

## LATENCY AND DURATION OF PRURITUS ELICITED BY TRYPSIN IN AGED PATIENTS WITH ITCHING ECZEMA AND PSORIASIS

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It has long been known that itching occurs frequently in the aged. The empirical concept, pruritus senilis, is a diagnosis by exclusion, i.e. itching which has no relation to diabetes, renal disorder, liver disease, malignant processes etc. Pruritus senilis is partly a consequence of asteatosis. By asteatotic itching is meant the reduced function of the sebaceous glands in old age, the decreased water content of the skin interfering with sweat obstruction. The itch threshold, is lowered and different external factors (*e.g.* microtraumata, friction of heavy woollen clothes, abrupt changes in temperature, prolonged effect of soap and water) which affect skin of this type, can cause itching (17).

Experimental itch tests are usually performed on young persons, mainly because, in general, they are alert; this is necessary when assessing itch sensations. Therefore it was expected that the investigation of itch in certain older persons may be difficult.

It appears justified to investigate whether differences in experimental itching between young and old patients with skin diseases can be recorded.

### Material and Methods

Persons of both sexes comprised a material under treatment for various itching eczemas and for psoriasis with pruritus at the Department of Dermatology at Karolinska sjukhuset, and were selected for the investigation. The age distributions were:

80 persons between 16-59 years of age  
30 persons between 60-65 years of age  
40 persons over 65 years of age

The method consisted of the intracutaneous injection of trypsin 1:10,000 into at least 3 places on the macroscopically *intact* skin of the upper arm, recording the latency and the duration of the itching produced. Physiologic saline was also given in order to exclude, as far as possible, purely psychic sensations (for details see 10).

### Results

In all cases latency could be recorded, but the duration could not be determined in 2 cases between 60-65 years and in 10 cases in persons more than 65 years, because of the subjects' uncertainty. The results of the investigations are given in table 1. Latency was quite short in young persons, prolonged in those between 60 and 65 and substantially prolonged in subjects over 65. These differences between the groups are statistically significant ( $\chi^2$  test). In regard to the duration of itching, this continued, only exceptionally longer than 2 minutes in young persons and in persons between 60-65, whereas in still older subjects, this limit was exceeded to a significantly greater extent.

### Discussion

Few investigations have been undertaken on the duration of itching in elderly persons with and without skin diseases. In the

Table 1. Latency and duration of itching, induced via i.c. trypsin, in different age groups in patients with itching eczema and psoriasis

	Persons		
	I Under 60	II Between 60-65	III Over 65
A. Itch latency under 30"	75	14	9
Itch latency over 30"	5	16	31
	80	30	40
B. Itch duration under 2'	77	26	16
Itch duration over 2'	3	2	14
	80	28*	30*

According to  $\chi^2$  tests:

Differences in A. between I, II and III are of +++ significance ( $P < 0.001$ ).

Differences in B. between I and III and between II and III are of +++ significance ( $P < 0.001$ ).

\* See text.

author's earlier experiments itching was observed in persons suffering from Besnier's prurigo. They had longer itch duration on intact skin compared with persons with eczema and psoriasis in the same age group (11). The possible analogy in itch duration values between elderly persons and prurigo patients will be reported in another connection (12). The finding of a prolonged itch duration in old age (of patients with skin disease) is interpreted as a recordable characteristic of the aging asteatotic skin.

Shelley *et al.* state that latency in normal cases following injection of endopeptidase/proteinase is from 4-5" to 60-120", and remark that longer latency occurs after more diluted solutions (1, 18). Although there is no certain evidence regarding possible morphological changes as an explanation of prolonged itch latency in old age, certain data should be considered in this connection:

Tomasch and Britton (20) established a rather large individual variation in the com-

position of the nerve fibre and found no definite connection between variation and age. Similarly, Cauna (3) found that the free nerve endings were the least inconstant in changes due to age. Moreover, it is stated that vibratory perception in the toes in elderly persons probably increases (6).

On the other hand, several authors have observed a reduced peripheral nerve function in elderly persons. Thus a decrease in Meissner's corpuscles (15), reduced corneal receptivity (7), and diminished vibratory perception has been established in the aged (16). The number of myelinated fibres in the peripheral nerves decrease in elderly persons (4, 14, 19) or a segmental degeneration can be observed (8). Furthermore, valuable information is available on investigations of old persons with electro-neurograms, which is regarded as a sensitive method for the study of peripheral nerve functions.

Buchthal and Rosenfalck (2) investigated the sensory action potential in human peripheral nerves and tested i.a. 20 men between 70-88 years of age and found decreased amplitudes of the nerve action potential. There was also a higher sensory threshold in these persons. In an electro-neurographic investigation of pernicious anaemia, Reizenstein, Wennberg and Widen (13) were able to establish, on the basis of results compared to 117 controls, that there was a negative connection between the amplitude (originating from the coarsest, mainly afferent, nerve fibres) and age. They considered that the low action potentials in the aged, indicating a disturbance in impulse transmission in the peripheral nerves, can have two causes: a) loss of a certain number of fibres, and b) increased dispersion in conduction rate in different fibres, which results in impairment of synchronism of impulses, with reduction of amplitude, increase in width and change in shape of the nerve action potential as a consequence, but without necessarily causing sensory disturbances. There is thus a strong parallelism between the findings of these two research groups. Finally, the results of Mayer's experiment

(g) may be mentioned: that in normal persons between 50–80 years of age, in 20% no action potential could be recorded in the tibial/peroneal nerves.

Cormia (5) reported that 89% of persons under 50 and only 47% of those above this age had itch sensations provoked by experimental histamine pruritus; but has not explained this observation. The present author considers that this finding can be interpreted as depending either on a) decrease of loss of nerve fibres (on the analogy of the above-mentioned finding of myelinated fibres), or b) a less exact "sensory reproduction", which was also observed in about 1/6 of the persons over 60 in the present work.

There are no data, however, on possible morphological/functional changes in the itch receptors or of the itch-transmitting, non-myelinated, thin C nerve fibres in older subjects with or without skin diseases. The observations in question on prolonged itch latency in elderly persons (with skin diseases) seem to show a certain parallelism with the data on diminished peripheral nerve functions in elderly persons, as given in the literature referred to above. Besides, it cannot be excluded that, in addition to the peripheral, also the central parts of the itch "pathways" play a role in this connection (see b) in the preceding paragraph). In the present investigations it was shown that itch latency as well as itch duration was prolonged in the intact skin of persons with skin disease over 65 years of age. The correlation between these two parameters and the finding that itch duration is prolonged only after 65, whereas itch latency is retarded already at 60 cannot at present be explained.

#### SUMMARY

The latency and the duration of itching induced via the intracutaneous injection of trypsin 1:10,000 were investigated in elderly persons. The investigations was carried out on the macroscopically intact skin of the upper arm of persons with various itching eczemas and psoriasis with

pruritus. Latency was significantly prolonged in persons between 60–65 years of age compared with that of younger individuals, and was substantially prolonged in subjects over 65. Itch duration was longer in persons over 65. The cause of these phenomena in elderly persons are discussed.

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