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The renin-angiotensin-aldosterone (RAAS) axis, endothelial function and hypertension: diagnostic strategies, and therapeutic role of potassium supplementation

Submission date
25/03/2009

Recruitment status
No longer recruiting

Registration date
30/06/2009

Overall study status
Completed

Last Edited
30/12/2020

Condition category
Circulatory System

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

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
RGHT000502

Study information

Scientific Title

The renin-angiotensin-aldosterone (RAAS) axis, endothelial function and hypertension: diagnostic strategies, and therapeutic role of potassium supplementation - a randomised cross-over trial and an observational study

Study objectives
Study 1:
We seek to test the hypothesis that endothelial function is improved when dietary potassium is supplemented in a group with moderate risk of developing cardiovascular disease. We also wish to assess the effect of this supplementation on the renin-angiotensin-aldosterone (RAAS) axis and the effect of any of these changes on proinflammatory cytokines and adhesion molecules.

Study 2:
We seek to test the hypothesis that the synacthen test can be used to distinguish patients with primary (essential) hypertension from those with secondary hypertension due to hyperaldosteronism (due to Conn's adenoma or bilateral adrenalhyperplasia). We will also assess the aldosterone response to gonadotropin releasing hormone (GnRH) in healthy volunteers and patients with hyperaldosteronism.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Office for Research Ethics Committees Northern Ireland
Study 1 approved on 02/09/2008 (ref. 08/NIR08/54)
Study 2 approved on 19/08/2008 (ref. 08/NIR08/55)

Study design
Study 1: Prospective randomised cross-over investigator-blinded trial
Study 2: Observational study

Primary study design
Interventional

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Hypertension, cardiovascular risk, hyperaldosteronism

Interventions
Study 1: Dietary intake of sodium and potassium will be assessed and a 24 hour urine collection for estimation of Na and K excretion will be taken. The subjects will be randomised to either placebo or potassium supplementation (4.8 g/day; oral) for 6 weeks. There will be a 6 week washout period. Subjects will be studied at baseline, at the end of washout and after each intervention (4 in total).

Study 2:
The target numbers of participants for the three groups are as follows:
i. Patients with essential hypertension: n = 20
ii. Patients with hyperaldosteronism: n = 8

iii. Healthy volunteers: n = 15
43 participants in total

Patients with essential hypertension and patients with hyperaldosteronism will undergo a 250 mcg synacthen test with blood and saliva sampled at 0, 30 and 60 mins for cortisol and aldosterone. This test will be performed after 30 min of recumbency. In addition the healthy volunteers and patients with hyperaldosteronism will also undergo a GnRH test to assess aldosterone response.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Potassium

Primary outcome(s)
Study 1 - Global endothelial function assessed by determining the change in augmentation index (AIx) in response to the administration of nitroglycerin (NTG) and salbutamol.
Study 2 - Aldosterone response to synacthen/GnRH

All primary and secondary outcomes for Study 1 will be assessed at baseline, at the end of washout and after each intervention.

Key secondary outcome(s))
Study 1 - Brachial blood pressure, pulse wave velocity, serum potassium, renal function, lipid profile, plasma renin activity and aldosterone levels (taken after at least 30 minutes recumbency). Circulating markers of endothelial function (E selectin, VCAM-1, ICAM-1) and markers of inflammation (IL-6, IL-1 beta, hsCRP)

All primary and secondary outcomes for Study 1 will be assessed at baseline, at the end of washout and after each intervention.

Completion date
06/08/2010

Eligibility

Key inclusion criteria
Study 1:
1.1. Patients (both males and females) aged 40-70 with moderate (>10%) cardiovascular disease risk (Joint British Societies' [JSB2] guidelines)

Study 2:
Three groups of participants (both males and females, all within age 18-70):
2.1. Patients with essential hypertension
2.2. Patients with hyperaldosteronism
2.3. Healthy volunteers

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
70 years

Sex
All

Total final enrolment
40

Key exclusion criteria
Study 1:
1.1. A history or renal or cardiovascular disease
1.2. Fasting glucose >7 mmol/l
1.3. Serum potassium >5.5 mmol/l
1.4. Treated seated blood pressure >140/90 mmHg
1.5. Women on hormone replacement therapy (HRT)
1.6. Pregnancy

Study 2:
2.1. Pregnancy

Date of first enrolment
20/11/2008

Date of final enrolment
06/08/2010

Locations

Countries of recruitment
United Kingdom

Northern Ireland

Study participating centre
Royal Victoria Hospital
Belfast

United Kingdom
BT12 6BA

Sponsor information

Organisation
Royal Victoria Hospital (UK)

ROR
https://ror.org/03rq50d77

Funder(s)

Funder type
Government

Funder Name
Northern Ireland Research and Development Office (UK) (ref: EAT/3740/07)

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/05/2014	30/12/2020	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes