

Robert D. Bowers

DOB: 9/4/72

DEFENDANT'S
EXHIBIT

117

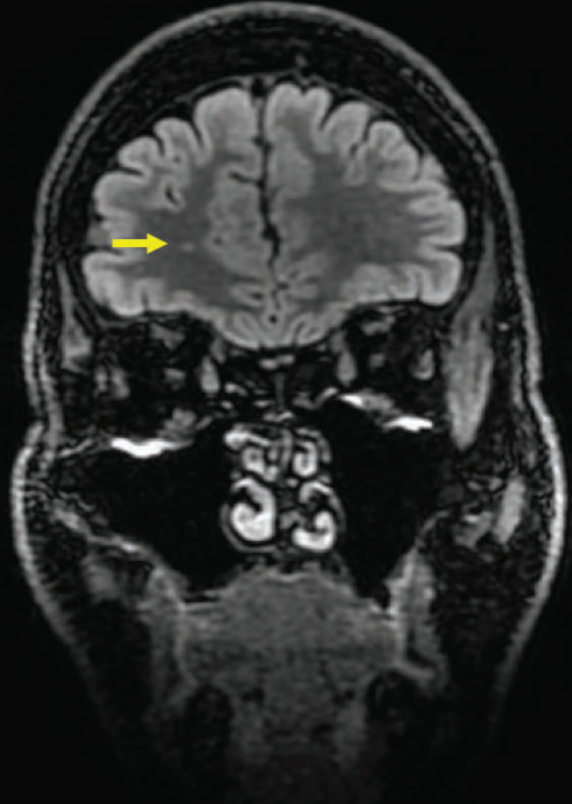
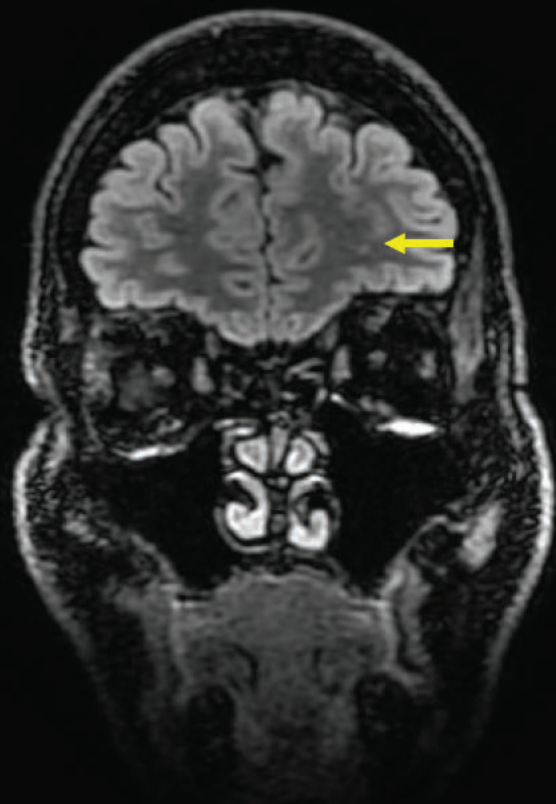
Imaging Studies

3T MRI of the Brain with Gadolinium Contrast Material

UPMC 1/3/22

RIGHT

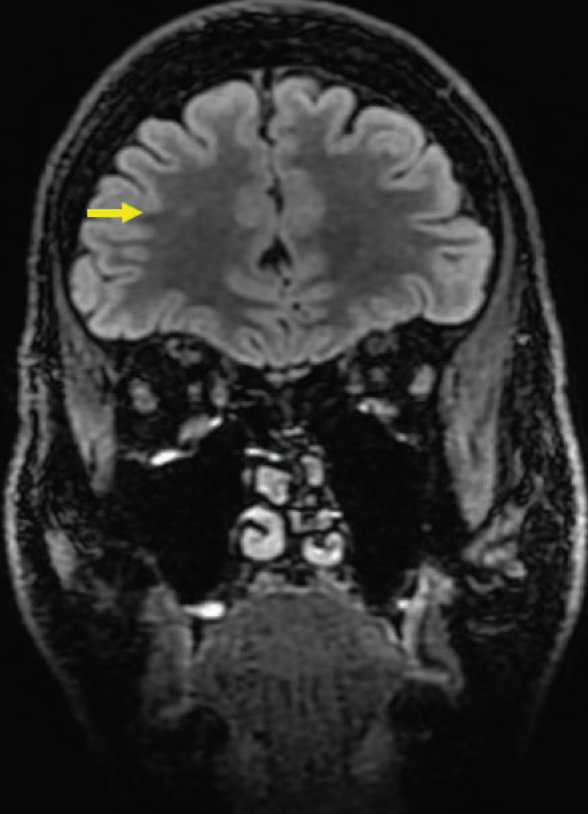
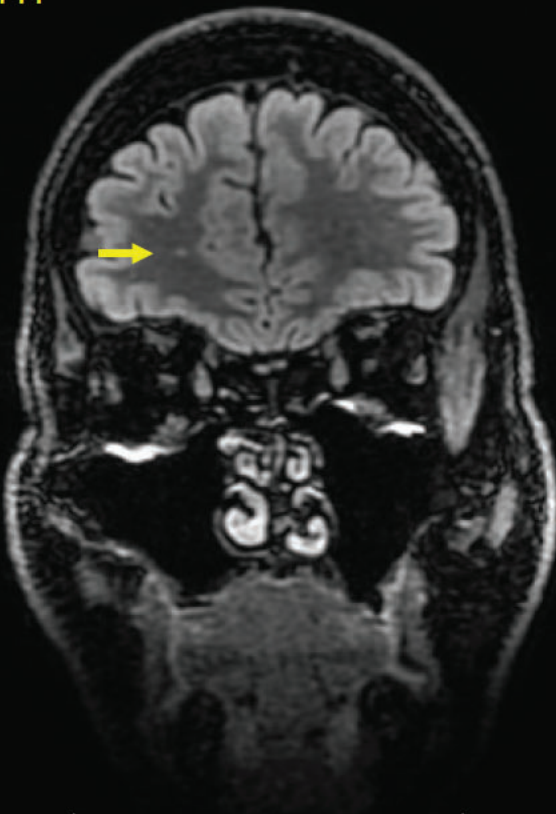
LEFT



T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

RIGHT

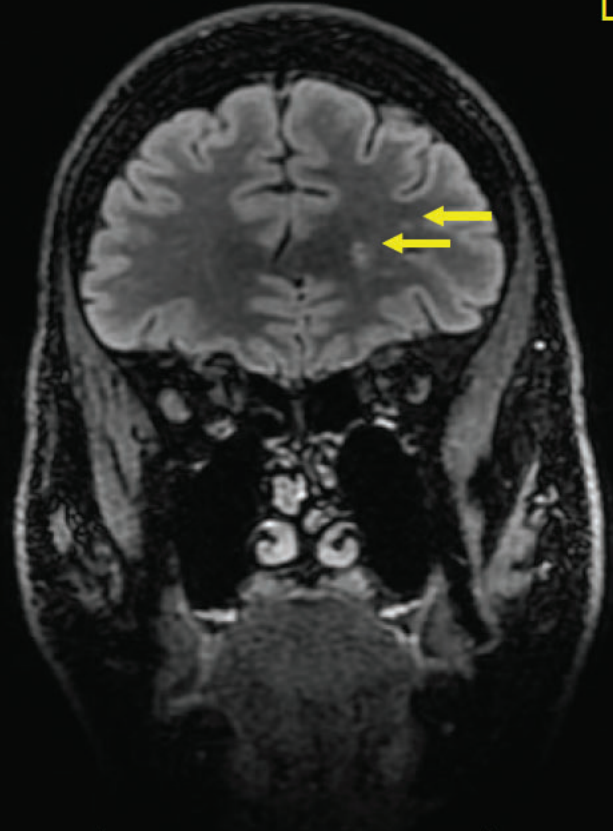
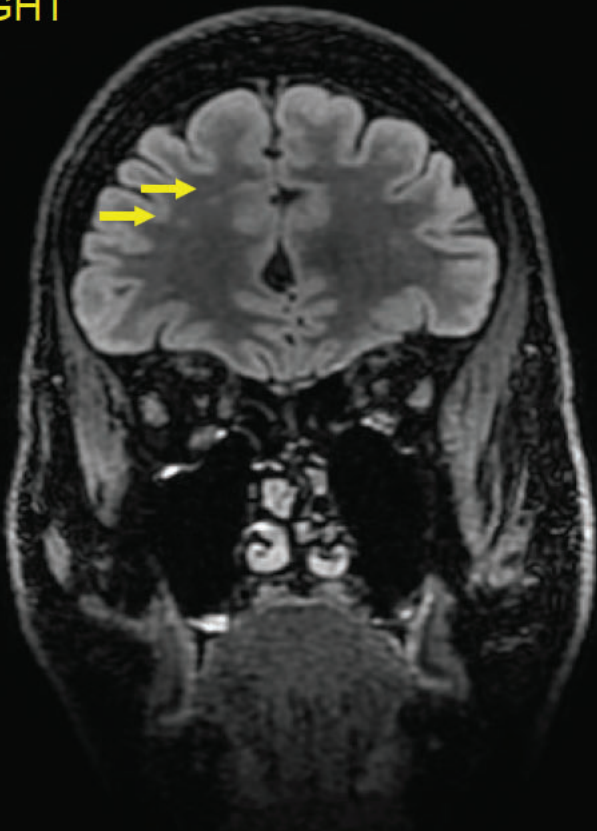
LEFT



T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

RIGHT

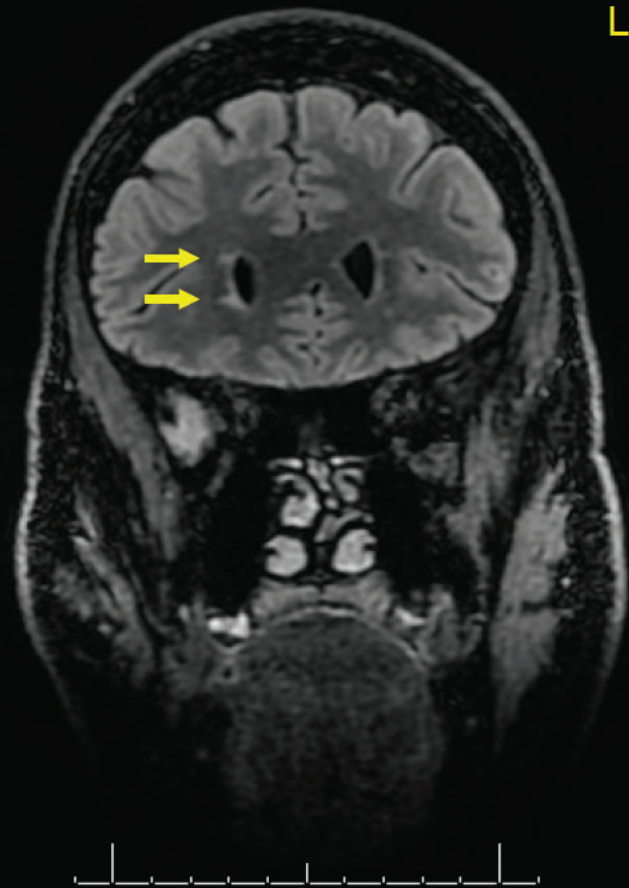
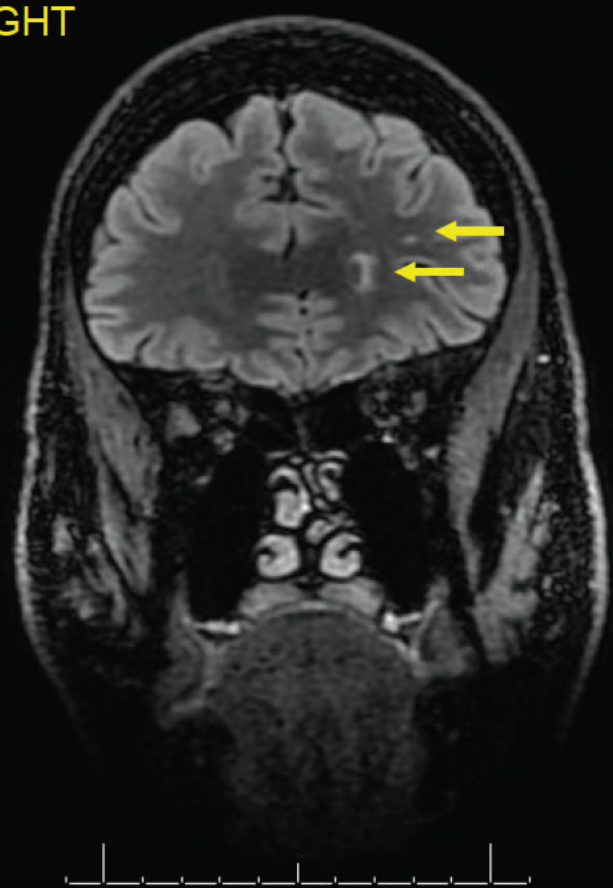
LEFT



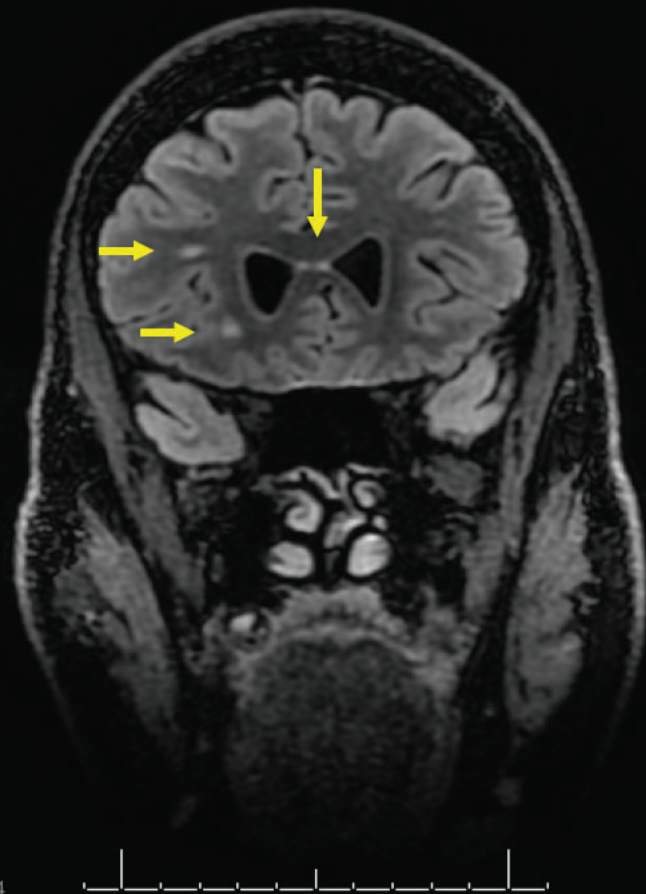
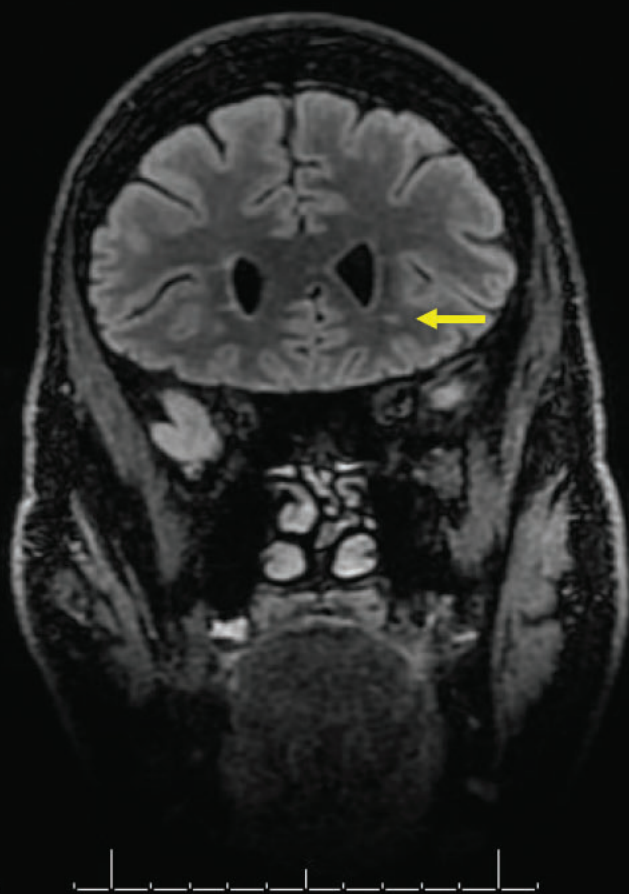
T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

