Reviewer's report

**Title:** Lipomatous Metaplasia Incidentally Identified in Rabbits with Evolving Reperfused Myocardial Infarction: 3.0T Magnetic Resonance Imaging and Histopathology Findings

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**Reviewer:** giovanni donato D aquaro

**Reviewer's report:**

Feng and colleagues evaluated the evolution of myocardial infarction using a rabbit model of occlusion/reperfusion-induced myocardial infarction. Authors repeated several MRI examination on 3T magnetic resonance scanner in 3 rabbits after myocardial infarction describing the evolution from acute infarction, scar and finally fat metaplasia. Other 7 rabbits were sacrificed immediately after first MRI scan.

On the results, authors found a good correlation between DE and histology. Then in the 3 rabbits sacrificed at 9 months, one rabbit had large sign of fat metaplasia. The remaining 2 rabbits had no clear signs of fat at MRI but histological analysis demonstrated small spot of fat metaplasia.

**Major Compulsory Revisions**

Actually, I did not understand the rationale of this study. The accuracy of late enhancement in animal models of myocardial infarction, compared with histology, was demonstrated by several study in the last years. Then, this point lacks of novelty. Moreover, the manuscript was entitled "Lipomatous Metaplasia Incidentally Identified in Rabbits with Evolving Reperfused Myocardial Infarction", then why to perform histopathological evaluation after the first MRI?

To describe only an "incidental finding of fat metaplasia" occurred in MRI performed for other purpose (what purpose?) is absolutely not interesting and definitely not novel.

Instead, the description of the pathological changes in myocardial infarction evaluated in vivo by repeated MRI examinations, from the acute phase to 9 months after AMI, may be interesting. However, this was performed in only 3 animals and MRI was performed only after 48h post MI, after 2 weeks, 2 months and 9 months. I believe the authors should add at least other 7 rabbits completing the full protocol. MRI examination should be repeated also after 4-6 months at least.

In the discussion, author stated that "this study was not by intention to address the LM, and therefore only some cMRI sequences were applied for detection of fat. The LM was only recognized incidentally at 9 months after MI induction". Actually, what's the aim of this study? Is this an "incidental finding" report? it is
known that 33% of old myocardial infarction had fat metaplasia, then what is the novelty?

in the conclusion, authors stated that "The in vivo cMRI corresponded well to ex vivo MRI and histomorphology, suggesting a promising animal model and research platform for further study on the mechanisms and possible therapeutic interventions of LM."

I've some concerns about this sentence: 1) "corresponded well", is this a qualitative statement, I've found no comparison between in-vivo and ex-vivo and histological measurement of extent of fat metaplasia. Then we cannot say whether correspond well or not. 2) "promising animal model and research platform for further study...metaplasia", actually we cannot say this, because only three animals completed the protocol and only in one the fat was found at in-vivo MRI but all the three of them had fat (small island in two) at histology. then, the model should be evaluated by further studies. 3) "possible therapeutic interventions of LM", why? LM is the normal evolution of fibrosis in 33% of old myocardial infarction. In humans it is described in >60% of myocardial infarction older than 5 years, then it is intrinsically associated to a good prognosis. Therapy is not necessary.

Minor essential revisions

Authors stated that "the 3.0-T superconducting system with a higher magnetic field, cardiac array coils with 8-channels or more and upgraded hardware enables obtaining images with higher signal-to-noise ratio (SNR), temporal and spatial resolutions, and speed of imaging acquisition as compared to the". This is correct. However, at 3 Tesla cardiac imaging is characterized by more susceptibility artifact, higher chemical shift artifact (then more indian ink in cine imaging), more turbulence artifact, making cardiac imaging more difficult in pediatric patients as well as small animals as rat and rabbits. Please discuss this.

Image: in the figure 5, authors showed in-vivo and ex-vivo MRI images. From these images it is very hard to confirm the presence of sub-epicardial fat metaplasia in in-vivo images. Instead, in the ex-vivo FSE images it is easy. How was performed the image analysis? were Investigators blinded of the results of histopathology and ex-vivo MRI? Please discuss this.

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I've not any financial competing interests and any non-financial competing
interests