Nephron 1991;59:162-163

Hemodialysis-Induced Hypoxemia and Fibronectin

N.	Nurol	Arik
O.	Oktay	Özdemir
M.	Murat	Sayin
T.	Turgay	Arinsoy
I.	Izzet	Bariş
S.	Semra	Dündar
I.	Ilgar	Taşdemir
Ç.	Çetin	Turgan
Ü.	Ünal	Yasavul
Ş.	Şali	Çağlar

Departments of Nephrology, Hematology and Chest Diseases, Hacettepe University, School of Medicine, Ankara, Turkey

Nurol Arik, MD, Department of Nephrology, Hacettepe University, School of Medicine, 06 100 Ankara (Turkey)

FN, mg/l pO₂ WBC 300

90 85 80–75–

280 260 240 220

200 J 70

Sir,

The pathogenesis of hemodialysis-induced hypoxemia has been debated for many years. Not a single factor was thought to be responsible for hypoxemia during dialysis, instead various causes such as membrane-associated factors [anaphylotoxins and other humoral mediators, 1, 2], respiratory factors [decrease in pulmonary diffusion capacity, 3, widening of alveolar-arterial oxygen tension gradient, 4, hypoventilation due to CO₂ transfer to acetate dialysate, 5] and pulmonary leukosequestration originating from blood-membrane interactions [3] were suggested by several earlier studies. On the other hand, low levels of fibronectin are known to spoil pulmonary gas exchange by elevating the permeability of the pulmonary vessels, thereby leading to pulmonary edema, [6]. In view of the latter information, Schwartz et al. [7] proposed that decreases in plasma fibronectin (FN) levels observed during dialysis can cause dialysis hypoxemia as a result of pulmonary edema in hemodialysis patients.

In order to evaluate the role of FN on the genesis of dialysis hypoxemia, we studied white blood cell counts, arterial blood gases, and FN levels at 0, 15, 30, 60, 90 and 120 min during dialysis procedure in 18 patients on maintenance hemodialysis, using a parallel-plate dialyzer with a cuprophane membrane and acetate-buffered dialysate. The results are shown in figure 1.

There was a marked drop in leukocyte count at 15 min and it reached the lowest level at that time. Marked leukopenia was still evident at 30 min of dialysis ($p < 0.001$). Reduction of arterial oxygen tension was

90
120
0 15 30
Time, min

Fig. 1. Changes in laboratory values during hemodialysis.

noted to begin at 15 min and was most severe at 30 min. The observed hypoxemia lasted during the entire study period ($p < 0.05$). An early fall in plasma FN levels was observed at 15 min, followed by a return to predialysis levels after 30 min from the start of dialysis and remained like this through the procedure.

These data indicate that FN may contribute to dialysis hypoxemia only in the early phase of dialysis. The persistence of hypoxemia through the whole course of the study in spite of the normalization of plasma FN levels at 30 min suggested that the factors apart from FN are responsible for dialysis hypoxemia, especially in the late phase of the hemodialysis procedure.

Hemodialysis-Induced Hypoxemia and Fibrinogen

163

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