RIGHT

LEFT



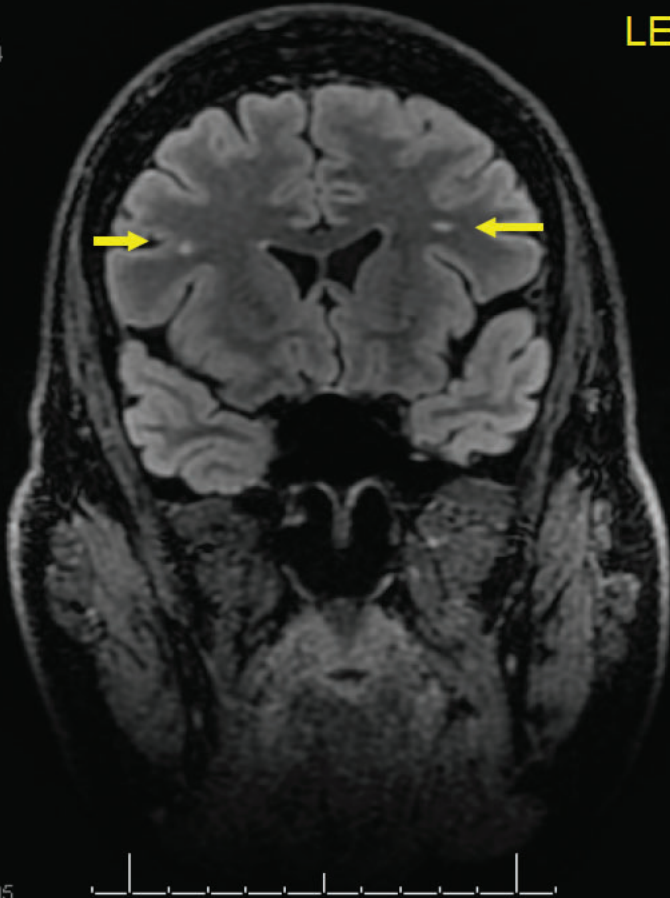
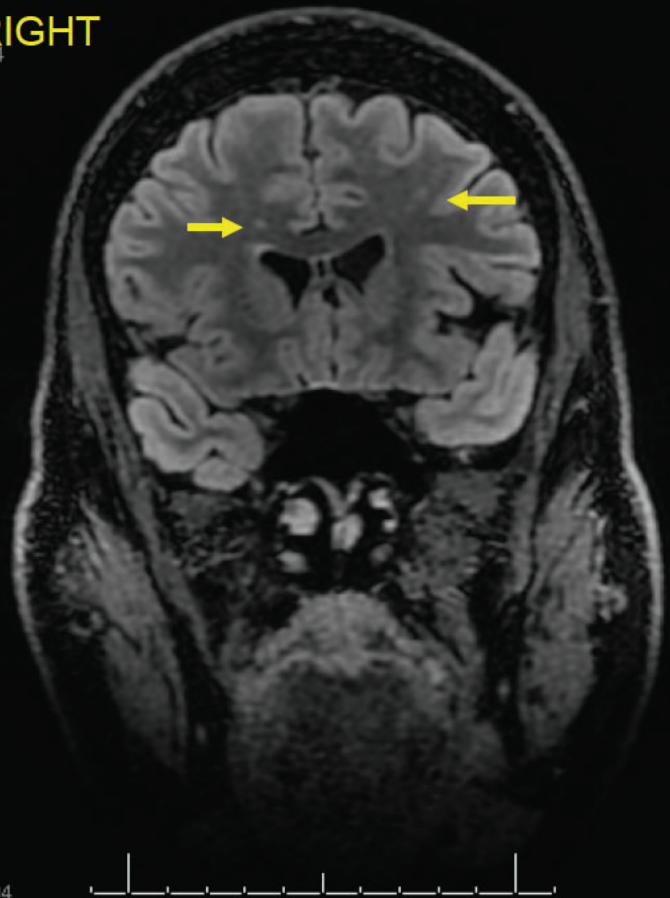
T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.



