

PHAGOCYtic ACTIVITY OF NEUTROPHIL LEUCOCYTES IN PUSTULOSIS PALMO-PLANTARIS, CHRONIC DISCOID LUPUS ERYTHEMATOSUS AND ERYSIPELAS

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Abstract. In 19 cases of palmo-plantar pustulosis, in 14 cases each of erysipelas and of discoid lupus erythematosus, a decreased phagocytosis of the neutrophils studied by a yeast particle technique, was found. This was also seen in some investigated cases with generalized pustular psoriasis, cutaneous vasculitis, and scleroderma.

The ability of certain mammalian cells to engulf foreign material, i. e. phagocytosis, was first described by Metchnikoff in 1887 (9). This capacity has long been considered as one of the body's cellular defence mechanisms; recently the detection of serum factors with importance in phagocytosis, the humoral defence mechanism, has also been mentioned in relation to phagocytic activity (5). The actual mechanism of phagocytosis is, however, unknown. The act of phagocytosis nevertheless plays a part in the initiation of the antibody-forming process (13). The most important blood cell in phagocytosis is the (peripheral) neutrophil leucocyte. A similar ability of other cells including eosinophils, basophils, monocytes, lymphocytes as well as thrombocytes is also proven, though inferior to that of neutrophils.

The phagocytic activity of neutrophils has been studied by different methods in several disorders including some skin disorders. These reports are summarized in Table I. However, no such study has recently been reported in relation to dermatoses. Thus it seems be of interest to study the phagocytic activity of neutrophils in some dermatoses by a newer, simple technique.

MATERIAL AND METHODS

The technique elaborated by Brandt (2) was chosen, with a few modifications. The heparinized venous blood

of the patient is sedimented at room temperature, whereupon the buffy coat is resuspended in the patient's own plasma to a concentration of 5 000 neutrophils/mm³. One volume of this suspension is incubated during 30 min on 37° with an equal volume of heat-killed yeast cells, which were suspended in physiologic saline at a concentration of 20 000 cells/mm³. After centrifugation, the sediment is smeared on a glass slide, stained according to May-Grünwald-Giemsa and counted. 200 neutrophils are counted and a phagocytic index, i.e. the mean number of phagocysed particles per neutrophil, is calculated.

Investigations were made on 19 cases with palmo-plantar pustulosis who had no macroscopic or microscopic features characteristic of psoriasis vulgaris, 14 cases each of erysipelas of the legs or face, mostly not recurrent cases, and 14 cases of discoid lupus erythematosus without signs of dissemination as well as a few cases with generalized pustular psoriasis, cutaneous vasculitis, and scleroderma. Controls were 18 healthy blood donors.

RESULTS

In all the dermatoses, relatively unanimous findings showed differences compared with control values. The difference was statistically significant in the cases with palmo-plantar pustulosis, erysipelas and discoid lupus erythematosus (and not calculated for the few cases with other dermatoses) (Table II).

DISCUSSION

The list of disorders showing defective phagocytic activity is increasing (see Table I). One of the latest additions to this group is impaired leucotactic responsiveness (14) in which disease (unrelated?) impaired phagocytosis was also found when tested for bactericidal activity against *E. coli* and *K. enterobacter*. Furthermore, it is of

Table I. Phagocytic activity of neutrophil leucocytes in various disorders

Disorders	Phagocytic activity	Author
Chronic myeloid leukemia	Decreased	(1, 2)
Myelofibrosis	Decreased	(2)
Myeloma	Decreased	(3)
Macroglobulinaemia Waldenström	Decreased	(3)
Systemic lupus erythematosus	Decreased	(3)
Diabetes mellitus	Decreased	(7)
Lymphocytic infiltration of Jessner	Decreased	(8)
Fatal granulomatous disease (cong. dysphagocytosis)	Decreased	(4, 8)
Familial plasma-associated defect phagocytosis	Decreased	(10, 11)
Impaired leucotactic responsiveness	Decreased ^a	(14)
Polycythemia vera	Increased	(2)
Trombocythemia	Increased	(2)
Hodgkin's disease	Increased	(2)

^a For certain gram-negative bacteria.

interest that the case of familial plasma-associated defective phagocytosis (10) presumably due to impaired ability to generate chemotactic activity of the serum, could be corrected by the addition of purified human C 5 (11).

Of the cases studied in present work, palmo-plantar pustulosis may be of special importance. There is still no explanation for the accumulation of leucocytes in this disease having an unknown etiology and with different classifications. The present finding of a decreased phagocytic activity of neutrophil leucocytes may be one of the presumably complex etiological and pathologic factors in these diseases. Similarly, several factors including specific immune weakness against streptococcal substances (12) are proposed in erysipelas, primarily in the recurrent cases. The present find-

ing of decreased neutrophil phagocytic activity may thus also be one of the pathologic events.

It was shown that phagocytic activity in animals may be attributed to young leucocytes whilst a reduced tendency was seen in aged cells (6). In megaloblast anaemia, where a neutropenia occurs in addition to the maturation defect in myelopoiesis, the low phagocytic activity may be corrected after only one week by administering vitamin B₁₂. Similarly, in polycythemia vera, where the myelopoietic activity too is accelerated, and correspondingly an increased phagocytic activity was found, a normalization was observed of the latter after the administration of P³² (2). Furthermore, in cases of systemic lupus erythematosus showing reduced neutrophil phagocytosis, studied by Brandt (3), this ability was, in general, concurrent with a neutropenic state. In our cases of discoid lupus erythematosus, however, no signs of neutropenia were found in the patients showing a decreased phagocytic activity. We have as yet no explanation for these findings.

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Table II. Phagocytic index found in the present study in some skin disorders

Skin disorders	No. of cases	Mean phagocytic index	Analysis of the difference to the normals	
			t-values	Significance
Normals	18	3.36		
Palmo-plantar pustulosis	19	2.95	3.18	0.01 > p > 0.001
Erysipelas	14	3.04	2.46	0.05 > p > 0.01
Discoid lupus erythematosus	14	2.73	5.08	0.001 > p
Generalized pustular psoriasis	3	2.94	Not calculated	
Cutaneous vasculitis	3	2.98	Not calculated	
Scleroderma	2	2.94	Not calculated	

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