A complex case of behavioural change and autobiographical amnesia with unilateral amygdala enlargement and temporal lobe epilepsy

James Maye*, Bryony Dayment*, Laurence Knowles, Mark Fish

Department of Neurology, Royal Devon University Healthcare NHS Foundation Trust

Dr James Maye: james.maye1@nhs.net
Dr Mark Fish: mark.fish1@nhs.net

*These authors contributed equally and are considered joint first authors

Introduction

In many patients with neuropsychiatric conditions there are multiple coexistent pathologies, complicating the diagnostic process.

Both temporal lobe epilepsy and Behavioural variant frontotemporal dementia (bvFTD) are associated with a range of neuropsychiatric symptoms, including impairment to cognition, autobiographical memory, emotional responses, and behaviour.

Aim

To describe a complex case of behavioural variant Frontotemporal Dementia, the diagnosis of which was complicated with co-existent temporal lobe epilepsy with amygdala enlargement.

Case Presentation

Background

- 70 year old male
- Past medical history: Obstructive sleep apnoea, type 2 diabetes mellitus
- Childhood epilepsy following traumatic birth, off treatment since mid-teens
- Seen previously in memory clinic: possible depression-related mild cognitive impairment

Initial Presentation

- Referred following first adult generalised tonic-clonic seizure
- The patient's wife reported profound autobiographical memory loss, apathy, and speech deficits. The patient had no insight into this.
- ACE-R: 87/100. Anomia & reduced verbal fluency were present

Subsequent Assessments

- Frequent unresponsive episodes suggestive of subclinical seizures despite trials of sodium valproate and then levetiracetam
- The patient's wife reported a severe progressive deterioration in behaviour and ability to care for himself
- Cognitive assessment remained relatively stable with ACE-R scores plateauing in mid-70s for several years (see figure, right)

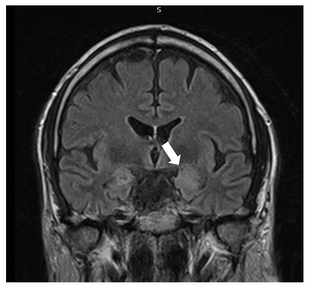
Investigations

- MRI head: left amygdala & medial temporal lobe enlargement with T2 hyperintensity. No contrast enhancement. Slightly reduced cortical volume. The amygdala changes are static over serial scans
- Ambulatory EEG: subclinical epileptic focal seizures spreading from the left medial temporal area with interictal abnormalities in this area
- CSF & auto-antibody panel normal

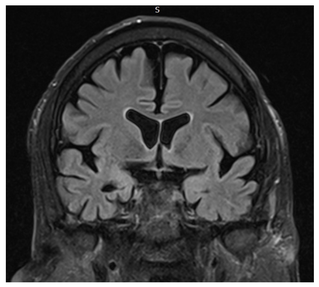
Treatment & Evolving Presentation

- Trial of immunosuppression for possible autoimmune encephalitis: no improvement
- Treatment of temporal lobe epilepsy with brivaracertam, lamotrigine, and sodium valproate leads to normalisation of EEG and resolution of amygdala swelling on MRI
- Despite epilepsy treatment, cognition and behaviour continue to deteriorate with apathy, agitation and emotional lability, and frequent roaming. The patient now requires help with all activities of daily living
- Serial MRI scans demonstrate progressive cortical atrophy
- ACE-R score declines to 59/100 (see figure, right)

MRI Brain

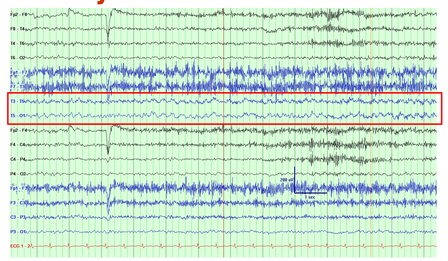


Left: From first presentation in 2018. White arrow indicates left amygdala swelling.



Right: From 2023. The amygdala swelling has resolved. Increased cortical atrophy compared to the 2018 scan is noted.

Ambulatory EEG



Ambulatory EEG 2021. Rhythmic slow waves are seen in the left medial temporal area (red box).

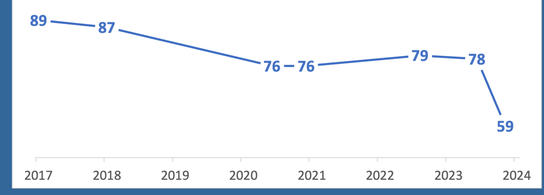
Diagnosis

- bvFTD
- Temporal lobe epilepsy with amygdala enlargement

Discussion

- This case demonstrates the complexity of diagnosis when coexistent pathologies can explain the patient's symptoms. Treatment of temporal lobe epilepsy was required to interpret cognitive decline accurately, leading to the diagnosis of bvFTD.
- Epilepsy has an increased incidence in neurodegenerative diseases and when present it appears to accelerate cognitive decline. Causality may be bidirectional, with epilepsy both predisposing to and being caused by neurodegeneration.
- Temporal lobe epilepsy with amygdala enlargement has been suggested as a distinct clinical phenotype associated with neuropsychiatric symptoms including cognitive impairment and anxiety or depression.
- The aetiology of amygdala enlargement is uncertain, with potential structural and autoimmune causes. Studies have suggested amygdala enlargement may be a secondary process to frequent seizures in the temporal lobe. The resolution of amygdala swelling following seizure control in this case would be in keeping with this hypothesis.
- It may be that symptoms during the early years of this patient's disease progression, with relatively stable cognitive testing, were caused by the temporal lobe epilepsy, with bvFTD symptoms coming to the fore as neurodegeneration progressed.

ACE-R Score



Key Points

- This case highlights that clinicians should be vigilant to the possibility of alternate diagnoses when behavioural symptoms do not not resolve with treatment of epilepsy.
- Temporal lobe epilepsy can mimic the neuropsychiatric comorbidities of frontotemporal dementia, complicating the diagnosis of both conditions.

References

- Arnaldi D, Donniaquio A, Mattioli P, et al. Epilepsy in Neurodegenerative Dementias: A Clinical, Epidemiological, and EEG Study. *Journal of Alzheimer's Disease*. 2020;74(3):865-874.
- Baker J, Libretto T, Henley W, Zeman A. A Longitudinal Study of Epileptic Seizures in Alzheimer's Disease. *Front Neurol*. 2019;10:1266.
- Chakravarty K, Ray S, Kharbanda PS, Lal V, Baishya J. Temporal lobe epilepsy with amygdala enlargement: A systematic review. *Acta Neurol Scand*. 2021;144(3):236-250.
- Reyes A, Thesen T, Kuzniecky R, et al. Amygdala enlargement: Temporal lobe epilepsy subtype or nonspecific finding?. *Epilepsy Res*. 2017;132:34-40.
- Shakhatreh L, Sinclair B, McLean C, et al. Amygdala enlargement in temporal lobe epilepsy: Histopathology and surgical outcomes. *Epilepsia*. 2024;65(6):1709-1719.

Acknowledgements

We thank the patient and their family who have kindly consented to the publication of their case.