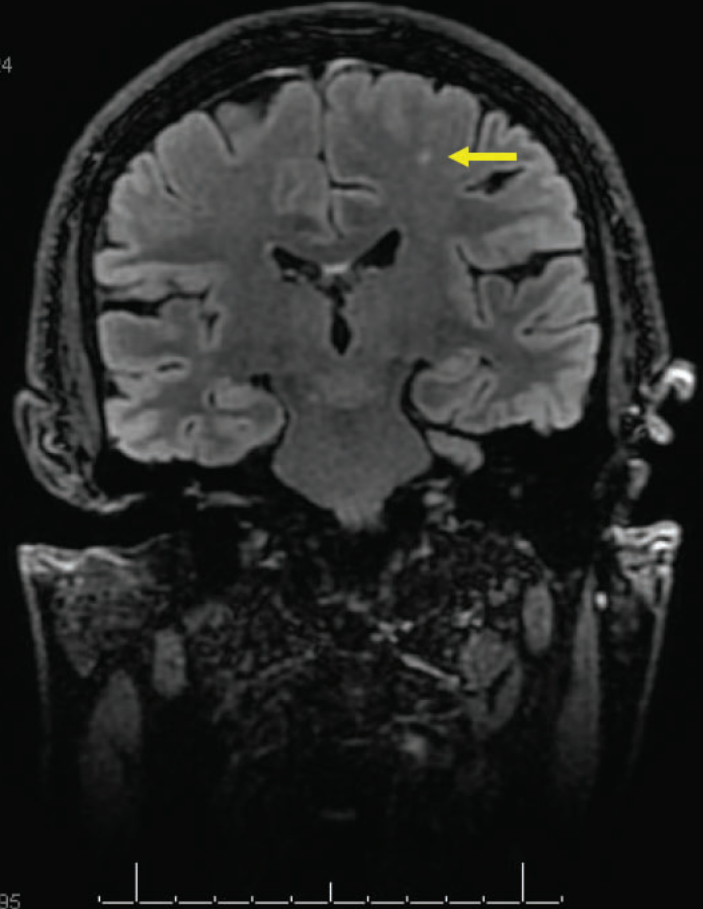
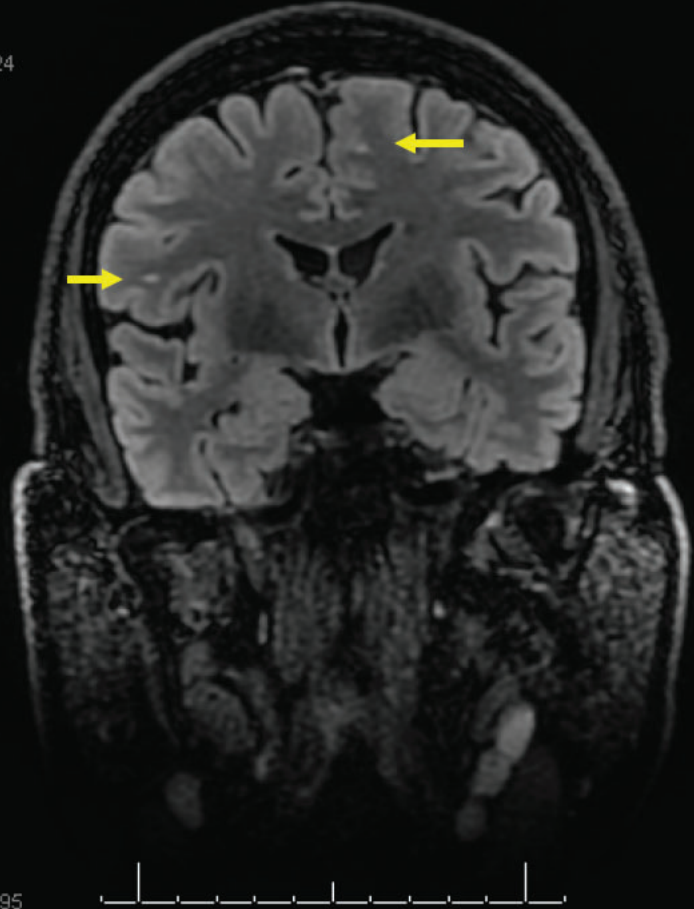
T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

