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NIOX VERO nasal application in primary ciliary dyskinesia

Submission date 01/12/2015	**Recruitment status** No longer recruiting	[X] Prospectively registered [_] Protocol
Registration date 30/12/2015	**Overall study status** Completed	[_] Statistical analysis plan [X] Results
Last Edited 23/04/2021	**Condition category** Genetic Diseases	[_] Individual participant data

Plain English summary of protocol

Background and study aims
Primary ciliary dyskinesia (PCD) is a rare, inherited condition where there is a problem with the structure or function of the tiny hair-like structures (cilia) in the airways. In an unaffected person, the cilia work as a filter, preventing harmful substances and bacteria from entering the lungs. In a person suffering from PCD, the cilia do not work as they should do which makes the sufferer vulnerable to lung infections and breathing problems. It can be difficult to diagnose PCD, as there is currently no wholly reliable screening technique. Recent studies have shown that measuring nasal nitric oxide (the amount of the gas nitrogen oxide that is breathed out of the nose) may be a good way of screening for PCD, as it has been found that levels are much lower in sufferers than in the general population. The aim of this study is to find out whether using a device to measure nasal nitric oxide (nNO) called the NIOX VERO is able to show the difference in exhaled nitric oxide measurements in PCD sufferers and healthy patients of the same age.

Who can participate?
Patients above 5 years old with confirmed PCD and healthy patients of the same age.

What does the study involve?
All participants attend a single visit at the study centre, which is expected to last between one and two hours. Firstly, a brief medical history is taken, in which the participants are asked about their age, gender, height, weight, race, current medications and living environment. If the participant is a PCD sufferer, then they are also asked about their disease history. After a brief nasal exam (looking into each nostril to make sure they are clear), participants are taught how to use the NIOX VERO (device to measure nasal nitric oxide) with the nasal adapter by the study staff and are given a chance to practice. The participants are then asked to blow their noses and perform a total of two measurements while breathing normally and two measurements while breathing forcefully.

What are the possible benefits and risks of participating?
There are no direct benefits or risks to participants taking part in the study.

Where is the study run from?
University Hospital Southampton NHS Trust (UK) and clinics in Denmark, Germany, France, USA, Ireland and Italy.

When is the study starting and how long is it expected to run for?
January 2016 to May 2016

Who is funding the study?
Aerocrine AB (Sweden)

Who is the main contact?
1. Mrs Margot Berko (Public)
2. Dr Kathy Rickard (Scientific)

Contact information

Type(s)
Public

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Additional identifiers

ClinicalTrials.gov (NCT)
NCT02622061

Protocol serial number

AER-051

Study information

Scientific Title
A clinical investigation determining the discriminative ability of the NIOX VERO NASAL to differentiate subjects with primary ciliary dyskinesia from healthy controls

Study objectives
To determine the feasibility and capability of the NIOX VERO to discriminate subjects with primary ciliary dyskinesia (PCD) from healthy subjects.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Not provided at time of registration

Study design
Multi-centre cross-sectional study

Primary study design
Observational

Study type(s)
Diagnostic

Health condition(s) or problem(s) studied
Primary ciliary dyskinesia (PCD)

Interventions
There will be one study visit which will last one or two hours.
Participants will be asked basic background questions such as age, sex, height, weight, ethnicity (a group of people who with similar racial origins or cultural background), primary language, environmental tobacco smoke exposure and prior experience with nNO measurements, as well as a brief medical history and review any current medication or other co-existing medical conditions. If participants have PCD, information about specific diagnosis, method of diagnosis and documented allergic history (e.g. asthma, eczema, allergy skin testing, drug allergies etc.) will also be recorded. Participants will also have a brief nasal exam (a simple external look with an otoscope to make sure you can breathe through each nostril and have no nose bleed). Participants will then be trained by the study staff how to use the NIOX VERO with the nasal adapter and given a chance to practice using the device. They are then asked to blow their nose to clear the nasal passages before performing the measurements. nNO measurements will be performed using two types of breathing methods (Tidal Breathing and Velum Closed ER Method) to attempt to obtain a total a 4 nasal NO measurements. When finished, they will be asked about any discomfort or adverse events.

