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Role of Expanded Hemodialysis in Optimizing Dialysis Outcomes and Sustainable Healthcare Resourcing

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Dialysis patients have been maintaining a high rate of cardiovascular morbidity and mortality. The dialysis membrane where the exchange of uremic toxins (UT) between the blood and the dialysis fluid occurs is the key element of the hemodialysis procedure. For this reason, new technical advances are necessary to be introduced in clinical practice. There is a relation between toxins retention and inflammation, mortality and morbidity. Until now, online hemodiafiltration (OL-HDF) have demonstrated its superiority, in terms of survival, compared to HF-HD. The four major published clinical trials (i.e. ESHOL , CONTRAST , Turkish and the CONVINCENCE studies) when high convective volumes are achieved. This improvement in survival has been linked to an increase in the clearance of higher molecules weight toxins, which is achieved when replacement volumes are greater than 23 litres².

During the last years, a new type of membrane has been developed, with a higher cut-off point (CO), called Medium Cut Off (MCO), with the ability to remove high molecular weight (MW) molecules, as well as it is done by high CO (HCO) membranes, used in myeloma, but capable of retaining albumin , , , . This MCO membranes is used to facilitate clearance of medium-sized toxins by forcing the internal filtration phenomenon .

The clearance of UT with these dialyzers has been compared with that of the HF-dialyzers and with OL-HDF , , , , , , , , , . HD-HF has similar or slightly inferior results regarding the elimination of molecules of low MW in contrast to OL-HDF and HDx. Regarding the middle molecules, post-dilution OL-HDF and HDx are superior to HF-HD.

MCO membranes are a new generation of membranes that allow the removal of a greater number of medium-sized molecules compared to high flux hemodialysis (HF-HD) but retaining albumin. MCO membranes have an increased permeability and the presence of internal filtration.

For its special properties, removal of a greater number of medium-sized molecules but retaining albumin, MCO generated a new concept of therapy called expanded HD (HDx). The name HDx refers to the fact that these dialysis membranes expand the spectrum of molecules that they are capable of eliminating towards higher MW molecules.



An observational study conducted in Colombia shows that HDx enabled by the TheraNova dialyzer was associated with a 25% decrease in mortality and preliminary data from the Mother study, a Spanish multicenter, prospective, randomized, controlled study, support the noninferiority of HDx versus OL-HDF.

In summary, HDx technique combines diffusion and convection inside a hollow fiber dialyzer with an MCO membrane characterized by a larger pore diameter and a high internal filtration rate (retrofiltration). For these properties HDx increases the clearance of higher MW toxins. Several studies have shown the use of the MCO membrane in HDx provides clinical benefits and better outcome although further studies are needed to assess the long-term effect and greater impact for dialysis patients.

