

URINARY ALBUMIN AND β_2 -MICROGLOBULIN EXCRETION RATES IN PATIENTS WITH EXTENSIVE SKIN DISEASE

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Abstract. Daily urinary albumin and β_2 -microglobulin excretion rates were measured with sensitive radio-immunoassays in 27 patients with extensive skin disease. Nineteen patients had psoriasis, 5 had erythrodermia, and 2 had eczema. There was no relationship between the degree of skin involvement, assessed by the "rule of nines" and the urinary albumin and β_2 -microglobulin excretion rates. The daily urinary albumin excretion rate in the patients (mean 7.1 ± 4.7 (S.D.) mg/24 hour) was about the same as in normal subjects (mean 9.1 ± 4.6 (S.D.) mg/hour). There was no significant difference between the daily urinary β_2 -microglobulin excretion rate (mean 110 ± 88 (S.D.) μ g/24 hour) as compared with normal subjects (mean 95 ± 71 (S.D.) μ g/hour). The present findings of a normal renal glomerular and tubular protein handling are incompatible with the previously advanced concept of a "dermatopathic nephropathy".

Key words: Skin diseases; Albuminuria; Proteinuria; Beta globulins

Recently, we found that the overall transcapillary escape rate of albumin was elevated in patients with extensive skin disease (9). None of the patients had clinical signs of proteinuria, as tested with Albustix®, though increased urinary protein concentration has been found in patients with skin disease (13) and, furthermore, a significant positive correlation between the degree of skin involvement and urinary protein excretion rate has been demonstrated (3). However, it is not known whether this increased urinary protein excretion reflects a glomerular, tubular, or glomerular-tubular type of proteinuria. This problem can be solved by measuring the urinary albumin and β_2 -microglobulin excretion rates, as demonstrated by Peterson et al. (10).

In the present study we measured the urinary albumin and β_2 -microglobulin, by means of sensitive radio-immunoassays, in patients with varying degrees of skin involvement.

MATERIAL AND METHODS

27 patients, 14 females and 13 males aged 13-74 years (mean 45 years) with varying severity of skin disease were investigated. 19 patients had psoriasis, 5 had erythrodermia, and 2 had eczema. The extent of the skin involvement was assessed by the "rule of nines". All patients had normal chest X-ray and ECG; no clinical signs of cardiac failure were present in any of the patients. None of the patients had hypertension, diabetes mellitus, or any other major disease apart from their skin disease. At the time of the investigation only bland topical treatment was being applied. The urine was collected for one 24 hour period and stored deep-frozen until analysis. Only urine without significant bacteriuria was used. Albumin and β_2 -microglobulin were measured by means of sensitive radio-immunoassays (4, 8).

The results were compared with those obtained in 27 adult control subjects, by identical techniques. Statistical analysis was performed using the Wilcoxon test for unpaired observations.

RESULTS

Table I and Fig. 1 show the daily urinary albumin and β_2 -microglobulin excretion rates in relation to the degree of skin involvement. There was no relationship between the extension of the skin disease and the urinary albumin excretion rate and no significant difference between controls (mean 9.1 ± 4.6 (S.D.) mg/24 hour) and patients (7.1 ± 4.7 (S.D.) mg/24 hour). The daily urinary β_2 -microglobulin excre-

