

# EOSINOPHILIA IN CHRONIC DIALYSIS PATIENTS

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## SUMMARY

We evaluated the incidence of eosinophilia ( $\geq 400/\mu$ ) in a stable chronic hemodialysis (CHD) group of 240 patients treated at a singular unit, and compared it with an age and sex matched control group of 189 non-renal outpatients. The incidence in the CHD patients was 13.75%, compared to 2.11% in the controls ( $p < 0.0002$ ). Parasitic bowel disease was not present in the 35 eosinophilic patients, and only two had a history of allergic disease. Age, sex, time on hemodialysis, and parathormone levels were not different in the CHD patients with and without eosinophilia. Twenty one out of 124 patients treated on coils had eosinophilia, not different from 12 out of 116 patients treated on capillaries. Of the 23 HBsAg positive patients, 7 had eosinophilia (30.43%), which was significantly different from 26 eosinophilic patients out of 217 HBsAg negative patients (11.97%) ( $p < 0.015$ ). All HBsAg positive patients were dialysed on coils. We therefore compared them with the 101 HBsAg negative patients also dialysed on coils. The respective incidence of eosinophilia was 30.43% and 13.86% ( $p < 0.058$ ). We conclude that 1) hemodialysis is associated with a high incidence of eosinophilia, which is not related to time on dialysis or to parathyroid status; 2) HBsAg carrier patients show an even higher incidence of eosinophilia. This might be related to the particular immunoreactive status of carrier patients.

## RESUMO

### Eosinofilia nos doentes em diálise crónica

De 240 doentes insuficientes renais crónicos (IRC) em hemodiálise, 217 AgHBs negativos e 23 AgHBs positivos, 33 (13.75%) apresentavam uma eosinofilia significativa ( $n^{\circ}$  de eosinófilos igual ou superior a  $400/\mu$ ). Esta incidência é muito superior à que encontramos numa amostra de população portuguesa — 2.11% em 189 indivíduos. Procurámos detectar os possíveis factores determinantes tendo-se verificado não haver qualquer correlação entre a presença de eosinofilia e a idade, o sexo, o tempo de permanência em hemodiálise e o tipo de filtro utilizado. Existe uma maior frequência de doentes com eosinofilia nos hemodializados com filtros do tipo *coil*; 21 em 124 (16.93%), contra 12 em 116 (10.34%) nos hemodializados com filtro do tipo *capilar*. A diferença, no entanto, não é estatisticamente significativa. Ao contrário do referido por outros autores não encontramos qualquer correlação entre os níveis sanguíneos da hormona paratiroideia e o número de eosinófilos circulantes. Foi feita uma análise separada dos doentes AgHBs positivos e dos AgHBs negativos. Sete dos 23 doentes AgHBs positivos (30.43%) tinham eosinofilia enquanto esta apenas se encontrava presente em 26 dos 217 AgHBs negativos (11.97%). A diferença entre os dois grupos é significativa para um  $p \leq 0.015$ . A associação entre ambos os factos — presença do antígeno HB de superfície e a eosinofilia — poderá representar uma das expressões do tipo particular de reacção imunológica existente nestes doentes.

## INTRODUCTION

Several reports<sup>1-3</sup> have emphasized the frequent occurrence of eosinophilia in regular dialysis treatment (RDT) patients. We therefore analysed a group of 240 RDT patients receiving treatment at a single dialysis unit (Centro Médico Nacional, Lisbon). We also studied a sample of the general population as control and further tried to identify possible explanations for this finding.

## PATIENTS AND METHODS

240 RDT patients were studied. 159 were male and 81 female. Age was  $47.7 \pm 13.3$  years (mean  $\pm$  1SD), range 18 to 78 years. They were on RDT for  $33.6 \pm 20.3$  months (mean  $\pm$  1SD), range 3 to 87 months. Only three patients were on RDT for less than one year.

217 patients were HBsAg negative, and 23 HBsAg positive (Table 1). The age and sex distribution in these two sub-groups was the same, as was their time on dialysis.

TABLE 1 Eosinophilia in Regular Dialysis Treatment Patients and Control Population

	No.	Dialysis Filter	Eosinophilia 400/ $\mu$	
			No.	%
Control Population	189	—	4	2.11
RDT Patients				
HBsAg negative	116	HPF, Erika	12	10.34
HBsAg negative	101	Coil, Travenol	14	13.86
HBsAg positive	23	Coil, Travenol	7	30.43

Dialysis was performed three times a week, in 4 hour sessions. Water was treated sequentially with softeners, carbon filters and reverse osmosis. A standard commercially available dialysis solution concentrate was used (Paracelsia). Systemic heparinization was employed. Maintenance therapy consisted of vitamins, folic acid, iron and aluminium hydroxide.

