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Removal of molecules associated with cardiovascular disease using a new dialysis membrane

Submission date	Recruitment status	[X] Prospectively registered
26/01/2020	No longer recruiting	[X] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
21/07/2022	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
12/08/2025	Urological and Genital Diseases	

Plain English summary of protocol

Background and study aims
End-stage renal disease, also called end-stage kidney disease, occurs when chronic kidney disease — the gradual loss of kidney function — reaches an advanced state. In end-stage renal disease, the kidneys are no longer able to work as they should to meet the body's needs. The kidneys filter wastes and excess fluids from the blood, which are then excreted in urine. When the kidneys lose their filtering capabilities, dangerous levels of fluid, electrolytes and wastes can build up in the body.
End stage renal disease leads to accumulation of different sized molecules and toxins. Dialysis patients routinely undergo haemodialysis (HD) treatment three times per week. Standard dialysis treatment utilizes traditional dialysis membranes which provide size specific clearance lead to accumulation of larger molecules such as Fibroblast Growth Factor-23 (FGF-23). Accumulation of FGF-23 is thought to be associated with increased risk of death in dialysis patients. A newer dialysis membrane, called medium cut-off (MCO) membrane (e.g Theranova by Baxter Healthcare), can potentially clear relatively bigger sized molecules due to bigger pore size. No data is available regarding clearance of FGF-23 on MCO membranes. The aim of this study is to investigate if the new medium cut-off membrane can remove FGF 23.

Who can participate?
Patients aged 18 years and over with end stage renal failure on regular HD.

What does the study involve?
Participants will be randomly allocated to receive one week monitored HD treatment with MCO membrane followed by one week monitored conventional HD or vice versa. Both options will include a three-week interval between monitored sessions during which the patients will receive conventional HD. Blood samples will be collected before and after dialysis during monitored treatment week.

What are the possible benefits and risks of participating?
There are no immediate clinical benefits or anticipated risks of participating in this study.

Where is the study run from?
Salford Royal, UK

When is the study starting and how long is it expected to run for?
February 2020 to October 2022

Who is funding the study?
1. Kidneys for Life, UK
2. Baxter Healthcare Ltd., UK

Who is the main contact?
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Contact information

Type(s)
Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
262813

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
S19REN08-S, IRAS 262813, CPMS 43129

Study information

Scientific Title
Impact of medium cut-off membrane on FGF-23 level in haemodialysis patients

Study objectives
Despite technological advances in the field of renal replacement therapy, mortality in haemodialysis (HD) patients remains high and is predominantly due to cardiovascular disease. One of the medium-sized uraemic molecules implicated in cardiovascular disease is FGF-23, a molecule that is increased in dialysis patients and is not removed with conventional standard dialysis membranes. A new medium cut-off membrane (MCO, Theranova, Baxter Healthcare) has a higher molecular weight cut-off than conventional membranes that facilitates removal of larger i.e. medium-sized molecules.

The study hypothesis is that FGF-23 removal with MCO membrane will be better than conventional dialysis membranes.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 18/12/2019, Health and Care Research Wales (Health and Care Research Wales Support and Delivery Centre, Castlebridge 4, 15-19 Cowbridge Road East, Cardiff, CF11 9AB; no tel. provided; hra.approval@nhs.net), 19/NW/0638

Study design
Prospective randomized case-crossover design study

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
FGF 23 clearance in haemodialysis patients

Interventions
This study will include adult patients with renal failure who are on long term haemodialysis (HD). During this study, patients will be randomized (using sealed envelope) to one week monitored HD treatment with MCO membrane followed by one week monitored conventional HD or to receive one week monitored conventional HD followed by one week monitored MCO membrane treatment. Both options will include a three-week interval between monitored sessions during which the patients will receive conventional HD. Blood samples will be collected before and after dialysis during monitored treatment week. Blood samples will be tested for FGF-23 levels but also for calcium, phosphate levels, Vitamin D and PTH levels which are known to affect FGF-23 levels.

Generated data will be analysed to compare clearance of FGF-23 on conventional dialysis membranes versus clearance on MCO membrane and rate of re-accumulation of FGF-23 between

dialysis sessions. If the new membrane is effective in removing FGF 23 further studies should explore the impact of the new membranes on cardiovascular profiles and cardiovascular outcomes

Intervention Type
Device

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Theranova by Baxter Healthcare

Primary outcome(s)
FGF 23 clearance measured using blood test before and after receiving dialysis for one week with each type of membrane

Key secondary outcome(s))
Measured using blood test before and after receiving dialysis for one week with each type of membrane:
1. Stability of FGF 23 clearance
2. Rate of FGF 23 re-accumulation
3. Phosphate, calcium and urea clearance and PTH levels
4. Range of circulating proteins measured using whole proteome analysis

Completion date
28/10/2022

Eligibility

Key inclusion criteria
1. Aged 18 years and over
2. End stage renal failure
3. On regular haemodialysis

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
All

Total final enrolment
20

Key exclusion criteria
1. Lack of capacity to consent to treatment
2. Significant residual urine output (> 500 ml of urine per 24 hours)
3. Poor dialysis adequacy (urea reduction ratio < 65%)
4. Active infection
5. Active malignancy

Date of first enrolment
09/09/2022

Date of final enrolment
09/10/2022

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Salford Royal
Salford Royal NHS Foundation Trust
Stott Ln
Salford
Manchester
United Kingdom
M6 8HD

Sponsor information

Organisation
Salford Royal NHS Foundation Trust

ROR
https://ror.org/019j78370

Funder(s)

Funder type

Charity

Funder Name
Kidneys for Life

Funder Name
Baxter Healthcare Ltd.

Results and Publications

Individual participant data (IPD) sharing plan
All data generated or analysed during this study will be included in the subsequent results publication

IPD sharing plan summary
Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		21/04/2025	12/08/2025	Yes	No
HRA research summary			28/06/2023	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Protocol file	version 2.2	11/01/2022	27/07/2022	No	No