

WG3: Minutes of Systematic reviews Working groups

Berlin, 13.10.2017

WG3 plans to write a series of comprehensive reviews on the most promising and widely used MRI biomarkers (DWI BOLD, ASL, and T1/T2 mapping). The aim is to present the current status of scientific knowledge in each MRI modality, describing utility, summarizing the methods, reporting published ranges, and highlighting current areas of variation. Several narrative reviews exist but none summarize all papers with summary tables of study design, details of acquisition, analysis, key findings.

This is an important step in moving the field forward, and will allow specific approaches to be developed for standardization and utilisation in clinical trials.

A common review template/protocol has already been prepared (by Anna Caroli, Nick Selby and Iosif Mendichovszky) to help maintaining consistency among the individual reviews

DWI review (lead: Jean-Paul Vallee)

Review team:

Jean-Paul Vallée, Anna Caroli, Alexandra Ljimini, Iris Friedli, Moritz Schneider, Isma Kazmi, Latha Gullapudi, Iosif Mendichovszky, Nicolas Grenier, Harriet Thoeny

Attendees:

Jean-Paul Vallée (JPV), Anna Caroli (AC), Alexandra Ljimini, Iris Friedli, Mohamed Aboelghar

Following the given template, the review on kidney DWI will include the following sections: acquisition, signal processing, biomarkers definition, outcome, and discussion. It will also include tables of some selected papers (selection process to be defined) as well a file of the complete table containing all the references published before October 13th, 2017 as supplementary data. It will exclude cancer study.

A PubMed search has already been performed with 399 hits. 202 references were not related to our subject defined as renal diffusion studies on volunteers and patients (excluding cancer patients).

In a first attempt, the following repartition was found:

acute transplant	27
CKD	28
Hydro/pyonephrosis	14
Acute pyelonephritis	9
Polycystic kidney	9
Lupus - Ig	9
HBP	5
Diabetis	4
non renal disease	5
Other disease	10

This endnote database with the pdf files of all the references will be shared among the review team using Dropbox.

The following steps will be sequentially performed:

- Tables filling
- Tables & references checking
- Review writing

Anna Caroli (AC) will take the lead of the acquisition and processing parts and she will be 1st author. Jean-Paul Vallée (JPV) will take the lead for the biomarker, validation / outcome and discussion parts as well as the overall lead of the review.

For the tables filling, the volunteers' studies will be processed by AC helped by Iris Friedli and Moritz Schneider and the clinical studies by Alexandra Ljimini, Isma Kazmi and Latha Gullapudi.

To double-check the accuracy of the table, both groups will check the references of the other group.

Iosif Mendichovszky will perform a cross search to find some missing references on our subject. Relevant studies found in the references of the diffusion papers will also be added to the database.

A XLS table has been proposed to collect data.

To validate the table and the way the data are entered, it is decided to give to every one involved in the review (senior and junior authors) 3 papers to be entered the xls table.

The deadline for this action is one week (Monday October 23rd). Then, after 1 week of iteration, the table structure will be validated and the filling process will begin (Monday October 30).

Action:

- JPV: send the link for the endnote database
- JPV: send the xls table as well as 3 pdf
- Everybody: fill the xls table with the 3 pdf and send comment / validation to JPV
- Everybody: fill the xls file with address and phone number for easier communication.

BOLD review (lead: Menno Pruijm)

Review team:

Menno Pruijm (Switzerland), Patricia van der Niepen (Belgium), Per Liss (Sweden), Iosif Mendichovszky (UK), Pottumarthi Prasad (USA) and Lilach Lerman (USA)

Attendees:

Menno Pruijm, Iosif Mendichovszky, Patricia van der Niepen, Per Liss, Anna Caroli

Considering the modest size of the review team, more members are welcome. MP will contact several other persons to see whether they are interested (possibilities: Michel Burnier, René van der Bel).

Initially, the work will focus on preparing different tables that summarize the papers in the field. The Excel spreadsheet circulated by the diffusion MRI review group will be used as source of inspiration. Five main Tables will be prepared:

1/ Table containing all known validation papers: these papers have validated the BOLD-MRI technique by comparing T2* or R2* values with directly measured pO2 or histological studies (pimanidazole staining for ex). This will be the only table that will contain animal studies.