124 patients were dialysed with single use cuprophane coils with PVC tubing (Travenol) on Travenol RSP monitors. 116 patients were dialysed with single use capillary filters (Erika HPF) with PVC tubing (Cobe) on Cobe Centry II monitors. All of the HBsAg positive patients were dialysed with coils. The control populations consisted of 189 random outpatients attending the same clinical laboratory for various medical reasons. They were sex and age matched to the study group. Eosinophilia was defined as a peripheral eosinophil count of 400/ $\mu$ l or greater. Blood samples to the eosinophil count and to the PTH assays were collected just before the beginning of the hemodialysis treatments.

The detection of the Hepatitis B Surface Antigen (HBsAg) was made by solid-phase radioimmunoassay (RIA), Abbott reagent. Human C-terminal parathyroid hormone (PTH) was measured by radioimmunoassay. Methods and reagents of the Immuno Nuclear Corporation.

Chi-square test was used for the analysis of significance.

## RESULTS

33 patients (13.75%) were found to have eosinophilia, with counts of  $613 \pm 289$  (mean  $\pm$  1SD), range 410 to 1780. 24 were male and 9 were female. This follows the sex distribution of the population studied. The distribution of primary renal diseases in this group (Table 2) was similar to that found in RDT patients.

TABLE 2. Primary Renal Disease

• Glomerulonephritis	13
• PN or Interstitial Nephritis	6
• Renal Vascular Disease	3
• Cystic Kidney Disease	2
• Tuberculosis	2
• Lupus Erythematosus	1
• CRF Aetiology Uncertain	6

In the control population of 189 patients, we found 4 with eosinophilia (2.11%). This difference was highly significant ( $p < 0.00002$ ). (Table 1).

We compared the incidence of eosinophilia in patients dialysed with coils to that in patients dialysed with capillaries. 21 out of 124 coil-patients (16.93%), and 12 out of 116 capillary-patients (10.34%), had eosinophilia. This difference did not reach significance.

In the group of 33 patients, PTH levels were  $9.48 \pm 8.84$  ng/ml (mean  $\pm$  1SD). In the 217 patients with normal eosinophil counts, PTH levels were  $9.02 \pm 8.76$  ng/ml (mean  $\pm$  1SD).

We analysed separately the HBsAg positive and negative patients. Out of 23 positive patients, 7 (30.43%) had eosinophilia, as opposed to 26 out of 217 HBsAg nega-

tive patients (11.97%). This difference was significant ( $p < 0.015$ ).

Since all the positive patients were dialysed with coils, we studied separately the 101 HBsAg negative patients who were also dialysed with coils. 14 of them had eosinophilia (13.86%), which was also observed in 7 out of 23 (30.43%) HBsAg positive patients. The difference between both groups although important did not reach significance ( $p < 0.058$ ).

## DISCUSSION

Previous reports<sup>1, 2</sup> have emphasized that eosinophilia, as defined by a peripheral blood count of 400/ $\mu$ l or greater eosinophils, is found in a considerable number of RDT patients.

In our survey of 240 patients treated at a single unit, 13.75% were found to have eosinophilia, which compares to the figures in other studies. Although we did not systematically exclude parasitic disease, it could not be found in the nearly half of the patients whose feces were screened, which is in accordance to previous findings. Besides, the difference towards the control sample is significant to such an extent as to exclude parasitic or allergic disease (clinically present in only 2 patients) as contributive to any significant degree.

Time on dialysis doesn't seem to influence the development of eosinophilia, since both eosinophilic and other patients were on RDT for similar periods of time. The same has been found by others.<sup>2</sup>

Although a greater percentage of patients dialysed with coils had eosinophilia, as compared to patients on capillaries, the difference did not reach significance.

Contrary to previous findings,<sup>2</sup> PTH levels were not found to bear any relation to the presence of eosinophilia.

The incidence of eosinophilia in HBsAg positive patients was greater than in negative patients. This difference was not accounted for by the use of coils in this group of patients, since it was still present, although to a smaller significant degree, when comparison was made with the group of HBsAg negative patients dialysed with coils.

Our findings therefore confirm the high prevalence of eosinophilia in RDT patients. It is also shown that this is even more so in HBsAg carrier patients. The association between both phenomena — carrier state and eosinophilia — probably represents different expressions of a peculiar immunologic reactivity.<sup>4, 5</sup>

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