RIGHT

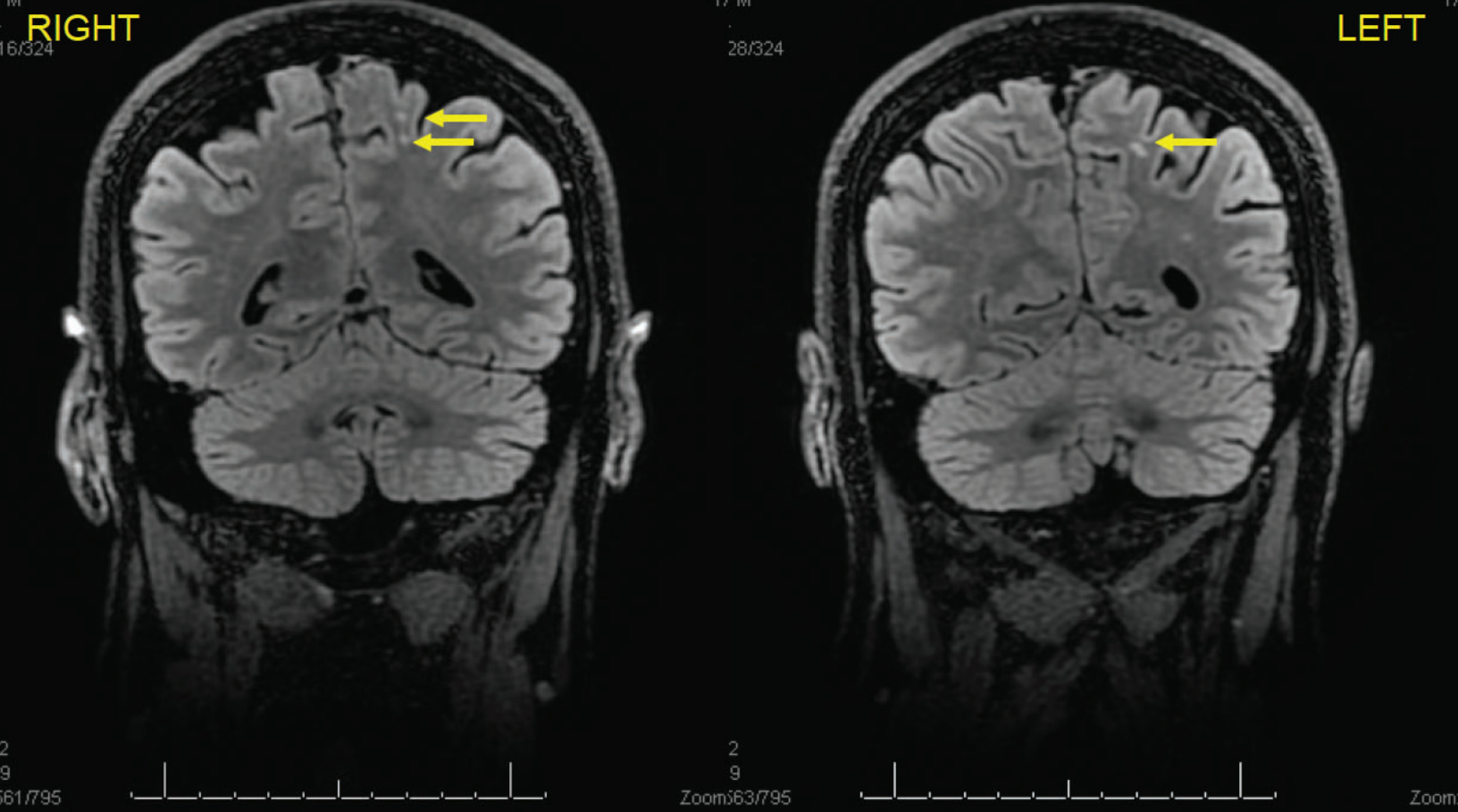
LEFT



T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.



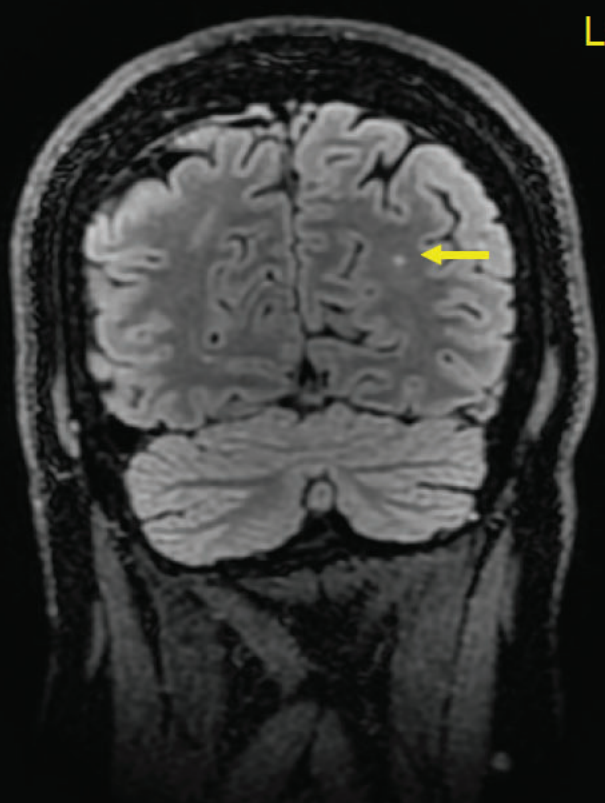
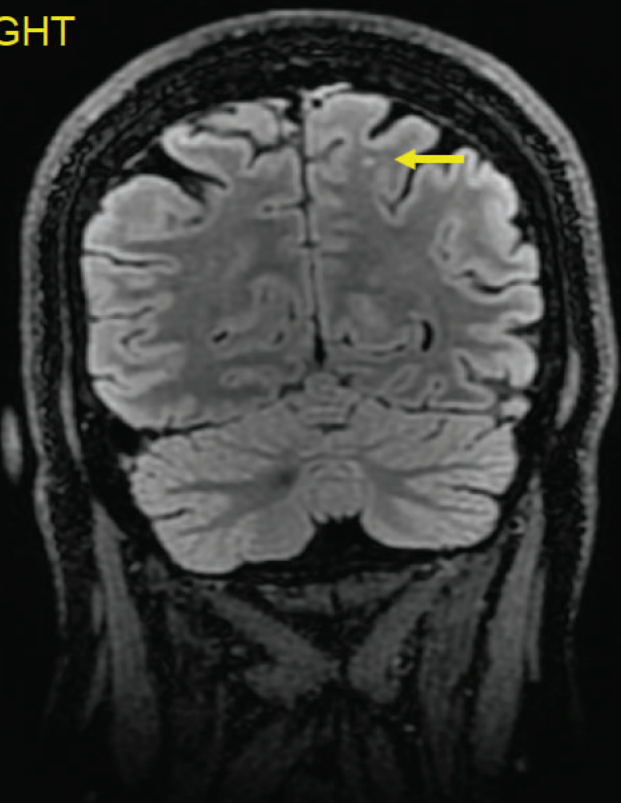
T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.



