

## Artificial Kidney and Dialysis

# Toxicity in uremia 2. *Correlation between PTH levels and impaired aspecific immunity*

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## KEY WORDS

- Aspecific immunity in uremia
- Phagocytosis
- PTH
- Uremic toxicity

## ABSTRACT

*The role of PTH in depressing polynuclear leucocyte (PMN) phagocytosis in uremia was investigated. The hydrophobicity and phagocytic activity of normal PMN was tested in presence of uremic patients' serum with low (Group A) or high (Group B) levels of plasma PTH.*

*The PMN phagocytic index was lowered by serum of both groups, but more in presence of Group B serum ( $p A$  vs  $B < 0.002$ ). Similarly, the contact angle of cells was affected more in presence of serum of patients with high PTH levels ( $p B$  vs  $A < 0.003$ ;  $p B$  vs  $C < 0.002$ ).*

## INTRODUCTION

Impaired immune response is an important clinical sign in uremic subjects (1-4). In these patients there is, in fact, a loss of immune defence mechanisms, involving specific and aspecific parameters, which may be considered a return to an earlier stage of phylogenetic evolution. There is a functional change of immunoglobulins, which are present in normal concentrations, but react insufficiently to immunogenic stimuli, and a low cellular immunity response which is closely correlated to the degree of renal impairment

(5-8). Furthermore there is depression of phagocytic activity and bactericidal action of polynuclear leucocytes which is the most important sign of impaired immunity in uremia (9). The mechanisms of all these impairments are not clear.

This study evaluated the role of PTH, which is always elevated in uremia, for hydrophobicity and phagocytic activity of polynuclear leucocytes.

## MATERIALS AND METHODS

Forty patients with renal insufficiency, treated by hemodialysis for approximately 2 years, were divided into 2 groups of 20 patients each, according to serum PTH level. In group A serum PTH was less than 2.5 ng/ml; in group B it was always higher than 12 ng/ml. Both groups were similar as to duration of dialysis treatment and blood levels of urea, creatinine, uric acid, calcium and phosphorus.

As control group, 20 normal subjects were selected, with serum PTH levels in the physiological range (group C).

Leucocytes from each subject were investigated for their phagocytic activity according to Van Zwet et al. (10) and the contact-angle was determined following Dahlgren and Sunquist (11).

## RESULTS

The phagocytic index of cells from normal subjects was higher than from uremic patients. The phagocytic index was also significantly lower in group B than in group A (Tab. 1).

**TABLE 1 - CORRELATION BETWEEN PTH AND PHAGOCYTIC INDEX**

GROUP	PHAGOCYTIC INDEX	p
A	0.13 ± 0.05	p (A>B) <0.002
B	0.07 ± 0.03	
C	0.22 ± 0.08	

Group A: patients with PTH levels &lt; 2.5 ng/ml

Group B: patients with PTH levels &gt; 12 ng/ml

Group C: normal subjects

**TABLE 2 - CORRELATION BETWEEN PTH AND SURFACE-HYDROPHOBICITY**

GROUP	CONTACT-ANGLE	p
A	18.8 ± 0.6	p (B vs A) 0.003
B	23.2 ± 1.6	p (B vs C) 0.002
C	18.2 ± 0.5	

Group A: patients with PTH levels &lt; 2.5 ng/ml

Group B: patients with PTH levels &gt; 12 ng/ml

Group C: normal subjects

The contact-angle of polynuclear leucocytes was moderately elevated in cells from group B patients (Tab. 2). This can be considered as an increased surface-hydrophobicity of these cells.

## DISCUSSION

The results of this study are in accordance with published data indicating depressed phagocytic activity of polynuclear leucocytes in uremic patients compared with normal subjects (9). Blood levels of PTH were, however, not investigated within the group of uremic patients.

This study found that in uremic subjects with high levels of PTH, phagocytosis was reduced more than in uremics with low PTH, despite a similar degree of uremia.

The mechanisms by which PTH may suppress phagocytosis are still unknown but useful information may be obtained by studying the phagocytic index in uremic patients before and after parathyroidectomy, before and after kidney transplantation and in patients with primary hyperparathyroidism.

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