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The effect of acidosis correction and exercise on tissue wasting and immune function in renal patients

Submission date
21/05/2008

Recruitment status
No longer recruiting

Registration date
12/09/2008

Overall study status
Completed

Last Edited
03/03/2015

Condition category
Urological and Genital Diseases

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Patients with Chronic Kidney Disease (CKD) very often find that their muscles get smaller and weaker, especially the muscles in their legs. These patients will often have other health problems as well as their kidney disease and will suffer regular infections, which is a major cause of death in this patient group. This suggests that muscle loss is linked to a defect in the immune system. A problem that is seen in nearly all patients is that acid accumulates in the blood and tissues (acidosis) and research suggests that this acidosis may cause muscle loss and a problem with the immune system. We know that regular exercise helps maintain a healthy muscle mass and a strong immune system, but we do not know if this is the case in CKD patients. The aim of this study is to test the ability of two treatments, sodium bicarbonate (an alkali therapy to correct the acidosis) and regular exercise, to improve the immune system and prevent muscle loss. Furthermore, we will determine if these treatments work best when given alone, or in combination with each other.

Who can participate?
Chronic kidney disease (CKD) patients at CKD stages 4 to 5.

What does the study involve?
The study involves a series of tests performed before and after a 6-month period to see the effect the alkali therapy and exercise has had on the immune system and the patient's ability to put on muscle. These tests include:
1. A skeletal muscle biopsy – this involves taking a small amount of muscle from your leg using a needle
2. Blood and urine samples
3. An exercise test on a treadmill
4. A DEXA scan (dual-energy x-ray absorbance)
5. Questionnaires about how you feel about your health
6. A food diary
We will then put you into one of four groups at random:
1. Exercise + sodium bicarbonate + usual care

2. Exercise + usual care
3. Sodium bicarbonate + usual care
4. Usual care only
If you are in the exercise group we will then ask you to start a 6-month regular walking programme. We will design the programme for you based upon how you did in the treadmill exercise test. We will ask you to aim for walking 5 days a week for 30 minutes, but it is likely that we will build up to this gradually. We will see you once a month to update your programme and discuss your progress. We will also ask you to fill in an exercise diary so we can see what you are doing. At the end of the 6 months we will repeat all the tests we did at the beginning, including the muscle biopsy to see if anything has changed.

What are the possible benefits and risks of participating?
There are no direct benefits to you of taking part in this research, although we anticipate that participating in the exercise training sessions will help you to improve your physical fitness levels. We hope that the results of the study will help us design improved treatments for other kidney patients in the future. There are no reported serious problems associated with a muscle biopsy and there is a very low risk of bleeding or infection at the site of the biopsy. You will first be given an injection of local anaesthetic which may cause slight discomfort. The biopsy itself is not painful, but the area may ache for a while afterwards (you will be offered painkillers to take away if you need them). You will need to refrain from eating or drinking anything other than water until you have completed the test. Therefore you may be rather hungry, but we will arrange these tests for the morning to reduce the time before you can eat. As with all exercise there is a small risk of injury especially when using a treadmill. However, you will be supervised at all times by trained staff to help minimise this risk. Committing to a research study such as this means you will need to give up some of your time. We cannot pay you for this time, but we can reimburse you for any travel-related costs for attending study appointments.

Where is the study run from?
Leicester General Hospital (UK).

When is the study starting and how long is it expected to run for?
From July 2007 to August 2008.

Who is funding the study?
University Hospitals of Leicester NHS Trust and Kidney Research UK.

Who is the main contact?
Prof John Feehally
jf27@le.ac.uk

Contact information

Type(s)
Scientific

Contact name
Prof John Feehally

Contact details
Leicester General Hospital
Gwendolen Road

Leicester
United Kingdom
LE5 4PW
-
jf27@le.ac.uk

Additional identifiers

Protocol serial number
Version 4

Study information

Scientific Title
The effect of acidosis correction and exercise on tissue wasting and immune function in renal patients

Study objectives
1. That efficient correction of blood acidity by feeding extra alkali to the patients improves their exercise tolerance, reduces muscle wasting, and improves the functioning of their immune system
2. That exercise therapy improves their exercise tolerance, reduces muscle wasting, and improves the functioning of their immune system
3. That applying alkali therapy and exercise therapy together exerts beneficial effects greater than with either therapy alone

Ethics approval required
Old ethics approval format

Ethics approval(s)
Nottingham Research Ethics Committee 2, 27/11/2007, ref: 07/Q2404/16

Primary study design
Interventional

Study design
Randomised controlled trial, factorial 2 x 2 design

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Chronic kidney disease

Interventions
Forty patients will be assigned randomly to the following four groups to determine whether alkali and exercise together are more effective than alkali or exercise alone:
1. Standard clinical therapy only (no exercise and target plasma bicarbonate of 24 mmol/L)

2. Additional alkali therapy (no exercise and target plasma bicarbonate of 29 mmol/L)
3. Exercise therapy without additional alkali therapy (target plasma bicarbonate of 24 mmol/L)
4. Exercise therapy and additional alkali therapy (target plasma bicarbonate of 29 mmol/L)

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Sodium bicarbonate

Primary outcome(s)
1. Changes in immune function - in vitro assessment of lymphocyte proliferation and neutrophil activation
2. Changes in body composition - dual energy X-ray absorptiometry (DEXA) scanning

Measurements made at zero and 6 months (end of study).

Key secondary outcome(s)
1. Changes in exercise tolerance - submaximal exercise testing (bicycle ergometry or treadmill exercise) to determine maximal oxygen uptake and lactate threshold
2. Muscle biopsies - in vitro evaluation of intracellular signalling pathways that regulate protein synthesis
3. Changes in cardiovascular function - blood pressure, pulse wave velocity, finometry
4. Changes in quality of life measures - Leicester Uraemic Symptoms Score

Measurements made at zero and 6 months (end of study).

Completion date
01/09/2008

Eligibility

Key inclusion criteria
Chronic kidney disease (CKD) patients at CKD stages 4 to 5

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
1. Age less than 18 years, either sex
2. Pregnancy
3. Physical disability sufficient to preclude participating in an exercise programme

Date of first enrolment
01/07/2007

Date of final enrolment
01/09/2008

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Leicester General Hospital
Leicester
United Kingdom
LE5 4PW

Sponsor information

Organisation
University Hospitals of Leicester NHS Trust (UK)

ROR
https://ror.org/02fha3693

Funder(s)

Funder type
Government

Funder Name
University Hospitals of Leicester NHS Trust (UK)

Funder Name
Kidney Research UK

Alternative Name(s)

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/03/2012		Yes	No
Results article	results	01/08/2013		Yes	No
Results article	results	01/09/2014		Yes	No