Intervention Type
Other

Primary outcome(s)
The concentration of nasal nitric oxide will be measured using the nasal adapter kit for the NIOX VERO during the study visit.

Key secondary outcome(s))
1. The observed nasal nitric oxide results (ppb)
2. The proportion of participants able to successfully complete nNO measurements using the TB-nNO method
3. The proportion of participants able to successfully complete nNO measurements using the velum closed ER-nNO method
4. The proportion of participants able to successfully complete nNO measurements using both methods

Completion date
28/04/2017

Eligibility

Key inclusion criteria
All participants:
1. Aged 5 years or over
2. Anatomically, is able to complete the nasal NO measurements in both nostrils

PCD patients:
1. Confirmed diagnosis of PCD from one of the PCD diagnostic centres based on clinical phenotype PLUS diagnosis made by at least 1 of the following (the specifics about how diagnosis was made must be documented in their medical file):
1.1. A nasal biopsy or scraping showing a hallmark PCD defect such as, an outer (+/- inner) dynein arm defect, microtubule defect
1.2. A genetic test positive for bi-alleilic mutations in a known PCD-causing gene associated with the diagnosis of PCD (e.g., ARMC4, C21orf59, CCDC39, CCDC40, CCDC65, CCDC164, CCDC103, CCDC114, CCDC151, CCNO, DNAAF1(LRRC50), DNAAF2 (KTU), DNAAF3, DNAH5, DNAH11, DNAI1, DNAI2, DNAL1, DYX1C1, HEATR2, HYDIN, LRRC6, MCIDAS, NME8 (TXNDC3), ODA/IDA, OFD1, RPGR, RSPH3, RSPH4A, RSPH9, SPAG1, ZMYND10)
1.3. A low nasal NO (determined by a chemiluminescent analyser) with either at least 2 separate occasions with ‘hallmark’ changes on high-speed video microscopy, or demonstration of mislocalisation of ciliary proteins by immunofluorescence microscopy (EU Centres Only)

Healthy patients:
1. No airway or immune problems
2. No recent significant injury
3. No systemic infection
4. No systemic inflammation
5. No allergies or asthma

Participant type(s)
Mixed

Healthy volunteers allowed
No

Age group
Mixed

Sex
All

Key exclusion criteria
All participants:
1. Currently smokes or it has been less than 6 months from quitting
2. Has had a nose bleed within the past 2 weeks
3. Has acute respiratory symptoms or signs of an upper or lower respiratory tract infection
4. Use of nasal medication as described below:
4.1. Xolair ≤180 days prior to nNO measurement
4.2. Oral or Systemic Corticosteroids ≤30 days prior to nNO measurement
4.3. Inhaled, nebulized, or intranasal corticosteroids ≤30 days prior to nNO measurement
4.4. Nasal or oral decongestants or antihistamines ≤14 days prior to nNO measurement
4.5. Leukotriene receptor antagonists ≤30 days prior to nNO measurement
5. Has an obstruction or anatomy that prevents a nasal measurement from being performed (as confirmed by simple visual inspection by the Investigator)
6. Has Cystic Fibrosis
7. Has a documented primary or acquired immunodeficiency
8. Is undergoing treatment with NO-releasing drugs (such as nitrates or molsidomine)
9. Has had food or beverage intake (other than water) or has participated in strenuous exercise within 1 hour of nasal NO measurement
10. Is unwilling or unable to provide consent to participate (self, parent or legal guardian)

PCD Patients:
1. Has mutations with RSPH1 since nasal NO may not be low in these patients
2. Has not had a standard clinical evaluation to address other potential causes of chronic oto-sino- pulmonary disease

Healthy Patients:
Atopy or the presence of any of the following: a recent significant injury (i.e., within 1-2 weeks), systemic inflammation, airway or immune problem, asthma or allergies.

Date of first enrolment
18/01/2016

Date of final enrolment
06/04/2016

Locations

Countries of recruitment
United Kingdom

England

Denmark

France

Germany

Ireland

Italy

United States of America

Study participating centre
Hôpital Armand Trousseau
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Study participating centre
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Sponsor information

Organisation
Aerocrine AB

ROR
https://ror.org/0389wyq54

Funder(s)

Funder type
Industry

Funder Name
Aerocrine AB

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Abstract results		01/10/2017	23/04/2021	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes