

Anorexia Nervosa and Psychopathological Manifestations in an Adolescent with Tuberous Sclerosis Complex: A Case Report

F. Elmansouri^{1*}, A. Abidi¹, Z. Elmaataoui¹, H. Kisra¹

¹Ar-Razi Psychiatric Hospital, Ibn Sina University Hospital, Rabat, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University

DOI: <https://doi.org/10.36347/sjmcr.2026.v14i10.043>

| Received: 23.08.2026 | Accepted: 12.10.2026 | Published: 22.10.2026

*Corresponding author: F. Elmansouri

Ar-Razi Psychiatric Hospital, Ibn Sina University Hospital, Rabat, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University

Abstract

Case Report

Tuberous sclerosis complex (TSC) is a multisystem genetic disorder that may be associated with various neurological, neurodevelopmental, and psychiatric manifestations. Eating disorders have rarely been described in this context. We report the case of a 15-year-old adolescent who had been followed since the age of 2 years for TSC associated with drug-resistant epilepsy and who progressively developed severe food restriction with significant weight loss. Her weight decreased from 57 to 42 kg at a height of 1.65 m, corresponding to a BMI of 15.4 kg/m². The patient expressed a desire to continue losing weight until reaching 35 kg, with marked concerns about body image and compulsive exercise behaviors. Psychiatric assessment also revealed body-related ideas of reference, notably involving a message attributed to a young girl seen on television who was allegedly asking her to lose weight in order to become a skeleton. Brain MRI showed multifocal white-matter signal abnormalities, subependymal nodules, and bifrontal cortical tubers, more prominent on the right. EEG showed a right mid- and posterior temporal epileptic focus without generalization. Laboratory investigations were unremarkable. This case raises questions about the interactions between neurobiological vulnerability related to TSC, epilepsy, psychosocial factors, and the emergence of an eating disorder during adolescence. It also highlights the importance of a thorough psychiatric assessment whenever changes in eating behavior occur in adolescents with TSC.

Keywords: tuberous sclerosis complex; anorexia nervosa; adolescent; epilepsy; eating disorder; psychotic symptoms; neuropsychiatry.

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INTRODUCTION

Tuberous sclerosis complex (TSC) is a rare autosomal dominant genetic disorder characterized by the presence of hamartomas affecting multiple organs, particularly the brain, kidneys, skin, and heart [4,9]. Neurological involvement may be accompanied by various neuropsychiatric manifestations, including neurodevelopmental disorders, anxiety and depressive disorders, behavioral disorders, and, more rarely, psychotic disorders.

Anorexia nervosa is an eating disorder that is particularly common during adolescence, but its association with TSC remains poorly described in the literature.

The aim of this publication is to present the case of an adolescent with TSC who developed anorexia nervosa associated with psychopathological

manifestations and to discuss its clinical and therapeutic particularities.

CLINICAL CASE

Ms. Z, aged 15 years, was attending the third year of middle school. She was the second of three siblings. Her biological parents were non-consanguineous and married. Family dynamics were described as unremarkable. She was referred to the child psychiatry clinic by her pediatric neurologist for management of anorexia nervosa.

History

Neurologically, the patient had been followed since the age of 2 years for drug-resistant epilepsy in the context of tuberous sclerosis complex. She was currently receiving antiepileptic treatment with Lamictal, Urbanyl, carbamazepine, and Cosapate. Her father reportedly had a probably similar condition, with a history of seizures

during childhood and facial skin lesions consistent with angiofibromas, although no formal diagnosis had been established.

Pregnancy and delivery were unremarkable. Delivery occurred at term by vaginal route, with a normal birth weight. There was no history of neonatal distress. Breastfeeding was continued for two years. Psychomotor development was generally satisfactory, although there was a history of delayed language development. Walking was acquired at the expected age, first words appeared at around 18 months, first sentences at 3 years, and toilet training was achieved at 3 years.

At school, Zineb initially had good results in CE1 and CE2, followed by a gradual decline beginning in CE3. Educational accommodations were implemented in sixth grade. She was currently in the third year of middle school, with grades around 12–13/20. Socially, she had been described as sociable since early childhood, enjoying interactions with other children and having no major difficulties with integration. However, she appeared to have more affinities with younger children.

History of the Present Illness

Since birth, the patient had experienced paroxysmal episodes that were initially not identified as epileptic seizures. At the age of 2 years, following the occurrence of a typical seizure, video-EEG and brain MRI were performed, leading to the diagnosis of tuberous sclerosis complex. Antiepileptic treatment was then initiated, resulting in a marked reduction in seizure frequency, although complete seizure control was not achieved despite several treatment adjustments.

