

**INFLAMMATORY PROFILE AND ANEMIA CORRECTION: IMPACT OF
CONVECTIVE CLEARANCE IN HEMODIAFILTRATION****Youssef Bighouab*, Sami Zarhloul, Chaymae Dadi, Yousra Manar, Ahmed Alayoud**

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ABSTRACT

Chronic renal failure is a major health issue in Morocco. Online hemodiafiltration combines diffusion and convection to enhance the clearance of middle-molecular-weight uremic toxins, potentially improving anemia and inflammatory status. This study evaluates the long-term impact of switching from conventional hemodialysis to online hemodiafiltration on inflammatory profile and anemia correction. A 5-year retrospective analytical study (2015–2020) was conducted at the First Medical-Surgical Center of Agadir on 30 stable chronic patients. Biological parameters were compared between the hemodialysis baseline and 5 years of continuous online hemodiafiltration. Switching to hemodiafiltration led to a significant increase in hemoglobin levels (10.74 ± 1.29 to 11.66 ± 1.38 g/dl). There was a 31% reduction in weekly erythropoietin doses. The erythropoietin resistance index improved from 6.2 ± 4 to 4.4 ± 3 . Inflammatory markers (C-reactive protein) remained stable, while serum albumin showed a significant but moderate decrease (39.4 ± 4.2 to 36.8 ± 4.7 g/l). In conclusion, online hemodiafiltration significantly enhances anemia management and reduces erythropoietin resistance, although nutritional monitoring is required due to convective albumin loss.

KEYWORDS: Hemodiafiltration; Anemia; Inflammation; Erythropoietin; Morocco.**INTRODUCTION**

End-stage renal disease affects more than 32,000 patients in Morocco. Conventional hemodialysis remains limited in the clearance of "middle molecules" (0.5–60 kDa), such as hepcidin and pro-inflammatory cytokines, which promote resistance to erythropoietin. Online hemodiafiltration addresses these limitations by combining diffusive transport with massive convective transport through high-permeability membranes. This study evaluates the impact of transitioning to hemodiafiltration on the biological profile of patients treated at CMC Agadir.

MATERIALS AND METHODS

Study design and patient selection This retrospective study included 30 stable adult patients who had been on dialysis for more than one year, followed between January 2015 and June 2020 at CMC Agadir.

Procedures and data collection The transition involved moving from standard hemodialysis machines to

Fresenius 5008 Cordiax monitors (post-dilution hemodiafiltration) with a target convective volume of >23 liters per session. Data including hemoglobin, erythropoietin doses, C-reactive protein, and serum albumin were collected quarterly and analyzed using SPSS 17. The significance threshold was set at $p < 0.05$.

Ethical matters The investigation was approved by the appropriate Institutional Ethics Committee. In accordance with ethical standards, informed consent was obtained from all human subjects involved in the research prior to data collection.

RESULTS AND DISCUSSION

Results The transition to hemodiafiltration resulted in a significant improvement in hemoglobin levels, rising from 10.74 to 11.66 g/dl ($p < 0.001$), an effect that became statistically stable by the second year. Simultaneously, erythropoietin requirements dropped by 31% (4400 vs. 3010 UI/week, $p = 0.029$), with a major improvement in the erythropoietin resistance index (6.2

± 4 vs. 4.4 ± 3 , $p < 0.001$). The inflammatory profile remained stable (initial C-reactive protein 5.57 mg/l vs. hemodiafiltration average 5.95 mg/l, $p = 0.4$). Serum albumin decreased significantly from 39.4 to 36.8 g/l ($p = 0.004$) without affecting the patients' dry weight.

DISCUSSION

The improvement in anemia during hemodiafiltration is explained by the convective clearance of hepcidin (2.7 kDa) and polyamines, thereby lifting the inhibition of erythropoiesis. These results confirm the benefits observed in the ESHOL^[3] and CONVINCe^[6] trials regarding high convective volumes. The stability of C-reactive protein suggests that hemodiafiltration does not provide additional inflammatory benefits compared to hemodialysis when ultrapure dialysate is already in use. Finally, the decline in albumin reflects the convective leak inherent to the technique, but it may also represent the beneficial elimination of glycated albumin bound to toxins.

CONCLUSION

The transition to online hemodiafiltration in Morocco represents a major advancement in the management of renal anemia. While safe and effective for reducing erythropoietin resistance, this technique necessitates rigorous nutritional monitoring to proactively manage convective protein loss.

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