**LiMON study Plain English summary**

There are approximately 30,000 adults in the United Kingdom receiving dialysis (blood cleaning) treatment for advanced kidney disease. Advanced kidney disease is associated with reduced quality of life and increased risk of hospital admission and death. For certain people with kidney disease treated with dialysis, receiving a kidney transplant is not possible. For other people who are treated with dialysis remaining healthy and well is crucial prior to receiving a transplant. It is therefore important to try and investigate the reasons behind poor outcomes in order to improve treatment strategies for people receiving dialysis.

A significant proportion of people (approximately 25%) receiving haemodialysis (a treatment where blood is removed from a person’s body and then ‘cleaned’ by a machine before being returned to the patient) have elevated measurements of inflammation on blood testing that cannot be easily explained by other medical conditions. One possible source of inflammation in this group of patients is the impaired ability of the liver to effectively decontaminate the blood from toxins and other waste products, some of which originate from the gut. There are many conditions, including diabetes, obesity, raised blood pressure and longstanding infection with hepatitis viruses, that can cause both kidney and liver impairment and there is also evidence that links kidney disease to the worsening of liver disease. There has however been little research to date looking at whether there is impaired liver function in people treated with dialysis. There is evidence that people with normal liver function blood tests, especially those treated with dialysis, can have impaired liver function and so additional investigations to investigate liver function are required.

This study will aim to see if there is a difference in the ability of the liver to ‘clean’ the blood between people treated with dialysis who have low levels of inflammation and people treated with dialysis who have high levels of inflammation. To assess this function of the liver people will be given an injection of a special fluorescent dye called indocyanine green (ICG). ICG is approved for safe medical use for injection into a vein and is used commonly by eye doctors to help assess the blood vessels at the back of the eye. It has been safely administered to patients (including those receiving dialysis treatment) as part of previous research studies. Levels of ICG in the blood will be measured non-invasively using a finger probe monitor. This is preferential from a participant perspective because it is a simple, painless test and multiple blood tests to measure ICG levels in the blood are not required. In order to perform this study safely we will check that patients do not have certain conditions or take medications that may affect the safety of giving ICG. We will also only administer this dye to patients who have safely received a dye when having a CT scan previously.

This study will also aim to establish if, through performing tests on the stool, there are differences in gut inflammation and leakage between patients who have low and high levels of inflammation. Additionally, participants will, both before and after dialysis, undergo a special type of ultrasound scan of the liver called a FibroScan which measures the stiffness of the liver and an assessment of the amount of fluid in the body. These procedures are being performed to try and detect a relationship between liver stiffness, the amount of fluid in the body, and liver function. Routine blood tests performed as part of usual dialysis care as well as other blood measurements of inflammation will also be performed as part of this study. Participants will be asked to fast for 3 hours prior to undergoing each FibroScan test which will be performed both before and after dialysis. Participants will be able to eat in between each FibroScan assessment.

In addition, as part of this study, participants will also be asked 2 questions about their mood. This will help to assess if there is any evidence of a relationship between mood, amount of fluid in the body and gut leakiness.

Following completion of the above investigations, there will be no further follow up for participants who are enrolled in this study. In total, all of the study procedures will take around 2 hours to complete.

This study aims to help establish if there is evidence of impaired liver function in patients treated with dialysis and if there is a difference in liver function in patients with and without inflammation on blood testing. The results of this study may help to inform future research about the impact of abnormal liver function in patients treated with haemodialysis.