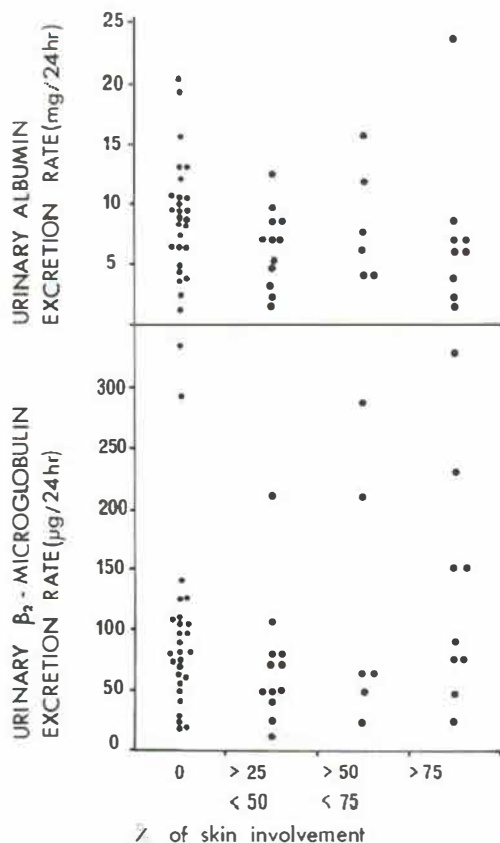


Fig. 1. Daily urinary albumin and β_2 -microglobulin excretion rates in relation to skin involvement.

tion rate was not associated with the degree of skin involvement. There was no significant difference between patients (mean 110 ± 88 (S.D.) $\mu\text{g}/24$ hour), and the controls (mean 95 ± 71 (S.D.) $\mu\text{g}/24$ hour). There was no difference between the erythrodermic and the remaining patients, regarding the above-mentioned variables. The urinary albumin and β_2 -microglobulin excretion rates were not related to age or sex.

DISCUSSION

Trotter & Fairburn (13) found that 8.2% of 771 dermatological outpatients had increased urinary protein concentration. In a later study Cotterill *et al.* (3) demonstrated that the daily urinary protein excretion rate was increased in patients with skin disease and correlated significantly to the degree of skin involvement. The present finding of a normal daily urinary albumin excretion rate, irrespective of the extension of the skin involved, is in clear

contradiction of the above-mentioned. For this reason, the clinical material and all crucial elements of the investigative procedures should be analysed critically before the results are interpreted. Unfortunately, it is not possible to make a just comparison between the present results and those obtained by Trotter & Fairburn (13), since they did not measure the urinary protein excretion rate but only the urinary protein concentration. Furthermore, no clinical data or information on the extension of the skin disease were given in their report. The discrepancy between the present results and those obtained by Cotterill *et al.* (3) cannot be explained by differences in the material investigated, since the skin diseases and the extent of skin involvement are fairly comparable. In addition, Cotterill *et al.* (3) found no relation between the type of skin disease and the proteinuria.

However, it is well established that the method used by Cotterill *et al.* (3) includes all proteins present in the urine, thus even proteins deriving from the tubules and more distal parts of the urinary system, e.g. the Tamm-Horsfall glycoprotein (for review see 2, 12). Several studies have demonstrated that the normal urinary excretion of plasma proteins quantitatively is dominated by albumin (5, 6, 11). The present finding of a normal daily urinary albumin excretion rate of about 10 mg is in excellent agreement with other studies using immunological or radio-immunological determination of albumin (1, 7, 11). Since Cotterill *et al.* (3) found an average normal daily protein excretion rate of 174 mg, it must be concluded that their method does not reflect plasma protein passage through the glomerulus but mainly the contribution from urinary tract proteins. However, further characterization of these proteins would be of considerable interest.

Table 1. Average urinary albumin and β_2 -microglobulin excretion rates in relation to skin involvement

% of skin involved	No. of patients	Urinary albumin excretion (mg/24 hr)	Urinary β_2 -microglobulin excretion ($\mu\text{g}/24$ hr)
Controls	27	9.1 ± 4.6^a	95 ± 71
25-50	12	6.4 ± 3.2	68 ± 52
50-75	6	8.3 ± 4.6	126 ± 116
75-100	9	7.2 ± 6.5	119 ± 101
25-100	27	7.1 ± 4.7	110 ± 88

^a S.D.

The present findings of normal urinary albumin and β_2 -microglobulin excretion rates indicate that the glomerular permeability and the tubular reabsorption of proteins are normal in patients with extensive skin disease.

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