A SHORT-TERM REPORT OF HD TREATMENTS WITH THE NEW DIALYZERS WITH MEDIUM CUT-OFF MEMBRANE (MCO THERANOVA®)

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OBJECTIVES

The high-flux dialyzers in standard hemodialysis offer numerous benefits for ESRD patients, such as, increasing the uremic toxins removal in a wide spectrum. New dialyzers with a medium cut-off membrane (MCO, Theranova®, Baxter Healthcare), designed to further expand the removal of medium molecules in standard HD (Figure 1), represent an innovative way to remove uremic toxins, called **eXpanded HemoDialysis (HDx).**
AIM: We evaluated the removal efficacy of HDx, enabled by Theranova® dialyzer, in a case study.

METHODS

Eight stable HD patients (M/F 6/2) were enrolled in a 5-weeks observational study in HD with Theranova® 400 (1.7 m2) dialyzer. Each patient were assessed two times (first week and last week, T0 and T5 respectively) by measuring pre and post-HD samples of: Urea, creatinine, beta2-m, myoglobin, hemoglobin, albumin and total serum protein. Data are reported as mean ± standard deviation (SD).

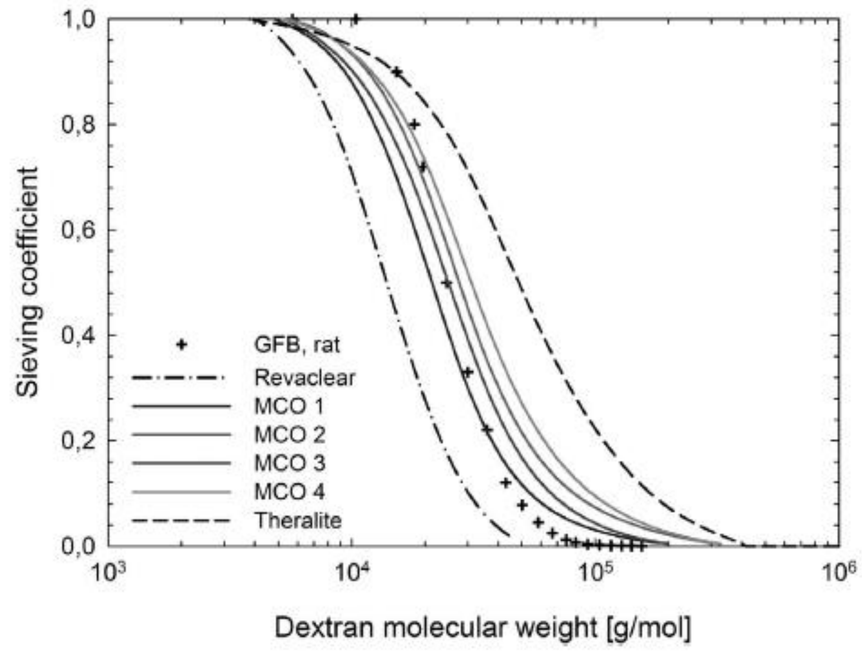

Figure 1: *Characteristic in vitro dextran sieving curves measured in aqueous solution for different membranes: Revaclear, MCO1 (Theranova) and Theralite (graph derived by Boschetti et al [1]).*

RESULTS

Theranova® was well accepted by all the patients and no adverse events were reported. The main results, as average value in all observation period, are reported in Table 1. The data showed a high removal rate for all the uremic toxins analyzed also in comparison to our previous study in HDF online [2].

	Urea (mg/dl)	Creatinine (mg/dl)	Beta2-m (mg/l)	Myoglobin (mg/l)	Hb (g/dl)	Total Protein (g/dl)
Pre-dialysis	136,8±25,8	9,5±1,3	31,7±6,7	175,8±56,9	11,8±1,1	6,8±0,3
Post-dialysis	40,8±11	3,6±0,8	9,5±2,9	79,4±29,1	13,0±1,1	7,8±0,6
Removal Rate (%)	70,4%±4,1%	62,0%±4,8%	70,3%±5,8%	54,9%±6,2%	-	-

Table 1: *Pre and post-HD values and Removal Rate (%) of several uremic toxins (Urea 60 Da, Creatinine 113 Da, Beta2-m 11.818 Da and Myoglobin 17.600 Da) measured in HDx treatments with Theranova 400*

Five weeks of Theranova® was enough to significantly decreased the pre-dialysis value of Creatinine (Table 2), but not the other uremic toxins. Moreover, the post-dialysis value of Beta2-m decreased showing and increase of removal. Finally no changes were found on albumin level between T0 and T5 (Table 2).

Table. 2	Creatinine (mg/dl)			Beta2-m (mg/l)			Albumin (g/dl)		
	T0	T5	p	T0	T5	p	T0	T5	p
Pre-dialysis	9,7±1,2	**9,3±1,3****	**0,001**	32,0±6,9	31,5±6,0	0,689	3,83±0,3	3,83±0,3	0,999
Post-dialysis	3,7±0,7	3,6±0,8	0,230	10,4±2,9	**8,7±2,5***	**0,025**	4,28±0,6	4,27±0,6	0,976
Removal Rate (%)	61,9%±3,3%	62,0%±5,7%	0,949	67,8%±4,9%	**72,8%±5,2%***	**0,015**			

Table 2: *Pre and post-HD values of Creatinine (113 Da), Beta2-m (11.818 Da) and Albumin (69.000 Da) measured in HDx treatments with Theranova 400. Comparison between T0 and T5 periods was statistically evaluated (*p<0.05 and **p<0.001).*

CONCLUSIONS

In a short-term, expanded HD (HDx), enabled by Theranova® dialyzer, offers high removal rate, for both small and medium-sized molecules (beta2-m, myoglobin), comparable to those achieved in high-volume HDF treatments, without changing in the albumin level.
A 5-weeks period was able to decrease the pre-dialysis level of Creatinine, but not Beta2-m and Myoglobin. A medium or long-term study is necessary to evaluate the removal performance of this new dialyzer.

REFERENCES:

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2. U. Teatini et al. Evaluation of a New Online Hemodiafiltration Mode with Automated Pressure Control of Convection. Blood Purification 2011;31:259–267

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