree.

As a diagnostic aid, therefore, in differentiating the rashes in diphtheria from true scarlatina, the study of the glands is perhaps of inconsiderable value. A well marked enlargement of all of the superficial glands, particularly the epitrochlear and axillary, would in doubtful cases, I think, tend to throw the balance in favor of scarlet fever.

In distinguishing between scarlatina and measles, which task is not invariably easy, an examination of the glands lends but little aid, because in the latter disease there is also a generalized glandular enlargement. It is to be noted, however, that the adenopathy of measles is not nearly as well marked as that observed in scarlet fever.

There is a class of affections closely resembling scarlatina in which an examination of the glands might be of considerable diagnostic importance. I refer to the eruptions grouped under the head of "erythema scarlatinoides." At the outset it is frequently impossible to distinguish between scarlatiniform erythema and scarlet fever. In this condition there is a generalized scarlatiniform rash with elevation of temperature. The rash of scarlet fever is due, in all probability, to the action of a specific toxin in the blood. Other toxins of a widely different character may produce similar eruptions. Thus these eruptions are prone to develop during the course of rheumatism, pyemia, septicemia, malaria, intestinal ptomain poisoning, typhoid fever, etc. They may also result from the ingestion of certain drugs such as quinine, mercury, belladonna, etc. I have not had the opportunity of examining the lymphatic glands in scarlatiniform erythema, but I am informed by a prominent dermatologist that in a number of cases observed by him, the glands were not enlarged. If this be true, the examination of the superficial lymphatic glands in scarlatiniform erythema shauld have considerable differential importance.

Statistics are frequently misrepresenting, and those presented above are to a certain extent no exception to the rule. Whilst it is true that the inguinal glands were enlarged in every one of the hundred cases of scarlet fever examined, it is more than prob-

able that in some of them the enlargement antedated the attack of scarlet fever. The percentage of apparently healthy children with pea sized or larger inguinal glands must be very considerable. Still the effort has been made in this work to eliminate this error as far as possible. It is in most cases not difficult to distinguish between an old and a recently enlarged gland. The former has a decidedly sclerotic feel with the resistance, say, of cartilage. The latter presents a peculiar resiliency with the consistency of liver. Whilst the inguinal glands are frequently enlarged in apparently healthy individuals, and the glands about the neck in those suffering from throat inflammations, this is not true, at least to the same extent, of the axillary and epitrochlear glands. In health, it is stated that the axillary glands cannot be felt, nor is the small gland above the internal condyle of the humerus palpable under normal conditions. Again the generalized character of these enlargements bespeaks their scarlatinal origin. In scarlatina it is known that all of the lymphatic structures of the body are hypertrophied. Microscopic research has demonstrated a hyperplasia of the lymphoid tissue of the spleen, liver and intestines. Pearce (Medical and Surgical Reports of Boston City Hospital, 1899), in 21 autopsies on scarlet fever patients found hyperplasia of the lymphoid tissue in every part of the body. It was not only noted in the subcutaneous and mesenteric lymph nodes, but also in the lymph nodules of the intestinal mucous membrane, particularly in Peyer's patches and the solitary lymph glands.

Hawley proposed some time ago to substitute the term lymphatic fever for scarlet fever.

The extent of glandular intumescence does not appear to be proportionate to the severity of the rash, but more to the intensity of the toxemia. Patients with high temperature and well marked eruptions are apt to have more marked adenopathy than those with but little fever and poorly marked rashes. Still it is not uncommon to find the glands considerably enlarged even when the associated symptoms are extremely mild.

The above work was carried on at the Municipal Hospital for Infectious Diseases, of Philadelphia, and I desire here to express my sincere thanks to my friend, Dr. William M. Welch, for the many privileges extended to me.

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(For discussion see page 213.)

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