[68Ga]Ga-DOTA-(RGD)2 PET/CT imaging of activated endothelium in lung parenchyma of COVID-19 patients.

Published: 07-04-2020
Last updated: 09-04-2024

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Viral infectious disorders
Study type	Observational invasive

Summary

ID

NL-OMON49142

Source
ToetsingOnline

Brief title
RDG-PET/CT imaging in COVID-19 patients.

Condition

- Viral infectious disorders
- Respiratory tract infections

Synonym
COVID-19; coronavirus infection

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universitair Medisch Centrum
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: [68Ga]Ga-DOTA-(RGD)2, COVID-19, PET/CT

Outcome measures

Primary outcome

The main study parameter is the uptake of [68Ga]Ga-DOTA-(RGD)2 in the lesions as quantified by PET/CT (SUVmean ±SD, SUVmax ±SD and SUVpeak ±SD).

Secondary outcome

1) spatial correlation (per lung segment) with ground-glass opacities, consolidation, vessel size and other components of CORADS system

2) spatial correlation (per lung segment) with perfusion abnormalities as measured by subtraction CT

3) quantitative correlation with blood counts and differentiation, ferritin, D-dimer, CRP, liver enzyme panel (ALAT, ASAT, direct and indirect bilirubin, alkaline phosphatase, gamma-GT, LDH), cytokines, as obtained by approved study BioMarCo-19 (CMO 2020-6344)

4) correlation with the following clinical parameters: ICU admission, mechanical ventilation parameters, oxygen demand, length of ICU stay (days), length of hospital stay (days).

Additional study parameters are uptake in the myocardium and the lung-to-background ratio (LBR).

Study description

Background summary

Patients diagnosed with COVID-19 present with markedly elevated D-dimer, ACE2, leukopenia. When respiratory insufficiency develops, ventilation parameters typically include high positive end-expiratory pressure (PEEP). These recent findings strongly indicate dysfunctional activated endothelium of the lung parenchyma.
Integrin *v*3 is over-expressed on activated endothelial cells. This expression allows the interaction with extracellular matrix proteins through their Arg-Gly-Asp (RGD) amino acid sequence. Previous studies at our institute demonstrated the feasibility of molecular imaging to noninvasively quantitate *v*3 integrin expression using PET/CT. Imaging activated endothelium in the lung parenchyma might contribute to an improved understanding of the pathophysiology in COVID-19.

Study objective

We aim to evaluate *v*3 integrin expression in proven COVID-19 infected patients with respiratory insufficiency and indicative findings on routine contrast-enhanced CT using [68Ga]Ga-DOTA-(RGD)2. If dysfunctional activated endothelium in the lung parenchyma contributes to the progressive respiratory insufficiency as frequently observed during COVID-19 infection, imaging *v*3 integrin expression using PET/CT could have potential as a clinical tool to characterize patients at early stages during disease.

Study design

This is a prospective, observational non-randomized pilot study. Maximum 10 patients will undergo a [68Ga]Ga-DOTA-(RGD)2 PET/CT scan and CT-subtraction scan in the same procedure. 10-minutes/bedposition static [68Ga]Ga-DOTA-(RGD)2 PET/CT scans of the thorax will be acquired starting at 60 minutes post injection.

Study burden and risks

Toxicity tests have been performed in mice and no adverse events were seen. Previous and published clinical studies with [68Ga]Ga-DOTA-(RGD)2 injection showed no adverse events. The risks associated with the radiolabeled peptides injection are in general low.
The combination of [68Ga]Ga-DOTA-(RGD)2 injection, low-dose CT and CT-subtraction impose a radiation dose equivalent of 11.4 mSv to the patient..
The addition of the [68Ga]Ga-DOTA-(RGD)2 injection PET/CT scan will not cause a change in risk and will still be in the risk category as defined by the International Commission on Radiation Protection. Because diagnostics and treatment are not influenced by the outcome of this study, the patient will not directly benefit from participation in this study.

Contacts

Public
Radboud Universitair Medisch Centrum

Geert Grooteplein Zuid 10
Nijmegen 6525 GA
NL
Scientific
Radboud Universitair Medisch Centrum

Geert Grooteplein Zuid 10
Nijmegen 6525 GA
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

* A microbiologically proven SARS-CoV-19 infection
* Pulmonary involvement as demonstrated on recent (<1 week) chest CT
* Enrolled in the BioMarCo-19 study (CMO2020-6344)
* More than or equal to 18 years of age;
* Ability to provide written informed consent.

Exclusion criteria

* Contra-indication for PET:
o Pregnancy;
o Breast-feeding;

o Severe claustrophobia.
* Contra-indication for administration of iodine-containing contrast agents.
* Other serious illness, e.g. history of malignancies
* Estimated creatinine clearance * 30 mL/min according to the Cockcroft-Gault formula (or local institutional standard method)

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Diagnostic

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	16-10-2020
Enrollment:	10
Type:	Actual

Medical products/devices used

Product type:	Medicine
Brand name:	[68Ga]Ga-DOTA-(RGD)2
Generic name:	Niet van toepassing

Ethics review

Approved WMO Date:	07-04-2020
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	20-05-2020

Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	03-11-2020
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	10-11-2020
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
EudraCT	EUCTR2020-001325-31-NL
CCMO	NL73551.091.20