T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

RIGHT

LEFT



T2 FLAIR images reveal many more white matter lesions than usually seen in a 49 YM. If there is no underlying history of migraine headaches, hypertension or significant prior smoking history the findings are suspicious for nonhemorrhagic post-traumatic shearing injuries.

NeuroQuant® Seizure

Hippocampal Asymmetry Report

Patient Information

Patient: BOWERS, ROBERT
Patient ID: 840141863
Sex: M
Age: 49
Referring Physician: NONASSIGNED,
PHYSICIAN

Report Information

Scan Date: 2022-01-03
Scan Accession: 102136820
Report Date: 2022-01-03
Software Version: 3.1.0

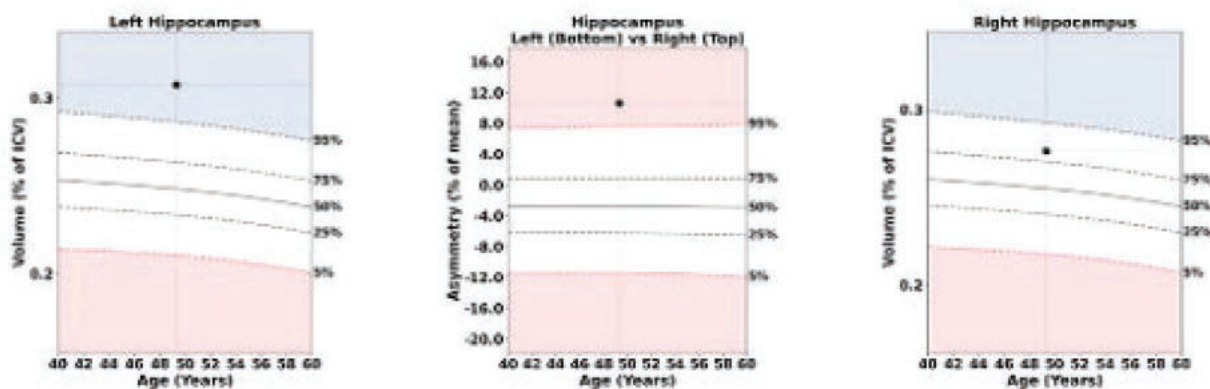
Site Information

UPMC
-
-
-

Brain Structure Volumes

Hippocampus	Volume (cm ³)	% of ICV (5%-95% Normative Percentile)	Normative Percentile
Left	5.03	0.31 [0.21 – 0.29]	99
Right	4.52	0.28 [0.22 – 0.29]	82
Left-Right Asymmetry Index*: 10.65			98

Normative Reference Charts



*The Asymmetry Index is defined as the percentage difference between left and right volumes divided by their mean.

NeuroQuant[®] Morphometry

General Morphometry Report

Patient Information

Patient: BOWERS, ROBERT
Patient ID: 840141863
Sex: M
Age: 49
Referring Physician: NONASSIGNED,
PHYSICIAN

Report Information

Scan Date: 2022-01-03
Scan Accession: 102136820
Report Date: 2022-01-03
Software Version: 3.1.0

Site Information

UPMC
-
-
-

Brain Structure Volumes

An asymmetry index of 10.6% is greater than normally seen. The asymmetry could indicate underlying seizure disorder or post-traumatic volume loss of the right hippocampus

Intracranial Volume (ICV) (cm ³)	1636.32				
Brain Structure	LH Volume (cm ³)	LH Volume (% of ICV)	RH Volume (cm ³)	RH Volume (% of ICV)	Asymmetry Index (%) [*]
Forebrain Parenchyma	561.67	34.33	565.64	34.57	-0.70
Cortical Gray Matter	261.79	16.00	269.68	16.48	-2.97
Superior Lateral Ventricles	13.49	0.82	12.75	0.78	5.66
Inferior Lateral Ventricles	0.69	0.04	0.93	0.06	-28.71
Hippocampi	5.03	0.31	4.52	0.28	10.65
Amygdalae	1.97	0.12	2.09	0.13	-5.95
Caudates	3.02	0.18	2.69	0.16	11.50
Putamens	5.66	0.35	5.18	0.32	8.87
Pallidums	0.58	0.04	0.55	0.03	4.26
Thalamus	8.04	0.49	8.49	0.52	-5.50
Cerebellum	73.57	4.50	74.71	4.57	-1.53

^{*}The Asymmetry Index is defined as the percentage difference between left and right volumes divided by their mean.