Her school course was characterized by the progressive emergence of difficulties, particularly during middle school. Behaviorally, her parents reported increasing irritability and oppositional behavior beginning in the first year of middle school. These changes occurred in the context of repeated bullying at school, particularly after seizures occurred in class, with some classmates calling her “crazy.”

Approximately six months before the child psychiatry assessment, the patient began progressively reducing her food intake, explaining that she wanted to lose weight in order to look like the girls at high school. At the same time, she began exercising after meals.

Food restriction became considerably more severe during Ramadan. The patient fasted during the day and, at the breaking of the fast, consumed only a very small amount of food, sometimes limited to a quarter of a loaf of bread, immediately followed by physical exercise. After Ramadan, the restriction became almost total, with her diet essentially limited to water and occasional food intake only when insisted upon by her parents.

This progression resulted in significant weight loss, with her weight decreasing from 57 kg to 42 kg at a height of 1.65 m, corresponding to a BMI of 15.4 kg/m². The patient expressed a wish to reach 35 kg in order to “become a skeleton.” She described a particular representation of this skeleton, imagined as a decorative object placed in a corner of the house, allowing her parents to observe the different organs of the human body through it.

She also reported having received a “message” from a girl seen on television, asking her to lose weight in order to become a skeleton. Sleep disturbance was also reported, with early awakenings in order to exercise without her parents’ knowledge, as they attempted to limit this activity during the day.

Psychiatric Examination

During the interview, the patient was calm psychomotorically, with mobile facial expression and easy rapport. Speech was normal in rate and continuity. Thought content, however, appeared marked by body-related ideas of reference as well as significant preoccupations focused on weight loss and body image.

There was no suicidal ideation and no perceptual disturbance was observed during the interview. Mood was neutral with a congruent affect. Appetite was markedly reduced and sleep was disturbed.

Additional Investigations

Laboratory investigations, including complete blood count, TSH, serum electrolytes, liver function tests, and renal function tests, showed no significant abnormalities.

Brain MRI showed multifocal white-matter signal abnormalities associated with several subependymal nodules and bifrontal cortical tubers, more pronounced on the right.

EEG showed a right mid- and posterior temporal epileptic focus without generalization.

DISCUSSION

Our case describes a 15-year-old adolescent with tuberous sclerosis complex (TSC), followed since childhood for drug-resistant epilepsy, who progressively developed a restrictive eating disorder with marked weight loss, body-image concerns, exercise after meals, and a desire to achieve an extremely low body weight. The originality of this observation lies in the association of anorexia nervosa with TSC, an association rarely reported in the literature, as well as in the presence of atypical psychopathological features in the form of body-related ideas of reference. The question therefore arises as to whether this represents an independent psychiatric comorbidity or a psychopathological manifestation facilitated by TSC and its neurological involvement.

Anorexia Nervosa and Tuberous Sclerosis Complex

Psychiatric manifestations of TSC are now grouped under the term Tuberous Sclerosis Complex-Associated Neuropsychiatric Disorders (TAND). They include neurodevelopmental disorders, cognitive and academic difficulties, behavioral disorders, anxiety and mood symptoms, and, more rarely, psychotic symptoms. Eating difficulties are also a recognized domain of TAND, although their prevalence and nature remain insufficiently studied. One study of patients with TSC found eating difficulties in 36.8% of subjects, whereas psychotic disorders were much rarer [1,2].

The specific association between TSC and anorexia nervosa remains exceptional. Goh and Thiele reported the first published case of anorexia nervosa in a child with TSC in 2005. The authors already emphasized the need to consider several factors together that may contribute to psychiatric manifestations observed in TSC: brain abnormalities, epileptic history, possible cognitive difficulties, psychosocial factors, and medication effects [3]. Our observation is consistent with this issue while presenting a different clinical picture characterized by prominent body-image concerns and atypical ideational features.

Childhood Period and Neuropsychiatric Vulnerability

In our patient, psychomotor development was generally preserved, although there was a relative delay in language acquisition. School development was initially satisfactory and was subsequently marked by a progressive decline in performance, leading to educational accommodations. This trajectory is consistent with the marked heterogeneity of neuropsychiatric manifestations in TSC. TAND may emerge at different developmental stages and include academic difficulties, social interaction problems, behavioral rigidity, attentional difficulties, and emotional manifestations [1,2].

In our case, the patient was also exposed to significant psychosocial difficulties, particularly repeated experiences of teasing and stigmatization at school because of her seizures. These events may have contributed to impaired self-esteem and the emergence of body-related concerns. Psychosocial factors should therefore be taken into account in the analysis of anorexia, without assuming that they alone explain the entire clinical picture. This multifactorial approach is consistent with that proposed by Goh and Thiele in their report of anorexia nervosa associated with TSC [3].

