

# **Association of Temporal Lobe Epilepsy with Gambling Disorder in a Patient with Mild Intellectual Disability and Autism Spectrum Disorder**

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## **INTRODUCTION**

Gambling disorder (GD) has been reported more commonly in those with Temporal Lobe Epilepsy (TLE). Here we describe a patient with a similar association, whereby the excitement brought about by engaging in gambling triggers seizure episodes.

## **CASE REPORT**

A is a 41-year-male with mild Intellectual Disability (ID), left-sided TLE, autism and history of psychosis. He first came to the attention of services at 20 years of age following the death of his father. A's behaviour had become unmanageable at home due to persecutory delusions pertaining to believing that his neighbours had inserted a monitoring device in the wall of his home and were intending to murder him. This led to a compulsory psychiatric admission under the Mental Health Act; he was subsequently commenced on antipsychotic medication and discharged to a residential home following

remission. He continues to take regular antipsychotic medication (Amisulpride) for his psychotic disorder, though this condition has since remained in remission. A was also taking Propranolol for management of high anxiety state but this was stopped recently due to post ictal bradycardia. A's autism is associated with qualitative impairment in his communication, associated with unusually loud and repetitive speech and invading people's personal space when speaking to them. He also interprets information given in an overly literal manner and has social naivety. A has never been in a relationship and has no close friends, and expresses a preference to be alone, remarking that he cannot understand why people get married or live together. He also exhibits multiple repetitive stereotyped behaviours, including patting his head and rocking gently when standing. A also demonstrates a strong preference for order, typified by his fastidiously ordered DVD library and collection of money in boxes and bottles.

A had an uncomplicated febrile seizure aged 6 months and started having unprovoked seizures aged 1 year. His epilepsy was treatment resistant in nature, with trials of numerous medications having failed to provide significant improvement in seizure control, including Ethosuximide, Gabapentin, Valproate, Phenytoin and Carbamazepine, as well as combination therapy of Levetiracetam (current dose 1500mg BD) and Topiramate (400mg BD). After adding Lamotrigine (to Levetiracetam and Topiramate combination therapy), seizure frequency significantly improved from 4-7 per month to 2 per month. A also reports a long-standing history of gambling over the past 25 years. His gambling behaviours manifest as placing bets on horse and greyhound racing.

A's gambling urges are such that he had been banned from local betting agencies owing to concerns about his expenditure; however, this led to him independently travelling further afield to seek out alternative betting agencies. He becomes visibly excited when recounting past wins and losses. He reports no guilt regarding his gambling, but experiences gambling urges several times per week, typically manifesting as thinking about images of horses and betting prices, leading to him feeling compelled to place bets. A is open with regards to his gambling behaviours and demonstrates insight into their deleterious consequences but finds it extremely difficult to resist his gambling impulses. After a win he can generally become extremely generous, treating fellow residents to takeaway meals, but following a loss he can become bad-tempered and might demand money from others in place of doing a service for them (e.g. doing their shopping). A received intensive specialist community nursing and psychological input (adapted to his level of ID) targeting his gambling habits, as well as involvement of the local authorities, though such measures proved unsuccessful in preventing further gambling behaviours. A's GD was measured using the Gambling Symptom Assessment Scale (G-SAS) [1], a 12-item self-rated scale for evaluating the severity of gambling symptoms in the week prior to assessment (Table 1).

A's seizure semiology is characterised by an aura of a churning or rising sensation in his abdomen which then radiates to the top of his head (sometimes accompanied by a religious ecstatic feeling as if he is seeing god) and/or vertigo-like symptoms. This is followed by a loss of awareness of his surroundings, and oral and manual automatisms and reported pallor. The episodes are stereotyped, typically 2-3 minutes in duration, and

have never persisted beyond 5 minutes. A does not experience generalised seizures. Triggers include a state of excitement surrounding gambling, responsible for approximately 20% of seizure episodes, as well as flashing lights and hot weather. Gambling-related seizures are only associated with the elation of winning; A does not experience seizures when he loses a bet. The timing of seizure onset can be immediate, upon the rush of excitement when winning the bet, or delayed, upon recounting his winning bet to others shortly afterwards or when laying the winning notes on the floor to count them.

MRI brain revealed left mesial temporal sclerosis; he was therefore referred to a specialist epilepsy centre for pre-surgical diagnostics including neuropsychiatric/neuropsychological investigations, video telemetry and further brain MRI. Interictal EEG showed epileptiform activity in the left temporal lobe. Two habitual seizures were recorded, with ictal patterns that were non-localising. He was discussed in a multidisciplinary team meeting and felt to be candidate for a left temporal lobectomy, estimating a 40-50% chance of seizure freedom following surgery. In spite of involving his family/carers in the management plan and providing him with detailed accessible information about the risks and benefits of a left temporal lobectomy, and the risks of ongoing uncontrolled epilepsy including Sudden Unexpected Death in Epilepsy, he has declined surgical intervention due to fear of complications.