2/ Table containing all clinical studies that used BOLD-MRI in chronic kidney disease patients (all causes). The design (cross-sectional or longitudinal), patient preparation (hydration, usual drugs taken yes/no), presence of a control group, technique used to analyze the images will be of particular importance.

3/ Table containing all clinical studies in patients with renal artery stenosis or essential hypertension.

4/ Table containing all studies performed in renal transplant patients.

5/ Table containing all studies that tested the effect of drugs (ACE inhibitors, Calcineurin inhibitors,..) or dietary changes (salt, chocolate, waterload,..) on R2*.

Important issues for all tables will be:

- "purpose of the study".
- reproducibility (Yes / No); what was it (reproducibility measure); percent of patients used for the reproducibility study (100% - all or only part of them).

Each reviewer will focus on one Table:

Proposition:

- Validation table: Per Liss
- CKD studies: Menno Pruijm
- RAS: Lilach Lerman
- Kidney transplantation: Iosif Mandichovsky

-Drugs and dietary changes: Pottumarthi Prasad (D) and Patricia van der Niepen (E)

Structure of the paper and main writer:

-Introduction	Menno Pruijm
-Search strategy	Menno Pruijm
-Patient preparation	Patricia van der Niepen and Menno Pruijm
-MR acquisition	Iosif Mendichovszky
- Image analysis	Menno and Iosif
-Validation	Per Liss
- Clinical studies	Lerman/Prasad/Prujm
-Discussion	Menno/Iosif supervised by Prasad and Lerman

Authorship order: proposition to be discussed : first author: Menno Pruijm; second: Iosif, third: Per Liss, fourth: Patricia van der Niepen; fifth: Lilach Lerman, last author: Pottumarthi Prasad

As search strategy, a first search resulted in 72 hits.

Additional search criterion will include studies performed for T2* mapping for abdominal organs that contain data on kidney, but not specifically performed for renal "BOLD" purposes. All included literature, as well as the tables, will be included in a dropbox folder. An endnotes file will also be included in the dropbox folder.

Timeline:

- enter the first papers in the Tables during the upcoming two weeks and communicate by e mail for suggestions concerning the table content.
- Skype call begin November will be organized by Menno Pruijm

ASL review (lead: Aghogho Odudu)

Review team:

Dr Aghogho Odudu (AO), Dr María A. Fernández-Seara (MFS), Dr Charlotte Buchanan (CB), Prof Susan Francis (SF), Mr Fabio Nery (FN), Dr Anita Hartveld (AH), Dr Douglas Pendse (DP)

Attendees:

Aghogho Odudu and Douglas Pendse

MFS, CB, SF and FN were attending WG1 meeting and corresponded with AO by email/verbally prior and since. FN, AH and MFS have already shared collection of references and MFS shared a summary table and slides of her Berlin presentation to the group.

ASL review will include healthy volunteers and where ASL was used to study physiology (eg response to IV fluids). The review is focussed so that non-experts (nephrologists!) can understand. However, we will make a detailed summary table which will include some technical detail that is valuable to someone looking to use ASL for the first time. We only want to abstract the information once but for publication some technical details might be abbreviated and included as supplemental data.

Group work so far:

In the dropbox are

1. Initial list of ASL references from Anita (37) and Word format from Fabio (45)
2. Table from MSF's lit review (27)
3. Review template
4. AO has merged the narrative templates using the abstracted domains:
 - a. Study reviewer
 - b. Study unique reference (pubmed ID)
 - c. Study design
 - d. Subject characteristics
 - e. Subject preparation
 - f. MRI acquisition details
 - g. ASL kinetic modelling details
 - h. ASL results (quantified then freetext)
 - i. Reference measures (eGFR, measured GFR, histology)
 - j. Other MRI parameters measured
 - k. Freetext general comments

Then using DWI spreadsheet and the narrative template and MSF table as starting point constructed a google form survey.

