

MEDIRAD

Project title: Implications of Medical Low Dose Radiation Exposure

Grant Agreement: 755523

Call identifier: NFRP-2016-2017

Topic: NFRP-9

Milestone MS15

Establishment of expert groups, definition of clinical indications for chest CT, decision on clinical image quality criteria and readout working procedures

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Work Package: WP2 – Task 2.1.1

Estimated delivery: May 2018

Actual delivery: **10/07/2018**

Type: Public Report on website and internal report of read-out procedure

This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 755523.



MS15: Establishment of expert groups, definition of clinical indications for chest CT, decision on clinical image quality criteria and readout working procedures (WP2)

1. Establishment of expert groups

The group of expert radiologists was established by the members of the consortium of the subtask 2.1.1, namely:

- IPC-ESTESC / CHUC: Amélia Estevão; Inês Abreu
- Otto-von-Guericke University, University Hospital Magdeburg: Maciej Pech; Maciej Powerski
- Univeristy of Crete: Apostolos Karantanas; Evi Vassalou
- Sahlgrenska University Hospital: Jenny Vikgren; Ase Johnsson
- Université Paris Descartes: Marie-Pierre Revel

2. Definition of clinical indications for chest CT

After several online and face-to-face meetings between the partners of the subtask and the radiologists assigned to this process it was finally agreed to consider the following clinical indications for chest CT:

- Mycobacterial infections and pulmonary tuberculosis
- Interstitial pathology - suspicion of pulmonary fibrosis
- Pulmonary metastases and nodules

To avoid bias in image analysis and influence in dose values, it was considered by the expert group to include only procedures without contrast media.

3. Decision on clinical image quality criteria

Based on the clinical indications defined for chest CT and after several discussions amongst the group of experts, a decision was taken to precisely define the anatomical area to be assessed according to the following image quality criteria:

1. Major fissure of left lung
2. Peripheral bronchi: 3 sub divisions of B1 of the apical bronchus of right upper lobe (left upper lobe if right one is not visible)
3. Right inferior pulmonary vein: 3 divisions on axial plane
4. B6: 3 divisions on axial plane of the right lung (left lung if right one is not visible)
5. A6: 4 divisions on axial plane of right lung (left lung if right one is not visible)

To evaluate the image quality criteria of the five anatomical structures defined it was agreed to use a 5-point Lickert scale, with the following items:

1. Confident that the criterion is not fulfilled;
2. Somehow confident that the criterion is not fulfilled;
3. I do not know if the criterion is fulfilled;
4. Somehow confident that the criterion is fulfilled;
5. Confident that the criterion is fulfilled.

Due to the patient pathology and the fact that in some cases the anatomical areas defined may not be seen, it was agreed to include a Non-applicable (N/A) option in the image assessment, that will be made using the ViewDEX software.

In addition to the evaluation of the image quality criteria, the experts considered of extreme relevance also to proceed with a subjective analysis of noise, diagnostic acceptability and artefacts, based on the following classification:

- Noise:
 1. absent
 2. present but not disturbing
 3. present and disturbing
- Diagnostic acceptability:
 1. fully acceptable
 2. probably acceptable
 3. unacceptable
- Artefacts
 1. absent
 2. present but not disturbing
 3. present and disturbing

4. Readout working procedures

- All the cases provided by the five clinical centres will be anonymised and integrated into the web-based ViewDEX platform. Each user will receive a username and a password for its own access.
- The images from the clinical cases uploaded to the ViewDEX web-based platform will be blindly assessed by the radiologists of the five centres, using calibrated diagnostic monitors. Adequate luminance indicators will be provided to all reading centres.
- The clinical cases will be uploaded with the DICOM file to allow the analysis of the protocol used and the dose values.
- The patients will be selected guarantying an equal gender balance.
- Whenever possible, patient weight and height will be provided. Nevertheless, effective patient diameter will be measured in all cases at the anatomical level of the xiphoidal appendix.

5. Ethics Committee approval

All centres have already submitted the request for the ethical approval.