

Autobiographical Amnesia following Electroconvulsive Therapy: A case study

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Background

- Electroconvulsive Therapy (ECT) is a highly effective¹, but controversial², treatment of severe mental health disorders, typically utilised when other treatments have failed.
- The technique involves the induction of an epileptic seizure by passing an electric current across the brain.
- Evidence currently suggests that while general cognitive function is typically retained, autobiographical memory (AbM) is vulnerable to impairment².
- This position is debated however, with suggestions that previous measures of AbM deficits are inadequate³.
- Here, we explore the case of XY, a 70 year old man who's depression responded well to ECT but who now reports dense and unrecoverable AbM memory loss.
- We utilise a relatively novel measurement of AbM memory loss to ECT research, the Levine Autobiographical Interview.

Case Profile

- XY had experienced spells of intermittent depression since his early 20s. Initially these spells were responsive to anti-depressant treatment, until approximately 5 years ago.
- At this time, XY underwent two courses of bilateral temporal ECT treatment. The first session in 2014 consisted of 14 sessions. After initial success, XY relapsed and a second course in 2015 of 26 sessions was administered.
- During this second course, XY noticed a difficulty with recollecting significant life events from the recent past and middle-age.

Hypothesis

XY will show an impairment on empirical measures of autobiographical memory.

Methods

Participants

XY was compared to a group of 12 neurologically typical participants previously recruited and reported on in another study⁴. This group consisted of 4 men, and had a mean age of 64.58.

Measures

XY completed a full battery of neuropsychological assessments. For brevity, we report here: estimated IQ (WASI test); depression score (HADs questionnaire); and AbM (personal semantics and Levine autobiographical interview).

Personal Semantics Test

In this test, the respondent was asked 6 questions for each decade of their life. These covered subjects such as friend's names, home addresses, jobs etc. Each answer was graded out of three, for a maximum score of 18 per decade.

Levine Autobiographical Interview (AI)

Respondents were asked to describe in as much detail as possible a personal event from each decade of their life. Event recall was probed with set questions to establish key event details (e.g. timing, location, perception). These 'stories' were then graded for relevant internal details and irrelevant external details, and the quality of each given detail of recall graded from one to three.

Analysis & Results

Table 1: Neuropsychological Data

Measure	XY Score	Control Score	P Value
Estimated IQ	134	119.33 (13.07)	.304
HADs Depression	3	2 (2.5)	.702
Personal Semantic	17.8	17.5 (0.76)	.911
AI Internal	31.86	60.98 (16.28)	.005
AI External	43.00	71.80 (34.1)	.220
AI Quality	12.34	18.16 (1.98)	.001

Notes: All scores represent mean averages, scores in brackets represent standard deviation of the mean.

- XY's scores were compared to group means with Crawford's T-Test in order to correct for multiple comparisons.
- XY demonstrated a greater estimated IQ (134) than that of his peers, however this was not a significant difference. He also scored within the normal range for depression.
- While XY could recall with little difficulty semantic details from all periods of his life, the number of internal details and quality of these descriptions was significantly below control level.
- In particular, quality of description for all decades of XY's life was diminished apart from his 20s. Internal details were particularly low for youth (ages 10 to 19) and middle age (30s to 60s).

Discussion & Conclusion

- The results demonstrate XY experiences a profound difficulty with retrieval of AB detail from his youth. This lends further evidence for the vulnerability of AB memory when ECT is utilised².
- Extensive autobiographical memory impairment is also reported in patients with temporal lobe epilepsy, including amnesic subtype, Transient Epileptic Amnesia (TEA)⁵.
- Given the similarities between autobiographical memory impairment in TEA and ECT, as well as neurological parallels between the condition and treatment, links between these profiles may be worth exploring in future.

Contact Details

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References

- [1] Carney, S., Cowen, P., Geddes, J., Goodwin, G., Rogers, R., Dearnass, K., Tomlin, A., Eastaugh, J., Freemantle, N., Lester, H., Harvey, A. & Scott, A. (2003). Efficacy and safety of electroconvulsive therapy in depressive disorders: A systematic review and meta-analysis. *Lancet*, 361, 799–808.
- [2] Rose, D., Fleischmann, P., Wykes, T., Leese, M., & Bindman, J. (2003). Patients' perspectives on electroconvulsive therapy: systematic review. *BMJ*, 326(7403), 1363.
- [3] Bergsholm, P. (2012). Patients' perspectives on electroconvulsive therapy: a reevaluation of the review by Rose et al on memory loss after electroconvulsive therapy. *The Journal of ECT*, 28(1), 27-30.
- [4] Milton, F., Muhlert, N., Pindus, D. M., Butler, C. R., Kapur, N. Graham, K. S., & Zeman, A. Z. (2010) Remote memory deficits in transient epileptic amnesia, *Brain*, Volume 133, Issue 5, Pages 1368–1379, <https://doi.org/10.1093/brain/awq055>
- [5] Butler, C. R., & Zeman, A. Z. (2008) Recent insights into the impairment of memory in epilepsy: transient epileptic amnesia, accelerated long-term forgetting and remote memory impairment, *Brain*, Volume 131, Issue 9, Pages 2243–2263, <https://doi.org/10.1093/brain/awn127>

Declaration of Interest

The researchers declare no conflict of interest. This project was unfunded.