بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

The Effect of Hemodiafiltration Versus High Flux Dialysis on Free Light Chains Reduction and Its Relation to Albumin Loss

A Thesis

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List of abbreviations

Abbreviation	Meaning
ADL	Activities of daily life
ADMA	Asymmetric dimethylarginine
AKI	Acute kidney injry
B2M	Beta-2-microglobulin
BTP	B-trace protein
CKD	Chronic kidney disease
CN	Cast Nephropathy
CVD	Cardiovascular disease
EBPG	European best practice guidelines
ERI	ESA resistance index
ESA	Erythropoiesis stimulating agents
ESRD	End stage renal disease
EUDIAL	European dialysis group
FGF-23	Fibrolblast growth factor -23
FLC	Free Light Chains
GFR	Glomerular filtration rate
HCO	High cut-off
HD	Hemodialysis
HDF	hemodiafiltration
HDx	Expanded HD
HF-HD	High flux hemodialysis
HFR-SUPRA	Supra hemodiafiltration

hsCRP	Highly sensitive CRP
IgLCs	Immunoglobulin light chains
Igs	immunoglobulins
IL6	Interleukin-6
IS	Indoxyl sulfate
K_oA	Mass transfer coefficient
KUF	Ultrafiltration coefficient
LCDD	Light chain deposition disease
MCO	Middle cut-off
MM	Multiple Myeloma
MW	Molecular weight
MWCO	Molecular weight cut off
MWRO	Molecular weight retention onset
OL-HDF	Online hemodiafiltration
PCS	P-cresyl sulfate
PD	Peritoneal dialysis
PES	polyethersulfone
pFLCs	Polyclonal free light chains
Pi	Inorganic phosphorus
PMMA	polymethylmethacrylate
PTH	Parathyroid hormone
Qb	Blood flow
QOL	Quality of life
RAAS	Renin angiotensin aldosterone system
RCT	Randomized controlled trial

RRT	Renal replacement therapy
SC	Sieving coefficient
TMP	Transmembrane pressure
UF	Ultrafiltration
VC	vasoconstriction

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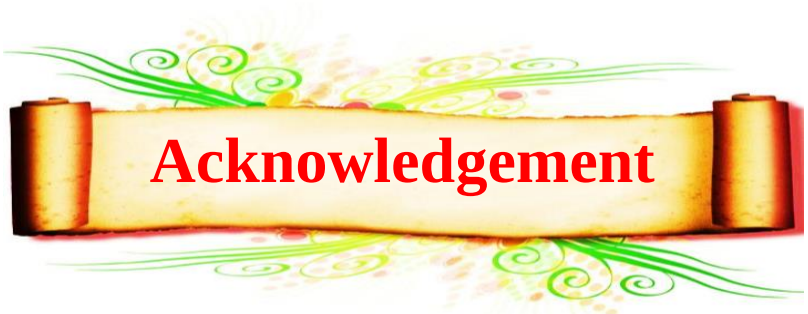

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Introduction

Uremic toxins are defined as molecules that accumulate in kidney impairment and have an adverse biologic effect. They can be broadly classified into three groups: small water-soluble molecule, middle molecule and protein-bound solutes **(Wolley et al., 2018)**

The primary goal of dialysis is solute removal. This capacity should be extended to include substances up to a molecular weight of 50 000 Da because this is the cut-off of the natural kidney **(Maduell, 2018)** to allow removal of large and middle sized molecules without albumin loss (66 kDa). **(Wolley and Hutchison, 2018)**

Immunoglobulin light chains (IgLCs) are classified as middle molecule uremic toxins together with beta 2-microglobulin (β2m) and parathyroid hormone. They have a mean molecular weight of 25,000 daltons for monomers (kappa "κ" free light chains(FLCs)) and approximately 50,000 daltons for dimers (lambda "λ" free light chains) **(Donati et al., 2016)**

In pre-dialysis patients, polyclonal FLC (pFLC) increase exponentially as the glomerular filtration rate (GFR)

falls. In dialysis patients (CKD-5D) it gets higher levels up to 20–30 times the normal values and the classical dialyzers have difficulties in efficiently removing FLC. The effect of renal replacement therapy on the k/λ FLC ratio in dialysis patients free from multiple myeloma using new generations of dialysis membranes has not been clarified. **(Bourguignon et al., 2016)**

Most of hemodialysis (HD) techniques remove small water-soluble molecules. Exemplified by the use of urea clearance as a metric for dialysis dose and kinetic modeling and the difference between them returns to middle and large molecules removal. **(Wolley and Hutchison, 2018)**

Convective therapies and highly permeable membranes are known to remove medium – large molecular weight solutes up to 25KDa giving higher dialysis adequacy but associated with higher transmembrane albumin loss than the previously routinely used low flux-HD. **(van Gelder et al., 2017)**

Hemodiafiltration (HDF) has several clinical benefits. It reduces cardiovascular risk via removal of erythropoietic inhibitor and inflammatory substances also, it enhances

hemodynamic stability and improves dialysis-related amyloidosis. **(Maduell., 2018)**

Newer ‘medium cut-off’ membranes have the potential to more effectively remove larger molecules up to 50 kDa, with limited albumin loss that improves dialysis outcome. **(Wolley and Hutchison, 2018)**

Aim of the Work

Primary end point: assessment of free light chains reduction and highly sensitive CRP (hsCRP) reduction in patients undergoing high flux dialysis (HF-HD) versus HDF.

Secondary end point: Assessment of cumulative albumin loss in patients undergoing high flux dialysis versus HDF and its correlation with convection volume.

Chapter (One)

Hemodialyzers

A dialyzer is a semipermeable membrane that separates blood and dialysate compartments, where it removes excess waste and water from the body by diffusion. it creates a counter current flow gradient where blood flow in one direction and the dialyzer dialysate is in the opposite direction. **(Vadakedath & Kandi, 2017).**

The role of the dialyzer is to act similarly to glomerulus to remove excess wastes and fluid from the blood; thus, it is often called an "artificial kidney"

The main aim of a dialysis filter is to better reproduce the physiological process of glomerular ultrafiltration. Dialysis membrane clearance, however, is based on concentration differences rather than the convective separation of solutes and low-molecular-weight proteins from large serum proteins and blood elements.**(Santoro & Guadagni, 2010)**