Epilepsy and Brain Involvement

Epilepsy is a particularly important element in our case. The patient has had drug-resistant epilepsy since the age of 2 years, with persistence of a right temporal epileptogenic focus on EEG. The association between epilepsy and psychiatric manifestations is well documented in TSC, with neuropsychiatric disorders

occurring more frequently in patients with significant neurological involvement. Epilepsy, together with structural brain abnormalities, may therefore constitute an additional vulnerability factor for psychopathological disorders. This hypothesis had also been raised in earlier literature on psychiatric manifestations of TSC.

Brain MRI in our patient also showed multifocal white-matter abnormalities, subependymal nodules, and bifrontal cortical tubers, more prominent on the right. However, based on a single observation, it is difficult to establish a causal relationship between lesion localization and the development of anorexia nervosa. Goh and Thiele had already emphasized that the relationship between the localization of brain abnormalities in TSC and specific neuropsychiatric disorders remains largely unknown [3]. The presence of brain lesions and drug-resistant epilepsy should therefore be considered vulnerability factors rather than demonstrated causes of the eating disorder.

The Place of Eating Difficulties within TAND

Recent international recommendations emphasize that eating difficulties are common in TSC but may result from very different mechanisms: food selectivity, restriction related to autism spectrum disorder, anxiety or mood symptoms, adverse medication effects, pain, or other medical problems. A comprehensive assessment is therefore recommended to determine the underlying mechanism [1].

In our case, however, the eating behavior goes beyond a simple eating difficulty associated with TAND. The restriction was voluntary and progressive, motivated by the desire to lose weight and achieve an extremely low body weight. It was accompanied by significant concern about body shape, exercise aimed at compensating for food intake, and weight loss from 57 to 42 kg, corresponding to approximately 26% of the initial body weight. The calculated BMI was 15.4 kg/m², which should be interpreted in the adolescent according to age- and sex-specific growth charts. Overall, the picture was therefore much more suggestive of a true anorexia nervosa than of a simple eating difficulty within the TAND spectrum.

Atypical Psychopathological Manifestations: Comorbidity or Expression of TSC?

Another distinctive feature of our observation is the belief that a young girl seen on television had transmitted a message to her to lose weight in order to become a “skeleton,” as well as the particular investment in this body representation. These features suggest ideas of reference and raise the question of possible associated psychotic symptoms.

This question recalls that raised by Elloumi *et al.*, regarding the occurrence of psychotic manifestations in a patient with TSC: the authors questioned whether the psychiatric disorders were comorbid or potentially

related to the neurological disease. They notably emphasized the rarity of psychotic disorders reported in TSC and the difficulty of establishing a causal relationship with brain lesions. In our case, however, the absence of hallucinations, disorganization of speech or behavior, and the clear predominance of eating- and body-related concerns do not allow a definite diagnosis of a psychotic disorder. These findings should rather be considered atypical psychopathological manifestations requiring longitudinal monitoring.

TSC, Neuropsychiatric Vulnerability, and Anorexia Nervosa

Thus, several factors appear to have interacted in our patient: neurobiological vulnerability related to TSC, drug-resistant epilepsy, structural brain abnormalities, academic and social difficulties, and repeated experiences of stigmatization. In this context, anorexia nervosa could be understood as a psychiatric comorbidity occurring on a particularly vulnerable neurodevelopmental background rather than as a manifestation directly attributable to TSC.

However, given the very limited number of published cases, it would be premature to completely rule out a contribution of TSC to the development of the eating disorder. As emphasized by TAND recommendations, neuropsychiatric manifestations of TSC probably result from complex interactions among genetic, neurological, developmental, and psychosocial factors [1]. Our observation therefore illustrates the value of systematic psychiatric assessment in patients with TSC, particularly when changes in eating behavior, body-image disturbances, or unusual psychopathological manifestations emerge.

CONCLUSION

The association of anorexia nervosa with tuberous sclerosis complex is rare and raises questions about the interaction between neurobiological vulnerability and psychosocial factors in the

development of psychiatric disorders. In our patient, drug-resistant epilepsy, structural brain abnormalities, and academic and social difficulties represent potential factors contributing to this vulnerability, although no direct causal relationship with anorexia nervosa can be established. The presence of atypical psychopathological features, particularly body-related ideas of reference, also highlights the complexity of the neuropsychiatric profile of these patients. This case underscores the importance of early screening and management of psychiatric manifestations, particularly eating disorders, in patients with tuberous sclerosis complex. Further studies are needed to better clarify the mechanisms underlying this association.

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