

ADNI GO/2 MRI QC Procedures

Aging and Dementia Imaging Research Laboratory
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Summary

The ADNI MRI QC core located in Dr. Clifford Jack's laboratory at the Mayo Clinic in Rochester, MN (ADIRL) is charged with performing first pass quality control on all standard MRI series obtained for the ADNIGO/2 trial. It is only when an exam has passed this first pass QC that the data is released from quarantine on the LONI website and released for use. This document will provide a better understanding of what aspects of the standard MRI study are examined during this QC.

ADNIGO/2 MRI QC Procedures

Study Level Components:

1. **Stereotactic Marker:** Identify whether or not a stereotactic marker was used.
2. **Serial:** Indicate if the scan is a baseline, if not, indicate if it matches the previous scan session.
3. **Medical Abnormalities Present:** Identify any findings and if they are exclusionary or acceptable.
4. **Overall Pass:** Marked to indicate the exam is acceptable.
5. **Pay Site:** Triggers payment notification.
6. **Release from Quarantine:**
7. **Rescan:** Marked to indicate if a rescan needs to be requested.
8. **Comments:**

T1 Image Quality form components:

1. Grading
 - a. **Excellent**
 - i. Requires panning thru slices
 - ii. Reserved only for scans that are superior in quality
 - iii. No artifacts
 - iv. Good coverage
 - v. Masks work
 - b. **Good**
 - i. Has some mild to moderate artifacts but they have no significant impact on the image
 - ii. Artifacts are local only
 - iii. Masks work

- c. **Poor**
 - i. Requires caution when running BSI
 - ii. Has enough moderate to severe artifacts to possibly impact analysis of the brain
 - iii. Artifacts are global
 - iv. Hard to distinguish tissue classes or hippocampal borders
 - v. Masks work
- d. **Unusable**
 - i. Artifacts are severe enough to impact analysis
 - ii. Analysis may work, but results shouldn't be trusted
 - iii. Not able to distinguish tissue classes or hippocampal borders
- e. **No Eval** - Default choice
- f. **Chosen Scan:** If more than one type of the same scan is present Mayo QC will provide a chosen image and only send that scan back to LONI as pre-processed.

Reasons for grading the image fair or unusable

- g. Once fair or unusable is selected, these will be enabled to check
- h. Indicate reason for the grading, If reason is not listed, write in comment

FLAIR Image Quality form components:

1. Grading
 - a. **Excellent**
 - i. Reserved only for scans that are superior in quality
 - ii. No artifacts/no coverage problems
 - iii. Masks work
 - b. **Good**
 - iv. Has some mild to moderate artifacts but they have no significant impact on the image
 - v. Artifacts are local only
 - vi. Masks work
 - c. **Poor**
 - vii. Requires caution when running automated analyses
 - viii. Has enough moderate to severe artifacts to possibly impact analysis of the brain
 - ix. Artifacts are global
 - x. Hard to distinguish tissue classes or hippocampal borders
 - xi. Masks work
 - d. **Unusable**
 - xii. Artifacts are severe enough to impact analysis
 - xiii. Analysis may work, but results shouldn't be trusted
 - xiv. Not able to distinguish tissue classes or hippocampal borders
 - e. **No Eval**
 - f. **Chosen Scan:** If more than one type of the same scan is present Mayo QC will provide a chosen image and only send that scan back to LONI as pre-processed.
2. **Reasons for grading the image fair or unusable**
 - a. Once fair or unusable is selected, these will be enabled to check
 - b. Indicate reason for the grading, If reason is not listed, write in comments
3. **Coverage Problems**
 - a. Check these boxes when there is an issue in coverage described below. Grade image quality independent of coverage. The grading should be able to be done quickly and zoom should not be used.
 - a. Cerebellum – indicate a coverage problem if any part of the cerebellum is cut off – If you see any tissue, there is an issue

- b. Vermis - a scan needs to include the tip of the vermis between the tonsils, if not included, there is a coverage problem. Again, if you see any tissue of the vermis, there is an issue. If vermis is selected, cerebellum will automatically be populated on the form

GRE Image Quality form components:

- 4. Grading
 - a. **Excellent**
 - i. Reserved only for scans that are superior in quality
 - i. No artifacts/no coverage problems
 - ii. Masks work
 - b. **Good**
 - iii. Has some mild to moderate artifacts but they have no significant impact on the image
 - iv. Artifacts are local only
 - v. Masks work
 - c. **Poor**
 - vi. Requires caution when running automated analyses
 - vii. Has enough moderate to severe artifacts to possibly impact analysis of the brain
 - viii. Artifacts are global
 - ix. Hard to distinguish tissue classes or hippocampal borders
 - x. Masks work
 - d. **Unusable**
 - xi. Artifacts are severe enough to impact analysis
 - xii. Analysis may work, but results shouldn't be trusted
 - xiii. Not able to distinguish tissue classes or hippocampal borders
 - e. **No Eval**
 - f. **Chosen Scan:** If more than one type of the same scan is present Mayo QC will provide a chosen image and only send that scan back to LONI as pre-processed.
- 5. **Reasons for grading the image fair or unusable**
 - c. Once fair or unusable is selected, these will be enabled to check
 - d. Indicate reason for the grading, If reason is not listed, write in comments
- 6. **Coverage Problems**
 - a. Check these boxes when there is an issue in coverage described below. Grade image quality independent of coverage. The grading should be able to be done quickly and zoom should not be used.
 - a. Cerebellum – indicate a coverage problem if any part of the cerebellum is cut off – If you see any tissue, there is an issue
 - b. Vermis - a scan needs to include the tip of the vermis between the tonsils, if not included, there is a coverage problem. Again, if you see any tissue of the vermis, there is an issue. If vermis is selected, cerebellum will automatically be populated on the form

About the Authors

This document was prepared by the Aging and Dementia Imaging Research Laboratory at the Mayo Clinic - Rochester. For more information please contact the ADNI MRI Core at adnimri@mayo.edu.

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