Reviewer's report

Title: Pulmonary tuberculosis: comparative detection with MR imaging and Helical CT.

Version: 1 Date: 23 December 2010

Reviewer: Alberto Villanueva

Reviewer's report:

General comments

The study is interesting. The hypothesis is original and very interesting: to compare the usefulness of STIR MRI sequences with CT in a group of patients with pulmonary tuberculosis (TB). It may help to avoid radiation in some patients. Since in the literature there is not much published about lung tuberculosis (TB) and MRI, and there is nothing about LDCT and MR in patients with lung TB. However, there are some important methodological errors, which make the report not suitable for publication as it is written. So it is unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions.

The study defines as diagnostic criteria the presence of culture-proven pulmonary tuberculosis. On the abnormal images, there is no proof that the adenopathies on TC or MRI are secondary to TB since there is no histological or microbiological studies. This could be avoided if there were follow up CT and MRI studies performed one year after receiving treatment. However post-treatment follow up performed with imaging is lacking. There is only follow up studies of 10 patients. The follow up period is not documented and the images of these patients are not analysed in a separate group. Not having the complete follow up for all patients is a serious drawback which makes the study not suitable for publication. If the authors would have the information and if it is included in the study it may be considered for publication.

There are also concerns about the CT protocol that was employed and it should be described (see in the following).

Some corrections should be made to the manuscript.

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

1.- SUBJECTS AND METHODS. PATIENTS. The study defines as diagnostic criteria the presence of culture-proven pulmonary tuberculosis. On the abnormal images, there is no proof that the adenopathies on TC or MRI are secondary to TB since there is no histological or microbiological studies. This could be avoided if there were follow up CT and MRI studies performed one year after receiving treatment. However post-treatment follow up performed with imaging is lacking. There is only follow up studies of 10 patients. The follow up period is not
documented and the images of these patients are not analysed in a separate group. Not having the complete follow up for all patients is a serious drawback which makes the study not suitable for publication. If the authors would have the information and if it is included in the study it may be considered for publication.

2.- SUBJECTS AND METHODS. PATIENTS. Do you think that reporting more clinical data would make the study reproducible? For example, AIDS, TB type or stage. Patients with TB, specifically those which have AIDS usually have additional concomitant infectious diseases. Thoracic radiological findings may be different if the patient has or does not have some additional infectious diseases. The authors do not clarify if the patients have AIDS or they do not have AIDS. They do not refer if the patients have any co infection. The authors should reflect these clinical data about patients.

3.- SUBJECTS AND METHODS. CT. There are doubts the acquisition parameters and the protocol may not be reproducible. For example, it is not clear if two different MDCT acquisitions were obtained, a low dose one and a high resolution one, or if it was a low dose acquisition with reconstruction parameters for high resolution and 1mm slice.

4.- SUBJECTS AND METHODS. CT. If a HRCT was obtained it should be manifested if it was a sequential protocol and the acquisition parameters should be described.

5.- SUBJECTS AND METHODS. CT. Please explain the use of 10mm slice thickness.

6.- SUBJECTS AND METHODS. CT. Please explain the use of high-resolution algorithm.

7.- SUBJECTS AND METHODS. CT/MR. Please explain the comparison made with 5mm thickness slice on MR with 1mm thickness slice of each 10mm CT slice.

8.- SUBJECTS AND METHODS. CT. It is not explained if a specific mediastinum reconstruction algorithm was employed. Did they use it? Did you evaluate the mediastinum using the high resolution reconstruction and mediastinum windowing?

9.- SUBJECTS AND METHODS. IMAGING ANALYSIS. How do you rule out bronchiectasis under the definition of cavitation?: “cavitation was defined as a gas-filled space, contained or not contained within a pulmonary consolidation, and with or without air fluid level. If not contained in a consolidation, the cavity must be surrounded by a wall whose thickness was greater than 1 mm.” The definition of the Fleischner Society for cavitation is “A cavity is a gas-filled space, seen as a lucency or low-attenuation area, within pulmonary consolidation, a mass, or a nodule” (Hansell DM, Bankier AA, MacMahon H, McLoud TC, Müller NL, Remy J. Fleischner Society: glossary of terms for thoracic imaging. Radiology. 2008 Mar;246(3):697-722.) May be this definition exclude a bronchiectasy or a neumatocele.
10.- SUBJECTS AND METHODS. IMAGING ANALYSIS. Criteria for pleural involvement should be described.

11.- SUBJECTS AND METHODS. IMAGING ANALYSIS. The authors compare CT IMAGES obtained in inspiration and MRI done in expiration. They should justify this aspect.

12.- DISCUSSION. In the discussion, reference is made to caseous necrosis not mentioning its diagnostic criteria nor the gold standard in material and methods section. Also in the results there is no mention of it. Even though it is explained that the lymph node signal is compared with muscle, the concept of caseous is not included. Caseous is an histological term. Since the study does not include histological material it would be better not to use the term in the tables that are included or indicate the signal intensity value as it is done in the text.

13.- DISCUSSION. The use of a fast T2 axial imaging sequence on STIR sequencing only (T2-weighted Fast Recovery Fast Spin-Echo (FR FSE T2) FAT SAT) should be justified. Authors should explain e.g. why they did not use diffusion imaging for adenopathies in these patients.

14.- DISCUSSION. Some criteria is lacking, for example the definition of small sized adenopathies. It should be indicated that the lack of histopathological correlation or microbiological tests of the adenopathies is an important limitation of the study.

Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

1.-Title: We propose to change the title “Pulmonary tuberculosis: comparative detection with MR imaging and Helical CT.” For the following title: “Pulmonary tuberculosis: comparative detection with MR imaging and Low Dose MDCT.” Or “Pulmonary tuberculosis: comparative detection with MR imaging and HRCT” because these titles reflect more specifically the study.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1.- SUBJECTS AND METHODS. It seems it is a prospective study, otherwise it should be specified.

2.- SUBJECTS AND METHODS. CT.. Kernel should be changed for an algorithm.

3.- SUBJECTS AND METHODS. CT First paragraph. Describe that the low dose CT parameters were obtained without contrast. This is mentioned in the discussion but not in the methods and material. The authors should also describe
if the CT study was performed under inspiration or not.

4.- SUBJECTS AND METHODS. MR. MRI in expiration may show non pathological processes such as small laminar atelectasis. Please describe this limitation in Discussion.

5.- SUBJECTS AND METHODS. IMAGING ANALISIS. It should be mentioned if “The level of the inferior pulmonary veins “ refers to the level of origin of the inferior pulmonary veins.

6.- DISCUSSION. The authors state that some lesions that give the appearance of tree in bud pattern are not well depicted in the MR imaged in this patient group. Could the authors describe a method for reducing this limiting factor?. For example one may consider performing MRI at end inspiration for those patients with tree in bud patterns and reducing the field of view to the pathological/doubtful areas.

7.- DISCUSSION. Performing MRI in children with TB may be interesting since they may have lymph node involvement rather than lung involvement. The authors should explain that anesthesia may be required. Also during pregnancy, MR imaging should be avoided during the first trimester. Authors should be explained that specific population studies are needed.

8.- DISCUSSION. Do the authors consider that combining the chest X ray findings with the MRI may add something to the comparison between MDCT and MRI?