Proposal of how ASL review group will work:

Step	Details	Example
Pre-review	Decide how we will work, scope of	Communication will be by email

process	the questions, changes of the table template etc as per agenda Ags emailed 13/10/17	regularly and teleconference by skype every 2 weeks
(1) Formulate research question	Formulate a focused research question, consisting of: (i) Intervention/exposure (ii) Disease of interest/health problem (iii) species/population studied (iv) Outcome measures	What are the characteristics/interventions/outcomes of all studies in humans using renal ASL? (answered in the table we will construct) What are the challenges in using renal ASL? (answered in the narrative descriptions we will write to discuss these papers) i) ASL ii) Any except cancer iii) Humans without renal cancer (we can change) iv) Outcomes (characteristics of study design and outcome)
(2) Identify appropriate databases and sources of studies	<ul style="list-style-type: none"> Identify both general biomedical and topic-specific databases Select all relevant databases Check other sources, such as reference lists (we can also use reference lists kept by the ASL network's monthly newsletter http://asl-network.org/ Fabio will contact UCL to find out who maintains) 	PubMed/MEDLINE and EMBASE
(3) Transform research question into search strategy	<ul style="list-style-type: none"> Design and run a search strategy customized for each database Start with a database that includes a thesaurus, e.g. PubMed or EMBASE Involve an information specialist (Ags d/w other review leads and given budget constraints decided not to do) Save citations (titles/abstract) in reference software using shared library (we have agreed to share using endnote library files or xml) 	

	<ul style="list-style-type: none"> Document the applied search strategies (we need to agree a final search strategy for publications) 	
(4) Collect search results and remove duplicates	Combine saved citations of all databases into one file in reference software and remove duplicates	PubMed, $n = 173$; EMBASE, $n = 506$ Removing duplications ($n = 139$) Total number of unique citations, $n = 450$
(5) Identify potentially relevant papers	Screen title and abstract of the references and identify papers based on potential relevance (human check) and make a subgroup within the reference software group	Screen PubMed, $n = 173$; EMBASE, $n = 367$
(6)	Split references we will each abstract (eg 20 references each with overlap of 5 references to ensure we are consistent in how we are completing the table)	
(7)	Abstract information into a table using a google forms survey Contact AO if you have any problems accessing or any comments to change- this is a draft	
(8)	Export table	
(9)	Discuss papers and delegate writing the narrative sections	

Agreed actions

1. DP to setup shared endnote library for team to upload references
2. DP and AO to conduct pubmed searches and check against already collected references to ensure none are being missed. The entire team will agree the final search terms and the final form of survey for the study by 27/10/17

T1 and T2 mapping (lead: Marcos Wolf)

Review team:

Anneloes de Boer, Kanishka Sharma, Neil Peter Jerome, Marcos Wolf

Attendees:

Anneloes de Boer, Kanishka Sharma, Neil Peter Jerome, Marcos Wolf

MFS, CB, SF and FN were attending WG1 meeting and corresponded with AO by email/verbally prior and since. FN, AH and MFS have already shared collection of references and MFS shared a summary table and slides of her Berlin presentation to the group.

Discussion:

- The group agrees on a TC once per week (Tuesdays at 1400 CET).
- The group is still open for new members (including physicians, radiologists, nephrologists)! New candidate is Susan Francis (UK).
- The finalized/optimized version of the review table will be shared within the WG3

Search terms:

- During the meeting we optimize the search terms and identify 700 relevant results (previously 1200-1500).
 - Further reductions are conceivable by excluding case reports (Anneloes)
- The search terms will be placed within the cloud based document.

Review table:

- The current review table seems to be sufficient for the current state of the review (cloud based document). The shared link will provide editing rights, therefore sharing is not permitted (only Marcos will share the link if needed).
- In addition, Marcos will do weekly external backups (Tuesdays at 1355 CET).
- The main review search will be done on pubmed.
- The team agrees to add 'individual' papers as well.
- The team agrees to merge the T1 and T2 tables (Marcos)
- Adding new fields:
 - 'ID/Link' for each paper
 - 'relevant'/'excluded' [paper excluded because of title/abstract]/'not relevant' [excluded during the actual review process]
 - 'other modalities' [for correlations]
- The physical and technical details of these sequences will be extended/summarized to fit all clinical vendors (Neil)

Next steps – tasks will be announced later

1. Finalizing the search terms and downloading the corresponding CSV file
2. Populating the review table
3. Splitting the workload within the team
4. Identifying 'relevant' vs 'excluded'

5. Thereafter each member of the team will select one (known and good) paper and populate the review table to identify potential problems.
6. After the test run the remaining workload will be again shared within the team.

Open Questions:

- How to sort kidney diseases?