

# Audit of post processing of CT brain scans performed for dementia workup

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## Background

In dementia assessment, structural brain imaging is recommended by the NICE, European and American guidelines. Imaging excludes reversible causes of cognitive impairment and assists in the diagnosis of dementia subtypes.

Alzheimer's disease (AD) is the commonest dementia subtype and is associated with mesial temporal atrophy (MTA). The mesial temporal lobe atrophy score (or Schelten's scale) is the most routinely used schema to stratify the degree of hippocampal atrophy and the widths of the choroidal fissures and temporal horns. These features should be assessed on coronal imaging oriented perpendicular to the long axis of the hippocampus. Inaccurate coronal reformatting can lead to incorrect MTA assessment.

In our local institution, CT is used as the first-line dementia investigation.

**Aim:** To assess the post-processing of CT head studies performed for the assessment of dementia.

**Standards:** Coronal reformats should be saved to the picture archiving and communication system (PACS), Coronal reformats should be oriented perpendicular to the long axis of the hippocampus.

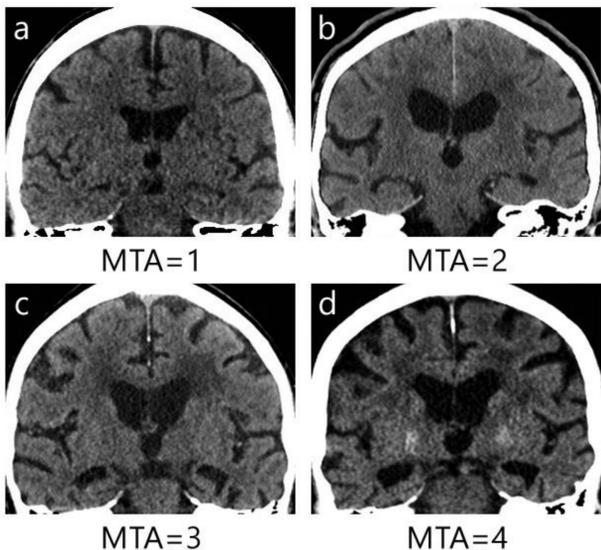
**Target:** 100% of studies should be appropriately reformatted

## Method

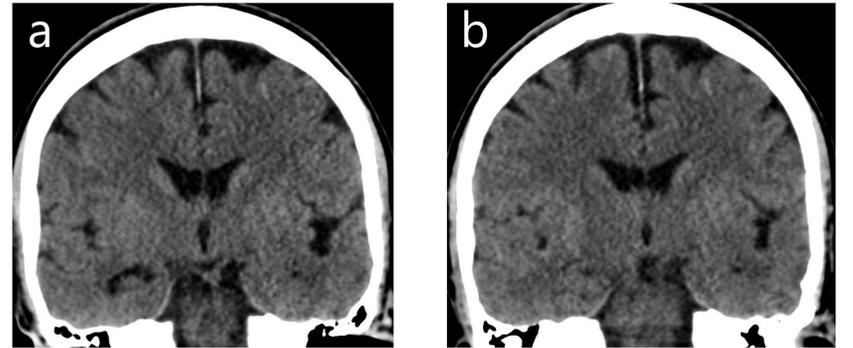
Consecutive outpatients CT studies requested for assessment of cognitive impairment and protocolled as a dementia study (5mm axial slices and 3mm coronal reformats) in January 2019 were identified using radiology information system (RIS). Coronal reformats are performed by the CT radiographers prior to sending to PACS. Data collected included patient demographics and request details. Imaging was reviewed on PACS. The presence of stored coronal images and the plane of coronal reconstruction were assessed using the Agfa IMPAX Clinical Applications software.



**Fig 1.** An example of axial (a), coronal (b) and sagittal (c) CT planning images for coronal reconstruction with correct alignment perpendicular to the hippocampus axis.



**Fig 2.** (a-d) The degree of cerebral atrophy using the MTA score can be accurately assessed on the reconstructed coronal images.

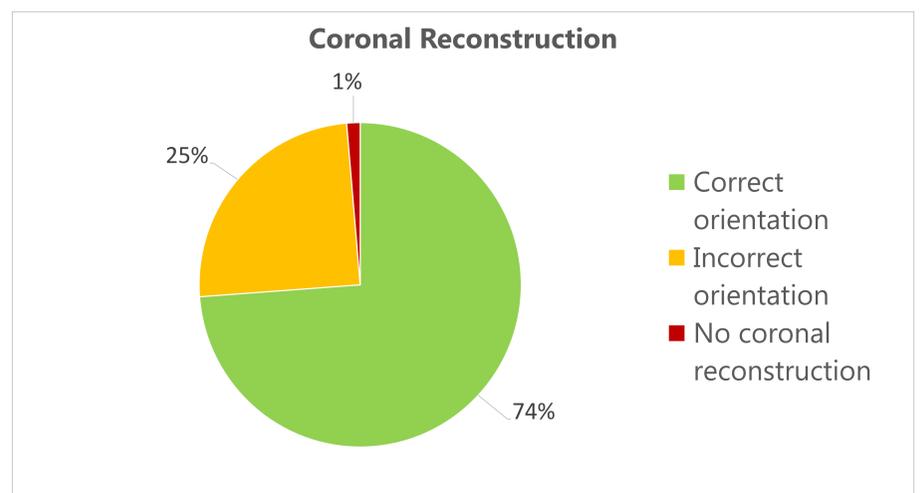


**Fig 3.** Both images were obtained from the same patient with correct (a) and incorrect (b) coronal reconstructions. This exhibits how incorrect coronal reconstruction alignment can lead to misinterpretation of medial temporal lobe atrophy. Eg. MTA score = 3 in (a) and MTA score = 0 in (b)

## Results

149 patients (84 female and 65 male) with a median age of 79 years (range 60-96) were analysed.

Most scans were requested for memory clinic assessment, either by a general practitioner (n=98) or by old age psychiatry (n=26).



**Fig 4.** Pie chart of the presence of correct or incorrectly orientated coronal reconstructions.

When evaluating for the presence of studies with coronal images, we found that 99% (147 out of 149) had coronal reconstructions performed. Of which, 75% (110 out of 147) of the coronal reconstructions were correctly orientated perpendicular to the long axis of the hippocampus.

Overall, 74% (110 out of 149) of scans had appropriately orientated coronal reconstructions.

## Action plan

1. Presentation of audit background and results to radiography team.
2. Update of CT protocol book explaining how to correctly construct coronal reformats.
3. Poster in CT control room to highlight correct protocol.
4. Re-audit in 12 months.

## References

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