Supplemental Material

Asymmetric Hippocampal Volume Loss

Hippocampal volume across age: Nomograms derived from over 19,700 people in UK Biobank

Lisa Nobis^{a,*}, Sanjay G. Manohar^{b,c}, Stephen M. Smith^{d,e}, Fidel Alfaro-Almagro^{d,e}, Mark Jenkinson^{d,e}, Clare E. Mackay^{a,e}, Masud Husain^{b,c,d}

^a Oxford Centre for Human Brain Activity, Wellcome Centre for Integrative Neuroimaging, Department of Psychiatry, University of Oxford, Oxford, UK

^b Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, UK

^c Department of Experimental Psychology, University of Oxford, Oxford, UK

^d Wellcome Centre for Integrative Neuroimaging, FMRIB, Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, UK

^e Oxford Health NHS Foundation Trust, Oxford, UK

A B S T R A C T

Measurement of hippocampal volume has proven useful to diagnose and track progression in several brain disorders, most notably in Alzheimer's disease (AD). For example, an objective evaluation of a patient's hippocampal volume status may provide important information that can assist diagnosis or risk stratification of AD. However, clinicians and researchers require access to age-related normative percentiles to reliably categorise a patient's hippocampal volume as being pathologically small. Here we analysed effects of age, sex, and hemisphere on the hippocampus and neighbouring temporal lobe volumes, in 19,793 generally healthy participants in the UK Biobank. A key finding of the current study is a significant acceleration in the rate of hippocampal volume loss in middle age, more pronounced in females than in males. In this report, we provide normative values for hippocampal and total grey matter volume as a function of age for reference in clinical and research settings. These normative values may be used in combination with our online, automated percentile estimation tool to provide a rapid, objective evaluation of an individual's hippocampal volume status. The data provide a large-scale normative database to facilitate easy age-adjusted determination of where an individual hippocampal and temporal lobe volume lies within the normal distribution.

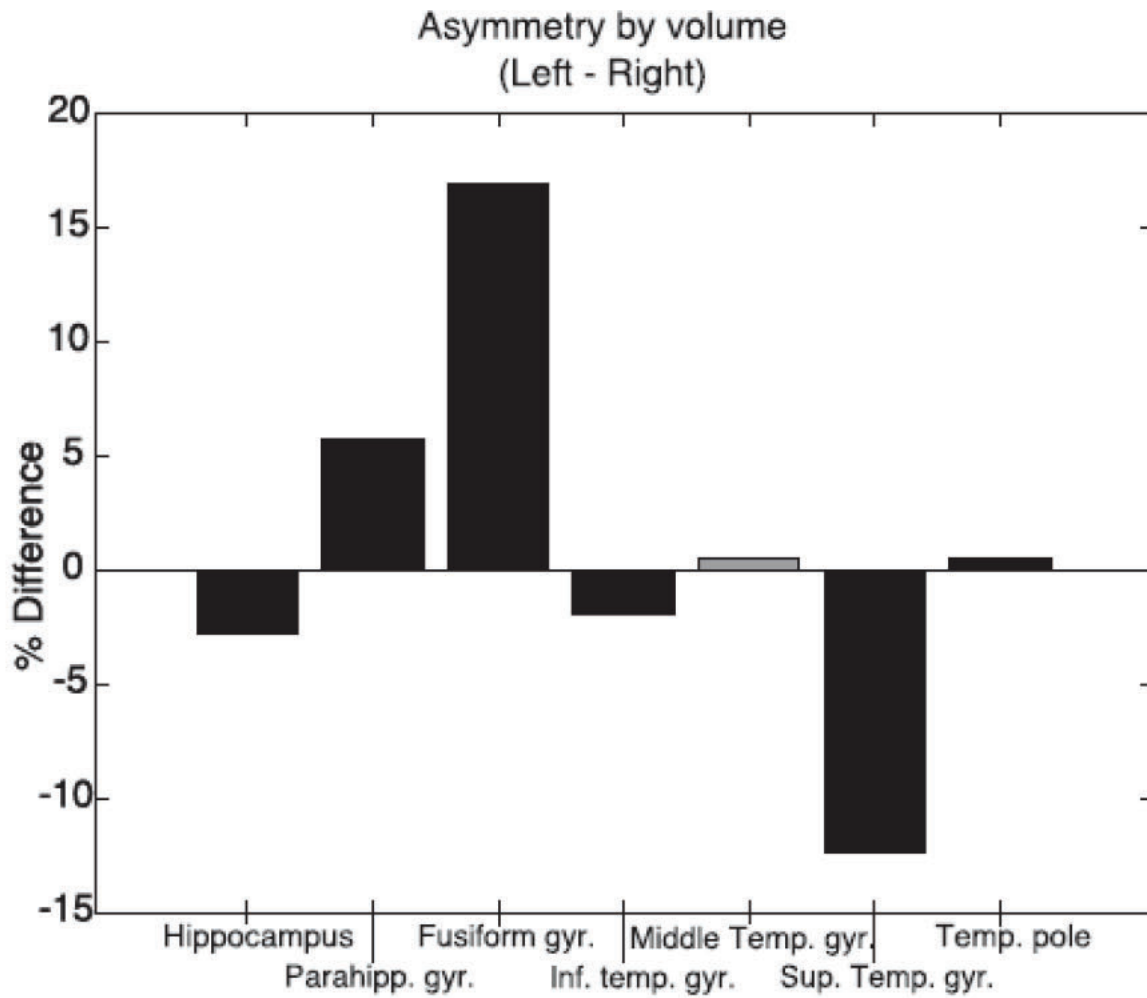


Fig. 6. Percent differences between left and right volumes.