Although there has been an improvement of seizure duration and frequency to 2 per month with add on Lamotrigine (75mg BD), A's gambling habits have now become more

intense and secretive (i.e. betting more money while hiding it from carers/family). His latest G-SAS score is 44, indicating extreme severity and required a new referral to the psychology department for one to one therapeutic work around his gambling habit.

## **DISCUSSION**

TLE is characterised by neuronal hyper-excitability often originating from the medial temporal structures (amygdala/hippocampus) or involving them rapidly. Hippocampal sclerosis is a frequent underlying pathology, and potentially amenable to surgical intervention. The diagnostic criteria for GD are outlined in Table 2.

Cavanna et al. [3] investigated the G-SAS and Yale-Brown Obsessive-Compulsive Scale (YBOCS) scores of 88 consecutive adult outpatients with epilepsy across three epilepsy clinics based in Northern Italy. They found that patients with TLE had significantly higher mean G-SAS scores relatively to their peers with Frontal Lobe Epilepsy and Idiopathic Generalized Epilepsy. Additionally, G-SAS scores were selectively predictive of YBOCS scores, suggestive of an association between the manifestation of obsessional and GD symptoms in patients with TLE. They postulated that such a difference could be attributable to alterations in the mesolimbic reward system pathway occurring in TLE. Such a theory is further supported by the over-representation of GD in other states associated with dopamine dysregulation, such as with patients receiving dopamine agonist treatment for Parkinson's disease. However, with all its inherent complexity, GD is unlikely to be entirely explained by a single neurotransmitter.

A's GD might be explained by poor decision making as shown by Von Siebenthal et al. [4] who found that individuals who had undergone temporal lobe resection performed significantly worse than insular resection and healthy control groups on tasks involving risky decisions. We were unable to locate any literature publications on the association of successful treatment of TLE and improvement in GD. However, it is difficult to draw a conclusion whether A's GD might have responded to successful treatment of his epilepsy, due to the treatment-resistant nature of his condition and that he has thus far declined a neuro-surgical intervention. GD in this particular case can also be explained by chance occurrence or in the context of his autistic interests/rituals. Further research is needed to explore these fascinating associations.

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Table 1: The G-SAS, with A's scores. The G-SAS is scored out of 48, where 41-48 represents extreme, 31-40 severe, 21-30 moderate and 8-20 mild gambling symptoms [1].

Item checklist	Severity
1. If you had any unwanted urges to gamble, on average, how strong were your urges?	Extreme (4)
2. How many times did you experience urges to gamble?	2-3 times (2)
3. How many hours were you preoccupied with your urges to gamble?	1-7 hours (2)
4. How much were you able to control your urges?	Minimal (3)
5. How often did thoughts about gambling and placing bets come up?	Several to many times (3)
6. Approximately how many hours did you spend thinking about gambling and thinking about placing bets?	1-7 hours (2)
7. How much were you able to control your thoughts of gambling?	Minimal (3)
8. Approximately how much total time did you spend gambling or on gambling related activities?	2-7 hours (2)
9. On average, how much anticipatory tension and/or excitement did you have shortly before you engaged in gambling?	Extreme (4)
10. On average, how much excitement and pleasure did you feel when you won your bet?	Extreme (4)
11. How much emotional distress has your gambling caused you?	Moderate (2)
12. How much personal trouble has your gambling caused you?	Mild (1)
Overall score	32 (Severe)

Table 2: The Diagnostic and Statistical Manual of Mental Disorders 5<sup>th</sup> edition (DSM-5)

Diagnostic Criteria for Gambling disorder [2].

A/ Persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:	
1	Needs to gamble with increasing amounts of money in order to achieve the desired excitement
2	Is restless or irritable when attempting to cut down or stop gambling
3	Has made repeated unsuccessful efforts to control, cut down or stop gambling
4	Is often preoccupied with gambling (e.g. having persistent thoughts of reliving previous gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble)
5	Often gambles when feeling distressed (e.g. helpless, guilty, anxious, distressed)
6	After losing money gambling, often returns another day to get even ('chasing' one's losses)
7	Lies to conceal the extent of involvement with gambling
8	Has jeopardized or lost a significant relationship, job or educational or career opportunity because of gambling
9	Relies on others to provide money to relieve desperate financial situations caused by gambling
B/ The gambling behaviour is not better explained by a manic episode	

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